

# Proceeding

Two day International Conference  
on

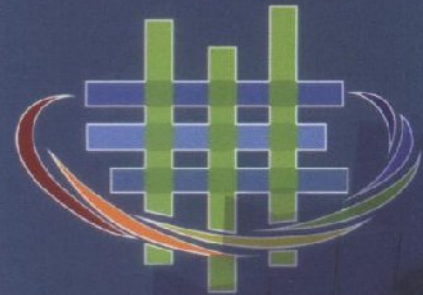
# WORLD STATISTICS DAY

"STATISTICS FOR SOCIETY"

ON  
October 21-22, 2010

AT  
SUPERIOR UNIVERSITY  
Raiwind Road, Lahore (Pakistan)

اليوم العالمي للإحصاء



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**Address By**  
**Dr. Munir Ahmad, Founding President and Patron ISOSS**

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**Founding President and Patron ISOSS**

- **Sirdar Zulifaqar Khan Khosa, Senior Advisor to Chief Minister Punjab,**
- **Rana Iqbal Khan, Speaker, Punjab Assembly,**
- **Dr. Ch Abdul Rahman, Rector, Superior University,**
- **Dr. Khurshed Ahmad, Dr. M. Hanif, Dr. Ahmed Zogo Memon,**
- **Distinguished delegates My Colleagues, Students, Ladies and Gentlemen:**

I on my behalf and on behalf of members of ISOSS welcome you to the 7<sup>th</sup> International Conference on Statistical Sciences being held in the celebration of First Ever World Statistics Day, UNO General Assembly in its 61<sup>st</sup> Session passed a resolution and tasked UN Statistics Commission to celebrate World Statistics Day on October 20, 2010 for the promotion of development of National Statistics and improving their comparability, coordinating the statistical work of specialized agencies of the fundamental principles of official Statistics.

Sir, during a meeting with Dr. Ch. Abdul Rehman to finalize the conference program, the sad news of the demise of his father Ch. M. Akram came during the meeting. We all felt sorry for the loss of his father. We pray for his soul and pray for Dr. Ch. Abdul Rehman and his family to bear the loss.

We have also another causality last week of the demise of Mian M. Rafique, former FAO advisor and a statistician.

I feel proud that our efforts have become fruitful in joining the World in celebrating the WSD. In fact, we had arranged the WSD-Week long program from October 18-22, 2010. The program included Kinnaird College arranged 'Statistical Festival' on October 18, 2010. Lahore College for Women University held one-day Seminar on Development of Statistics in Pakistan on October 19, 2010 and two-day sessions arranged by Department of Environmental Management and Science under the guidance of Dr. Khurshed Ahmad. ISOSS and Government Officials from Statistics Division, Population Census Organization, Agriculture Census Organization, Punjab Bureau of Statistics, Superior University, Kinnaird College, Lahore College for Women University, National College of Business Administration & Economics, Shah Abdul Latif University, Khairpur had joined us on 'WSD Walk' on October 20, 2010. The Walk was from NCBA&E campus to Technical Education and Vocational Training Authority (TEVTA) Office on Gulberg Main Boulevard. It was originally from Punjab University Old Campus to Provincial Assembly, but could not hold the walk on Sharah-i-Quaid-e-Azam due to security reasons.

Sir, I hope you remember that as Governor Punjab you inaugurated our 7<sup>th</sup> Islamic Countries Conference on Statistical Sciences in University of the Punjab, Lahore, where 37 countries participated in the conference deliberations, but unfortunately, not a single

country sent delegation to this conference, I am sure, due to disturbance in Pakistan. In some cases, Pakistan Embassies did not issue visa to some participants. In fact, we had received papers from 42 foreign participants.

You will be glad to know that ISOSS has now built ISOSS House on the land allotted by Mian Nawaz Sharif when he was the Chief Minister, Punjab on the recommendations of Dr. Abdullah Bin Omar Nasseef who came to Lahore from Saudi Arabia to personally request Mian Nazwaz Sharif, who very gracefully accepted his recommendations. Members and friends of ISOSS had generously contributed and are contributing / finances for the ISOSS House

Now we need help from all friends of Statistics for setting up internationally recognized Research Institution. ISOSS activities have been internationally recognized. In this connection, I thank Dr. Ch. Abdul Rehman who had offered full support to make ISOSS activities fully operational. We are also negotiating with him on joint research projects.

We have ideas of generating new areas in Official Statistics directly useful for planning. Statistics can be used from preparation of planning and monitoring of its performance at different steps as South Korea did on our 5 Years Plan. They used Statistics very effectively, whereas we failed in implementing the Plan because of absence of reliable statistics and statisticians participation in the planning and monitoring processes.

I strongly believe that planning without statistics is futile. Planning has to be knowledge based and to be implemented and monitored by strong teams of statisticians. At present, there is no interaction between academicians and Statistics Officials at Federal as well as provincial levels. If Official Statistics is to be improved, academia must be involved very effectively and if statistical agencies need qualified incumbents, statistical agencies must be effectively involved in colleges and universities so that statisticians produced by colleges and universities are directly inducted in statistical organizations. It is important to inform you, Sir, that we at ISOSS forum and NCBA&E have so far produced 22 Ph.Ds and 54 M.Phils in Statistics, Economics, Management, Environment and Mathematics on the subjects crucially, important for the socio-economic and Bio-Agro developments of Pakistan.

ISOSS has prepared a type of 'white paper' on the Statistics and 63-years history of Statistics in Pakistan with a large number of practical proposals and recommendations for the Government, which will be mailed to all the concerned quarters.

I once again thank you for joining us in spite of your heavy schedule. I also thank Dr. Ch. Abdul Rehman and his team for accepting our request for holding the conference at his campus and very nicely arranging the conference program. I, at the end, thank my team at ISOSS and delegates who have joined us from Lahore and outside Lahore. I hope they will enjoy the cultural, educational and historical city of Lahore. They will forgive us for any inconvenience they face during their stay at Lahore.

I thank you Sir, and thank you all.



## DNA HAVING BYSERIAN APPROACH

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### ABSTRACT

We applied our algorithm to DNA having Bayserian approach covering the first 875 nucleotides of their coding regions. The problem of finding gene in DNA has been studies to many years. The problem is given a sequence of DNA, determine the location of genes, which are the region containing information that code for proteins. The exon 7untron are sepretated by splice sites. Regions outside gene are called intergenic. Another tricky problem is how to create an bayes rule in the first place, given a particular set of related training sequences. It is necessary to estimate the amino acid emission distributions in each state and all state-to-state transition probabilities from a set of related training sequences. This is done by using the Baum-Welch Algorithm or the Forward Backward Algorithm.

The algorithm proceeds by making an initial guess of the parameters (which may well be entirely wrong) and then refining it by assessing its worth, and attempting to reduce the errors it provokes. When fitted to the given data. In this sense, it is performing a form of gradient descent, looking for a minimum of an error measure. We introduce here the gene-prediction bayesian rule that can be used to predict the structure of the gene. Our objective is to find the coding and non-coding regions of an unlabeled string of DNA nucleotides.

The motivation behind this is to

- assist in the annotation of genomic data produced by genome sequencing methods
- gain insight into the mechanisms involved in transcription, splicing and other processes.

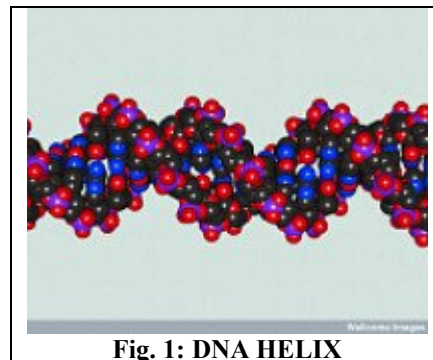


Fig. 1: DNA HELIX

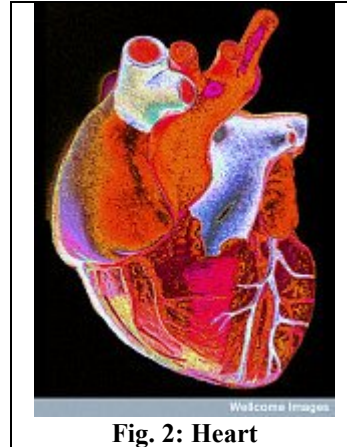
### 1. INTRODUCTION

Here of twistedness in DNA provides a technical basis for the discussion in the paper. The insights in the reseach regarding "twistedness" reflect an intuitive understanding of complexity which calls for deeper insight to understand how twistedness works and why it may be vitally important in some psycho-social

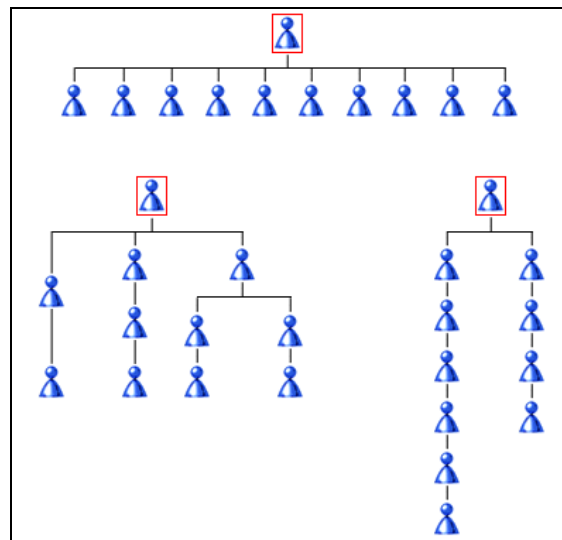
processes – as well as being highly problematic in others. Part of the difficulty in approaching this matter is that "twistedness" is in most cases used unthinkingly as a pejorative term to characterize a pattern which is felt to inhibit right-thinking and clarity. The argument here is that, given its importance at every scale in nature, from the organization of nebula to the organization of the human cell, there is a case for distinguishing various forms of twistedness and understanding their function. This could be especially valuable to reconciling apparently irreconcilable understandings in society.

The merit of focusing on the nature and function of twisting in DNA is that it provides a rich natural template. It offers a sense of the degree of complexity that it may be required to master in order to comprehend how twistedness "works" in practice. It might also be argued that, as a process active in every human body and inherent to human life, humans may well have some kind of profound intuitive understanding of how it works and the "rightness" of such working. Some of the very explicit dynamics of this process may also offer patterns for understanding how the inhibiting effects of "twistedness" may be addressed when they are perceived to be a constraint on human development.

Understanding of how DNA works has been much enriched by concepts from topology -- as a branch of mathematics that deals with structural properties that are unchanged by deformations such as stretching and bending. This use of mathematics is especially important because there is no experimental way to observe the dynamics of enzymatic action directly, notably with respect to knotting and coiling of DNA.



**Fig. 2: Heart**



**Fig.3: DNA MOLECULES**

Chromosomal DNA molecules are very long and thin. There is over a metre of DNA in every human cell in a space of some 0.0006 centimetres diameter. If DNA were constrained to be linear it would not fit into a cell. It must therefore fold many times to fit within the confines of a cell. The DNA is composed of  $10^{10}$  base pairs. This density of packing results in tangles and knots in the DNA that are essential to enable the cell to divide (involving transcription and replication).

### 1.1 Structure of DNA

In the case of the molecular structure of eukaryotic chromosomes in each human cell, 2 metres of DNA is packaged into the cell nucleus. To access the information, it must be unwound as a double helix and needs to be "spread out" in the nucleus. However during cell division (mitosis), in order to move them around, they are packaged as follows into dense bundles:

- Nucleosome formation ("beads on a string"): 2.5 loops of DNA wrapped around core DNA
- Solenoid Formation "beaded string is coiled": 6 nucleosomes per solenoid coil
- Supercoiling (coil of solenoids is itself coiled): coiled coil is then folded - as in mitotic chromosome, namely a 10,000 fold reduction in length

In circular double helix DNA (closed circular ccDNA), both strands are covalently joined neighbouring helices, known as knobs-into-holes packing, that defines the structure as a coiled coil.

### 1.2 Cardiomyopathies:

Coronary artery disease (CAD) is a complex disease with environmental and genetic determinants. Many other cardiovascular (CV) conditions also have a genetic basis. A positive family history of CV disease in first-degree relatives is a strong independent risk factor for CAD as well as several other cardiac disorders. This genetic susceptibility to CV diseases will be understood more clearly when combined with genomics, proteomics and genotyping.

The Department of Cardiology at Gold Coast Hospital (Queensland, Australia) with the Faculty of Health, Science and Medicine at Bond University (Queensland, Australia) established the Gold Coast Cardiovascular DNA bank in 2006. The dataset on each individual volunteer includes coronary angiograms, clinical information (including a coronary risk factor profile), biochemical (including cardiac biomarkers) and hematological parameters, and electrocardiograms and echocardiograms. The establishment of the DNA biobank was associated with several key challenges, both technical and logistic.

Given the comprehensive nature of the information gathered, the present study has the added potential of identifying genes associated with nonischemic cardiomyopathies, valvular heart disease, congenital heart diseases and other cardiomyopathies. Pooling data from results obtained here with multiple existing DNA biobanks and registries will help in finding answers to the genetic conundrum in CV diseases. The present DNA biobank will serve as a resource well into the future as the technology and science of medical genetics evolve.

The most frequent pathology encountered in the biobank is CAD. The significance of the familial occurrence of CAD has been the focus of research for at least 50 years, with a positive family history of CV disease emerging as an independent predictor of risk in the development of CAD. By applying the knowledge learned from studies on CV genetics together with the data from the DNA biobank,

- **Linking number:** This is a topological property that determines the degree of supercoiling; It defines the number of times a strand of DNA winds in the right-handed direction around the helix axis when the axis is constrained to lie in a plane. It is the number of times that one DNA strand crosses about the other when the DNA is made to lie flat on a plane. If both strands are covalently intact, the linking number cannot change. Link is thus a topological invariant, remaining unaltered even if the two curves are deformed in space -- as long as neither is cut. Topology theory indicates that the sum of T and W equals to linking number:  $L=T+W$ . For example, in the circular DNA of 5400 basepairs, the linking number is  $5400/10=540$ . When a molecule is relaxed and contains no supercoils, the linking number = the twist number since  $W=0$ . Thus if there is no supercoiling, then  $W=0$ ,  $T=L=540$ . If there is positive supercoiling,  $W=+20$ ,  $T=L-W=520$ . In the special cases in which axis of the double helix remains in a plane or on the surface of a sphere, then twist equals the linking number, and there is no writhe, but all other cases are considerably more complex. Supercoiling can be caused even by an increase in the linking number (though this does not occur in nature).
- **Link altering enzymes:** The functionality of DNA is related to its topology which is maintained by enzymes that are capable of altering it. Nature has come up with particular enzymes that control the knottedness (as well as other topological states such as twist-induced supercoiling) of DNA. The exact ability of these enzymes to locate a knot in a circular DNA is an unresolved question in molecular biology. Known as Topoisomerases, these enzymes change the structure by altering the DNA link of a molecule. This is achieved by temporarily breaking one of the strands,

### 1.3 Energy associated with different structures

The energy of the molecule changes if there is a change in pitch (that is, the number of bases per full turn) or bending of the double helix ring. Even a small change in the pitch of the DNA results in a large increase in energy

- **Minimum energy:** Linear DNA assumes the B configuration because it is the one of minimum energy. Linear molecules of DNA assume a configuration known as the b-configuration. Deviation from this relaxed state increases the energy of the DNA molecule, although circular DNA of large diameter increases it least.
- **Higher energy:** In the ring form too, the DNA double helix tries to attain the state of minimum energy. The DNA ring approximates the b-configuration of the linear molecule while trying to attain the state of minimum energy. This packaging of DNA deforms it physically, thereby increasing its energy. Such an increase in stored (potential) energy within the molecule is then available to drive reactions such as the unwinding events that occur during DNA replication and transcription. Too much stored energy is not necessarily a good thing, though. In nature, this problem is addressed by having DNA form supercoils, in which the helical axis of

the DNA curves itself into a coil. Supercoiling or the formation of a superhelix structure minimizes the excess energy that builds up when DNA molecules are deformed during the packing process.

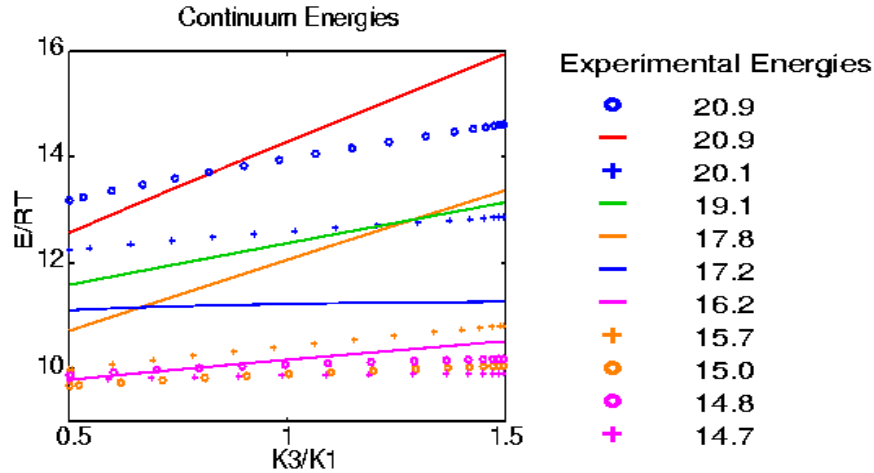
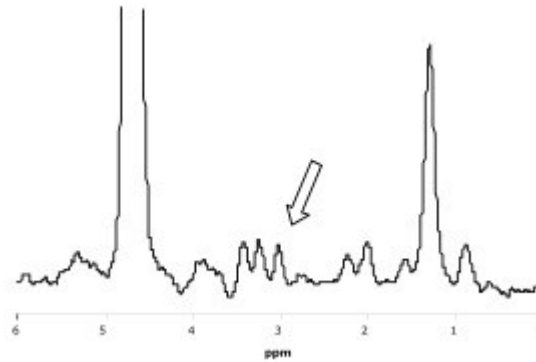


Fig.5: Excess energy build up by DNA MOLECULES

**1.4 BAYSERIAN PROBABILITY:**

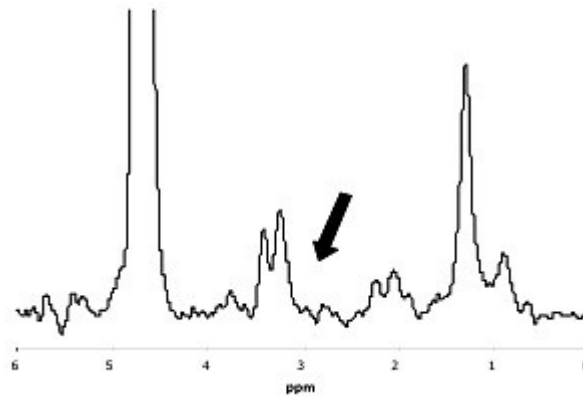
- $SP=TP/(TP+FP)$  (1)
- $SN=TP/(TP+FP)$  (2)
- $ACP=1/4(TP/(TP+FN)+TP/(TP+FP)+TN/(TN+FN)+TN/(TN+FP))$  (3)
- TP IS TRUE POSITIVE NUCLEOTIDE
- TN IS TRUE NEGATIVE NUCLEOTIDE
- FN IS FALSE NEGATIVE NUCLEOTODE

Figure 1A:



for normal creatine metabolism assessed by cardiac 1H-MRS

Figure 1B:



Abnormal creatine metabolism assessed by cardiac 1H-MRS

**1.5 Result:**

At this point, it's a good idea to mention that supercoiling is not necessarily the only solution to the problem of normalizing the number of base pairs per helix in an unwound piece of DNA. You could also separate the two strands by breaking the hydrogen bonds between complementary bases in contiguous base pairs until the remaining DNA has the correct number of base per per turn. In terms of energy needed, though, it requires a lot more energy to break the H-bonds than to supercoil. Nevertheless, strand separation does occur during replication and transcription and it turns out that it is the mathematics of the underwinding that facilitates the strand separation. Cruciform structures also require some unpairing of the base pairs and, again, it is the underwinding that maintains the required strand separation. Faster testing is available for an additional. Your genes are the main factor determining the level of these enzymes in your liver- if you have too much of the enzyme, you process the medication too quickly, too little of the enzyme and the medication builds up in your bloodstream potentially causing adverse reactions or side effects. Without knowing your genetics, We may need to go through months of trial-and-error by using bayserian approach prescribing to find the right drug and dose.

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## CONCERNING TOPOLOGICAL GROUP OF ANALYTIC FUNCTIONS

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### ABSTRACT

It has been [7] shown among others that if  $D_1$  and  $D_2$  are domains in the complex plane,  $A(D_1)$  and  $A(D_2)$  are rings of analytic functions on  $D_1$  and  $D_2$  respectively,  $\phi: A(D_1) \rightarrow A(D_2)$  is homomorphism, and if  $\psi: D_2 \xrightarrow{\text{maps}} D_1$  then the mapping  $f \rightarrow f \circ \psi$  is an isomorphism. It is shown here in this work that  $A(D)$  is a Topological Group under the operation  $\circ$  of composition of mappings whenever  $D_1 = D_2 = D$  then  $D$  is simply connected. Implying thereby  $D$  is homeomorphic to the open unit disc  $U = \{z : |z| < 1\}$ .

### INTRODUCTION

Bers [1] proved that if  $D_1$  and  $D_2$  are two plane domains such that  $\phi: A(D_1) \rightarrow A(D_2)$  is isomorphism then the domains are conformally equivalent, Kakutani [2] proved conformal structure of a domain or Riemann surface with some open problems.

Henriksen [3] determined the ideal structure of the ring of entire functions. In this paper I have determined among others isomorphism and automorphic Topological group structure of  $A(D)$  under the operation  $\circ$  of composition of mappings on a Riemann surface  $D$ . In earlier papers [4] and [5], I have determined Maximum Modulus Algebra and the Ideal structure of the ring of continuous functions. In my recent paper [7], I have shown among others that  $A(D)$  is a topological Group. This paper is generalization in another direction which contains the result of [7] as corollaries.

#### Theorem-1:

The mapping  $f \rightarrow f \circ \psi$  is algebraic isomorphism of  $A(D_2)$  with  $A(D_1)$ .

#### Proof:

Following preliminaries and notation in [1], [4] and [5],  $\phi(f) = f \circ \psi$ ,  $f \in A(D_2)$  and  $\psi: D_2 \rightarrow D_1$ ,  $\phi(f) = \phi(g) \Rightarrow f \circ \psi = g \circ \psi \Rightarrow f = \phi(f) \circ \psi^{-1} = \phi(g) \circ \psi^{-1} = g \Rightarrow \phi$  is one to one. Given  $h \in A(D)$  where  $\phi: A(D) \rightarrow A(D)$  is automorphism,  $\phi(fg) = fg \circ \psi = (f \circ \psi)(g \circ \psi) = \phi(f) \circ \phi(g)$  which proves the theorem that  $\phi: A(D_2) \rightarrow A(D_1)$  is an algebraic isomorphism,  $A(D_1)$  and  $A(D_2)$ , being algebras. We have the following generalization:

#### Theorem-2:

If  $\psi \in A(D)$  the mapping  $f \rightarrow f \circ \psi$  is an algebraic automorphism of  $A(D)$ . Also if  $\phi: A(D_2) \rightarrow A(D_1)$  is algebraic isomorphism then  $\phi(u): D_1 \rightarrow D_2$  for identify function  $u$  is an isomorphism and the mapping  $\psi \rightarrow f \circ \psi \circ f^{-1}$  is group automorphism of the topological group  $A(D)$

**Proof:**

Obviously if  $f \in A(D_2)$ ,  $w \in f(D)$  if and only if  $f^{-1} \cdot w$  has a zero in  $D$ , that is,  $f^{-1} \cdot w$  has no multiplicative inverse in  $A(D)$ . Apparently as I have proved in [6] that  $f$  and  $\phi(f)$  have the same range, the theorem proved.

**Theorem-3:**

$A(D)$  is a topological Group under the operation  $\circ$  of composition of mappings.

**Proof:**

Following [7] given  $f \in 1(D_1, D_2) = \{f \circ \psi: \psi \in (AD_1)\}$  and the mapping  $\psi: f \circ \psi \circ f^{-1}$  is a group isomorphism of  $A(D_1)$  with  $A(D_2)$ . To prove the result, let  $S(\psi) = f \circ \psi \circ f^{-1}$ ,  $S\psi \in A(D_2)$  and if  $S\psi = SX$  then  $\psi = f^{-1} \circ S\psi \circ f = f^{-1} \circ SX \circ f^{-1}$  so that  $S$  maps  $A(D_1)$  with  $A(D_2)$  and  $S$  is one to one into  $A(D_2)$ . Given  $\psi_2 \in A(D_2)$ , we have  $f^{-1} \circ \psi_2 \circ f \in A(D_1)$  and  $S(f^{-1} \circ \psi_2 \circ f) = f \circ \psi_2 \circ f^{-1} \circ f^{-1} \circ f = \psi_2 \Rightarrow S$  maps  $A(D_1)$  onto  $A(D_2)$ . Given  $\psi, X \in A(D)$ , we have  $S(\psi \circ X) = f \circ \psi \circ X \circ f^{-1} = f \circ \psi \circ f^{-1} \circ f \circ X \circ f^{-1} = S(\psi) \circ S(X)$  which shows that  $S$  is group automorphism of the topological group  $A(D)$ . From the above discussion we conclude:

**Theorem-4:**

The mapping  $\psi: D_2 \rightarrow D_1$  is conformal mapping of the group  $1(D_1, D_2)$  and also of the topological group  $A(D)$ .

### HOMOTOPI CLASSES AND FUNDAMENTAL GROUP IN THE COMPLEX PLANE-D

**Definition:**

Let  $\gamma_1$  and  $\gamma_2$  be any two arcs over the same parameter interval  $\{a, b\}$  with common end point in the domain  $D$  of the complex plane then  $\gamma_1$  is homotopic to  $\gamma_2$  in  $D$  if there exists a continuous function  $\gamma(t, u)$  defined on a rectangle  $\{a, b\} \times \{0, 1\}$  with the following properties:

1.  $\gamma(t, u) \in D$  for all  $(t, u)$ .
2.  $\gamma(t, 0) = \gamma_1(t), \gamma(t, 1) = \gamma_2(t)$  for all  $t$ .
3.  $\gamma(a, u) = \gamma_1(a) = \gamma_2(a), \gamma(b, u) = \gamma_1(b) = \gamma_2(b)$ . for all  $u$ .

It is easy to see that homotopy relation  $\sim$  is an equivalence relation which partitions  $D$  into disjoint equivalence classes:  $[\gamma]$  and  $[\delta]$  such that  $[\gamma][\delta] = [\gamma \delta]$  have common end point and can be deformed into each other within  $D$ . If the arcs  $\gamma_1$  and  $\gamma_2$  are traced in succession with  $\gamma_2$  beginning at the terminal point of  $\gamma_1$ , then we obtain a new arc  $\gamma_1 \gamma_2$ .

**Theorem-5:**

The homotopy classes  $[\gamma_1], [\gamma_2]$  and  $[\gamma_3]$  of closed curves form a group  $G=A(D)$ .



**Proof:**

1. The associative law  $(\gamma_1\gamma_2)\gamma_3$  is homotopic to  $\gamma_1(\gamma_2\gamma_3)$ .
2. Existence of unit curve 1 such that  $\gamma.1$  is homotopic to  $1.\gamma$
3. Existence of an inverse curve  $\gamma^{-1}$  such that  $\gamma.\gamma^{-1}$  and  $\gamma^{-1}.\gamma$  are homotopic

If  $\gamma$  is represented by  $z = \gamma(t)$ ,  $t \in [a, b]$  then  $\gamma^{-1}$  can be represented by  $z = \gamma(2b-t)$ ,  $t \in [b, 2b-a]$

**Theorems-6:**

Let  $H \subset A(D)$  then H is homotopy subgroup of A(D) if

1.  $\gamma_1\gamma_2 \in H$  for  $\gamma_1, \gamma_2 \in H$
2.  $\gamma^{-1} \in H$  for every  $\gamma \in H$ .

**Proof:**

Proof is obvious.

In view of above, we have;

**Theorem-7:**

If  $G = A(D)$  and H is homotopy subgroup of G then  $G/H$  is a homotopy group and  $G \rightarrow G/H$  is a canonical mapping.

**Proof:**

As an abstract group G it does not depend on the point  $z=z_0$  which is the initial and terminal point of the closed classes of homotopy curves so let  $z'_0$  be another point in D.

We join  $z_0$  to  $z'_0$  by an arc c in D. To every closed curve  $\gamma$  from  $z'_0$  corresponds a closed curve  $\gamma' = c\gamma c^{-1}$ . This correspondence is homotopy preserving and thus a homotopy correspondence between homotopy classes of G and that of quotient group  $G/H$  as such it is product preserving because  $(c\gamma_1 c^{-1})(c\gamma_2 c^{-1}) = c\gamma_1\gamma_2 c^{-1}$ . From above discussion, we conclude :

**Theorem-8:**

$A(D) = G$  is a topological group and  $H \subset G$  is homotopic subgroup of G, H is fundamental null homotopic employing thereby D is simply connected.

We have the following equivalent generalization.

**Theorem-9:**

D is homeomorphic to the open unit disc  $U = \{z : |z| < 1\}$ .

From above we conclude:

**Theorem-10:**

The domains  $D_1$  and  $D_2$  are conformally equivalent.

**Proof:**

From Theorem 8 and Theorem 9 above,  $D_1$  and  $D_2$  are homeomorphic thereby implying that domain  $D_1$  is conformally equivalent to domain  $D_2$ .

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**MODELING NARROW DEMAND FOR MONEY IN PAKISTAN:  
A MULTICOLLINEARITY DIAGNOSIS AND REMEDIAL**

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**ABSTRACT**

The Central Banks has been interested in obtaining stable estimate of money demand function in order to measure income elasticity, which helps in determining the rate of monetary expansion and the consistent with long run price stability and also interest rate semi-elasticity, which aids in calculating the welfare costs of inflation. The stable money demand is to be considered essential for the formation and the conduct of monetary and the fiscal policy. The time series annual data from the International Financial Statistics (IFS) of the IMF CD ROM data base for the time period 1956 to 2009 is applied. Stationarity, Statistical Significance, R<sup>2</sup>, 2 R and DW statistics have been examined in order to diagnosis the Serial correlation. If the Lagged value is used in the regression as independent variable then Durbin Watson d statistics is not applicable and we use h Statistics to diagnose the autocorrelation in regression (Iqbal & Saghir 2008). It is highly plausible that some of the time series variables non-stationary in their levels, therefore, simple OLS technique is questionable (Engle & Granger 1987). The technique of Principle Component is utilized to remove the multicollinearity and also to minimize the no of Independent variables (Iqbal & Saghir 2009). After generating principal Component from the best model for Narrow Demand for Money (M1), we regress Dependent variable on the Principal Component and get the final results. After generating Principal Component from the best model for Demand for Money (M1), we regress the Dependent Variable on the Principal Component and get the final and the best model.

**KEY WORDS**

Money Demand, Income, Output, Interest rate, Time Series, Unit Root, Developing Country, Pakistan.

**1. INTRODUCTION**

Inflation negatively affects the financial sector development and the vulnerable poor segment of the population also. There is a consensus that even moderate levels of inflation damage the real growth (Cecchetti 2000). Considering such adverse impacts of inflation on the economy, there is a consensus among the central banks that the price stability is the prime objective of monetary policy (King 1999; Blejer, *et al.* 2000) and all the Federal banks are committed to the low inflation (Goodfriend 2000). Hence the adopted inflation as the main focus of the monetary policy, targeting inflation explicitly or implicitly as and when required. Monetarists argue that inflation is essentially a monetary phenomenon (Friedman, 1963). So the Monetarist models the mechanisms by

which monetary policy affects the inflation. How such mechanisms can be used to control inflation (Svensson, 2000; Hendry, 2001). As the stable money demand is to be considered essential for the formation and the conduct of monetary and also the fiscal policy (Ahmed and Islam 2007) and particularly the determination of the factors which affect the money demand e.g. income ( $y$ ), Interest rate ( $r$ ), Inflation ( $\Delta P$ ) and Exchange Rate ( $e$ ) etc. These factors not only affect the long run money demand but also short run dynamic adjustment of actual money balances to the desired level (*Iqbal & Saghir 2008*), which is till today inconclusive (Ahmed and Mansoor 2006) due to continuous innovation in monetary and the financial market integration.

**Table 1.1: Key Indicators of Pakistan's Financial Development**

Years	M2/GDP	(DD+TD)/M2	Years	M2/GDP	(DD+TD)/M2
1999-00	36.9	74.6	2005-06	45.0	72.5
2000-01	36.7	75.4	2006-07	46.6	74.1
2001-02	40.0	75.4	2007-08	44.7	73.3
2003-04	44.9	76.8	2002-03	43.1	76.2
2004-05	45.1	77.6			
July-May 2007-08	43.0	71.2	2008-09	37.0	70.1

Source: State Bank of Pakistan

In the table 1.1 we see the financial strength of the Pakistan economy for last ten years. The Broad money (M2) to GDP ratio increase from 37% to 47% approximately where as the Broad money (M2) to the demand deposit and Time deposit ratio remain nearly constant. Like other countries, inflation in Pakistan is also measured on the basis of CPI. As the inflation has crucial macroeconomic problem for the economies, and the Pakistan has no exception. Inflation is a multidimensional phenomenon and there are diverse outlooks about it causes and effects. The monetarist model asserts that the prime factor explaining the current rate of secular prices is change in the past behavior of money to output ratio (*Iqbal & Saghir 2008*). It is also dictum of the quantity theory of money which regards inflation as monetary Phenomenon.

### 3. METHODOLOGY

#### 3.1 Theoretical Frame Work

The monetary base is important for discussions of monetary policy, since it includes only the quantities that are controlled by central bank policy. The next money concept is called M1. M1 includes forms of money that can be immediately used for making purchases. It therefore corresponds closely to the function of money as a medium of exchange. M1 is always ready to be used for transactions. It includes the currency circulation and checking accounts. The currency circulation is cash in hands of the non-banking sector. It does not include vault cash of banks.

#### 3.2 THE DATA AND MODELS AND RESULTS:

The Data is mainly from International Monetary Fund (IMF) CD ROM of International Financial Statistics (IFS) for the year 2007. Annual Data is used for the study. However the Economic Survey of Pakistan, Government of Pakistan (Various

Issues) and the various publication of State Bank of Pakistan are considered also. The different Reports of Federal Bureau of Statistics has also been utilized for data purposes.

We start with the idea of the Cambridge economist Marshall and others who assumed that the Demand for money would be a proportional to income and wealth. In most of the formulations the distinction between income and wealth has been neglected and it is assumed that Demand for Money a function which relates to the demand for real balances  $[M_t/P_t]$  to real Income  $[Y_t/P_t]$  (Qayyum 2005).

The Money demand also depends upon the level of income (y) and the interest rate (r). In the Keynesian Model, used by the Meltzer (1963), which is more realistic, considers demand for money as function of real income (y) and interest rate (r) i.e.

$$M^d = f(y, r)$$

where  $M^d = M/P$ , after the thorough consideration of different variables and the literature Review, we suggest the following model

$$\left(\frac{M_t}{P_t}\right) = f(Y_t/P_t, r_t, \Delta P_t, e_t, \xi_t)$$

The time series annual data is used for the analysis. The data is from 1960 to 2009. To incorporate all important variables like supply-side, demand-side and policy variables and to keep it straight, the prime considerations in designing the methodology, but in explanation the causes of inflation is very successful.

For example Lucas (1988) relating real monetary balances and a measure holding money, opportunity cost of has been expressed as

$$\text{Log}\left(\frac{M}{P}\right)_t = \beta_1 \text{Log}\left(\frac{Y}{P}\right)_t + \beta_2 r_t + \xi_t$$

where  $\beta_2$  is the interest semi-elasticity and expected to have a negative sign and  $\beta_1$  is the income elasticity of real money balances and should lie in the vicinity of unity. Although some studies for example, Baba et al (1992) and Ball (2001) reported and elasticity around 0.5 and also predicted by the

$$\text{Log}\left(\frac{M_t}{P_t}\right) = \alpha_0 + \alpha_1 \text{Log}(Y/P)_t + \alpha_2(r_t) + \varepsilon_t \quad (\text{Md}_1)$$

The above two models are the simplest models. We can also assume that money demand may also be affected by, apart from level of income (y), inflation ( $\Delta P$ ) and level of sum of exchange rate and interest rate ( $e+r$ ), see Arize, Darrat and Meyer (1990).

$$\begin{aligned} \text{Log}\left(\frac{M_t}{P_t}\right) = & \varphi_0 + \varphi_1 \text{Log}(Y/P)_t - \varphi_2 \text{Log}(e_t) - \varphi_3 \left(\frac{r_t}{e_t}\right) + \varphi_4 \frac{1}{2} \left(\frac{r_t}{e_t}\right)^2 \\ & + \varphi_5 \text{Log}\left(\frac{M_{t-1}}{P_{t-1}}\right) - \varphi_6 \text{Log}\left(\frac{M_{t-2}}{P_{t-2}}\right) + \varepsilon_t \quad (\text{Md}_{10}) \end{aligned}$$

We apply all the ten models describe above to the data in order to find the best model for the Pakistan economy to estimate the Narrow Demand for Money (M1) in term of statistical Properties.

### 3.3 Estimate of the Models for Narrow Money Demand (M1):

All the 10 models mentioned above section are applied in the study the Narrow Money Demand (M1) and to find the best model that can predict and explain the maximum variation in Money Demand (Md). The models would be assessed on the basis of coefficient of determination  $R^2$ , Adjusted  $R^2$  and Durban Watson d Statistics or Durbin Watson h Statistics.

We will prefer the model (Models) without Auto correlation, as the presence of Auto Correlation will make the model unreliable to interpret because of unduly large sampling variance of the regression coefficient and also may obtain inefficient predictor. In this research we find out the following drawbacks or the shortcoming of the models. In this research nine independent variables are used and the model considers combination different variables, no of variables vary from two to six per model.

### 3.4 Multicollinearity:

The OLS estimator and their standard errors can be sensitive to small change in data. Multicollinearity can affect the square of the distance between the estimator of minimum squares of the estimated co efficient and the parameter (Hoerl and Kennard 1970). Multivariate Analysis problem could start out with a substantial number of correlated variables (*Iqbal & Saghir 2009*). Principal Component Analysis is a dimension reduction tool that can be used advantageously in such situations. Principal component analysis aims at reducing a large set of variables to a small set of uncorrelated variables that still contains most of the information in the large set. The following procedures were used to assess the presence of multicollinearity in the working variable.

- A) **Analysis of the correlation Matrix.** This procedure involves the analysis of the non diagonal elements ( $r_{ij}$ ) of the correlation matrix. If the variable in the study are  $X_i$  and  $X_j$  are approximately linear dependent, then  $r_{ij}$  will be near unity, in absolute values. A high correlation coefficient indicates multicollinearity. When the explanatory variables in the regression exceed two this condition only become sufficient but not necessary and the absence of high correlation between two variables does not indicated absence of multicollinearity (Kmenta 1971).

**Table 3.1: Correlation Matrix of explanatory Variables**

Variables	Log(Y/P)	Log(e)	(r/e)	(r/e) <sup>2</sup>	log(M/p) <sub>t-1</sub>	log(M/p) <sub>t-2</sub>
Log(Y/P)	1.000	0.978 (0.000)	-0.757 (0.000)	-0.645 (0.000)	0.989 (0.000)	0.987 (0.000)
Log(e)	0.978 (0.000)	1.000	-0.820 (0.000)	-0.723 (0.000)	0.969 (0.000)	0.972 (0.000)
(r/e)	-0.757 (0.000)	-0.820 (0.000)	1.000	0.970 (0.000)	-0.754 (0.000)	-0.754 (0.000)
(r/e) <sup>2</sup>	-0.645 (0.000)	-0.723 (0.000)	0.970 (0.000)	1.000	-0.642 (0.000)	-0.644 (0.000)
log(M/p) <sub>t-1</sub>	0.989 (0.000)	0.969 (0.000)	-0.754 (0.000)	-0.642 (0.000)	1.000	0.995 (0.000)
log(M/p) <sub>t-2</sub>	0.987 (0.000)	0.972 (0.000)	-0.754 (0.000)	-0.644 (0.000)	0.995 (0.000)	1.000

P- Values are in Parenthesis

The simple linear correlations among all the explanatory variables of model Md10 are shown in Table 3.1. all the (correlations)  $=|r_{ij}| \geq 0.642$  indicate the presence of multicollinearity between the explanatory variables with the  $P \leq 0.000$ .

**B) Test of the determinant of the Correlation Matrix.** The matrix in correlation form and therefore its determinant varies from zero to one. The determinant is one if the explanatory variables are orthogonal and zero if there is complete linear dependence between them. As the determinant approaches zero multicollinearity become more intense. This method however, does not allow the identification of the variables causing multicollinearity (Montgomry and Peck, 1981).

Determinant of correlation matrix = .000

As the determinant of correlation matrix is 0.000, indicating the presence of severe multicollinearity.

**C) Analysis of Eigen vectors and Eigen values in the correlation matrix.** One or more Eigen values of the correlation matrix will be small when there are linear dependencies among the independent variables, (Belsley et al., 1980 and Silvey, 1969). The assessment of multicollinearity by using condition number (CN) of a correlation matrix, given its symmetry, CN is defined as the relation between the smallest and the largest Eigen value (Montgomry and Peck, 1981). If  $CN < 100$ , multicollinearity is not serious problem. If  $100 < CN < 1000$ , multicollinearity is moderate to strong and if  $CN > 1000$ , multicollinearity is severe.

where Condition Number = Maximum Eigen Value/ Minimum Eigen Value

$CN = \text{Variance Explained by first Principal} / \text{Variance explained by the last principal Component}$

$CN = 5.218 / 0.004 = 1304.5$

As the C.N. =1304.5 pointing the presence of severe multicollinearity (See Table 3.2). More economically, we believe and can represent by a smaller set of factors,

so we initiate by identifying a set of variables whose variance. Belsley et al (1980) have suggested Condition Index for the assessment of the presence of multicollinearity. Condition Index is defined as  $C.I. = \text{Maximum Eigen Values} / \text{Current Eigen Values} \lambda_k = \mu_{\max} / \mu_k$ ,  $k = 1, 2, 3, \dots, p$ , and thus  $\lambda_k \geq 1$  for all  $k$ .

**Table 3.2: Total Variance Explained (Initial Eigen values)**

Component	Eigen Values	% of Variance	Cumulative %	Condition Index
1	5.218	86.959	86.959	1.000
2	0.720	12.004	98.963	7.250
3	0.029	0.481	99.444	179.93
4	0.018	0.294	99.738	289.89
5	0.011	0.189	99.927	474.36
6	0.004	0.073	100.00	1304.50

Extraction Method: Principal Component Analysis.

**D) Inflation factors of the variance.** Marquardt (1970) gives the diagonal elements of the matrix  $R_{xx}^{-1} = (X'X)^{-1}$  of variance inflation factors (VIF) when the matrix  $X'X$  is taken in the correlation form. In order to detect multicollinearity, these factors can be used (Montgomery and Peck, 1981). The  $V_{jj}\sigma^2$  is the variance of the  $j$ th minimum square regression coefficient, where  $V_{jj}$  can be interpreted as the variance increases factor of the estimates when there is linear dependence among the explanatory variables. If  $VIF > 10$ , it is possible that the minimum square regression coefficients associated with such values are highly affected by multicollinearity (Neter et al. 1983). In our case all the  $VIF > 10$ , shows the presence of high multicollinearity.

**Table 3.3: Variance inflation factor Co linearity Statistics<sup>a</sup>**

	Tolerance	VIF
Log(Y/P)	.014	69.761
Log(e)	.026	37.971
r/e	.029	34.708
(r/e) <sup>2</sup>	.040	25.101
Log(M11/p)	.008	125.471
Log(M12/p)	.009	116.658

a Dependent Variable: Log(M1/P)

**E) Splitting into singular values.** Any matrix  $X$  of order  $n \times p$ , where the  $p =$  no of variables and  $n =$  number of observation and can be broken down to  $X = UDV'$ . According to Lawson and Hanson 1974 and Belsley et al. 1980, then  $X'X = (UDV')'(UDV') = VD^2V' = V\Lambda V'$ , where  $U$  is a  $n \times p$  dimension matrix, whose columns are the Eigen values associated with Eigen values of  $X'X$ . Matrix  $V$  is of  $p \times p$  dimension formed by the normalized Eigen vectors of matrix  $X'X$ . The equality  $U'U = V'V = I_p$  exist. Matrix  $D$  is diagonal of  $p \times p$  dimension, with non-negative diagonal element  $\mu_j$  ( $J=1, 2, 3, 4, \dots, p$ ) representing the singular  $X$



values. Thus,  $X = UDV'$  is a form of splitting  $X$  into its singular values. The ill conditioning degree of matrix  $X$  affect the size of the singular value for each approximate linear dependency get larger (Montgomery and Peck 1981). This relationship is called condition index ( $\eta_k$ ) of the  $X$  matrix, defining:

$\eta_k = \mu_{\max}/\mu_k$ ,  $k = 1, 2, 3, \dots, p$ , and thus  $\eta_k \geq 1$  for all  $k$ . the variance of minimum squares estimator of  $\beta$  can be written as

$$V(\beta) = \sigma^2 (X'X)^{-1} = \sigma^2 V\Lambda^{-1}V \text{ Or for } k\text{th component of } \beta,$$

$$V(\beta_k) = \sigma^2 \sum v_{kj}^2 / \mu_j^2 = \sigma^2 \sum v_{kj}^2 / \lambda_j$$

$$(VIF)_k = \sum v_{kj}^2 / \lambda_j$$

the presence of one are more small singular values or Eigen values will cause inflation in the  $\beta_j$  variances.

The variance splitting process can also be done to measure the degree of multicollinearity, (Belsley et al , 1980) suggested

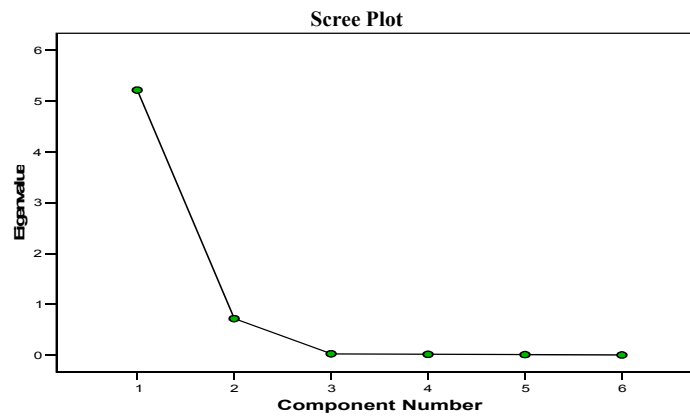
$$\Pi_{jk} = [v_{kj}^2 / \mu_j^2] / (VIF)_k, \quad j=1, 2, 3, 4, \dots, p.$$

The elements  $\Pi_{jk}$  are ordered in a  $\Pi \times p$  dimension matrix where  $p=6$ . In this matrix the element of each column of  $\Pi$  are the proportion of the variance of each  $\beta_k$ , which is also each variance inflation factor  $(VIF)_k$  associated with the  $i$ th singular value.

High proportion of  $\Pi_{jk}$  associated with low  $\mu_j$  values indicate that this singular value is associated with multicollinearity which, in turn, is inflating the  $\beta$  variances.

0.0002	0.0000	0.0310	0.0632	4.8557	0.0018
0.0000	0.0044	0.4295	0.8154	0.0275	0.0222
0.0000	0.0110	0.0073	3.5214	0.4391	0.2259
0.0000	0.0187	0.1500	1.0980	0.1534	0.0668
0.0001	0.0001	0.0005	0.2992	1.5175	14.6363
0.0001	0.0000	0.0010	0.0428	1.7807	15.1703

Using the output from application of Principal Component, we get a new set of uncorrelated variables in the form of PC's. According to the latent root criterion for number of factors to derive would indicate that there is one component to be extracted for these variables, as the output shows that only one Eigen values greater than 1. But we are going to consider first two Principal Component as variables as the 2<sup>nd</sup> PC not only explained 12 % but also increase cumulative approximately 99%. The scree plot also suggests the same in (Graph 3.1). The scree plot is another useful aid to determining an appropriate number of principal components. The scree plot, plot of  $\lambda$  versus  $i$  i.e. the magnitude of Eigen values versus its number, with the Eigen values ordered from highest to smallest. In the scree plot, we look for an elbow (bend), in order to decide the suitable number of components. The no of components taken to be the point at which remaining values all are about the same size and relatively small. The graph 3.1 shows a scree plot for our research show six components. An elbow occurs in the graph 3.1 at about  $i=2$ . that is, the Eigen values after  $\lambda_2$  are small and about the same size. The two samples Principal component effectively summarizes the total sample variance which is 98.963 % according to the table 3.5.

**Graph 3.1: Scree Plot of the Principal Component**

The *scree* test is a graphical method by Cattell (1966).

We select and plot the first two Principal components and the behavior of years show that the multicollinearity is removed due to Principal Component technique and there is no auto correlation among the principal Component and

**Table 3.4: Component Matrix**

	1	2	3	4	5	6
Log(e)	.981	.132	.137	.019	.033	.011
Log(Y/P)	.964	.248	.016	-.018	-.087	-.013
Log(M/P) <sub>.2</sub>	.964	.251	-.058	.021	.045	-.043
Log(M/P) <sub>.1</sub>	.963	.253	-.078	.001	.010	.047
r/e	-.896	.432	.004	.099	-.016	.003
(r/e) <sup>2</sup>	-.816	.572	.018	-.081	.019	-.001

Principal Component Analysis by Extraction Method and 6 components extracted. Principal Component which we discuss in previous section is very important due to 12 % variance explained by it in over all money demand. Now in above Table it is worth interpreting as all the coefficient of 2<sup>nd</sup> PC is positive. Another interesting factor be noted in 2<sup>nd</sup> PC is that the sum of co efficient due to Taylor series {Log(e), r/e} and (r/e)<sup>2</sup> is 1.136 while other co efficient sum is 0.752 which is less than Taylor's series. Principal component technique not only produces the linear combination of the explanatory variables but also help in diagnosing the presence of multicollinearity (Lawrence 1962) suggested condition Number (CN). Which variables can be represented by which components and which variables should be retained as individual variables because the factor solution does not adequately represent their information, the end result of the principal components analysis will tell us.

After generating principal Component, we regress Dependent variable on the first two Principal Component as following and find that linear form is best fit in case of Narrow Demand for Money (M1). Also The R Square and Adjusted R Square have the Same Value and confirm the table 3.2 of Eigen values where first two components cumulatively explained the 98.9% of Variance.

**Table 3.5: Regression on Principal Component**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.992(a)	0.984	0.984	0.04764

a Predictors: (Constant), 1<sup>st</sup> PC, and 2<sup>nd</sup> PC

b Dependent Variable: Log(M1/P)

**ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.927	2	3.463	1525.662	0.000 <sup>(a)</sup>
	Residual	0.111	49	0.002		
	Total	7.038	51			

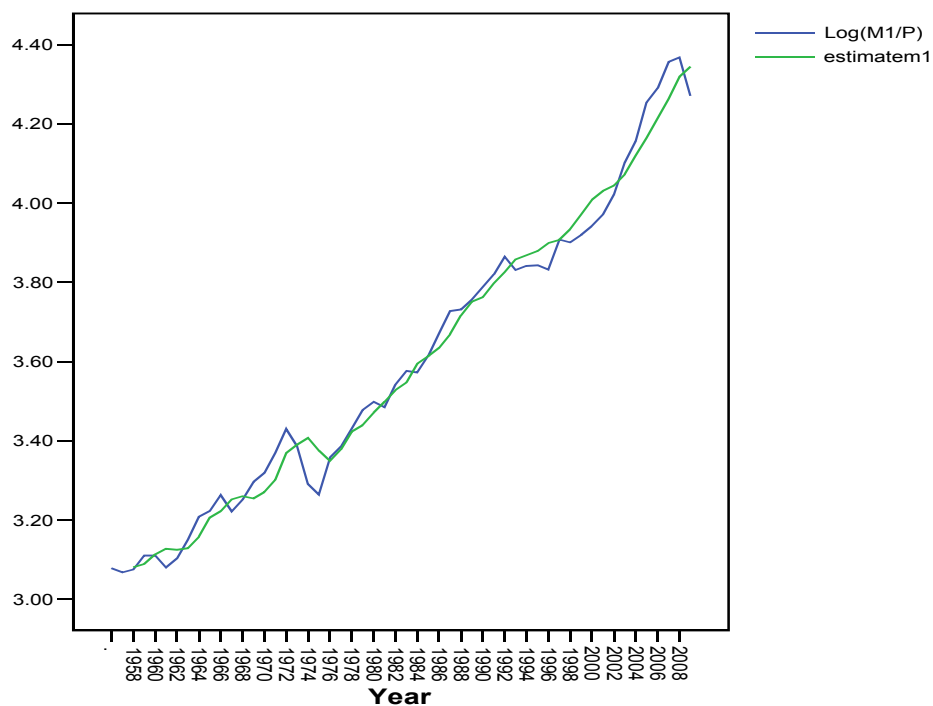
a Predictors: (Constant), pc2, pc1

Regression Coefficients<sup>(a)</sup>

Model	Unstandardized Coefficients		t	Sig.	
	B	Std. Error			
1	(Constant)	3.621	.007	547.969	.000
	pc1	0.341	.007	51.098	.000
	pc2	-0.140	.007	-20.985	.000

a Dependent Variable: Log(M1/P)

**GRAPH 3.2: Dependent Variable, Principal Component Fits**



#### 4. CONCLUSIONS

The study tested the monetarists' proposition that money supply has been the main determinant of inflation in Pakistan. For this purpose, we estimated the relationship between the rate of inflation, money growth, growth in real income, and growth in velocity in Pakistan in the 1956–2009 period.

One very important issue which was discovered in the study is that 2nd lagged value is much more important in case of Pakistan in order to remove Auto Correlation in the model. Although the studies in various economies used 1st lagged to study money demand but very rare studies report the Durbin Watson (d) statistics.

The present study aims to provide empirical evidence that various macroeconomic components of real income namely GDP, Interest rate, Exchange rate and expected inflation have different impacts on real money demand. In the sense of policy implication, this finding might add advantage to traditional money demand specification that uses single real income or real wealth variable. Consistent with theoretical Postulate, as study finds that Money Demand is positive respond by income and negative by interest rate.

The variable of opportunity cost of holding money (proxy by Call Money Rate) finds to be inelastic. This indicates that any monetary policy that affects interest rate or inflation may, however, not affect the demand for these aggregates materially - money balance. In conclusion, it must be emphasized that in order to accurately attain desired policy targets, policymakers must acknowledge the importance of various components variables when designing the monetary policy for their specific economies.

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## MOBILITY MANAGEMENT IN NEXT GENERATION MOBILE NETWORKS

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### ABSTRACT

This paper's main focus is on identifying issues faced by quality of service and mobility management when performing vertical handover between heterogeneous networks such as between WiMAX and WLAN. The vertical handover management is much more complex as compared to horizontal handover management which is used for homogenous networks because it is a multi-criteria decision issue involving handoff delay, bandwidth, price, traffic load, battery consumption, signal quality and user preferences. The transition between different access technology should be transparent to user. To minimize these issues, this paper proposes some solution for dealing with vertical handovers such as mobile nodes pattern reorganization mechanisms and mobile node in built functionality to handle handovers.

### KEY WORDS:

Mobile nodes, Vertical handover, Quality of services

### 1. INTRODUCTION

Mobile communication's quality of service has become very important area in last few years. Next generation mobile networks will be heterogeneous. It will allow mobile nodes to roam over a number of radio access networks such as WLAN (Wireless Local Area Network), WiMAX (Wireless Metropolitan Area Network), UMTS (Universal Mobile Telecommunications System), W-CDMA (Wideband Code Division Multiple Access), (Code Division Multiple Access 2000) CDMA2000 and so on by integrating mobility management mechanisms and vertical handover management at the network layer. There are local (intra access network) mobility and global (inter access network) mobility. Inter access network mobility involves horizontal and vertical mobility management as horizontal mobility is mobility between homogeneous technologies such as within WLAN and vertical mobility is mobility between heterogeneous technologies such as between UMTS to WLAN. Vertical handover maintains the mobile node's active connection during switching between different inter access networks such as from a WiMAX to a WLAN or from WWAN to HIPERLAN (high performance radio local area network ) or from WMAN to Bluetooth, WiFi to UMTS, etc.

The mechanisms of mobility management in wireless network involves that when a mobile station transfers a user's session from one network to another, the Internet protocol's (IP) address will change. Therefore, the aim of mobility management is to track where the subscribers are, so that calls, SMS and other mobile device services can

be delivered to them. The mobility management is used to manage the communication session to continue between mobile node and correspondent node by caring out the handover. The handover procedure involves that when mobile node is in frequency reuse or cellular coverage areas where subscriber's connection from one cell to a neighboring cell changes often, as the subscriber moved from one location to another, then the call is transferred to the new cell in order to avoid call or communication session's termination. The mobility management mechanism involves decision about which terminals to be detached, connected or idle from network and monitors mobile nodes which are moving at high speed over various coverage area networks. Hence, the mobility managements are very vital for active connections over the next generation mobile networks.

## **2. ISSUES OF VERTICAL HANDOVER IN HETEROGENEOUS NETWORK**

The heterogeneous networks contain different quality of service, mobility management mechanisms and in order to deliver services across these networks requires the networks to work in a cooperative manner. The negative interaction of the different quality of service, mobility management mechanisms is one of the barriers. Previous protocols that are defined some have mobility management functionality and some have quality of service but problem occurs when we try to combine different protocols together and can jam the system or interlocked access systems. It will be better to have quality of service, mobility management mechanisms and security, all these functionality in one protocol.

When handover occurs between heterogeneous networks then mapping operation of different factors like quality of service parameters, mobility factors and security has to be carried out. When handover from WiMAX to WLAN occurs then a lot of mapping of different factors has to be done for smooth handovers with no or minimum delays. Heterogeneous networks have different wireless network interfaces and have inherent diversity like different radio frequency and spread spectrum techniques i.e. direct sequence spread spectrum (DSSS), frequency hopping spread spectrum (FHSS), etc, which require mapping functionality. The main crucial problem is the effective integration of these two wireless technologies. It consists of factors, which diversify the two heterogeneous technologies. The main aim of seamless vertical handover management is to maintain a mobile node's active connections as it moves between different types of heterogeneous network.

The main issues are of managing end to end of handover delay which is the time it takes for mobile node to move from the point of attachment at which handover should occur to point of attachment at which handover does occurs, that is caused by message exchanges; there are other issues for vertical handover management as well, which are how to make use of the effective data rates in overlapping region. How to select an appropriate wireless interface as most of mobile devices such as PC, PDA, laptops and new mobile phones have more than one networking interface e.g. UMTS, Bluetooth, Ethernet, WLAN, GPRS, UWB (Ultra Wide Band), etc. How bandwidth fluctuation can be managed which occurs from noise in physical devices and communication channels [4], link layer routing and multiplexing in heterogeneous networks during handover.

In heterogeneous networks handover is concern with determining which network to connect and when to perform a handover between the different networks. At what time network selection strategy can be used by the application, which can result in optimization of bandwidth and stabilizing networks. There is concern how to manage mobile node's mobility between different mobile network domains. How to reducing signaling traffic when there can be exchange of messages between different network domains.

There are also problem of optimum end to end usage in heterogeneous networks involves variables such as routing optimization, throughput optimization, priority-based routing at the network layer, delay budget calculations and cost economical factors. There is also an issue of congestion control, when sending data when mobile network can face packet loss than it assumes that there is network traffic congestion and reduce the data send rate but it can be because of environment condition like rain, fog etc or fading and interference; these are temporary conditions and does not relate to network congestion.

There are many problems of handover such as handoff latency, frequent handovers, frequency of the signal transmission, number of packet loss, end to end throughput, reducing handoff rate, different mobile handset design, wireless system discovery, terminal mobility, topological fault tolerance, bit error rates, mobile terminal velocity and matching of mobile device's parameters in the mobile network, multiple database accesses, and negotiation-renegotiation processes, path establishment time, transfer rate, network delay, and reliability affecting the performance of system.

Resource allocation affects directly the experienced quality of service, but the end-to-end quality of service also requires other management as well, such as prioritizing packets in the routing, using header compression over wireless links and buffering packets in the terminals and routers. There is concern how to transfer context information from a mobile node's previous access network to its new access network in order to improve handover performance.

### **3. PROPOSED SOLUTIONS FOR VERTICAL HANDOVER IN HETEROGENEOUS NETWORK**

Solving above issues is very important for optimizing throughput in vertical handoff management and also for maintaining optimal quality of service in heterogeneous wireless mobile networks as they are all affecting the professed quality of service and mobile application usage experience by the end user.

It is proposed to develop new location aware mobile nodes pattern reorganization mechanisms, which consist of intelligent detection of mobile nodes patterns and routine. Intelligent agent nodes can be used to manage information of mobile node consisting of its locations over coverage networks by management agents. Intelligent agent nodes can be used to manage required information and load balancing. It can have the ability to organize, sort and filter large quantities of incoming data. This can result in obtaining data and routing information in a timely and efficient manner. Intelligent nodes' agent can also enhance the mobile nodes power to make complex decisions based on detailed information necessary to make an effective decision by intelligent agent nodes.



It involves that when mobile node is moving away from the center of intelligent node (IN) and enters in overlapping region, then there should be special processor to make the mobile node be aware of upcoming handover and predict when the mobile node will enter an area covered by a IN suppose using WLAN and then evaluate which of the available networks will provide the required quality of service and if there is no mobile network that meets with the application quality of service requirements then there can be additional adaptation may be required and carried out. It can use the dynamic buffering mechanism, which buffers packets during the handover. The IN can have powerful location recognition functionality, knows pattern routines and information where data can be and on which network and at a given location on certain time, which can make fast retrieval of information.

It can pre register the mobile node with the IN in WLAN in order to reduce signaling and as a result information can be passed quickly, as pre registering need to know neighbor base station information. Intelligent Node on the mobile network can manage all relevant information about mobile node like its location relative to different networks, its signal strengths at new location, and direction and velocity. By having a processor perform the pre-registration, the radio resources of the mobile node are preserved; and handover initialization processes and makes decision for handoff and utilizes collective radio resource management and inters domain routing based on packet switching in a collaborative manner and then finally performs the handover.

When developing new mobile devices, we can add new functionality; by using that mobile device will be able to control handover itself and there can be also be functions for automatically setting of mobility parameter and multi-homed with multiple interfaces. Now-a-days many mobile devices like future mobile phones; PDA, etc. can have many interfaces and can keep updated information about its different network interfaces. Hence, mobile devices, which are mobile nodes, can better decide when to perform handovers. As mobile devices knows about connection information and its states. By adding this functionality in mobile nodes then load on the network will be reduced and shared and it will be economical as well.

Probability of successful vertical handover to occur depends on traffic optimization in the next generation mobile networks. In order to maintain traffic flow, it can be divided in to different classes and each class will monitor arriving traffic for each heterogeneous networks service. There can be frequent updates in network level routing information and transport and application level adaptation. The use of congestion control mechanism to map different bandwidth fluctuations in heterogeneous networks.

By using measurement of signal strength to increase throughput performance of mobile networks and to reduce handover delay, latency; the information can be exchange in the form of signaling using smart antenna signaling in order to minimize the overhead of communication link and enhancing the performance of mobile network. The heterogeneous networks can use radio resources management for developing new software for reconfigurable radio management system which can use economical smart or adaptive antennas in the MIMO (multiple input multiple output) radio channels, which can work on different technologies i.e., UMTS, Bluetooth, GPS, next generation mobile network with advances in the OFDMA (orthogonal frequency-division multiple access),

etc as it has less infrastructures and provide high speed connections for mobile nodes. There is need for new handoff algorithms, which can reduce signaling traffic rather than the traditional handoff algorithm that is based on received signal strength thresholds, which does not give much performance.

Intelligent node can be context aware and need to adapt itself to context changes, including user devices, mobile node's location, network environment and changes in mobile network quality of service. Content aware solutions can have the ability to translate to different naming and addressing schemes as packets are transmitted by different heterogeneous networks. Cache mechanism can be used with certain timer and time out mechanism to accelerate the content mapping functions.

#### **4. IMPROVEMENT IN QUALITY OF SERVICE FOR NEXT GENERATION NETWORKS**

The main mechanism for improvement in mobile quality of service for next generation networks comprise increase use of efficient packet switching techniques for data communication which can increase data communication dramatically than circuit switching. In order to use QoS in packet switching networks, network load and load sharing mechanisms can be used in congested networks, to keep it under certain threshold, in order to provide satisfactory performance in the system. Moreover, efficient packet scheduling in responds to location-dependent channel conditions and controlling packet error rate in wireless networks can be used. All next generation networks can be bases on packet switching techniques which very efficiently utilize available bandwidth in this case each mobile node's packets compete for available bandwidth, and billing customers for the amount of data actually transmitted and not based on round off time consumed. When the packets are routed over the network then these can be classified according to various traffic classes with priority precedence

The utilization of traffic class for maintaining traffic flows can significantly increase to next level and monitoring arriving traffic for each service classes for IPv4, IPv6, and MPLS (Multi Protocols Labelling Switching) traffic and perform traffic classification in routing. Where network access medium of the conventional networks with interpretability, access control and security with improved and fast routing mechanisms. QoS can be improved by using point-to-multipoint (P2MP) in Label Switched Paths (LSPs) which provides video traffic with a bandwidth reservation connection for end users anywhere and at anytime. Efficient bandwidth with higher speed, more cost effective services having an impact on reduction of servers, routers and software applications. QoS entry control would allow flow to assign bandwidth through signaling to entire nodes over network on traffic path. Network capacity can be increased to provide more simultaneous users per cell. In order to provide better QOS there would be more use of reservation-less engineering e.g. differentiated services (DiffServ). The next generation networks would have dynamic bandwidth allocation on basis of each customer for voice, video and data VPLS (virtual private LAN service) in VLANs (virtual local area networks). In order to provide effective mobility, there is going to be use of micro mobility protocols between intra access networks mobility and use of macro mobility protocols between inter access networks' mobility that can enormously increases the performance of the networks.

The QoS of the next generation networks will increase tremendously by very smooth handover across heterogeneous networks in order to provide seamless networking. Audio quality of mobile networks can be improved by using efficient digital modulation techniques such as OFDM and OFDMA, MIMO, BLAST (bell labs layered space time), space time coding, adaptive modulation and coding methods. These digital modulation techniques are in wireless systems or xDSL systems to improve both bandwidth and power efficiency. Firewall located in carrier-neutral facility can be improved. Centralized firewall gives each network direct access to the internet and improving latency, reliability and throughput. The increase modification in advance signaling and session controls i.e. session initiated protocol (SIP) to provide more security over wireless networks. QoS in next generation networks involve minimizing handover delays, power consumption, and signaling loads. The voice-over IP (VoIP) transmits signals a digital audio which are encapsulated in data packets over IP. The VoIP communications uses packets to destination MN simultaneously through different routes. The predictive or planned handovers can increase and there can be maintaining history of signal strengths e.g. stable, unstable, and weak in order to prepare for upcoming handovers.

In order to reduce signal to noise ratio for clear communication and improve radio to signal strength. The mobile terminal can be utilized as communicator. When end customers have multiple subscribers for single wireless device then there would be effective multiple billing information from each subscriber. There would be functions for automatically setting of mobility parameter for multiple interfaces. Use of spread spectrum to reduce interference and for efficient high speed mobile transmission. Increase data rates in mobile communication to 100 Mbps or even more. There would be better synchronization for multimedia applications in wireless networks. The next generation networks would provide efficient paramount application services of voice-over IP (VoIP), video on demand (VoD), IPTV, virtual private networks (VPNs), multimedia services, public network computing (PNC), connectivity services, e-commerce, call centre services, and interactive video gaming. The operational and management functionality of the next generation networks are based on open standards instead of vendor specifics which is useful for interoperability between devices and irrespective of supplier. Furthermore, telecommunication industry use these point to rate the QoS of network. These next generation networks would use more efficient features of bandwidth broker in order to provide better QoS. These bandwidth broker have effect on policy control, policy based admission control, accounting, customer billing management, authorization and authenticating end customers, network management functions and both inter and intra domain routing. The major task of bandwidth brokers is to provide admission control in order to decide whether an incoming "resource reservation request" will be accepted or not. When two network domains want to communicate then service level agreements (SLA) occurs, where one domain is the service provider and the other domain is the customer. In NGN, SLAs are assumed to be bilateral, between peer domains where bandwidth brokers acts as agents whose functional responsibilities include the implementation of the technical aspects of the agreements. The quality of service (QoS) in NGN provides SLA guarantees for the better performance. Therefore, by adopting these measures and mechanisms the quality of the services of the next generation networks will significantly increase to provide better performance.

## 5. CONCLUSION

Maintaining the quality of service and mobility management in mobile communication is very important. When handover occurs between heterogeneous networks, which are using different technologies then mapping operation of different factors like QoS parameters, mobility and security has to be done. There is concern how to make use of the effective data rates in overlapping region, how to select an appropriate wireless interface in mobile devices, bandwidth fluctuation, handover processing and delays. Proposed solution for dealing with vertical handovers are to develop new location aware mobile nodes pattern reorganization mechanisms, which consist of intelligent detection of mobile nodes patterns and routine. When developing new mobile devices, we can add new functionality; by using that mobile device will be able to control handover itself. The heterogeneous networks can use radio resources management for developing new software for reconfigurable radio management system which should use economical adaptive antennas in MIMO radio channels, which can work on different technologies i.e., WLAN, Bluetooth, etc to improve performance.

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**ON THE NEED OF ESTABLISHING DATA VALIDATION  
RESEARCH HOUSES IN THE DEVELOPING COUNTRIES**

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**ABSTRACT**

In this competitive age, the managers in the organizations (public as well as private) have to make certain decisions for achieving set targets in the business activity under their control like production, agriculture, population, banking, healthcare, industry and environment etc. This decision making is required at each managerial level right from Planning to Control.

Data is used for exploratory / empirical investigational (economics or medical) studies and for developing official statistics/economic indicators to be used by the planners, policy makers and researchers in internal / external environment of the organization(s) like projected cash flows in banking sector, line losses in energy and other utilities and planning / scheduling and coordination in production management etc. The use of reliable information has therefore, risen to primacy level in decision making. The challenges of corruption and bad governance in developing countries can also be minimized through better policies and planning based on unbiased decision making.

This paper seeks to quantify importance and utility of information for decision management, identify the disturbances faced with respect to availability of reliable information as per requirement of a particular business environment and to suggest measures for ensuring valid information for unbiased decision making that will lead to overall development and good governance in the developing countries.

**KEY WORDS:**

National Statistical Organizations (NSOs), capacity building, data power, human resource, governance, data validation house.

**1. INTRODUCTION**

1.1 The governance and economics of development of a country refers to sum total of exploitation of its available natural resources plus external resources by the decision makers of the state through their optimal management which includes identification of potential resources (Physical, HR, Financial), cost factor advantage, strategic formulation and developing short / medium / long term mechanism, for achieving the set target(s).

- 1.2 Managers have to take certain decisions for achieving the set targets effectively in the organizations (public / private) effectively. The decisions are taken by the Managers both under certainty or uncertainty conditions with specific strategy management [6].
- 1.3 Decisions making is pivotal for promoting a business activity i.e. production, agriculture, population, banking, healthcare, industry etc. and even in the human resource management. Whatever may be the form, type or nature of a decision (general or technical), it has far reaching impact on the internal as well as external environment of the organization and resultantly on the overall economic development of a country. The decision making is therefore required to be unbiased at all managerial levels right from policy planning to control which requires correct and reliable data.

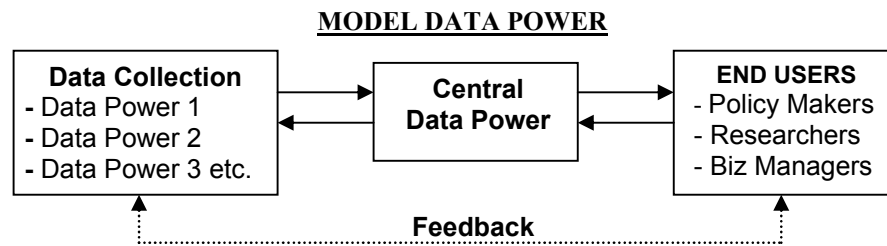
## 2. ANALYTICAL DISCUSSION

- 2.1 Information has emerged to primacy as key resource at the centre of organizational life [4] and is being used for all types of exploratory / empirical research studies. The investigational type data relating to medical or agriculture fields where “testing of hypothesis for treatments” is applied, requires accuracy as the application of results of such a research may pose threat to the life of individuals.
- 2.2 National Statistical Organizations (NSOs) in almost all developing countries have been established for data management, preparing official statistics for personnel performance / appraisal systems or technical issues like revenue recoveries in the utilities for future predictions covering a wide variety of social, economic, industrial and demographic aspects but without proper programmed responsibility i.e. taking into account the user needs [3].
- 2.3 Official statistics and economic indicators in the developing countries are open to certain observations from quality end like customization of data input formats, data reporting systems (sample selection, questionnaire designing and outliers present in the data etc). These factors provide rationale for establishing valid decision management capacity building in the organizations.

## 3. DECISION MANAGEMENT CAPACITY BUILDING

- 3.1 Capacity building of any managerial activity generally refers to tapping of various systems differentials and resources applied in a business scenario for achieving the set objective(s) of that activity. Decision management capacity building includes besides infrastructure / systems, physical, financial, HR resources and information. The quality of data and its validity are special features of decision management.
- 3.2 **Data Quality.** Like quality of finished products, the data quality is equally important in decision making. The essential characteristics of data are that it should be purpose oriented, correct, timely, complete, and reliable. Quality of data is affected if data input forms and questionnaires for data reporting are not customized and priorities for data collection for future targets are not reviewed regularly with respect to their relevance by the end users.

- 3.3 Decision management in any activity is correlated positively with quality of data. The quality of data could be improved if data benchmarks are well defined and proper data collection, reporting and filtration systems are developed giving rise to Data Powers development at the Organization and central levels, as given below [6].



- 3.4 **Data Validation.** Decision management in any activity is correlated positively with quality of data and its validity with added expertise of HR for date managing. Therefore, responsibilities of various roles of HR involved in data collection, its analysis and interpretation and decision management are to be well defined. They are to be enriched with proper communication style, statistics knowledge, skills and attitude (KSA) required through training and development for effective role playing and enhancing capacity building of HR so that if something goes wrong at any managerial stage, the specific role player could be held responsible and accountable for this act which will also create merit culture in the organization. This will also help developing infocracy culture [2] in the organizations.
- 3.5 For checking whether data in question is reliable, some mechanisms have to be developed within Data Power and in external environment. Besides routine application of statistical techniques / formulae for checking validity of data, there should be expertise available for comparing the data as per their experience and against some well established indicators / bench marks developed by the developed countries' NSOs and other formations like IMF, World Bank, Asian Development Bank. This leads to necessity of establishing of 'data validation houses'. On the panels of such data validation research houses at central level in the country, will be expert personnel of Statistic, data mining, Information Technology (IT) and management vistas (both from academician and Industry / end users).

#### 4. RECOMMENDATIONS

- 4.1 Besides developing Data Powers in developing countries at organizational and central levels, data validation research house(s) be established at central level for validating the data collected by the NSOs, and other agencies of the country.
- 4.2 Awareness in the masses for importance of reporting correct information on enquiry be developed through media.
- 4.3 Training and development of decision makers (executives / Info managers / line managers) for improving their KSA towards decision management capacity building be ensured through refresher courses / case studies / tailor made courses / seminars / workshops for better analysis and interpretation of data profiles.

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**DETERMINATION OF RISK FACTORS THAT CAUSE  
OVERWEIGHT TENDING TO OBESITY:  
A Cross-Sectional Sample Based Study of Female Youth of LCWU, Lahore, Pakistan**

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**ABSTRACT**

A cross sectional study was carried out and data was collected from a sample of size 378 out of 7058 students of Lahore College for Women University, Lahore, Pakistan using "Youth Obesity Questionnaire". The main objective of this study was to determine risk factors that cause overweight tending to obesity among female youth. Body Mass Index (BMI) was calculated to assess the weight status and was used as dependent variable. Multiple Linear Regression was used and risk factors mother's age at the time of baby's birth, birth weight, mother's BMI, vegetable consumption, time spent in study, working on computer and watching T.V., breakfast skipping, fruit consumption, age, physical activity, father's BMI and fast food consumption were found significant. Physical activity, fruit consumption and vegetable consumption had negative relationship whereas mother's age at the time of baby's birth, birth weight, mother's BMI, time spent in study, working on computer and watching T.V., breakfast skipping, age, father's BMI and fast food consumption had positive relationship with overweight tending to obesity among female youth.

**KEY WORDS**

Risk Factors, Body Mass Index, Overweight, Obesity, Multiple Linear Regression.

**INTRODUCTION**

Obesity is defined as surplus fat stored in body which instead of burning remains increasing. Obesity is considered as a chronic disease nowadays. It is crystal clear that the problem of obesity is global and increasing day by day and youth obesity is a major health care challenge of the 21<sup>st</sup> century.

According to Weight-control Information Network (WIN), an information service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); Most health care professionals consent that females with more than 30% fat stored in body are obese. Body Mass Index (BMI) is considered as more accurate to assess anyone's status of being underweight, normal weight, overweight and obese. An individual having BMI less than 18 is considered as underweight, having BMI 18 or more and less than 25 is considered as normal weight, having BMI 25 or more but less than 30 is considered as overweight and having BMI 30 or more is considered as obese.

Fat is located on different parts of body. Fat is gained around waist, hips, abdomen, neck and face which consequently increase body weight. Chances of being overweight or

obese of females are much more than males. There is not a sole factor which causes to be seriously overweight. Many other factors like genetic or hereditary factors, environmental factors, psychological factors etc. may interact and play a role to becoming obese.

For diagnosis of obesity, a term BMI is used which is a ratio of weight and square of height.

$$BMI = \frac{Weight(kgs)}{Height(cms) \times Height(cms)} \times 10,000$$

Salazar-Martinez et al. (2006) found that age, years of education, vitamin intake and participation in sports were correlated with overweight and obesity.

Fast food consumption and sedentary behaviour were risk factors of overweight in children and adolescents (Johnson-Taylor and Everhart 2006).

Parental and children overweight/obesity, were significantly associated (Bralic et al. 2005).

Parental overweight and obesity, low socioeconomic status and high birth weight were associated with overweight and obesity. Obese children were consuming less quantity of fruits and vegetables and more quantity of chips and lemonades (Danielzik et al. 2004).

According to He et al. (2004), higher consumption of fruits and vegetables was inversely associated with risk of obesity.

Breakfast skipping was associated with overweight (Berkey et al. 2003).

A study was conducted by T.H. Jafar, N. Chaturvedi and G. Pappas on 8972 people aged 15 or more and it was concluded for the entire population on the basis of the selected people that approximately 25% and 10.3% of the population in Pakistan were overweight and obese respectively. Greater age, high intake of meat and high or very low economic status were associated with overweight and obesity. It was also described that prevalence of obesity was more among urban literate women.

## OBJECTIVES

Intended objectives include

- Find prevalence of overweight tending to obesity among female youth of Lahore College for Women University, Lahore, Pakistan.
- Determine risk factors which are significantly associated with obesity.
- Find the strength of association with which risk factors are associated with obesity.
- Select a suitable prediction model for determining the risk of having obesity.
- Use the selected model for prediction purposes.

## RESEARCH METHODOLOGY

### Data Collection

A cross-sectional study regarding the problem of overweight and obesity was carried out that included the female youth of Lahore College for Women University, Lahore. A simple random sample of size 378 was drawn from 7058 students enrolled at LCWU and data was collected using a well constructed questionnaire titled as "Youth Obesity

Questionnaire". BMI was used to assess the weight status of students. Study period was from December, 2008 to March, 2009.

Risk factors under study were Age, Birth weight, Household income, Self perception about weight, Ever tried to lose weight, Mother's age at the time of baby's birth, Mother's BMI, Father's BMI, Vegetables unaffordable, Vegetable consumption, Fruit consumption, Rice and wheat consumption, Sweetened beverages consumption, Unhealthy food consumption, Breakfast skipping, Eating snacks between meals, Taking meals while watching T.V., Fast food consumption, Weight consciousness, Physical activity, Participation in sports, Afternoon Nap, Time spent in study, working on computer and watching T.V., Food consumption in the state of anger, depression or boredom, Celebration of happy moments with eatables, Drug usage and Hypothyroidism.

Linear Trend Test was carried out to find degree of linear trend or correlation and Kendall's tau b was used to measure whether there is any increasing or decreasing trend.

Multiple Linear Regression was used. Dependent variable was Body Mass Index (BMI) and independent variables were all risk factors.

### Multiple Linear Regression

A regression model that involves more than one regressor variable is called a multiple regression model. The response  $y$  may be related to  $k$  regressor or predictor variables. The model

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon$$

is called a multiple linear regression model with  $k$  regressors. The parameters  $\beta_j, j = 0, 1, 2, \dots, k$  are called the regression coefficients.

## STATISTICAL ANALYSIS AND INTERPRETATION

Analysis was performed using SPSS (Statistical Package for Social Sciences) for Windows, version 13.0.

Results were presented in two sections:

- Descriptive Section
- Analytical Section

### Descriptive Section

In descriptive section, cross tabulations of various risk factors and weight status of students were constructed and described. In this study, 378 students were selected by using simple random sampling, out of which 60 had BMI less than 18 (underweight), 184 had BMI 18 or more but less than 25 (normal weight), 98 had BMI 25 or more but less than 30 (overweight) and 36 had BMI 30 or more (obese).

### Analytical Section

- Bivariate Analysis
- Diagnostic Checks
- Multiple Linear Regression

**Bivariate Analysis**

**Table**  
**Bivariate Analysis**

Variable	Value of linear trend test $\chi^2_{(1)}$	p-value	Kendall's Tau-b
Student's age	19.890	0.000	0.204
Years of education completed	15.194	0.000	0.177
Birth Weight	40.603	0.000	0.311
Waist-to-hip ratio	11.397	0.001	0.161
Household income group per month	0.063	0.801	-0.004
Self perception about weight	3.313	0.069	-0.079
Ever tried to loose weight	1.329	0.249	-0.057
Age at onset of overweight or obesity	42.034	0.000	-0.561
Mother's age at the time of baby's birth	146.437	0.000	0.567
Mother's body mass index	144.235	0.000	0.563
Father's body mass index	131.549	0.000	0.533
Vegetables unaffordable	9.918	0.002	0.150
Vegetable consumption	132.456	0.000	-0.570
Fruit consumption	77.965	0.000	-0.444
Rice and wheat consumption	0.232	0.630	0.019
Beverage consumption	95.170	0.000	0.472
Unhealthy food consumption	91.990	0.000	0.459
Breakfast skipping	81.433	0.000	0.444
Snacks between meals	49.322	0.000	0.346
Meals while watching T.V.	41.505	0.000	0.314
Fast food consumption	103.728	0.000	0.485
Weight consciousness	1.070	0.301	-0.037
Physical activity	76.784	0.000	-0.419
Participation in sports	60.140	0.000	-0.381
Afternoon nap	17.668	0.000	0.217
Time spent in study, working on computer and watching TV	132.856	0.000	0.524
Food consumption in the state of anger, depression or boredom	5.831	0.016	0.119
Celebration of happy moments with eatables	5.331	0.021	0.113
Drug usage	7.565	0.006	0.123
Hypothyroidism	41.380	0.000	0.304
Backache	0.991	0.320	0.042
Joint pain	5.713	0.017	0.126
Constipation	8.208	0.004	0.146
Depression	1.546	0.214	0.062
Ulcer	43.314	0.000	0.303
Feel tired, all the time	26.684	0.000	0.247
Sluggish due to overweight	22.703	0.000	0.413
Depression or low self-esteem due to being overweight	13.621	0.000	0.320

### Multiple Linear Regression

Multiple correlation coefficient R has value 0.865 which shows that high positive relationship exists between dependent variable BMI and combined effect of all independent variables (risk factors) in the model.

Coefficient of multiple determination  $R^2$  has value 0.749 indicating that 74.9% of the variation in BMI has been explained by its linear relationship with regressors mother's age at the time of baby's birth, birth weight, mother's BMI, vegetable consumption, time spent in study working on computer and watching TV, breakfast skipping, fruit consumption, age, physical activity, father's BMI and fast food consumption. Adjusted  $R^2$  is 0.741, so loss of predictive power or shrinkage by using this model is  $(0.749-0.741)0.8\%$ .

**Table**

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.063	1.873		.033	.973		
ag_mr_br	.212	.046	.175	4.599	.000	.474	2.110
brth_wt	2.194	.268	.280	8.188	.000	.587	1.702
mr_bmi	.111	.037	.114	2.953	.003	.457	2.189
veg_con	-1.082	.335	-.113	-3.230	.001	.565	1.770
st_com_tv	.147	.040	.132	3.702	.000	.538	1.859
brk_skp	.827	.288	.087	2.872	.004	.750	1.334
fruit_con	-.648	.298	-.068	-2.175	.030	.694	1.440
age	.185	.063	.079	2.936	.004	.944	1.059
phy_act	-.606	.287	-.064	-2.110	.036	.745	1.342
fr_bmi	.085	.039	.084	2.168	.031	.457	2.190
fast_fd	.636	.322	.065	1.977	.049	.645	1.551

a. Dependent Variable: bmi

For the purpose of fitting a model, stepwise multiple linear regression was used. The final fitted model is

$$\begin{aligned}
 BMI = & 0.063 + 0.212(ag\_mr\_br) + 2.194(brth\_wt) + 0.111(mr\_bmi) - 1.082(veg\_con) \\
 & + 0.147(st\_com\_tv) + 0.827(brk\_skp) - 0.648(fruit\_con) + 0.185(age) \\
 & - 0.606(phy\_act) + 0.085(fr\_bmi) + 0.636(fast\_fd)
 \end{aligned}$$

Constant in the model is 0.063 which is meaningless because it is expected value of BMI when all variables included in the model are assumed to have value 0. But some variables in the model like mother's age at the time of baby's birth, birth weight, mother's BMI, student's age and father's BMI can never assume value 0.

One year increment in mother's age at the time of baby's birth brings about 0.212 increase in BMI of the females of ages from 15 to 26 years as compared to the females of the same age group who had younger mothers by 1 year at the time of their births keeping birth weight, mother's BMI, vegetable consumption, time spent in study, working on computer and watching T.V., breakfast skipping, fruit consumption, age, physical activity, father's BMI and fast food consumption constant.

The model suggests that individuals who had higher birth weights by 1 kilogram are likely to have increased BMI by 2.194 in their adulthood than individuals with lower birth weights, keeping effect of all other regressors constant.

The regression coefficient of mother's BMI is 0.111 as given by the model is indicating that the students born to mothers with higher BMI by 1 have increased BMI by 0.111 as compared to the students born to mothers with lower BMI, keeping effect of all other regressors constant.

According to the model, individuals who consume 3 or more servings (1 serving =1/2 cup) of vegetables on an average day are likely to have 1.082 reduction in BMI as compared to those who consume less than 3 servings on an average day, keeping effect of all other regressors constant.

Spending one hour more in study, working on computer and watching T.V. leads to increment of 0.147 in BMI, keeping effect of all other regressors constant.

Skipping breakfast on regular basis, results in increase of 0.827 in BMI as compared to those who do not skip breakfast keeping effect of all other risk factors constant.

According to the model, the individuals who consume 4 or more servings (1 serving =a medium sized whole fruit) of fruit on an average day are likely to have 0.648 reduction in BMI as compared to those who consume less than 4 servings on an average day, keeping effect of all other regressors constant.

Due to advancement of one year in age, rise in BMI is 0.185 as suggested by multiple linear regression model, keeping effect of all other regressors constant.

Increased physical activity for at least thirty minutes during leisure time on an average day brings decline of 0.606 in BMI, keeping effect of all other regressors constant.

The regression coefficient of father's BMI is 0.085 as given by the model indicates that the students who have fathers of higher BMI by 1, have increased BMI by 0.085 as compared to the students having fathers with lower BMI, keeping effect of all other regressors constant.

Frequent consumption of fast food from restaurants produces increase of 0.636 in BMI as compared to those who eat fast food from restaurants occasionally, keeping effect of all other regressors constant.

### **Prediction**

A 19 years old girl, whose birth weight was 3.63 kilogram, is not skipping breakfast on regular basis and consuming 3 or more servings of vegetables, 4 or more servings of fruit on an average day, her mother's age at the time of her birth was 24 years with BMI 23 and her father's BMI is 21, she is spending 7 hours in study, working on computer and watching T.V., consuming fast food from restaurants occasionally and engages herself in physical activity for at least 30 minutes during her leisure time on an average day. Then, according to fitted model, her predicted BMI is 19.67.

## CONCLUSIONS

Bivariate analysis of various risk factors show that a number of risk factors are positively and significantly associated with overweight tending to obesity including student's age, years of education completed, birth weight, mother's age at the time of baby's birth, mother's body mass index, Father's body mass index, Vegetables unaffordable, Sweetened Beverages consumption, Unhealthy food consumption, Breakfast skipping, Snacks between meals, Meals while watching T.V., Fast food consumption, Afternoon nap, Time spent in study, working on computer and watching T.V., Food consumption while in the state of anger, depression or boredom, Celebration of happy moments with eatables, Usage of sleeping pills or any antidepressant drugs and Hypothyroidism. Some other factors like age at onset of overweight or obesity, Vegetable consumption, Fruit consumption, Physical activity and Participation in sports are found negatively and significantly associated with overweight tending to obesity.

The significant association of age with weight problem, in this study, suggested that with growing age individuals tend to accumulate weight. Though the age range was not large in the selected sample, still accumulation of weight with age is found to be significant. Birth weight is another factor found significantly associated with weight which suggests that individuals born with higher weights may have tendency of being overweight in their adult life. The positively significant association of mother's age at the time of baby's birth suggests that babies born to older mothers may develop a tendency of getting overweight in their adulthood. This study also says that the female subjects who have overweight or obese parents may have tendency of being overweight or obese. It means family history of overweight or obesity also plays an important role in having tendency of overweight. It is evident from the study that female individuals who find vegetables unaffordable or who consume unhealthy food items like sweetened beverages, sweets, chocolates etc. are more likely to be overweight tending to obesity. It is also found that female youth who skip breakfast on regular basis, tend to eat more in the rest of the day, leads to excessive calories intake. Breakfast skipping even decreases their metabolic rate making them less active, causing less burning of calories. Habits like snacking between meals, eating while watching television, taking overmuch afternoon nap and sedentary life style lead to overweight tending to obesity. Eating out at fast food restaurants is also a cause found to be significant leading to overweight.

Some psychological factors like eating while in the state of anger, depression, or boredom, rewarding themselves with eatables are significantly linked to being overweight. Presence of thyroid problem called hypothyroidism is also found a cause of overweight among female youth.

The study also reveals that earlier the age at which individuals start getting overweight, the more weight they gain as they grow older.

The study suggests that healthy influences like eating vegetables, fruits and being physically active has negative association with being overweight and hence it may prevent the problem of overweight tending to obesity among female youth.

Overweight tending to obesity is significantly found to be the cause of some consequential factors like joint pain, constipation, ulcers, feeling tired, being sluggish all

the time due to overweight, among the female youth of LCWU. It is also found to be associated with having depression or low self-esteem due to being overweight.

The females, who become obese in their youth, can suffer from different chronic diseases in their old age.

Diseases which are included in severe consequences of obesity, in the old age of females, are Heart disease, High cholesterol, Cancer, Diabetes, Gallstones and gallbladder disease, Non Alcoholic Steato Hepatitis (NASH) or in simple words fatty liver disease and Polycystic ovary syndrome.

Awareness about the risk factors that cause overweight tending to obesity needs to be imparted amongst youth to prevent them from getting overweight and obese, also to keep them away from severe diseases.

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**REHABILITATION OF AGRICULTURE IN AFGHANISTAN (1979-2006)**

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**ABSTRACT**

The main objectives of the study were to review the Agricultural production system in Afghanistan during pre war, war and post war periods. Contribution of Donor Agencies during war and after war period for rehabilitation of agriculture sector. The study is based on the secondary sources of data obtained from the national and international organizations.

In order to precise the nature of the Afghan agricultural production systems before the war, the Authors have tried to analyze its strengths and weaknesses. It was observed that the Afghan agricultural production systems are the result of the adaptation of the Afghan farmers to their environment.

While examining the changes in agricultural production during the war, It was observed that irrigated land and production had decreased about 50%, making the country dependant on imports, especially that of cereals. The most affected sector was the livestock, decimated by the Soviet troops and it was difficult to restore without adequate resources and technical inputs for years to come. During war period the Afghan farmers has discovered the benefits of light mechanization and plantation of fruit trees that went on in a promising pace while both these activities were encouraged and supported by the NGOs.

The subsequent rehabilitation period has been a complete failure for the Afghan farmers, in spite of the efforts made by the international community in this sphere. Not only drought had seriously affected the production level, but also the efficiency of the international support was negligible. It was observed that during war period Afghan farmers concentrated their effort on wheat cultivation for the subsistence of their family and tried to earn some cash from poppy cultivation.

In order to bring the desired improvement in the rehabilitation of agriculture sector in Afghanistan, there is need for refocusing on the rehabilitation of water resources, soils conservation and forestry. There is also need for reshuffling of the government organs to pave ground for formation of a strong central government having full domination on the affairs of the country.

**KEYWORD:**

Agriculture Production System, Rehabilitation, Donor Agencies.

## 1. Introduction

### 1.1 Background of the Study

Agriculture was the main source of living for Afghans. Since 1979, nearly 30 years from now, Afghanistan became the theatre of endless violence and fighting. Everything started through the intervention of Soviet Union army. Then for 10 years, the soviet pummeled Afghanistan, mining the country, terrorizing and slaughtering its people. The United States of America responded by throwing billions of dollars into the Afghan war against the Soviets, relying on Pakistan to implement the resistance. Pakistan encouraged an Islamic Fundamentalist approach to mobilize against the Soviets. Harnessing of the anger of the Muslim world over the invasion, the United States and Pakistan supported an Islamic war against the Soviet Union. Fundamentalists from throughout the Muslim world, including Osama bin Laden, poured into Pakistan and Afghanistan. The Afghan freedom fighters, the Mujahidin were fierce, driven by anger, moral zeal and equipped with western arms. Ten years later, in 1989, the Soviets withdrew from Afghanistan and the cold war was won.

For Afghans, the results of this war was devastating: 1.5 million dead, 5 millions refugees, death of its intellectual community, drug affectation and trafficking, millions of landmines, widows, orphans, and extremist Islamic groups present in the country armed with some of the deadliest modern weapons. The ground was ripe for disaster, but the world looked away from impending crisis after the collapse of communism, the west left the Afghans in a political vacuum. During some years, between 1992 and 1996, the Mujahidin turned against each other, each group trying to take control of Kabul. In 1994, the Taliban's movement appeared and started to take control of some of the Southern Provinces until they took Kabul, without fighting, in September 1996. The Taliban's, largely comprising war orphans rose in strictly male societies, some of them educated in Pakistani madrassas<sup>1</sup>, were able to take over 95% of Afghanistan because they promoted law and order and actually brought a real security in the areas they controlled. On the other hand, they forbid music, dancing, every form of enjoyment still remaining of Afghan culture, they forbid work for women, and they had poor technical knowledge and communication Technology, making them incompetent for administrating the vast territories they had conquered. Another weakness they had was their poor communication with the western world for getting benefit for the country and their people.

On September 11, 2001, the world was shown the devastating consequences of the extremism in the world and deadly threat it posed to the international community. Islamic extremists have used Afghanistan as one of their bases but none of the suspects in the World Trade Center attack<sup>2</sup>. The United States of America started war in Afghanistan, allied with the Northern Alliance factions against Taliban's and Osama bin Laden. The social fabric and economic base of the country have been devastated. The financial, institutional and physical infrastructures are almost totally paralyzed or destroyed. Health, education, and other services are virtually inoperative. Agriculture, which is the back bone of Afghanistan economy also suffered.

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<sup>1</sup> Islamic religion schools

<sup>2</sup> New York 1993

### 1.2 Objectives of the Study

The main objective of a study was to know pre war, war, and post war period (1979-2006) conditions of Afghan farming systems.; to know the problems of Agriculture production systems in Afghanistan and to review the policies, plans developed by the Government in collaboration with International Financial Institutions regarding rehabilitation of agriculture sector in Afghanistan, and suggest remedies for its improvement.

### 1.3 Methodology Followed.

The study was based on the secondary data obtained from Afghanistan Government Departments Non governmental organizations and from International organizations who are assisting Government of Afghanistan in Planning, Restructuring and Reorganization of Economics system of Afghanistan and specially Development of Agriculture Sector and Rehabilitation of Rural peoples of Afghanistan which Constitute 75% of total population of the country.

## 2. AGRICULTURE PRODUCTION SYSTEMS PRE WAR PERIOD (1978-79)

In the 1970's there was a vigorous upward trend in agricultural production in Afghanistan. During the decade up to 1973, annual wheat imports averaged 115,000 tons. By 1975, the country was self-sufficient and average wheat yields had grown from 832 kg/ha in 1963-64, to 1,131 kg/ha in 1977-78. Although the rate of growth was significant, yields were still low compared with the rest of the developing world. Agricultural products were major export commodities, and totaled nearly 70% of prewar export earnings. Agricultural imports had fallen from 24% in 1975 to 15% of total imports in 1978.

Cereal crops were grown on about 87% of the total cultivated land with wheat (57%) being the principal edible crop. The total per capita consumption of wheat by Afghans has been the highest in the world (180 kg/year) and provided nearly 80% of calorific intake. Other cereals included maize, barley, and rice. Irrigated land produced 77% of all wheat, and 85% of all food and agricultural crops<sup>3</sup>. Industrial or cash crops included cotton, sugar beet, oilseeds, and fruits.

Livestock were an important integral component of the small farm production systems of Afghanistan for their products and for animal power, although mechanization was just beginning. Tractors were of growing importance in the larger formally operated irrigation schemes and farms such as the Helmand valley but animal power was still predominant.

It was estimated that in 1979 the kuchies reared 30% of the national sheep herd, 39% of the goats, 5% of cattle, 54% of horses, 14% of donkeys, and 63% of Afghanistan's camels.

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<sup>3</sup> ASA, 1988

### 3. ANALYSIS OF AGRICULTURAL PRODUCTION SYSTEMS

The year 1979-80 can be taken as the base since it marks the beginning of the current disturbances and information for that year is relatively complete.

**Table 1: Year-wise, Crop-wise Area and Productions in Afghanistan**

Crops	1978-79		1989-90		2002-2003	
	Area	Prod.	Area	Prod.	Area	Prod.
Wheat Irrigated	1,300	2,255	1,030	1,580	1,062	3,017
Wheat Rain fed	1,048	558	715	378	1,237	1,346
Maize	484	780	458	587	298	298
Barley	310	325	256	238	-	345
Rice	210	428	175	280	-	388
Grapes	70	440	67	281	52	250
Other fruit	70	350	48	220	58	230
Potatoes	18	250	17	169	20	280
Other veg.	76	516	72	367	57	550
Cotton	112	132	50	43	-	15
Sugar beet	5	73	3	20	2	1
Sugarcane	4	64	3	26	3	27
Oilseeds	50	35	50	24	25	17

Note: (Area - 000 Ha; Production – 000 Mt)

Source: **UNOCHA 1993, Facts from SCA Surveys**

It is observed from above that irrigated wheat is the major crop with 1.3 millions hectare of land representing 34 % of the total cultivated area and 52 % of the irrigated area, producing 52 % of the total cereals production. Rain fed wheat was occupying 1.048 millions hector of land or 27% of the total cultivated area and only producing 13% of the total cereals production. Fruits, vegetables and cash crops are also sown during said period.

It is concluded that afghan agricultural production systems are based on irrigated wheat, which is a main crop for livelihood of afghan people. The other cereals crop such as maize, barley and rice covers small area. Maize and barley are sown for animal feeding, and rice is sown where there is sufficient water. Other crops include fruits especially grapes, vegetables and some industrial crops like cotton, sugar beet, sugar cane, and oil seeds. Afghan farmers are using 52% of their irrigated land for cultivating irrigated winter wheat. Wheat is the main cereals crop, because it is vital for the farmer and his family, therefore, by cultivating it on their irrigated land, Afghan farmers try to ensure their subsistence and the subsistence of their family. Before the war, Afghanistan was self sufficient in wheat.

### 4. AGRICULTURE FARMING DURING WAR PERIOD (1979-1989)

During the Jihad years, the Russians bombed the irrigation canals and karezes and slaughtered the oxen in order to weaken the resistance movements. Through all these

disasters, how did the Afghan agricultural production systems survived? And how did their environment changed? All these problems are discussed in following Paragraphs.

**4.1 Effects of War on Climatic Changes.** The last catastrophic drought occurred in Afghanistan from 1999 and continued till 2006. It is very unfortunate indeed that the number of people in remote areas who lost their lives is unknown. Based on reports from the farmers and the statements that the water table in the wells had decreased every year.

**4.2. Decrease of Irrigated and Rain fed land (1978-79 to 1990-91).** The total area cultivated exceeded from 3.8 millions ha to 2.8 millions ha, equivalent to a decrease of 26%, and the irrigated area from 2.5 millions ha to 1.5 millions ha, equivalent to a decrease of 40%. Rain fed cultivation from 1.3 millions ha to 0.8 millions ha, equivalent to a decrease of 38%.<sup>4</sup>

**4.3 Non-availability of Inputs** a province wise survey was conducted to know availability of improved seed and fertilizers (Urea and Phosphorus) to farmers at village level. Surveyed villages in the North West (Ghor and Heart), North (Balkh and Jawzjan), North East (Badakhshan), East Central (Kapisa and Bamyan), South West (Zabul) and South East (Paktia) as a whole reported shortages of improved seeds, and fertilizer. The average for all zones was that 97% of the surveyed villages use the averagely only 45%, improved seed 36% urea and 22% phosphorus respectively.

## 5. ANALYSIS OF THE AGRICULTURAL PRODUCTION DURING 1989-1990

**It is observed from Table 1** for 1978-79 and 1990-91 shows that the total cultivated area has dropped from 48% to 35 % of the total arable land between these two periods, and irrigated land from 66% to 53% of cultivated land. The difference between total cultivated land and total irrigated land is rain fed land that also decreased considerably. And, thus, the total irrigated area dropped from 25000 km<sup>2</sup> to 15000 km<sup>2</sup> or 40%. When we know that irrigated land is the secure part of the Afghan agricultural production system, such a drop may have significant negative impact on production, a 52% drop in food grain production per capita.

The war in Afghanistan resulted in a degradation of the natural environment, impoverishment of the soils in organic matter, erosion, and continuous deforestation. At the same time, during the last decade, there was also a degradation of the climate conditions with a very severe drought period marked by irregular precipitation, higher mean temperatures, and replacement of a part of the snow by rain. The irrigation systems were damaged but not destroyed, agricultural inputs were available, but adapted seeds, especially wheat seeds, were difficult to find.

As a result, from self-sufficiency in 1979 Afghanistan fell down to dependency on imports.

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<sup>4</sup> Agricultural Survey of Afghanistan, Swedish Committee for Afghanistan, 1992.

**In parallel, poppy cultivation increased tremendously, making Afghanistan first world exporter.** The Afghan agricultural production systems became simpler in front of the priority for farmers to produce wheat to feed their family. During all these difficult years, farmers were able globally to feed their family. This is due to their work and, as emphasized before, some specific tenacity qualities of the Afghan mentality. This is also due to the good adaptation of the farming systems to the environment.

## **6. ACTION PLAN FOR REHABILITATION OF AGRICULTURE SECTOR (2002-2006).**

Agriculture remains the backbone of the Afghan economy, constituting 53% of GDP and providing employment for about 67% of the labor force. Agricultural sector in Afghanistan has the potential to play a leading role in reducing poverty, eliminating poppy cultivation and the overall economic growth prosperity of the country. Although production in the recent three years, especially with respect to the country's staple crop of wheat is encouraging, agriculture has yet to reach its performance level of the late 1970's.

### **6.1 Development of Irrigation System.**

The Action Plan is focusing on small and medium irrigation systems and the role of Mirab<sup>5</sup> is understood. Traditional irrigation systems are based on karezes and canals; their maintenance generally is well managed by the community itself. Just due to the critical economical situation of the communities, or the drought, or both, in some cases these ones are not able to improve, or rehabilitate or maintain the system. In this case outside assistance is required.

### **6.2 Enhancement of Crop Production.**

Wheat is the staple food grain, followed by maize, rice, barley, pulses, and vegetables.

High quality Seed and Planting Material (SPM) is a very limiting factor of production, the benefit of other inputs such as fertilizer, farm power; crop protection, irrigation and credit are reduced if SPM is of poor quality. There are an increasing number of private tractors in the country and it is probable that farm mechanization will proceed without much external interference from donors, Government or NGOs, except credit facilities, required by many farmers.

### **6.3 Crop Protection Measures.**

The most serious pests of crops in the North are the Moroccan locust (*Dociostaunus maroccanus*) and to a lesser extent, the Italian locust (*Calliptamus italicus*). An almost equally serious pest of wheat is sun pest (*Eurygaster integriceps* and other species) which over winters in the mountains and attacks grain fields in the spring. The yellow rust is a major factor of drop in the production of wheat and obliges normally those involved in field research to propose new varieties constantly to the seed producers because after 4-5 years, any variety becomes sensible to yellow rust. Powdery mildew is an important disease of grapes.

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<sup>5</sup> Mirab: responsible of the distribution of the water in each village, a very important person.

#### **6.4 Promotion of Horticultural crops**

The horticultural sector was producing 37% of exportations before the war, dried fruit alone representing 30%. Grapes either as fresh fruit or as dried raisins were the main export product. Almond was also an important exportation product, and, due to its easy storage and transportation, is an attractive production for the small producers in remote areas. Fruit, both fresh and dried, forms an important component of the national diet. Fruit are providing a high added value to farmers and are attractive as an alternative to poppy cultivation, as well as an opportunity to returning refugees and to provide jobs for women. Vegetable crops are grown largely for local consumption, except around the cities, where it constitutes an important source of income for the farmers.

#### **6.5 Promotion of Animal Production and Health**

Before the war livestock contributed 18% of the country's domestic product. The sedentary communities owned the majority of all livestock, while an estimated 27% of the national flock belonged to nomadic and semi-nomadic communities. The main limiting factors of production were the provision of winter-feed and the animal diseases control.

#### **6.6. Development of Forestry and Natural Resources.**

While natural pastures may have staged a comeback during the war due to reduced grazing pressures,<sup>6</sup> deforestation has devastated remnant forest areas. The rehabilitation of forests may be a long term process, but the production of on-farm fuel energy and timber will be important for the longer term viability of agricultural production systems.

#### **6.7 Prohibition of Poppy Cultivation**

Given appropriate Government policies and incentives, it is reasonable to assume that poppy cultivation can be influenced by rehabilitation activities. In areas where it is practiced discussions and agreement with local leaders to reduce and phase out poppy production should proceed to the implementation of UN-supported rehabilitation. Increased poppy production is influenced by many factors including the breakdown in enforcement, alternative income-earning opportunities, easy marketing, and assured cash income and, in some parts of the country, by poverty and isolation. The introduction of acceptable new cropping patterns should be a high priority for the rehabilitation of the agricultural sector.

### **7. CONCLUSION**

An agricultural production system is the result of the adaptation of the farmer to his environment. The Afghan farmers despite facing immense problems are receiving insufficient assistance but they are trying to adapt themselves to what they have access to. As a proof of their resilient characteristics, the systems turned towards two essential productions for survival: wheat for feeding the family and opium poppy for income to maintain livelihood. While the Afghan agricultural production system, was strong and resilient before the war, during the war and until the collapse of the Talibans.

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<sup>6</sup> But this has to be verified because drought is an other important negative factor

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## TEACHING STATISTICS IN BUSINESS SCHOOLS

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### ABSTRACT

In this paper an attempt is made to highlight the issues related to teaching of Statistics courses to the undergraduate business students in Karachi City. These undergraduate students are required to take Business Research Methodology or Research Seminars during their final years for which Business Statistics and Statistical Inference are the pre-requisites. These subjects pose obstacles for many students in carrying out their Business Education smoothly as most of them do not have good Mathematics or Statistics background. Therefore, teaching Statistics successfully to such students is a major challenge for Statistics teachers. This paper highlights improvements regarding teaching of Statistics in Business Schools. It also discusses the need for a change in the methodology of teaching Statistics so as to enable the students to better identify the suitable statistical procedures and interpret statistical results in their research projects.

### KEY WORDS

Statistics Education, Business Schools, Teaching of Statistics.

#### **Subject Classification:**

Statistical Education: Statistical Education in Non-Statistics Degree Programs

### 1. INTRODUCTION

The author has been teaching Business Statistics or, generally speaking, courses related to Quantitative Methods at Business Schools in Karachi for the last few years. Since Statistics as a discipline is an offshoot of Mathematics therefore the readers may please ignore if I frequently mix up the status of the courses of Statistics and Mathematics together. Although at University level they are two independent departments but at tertiary level their role and teachers are the same.

There is common realization among Statistics and Mathematics faculty members in Business Schools that in social gatherings during interaction whenever you introduce yourself as Statistics teacher you face an awkward pause. The professionals in this field generally possess a repulsive attitude toward this subject. There are many issues both from the students and the instructor's side which need to be addressed in order to bring improvement in the understanding of the subject.

Some of them are the following:

- a) Fear of studying Statistics and Mathematics courses on the part of the Students
- b) Lack of Quantitative courses in the Program

- c) Adjustment to the changing environment
- d) Use of Statistical Packages like Microsoft Excel, Minitab or SPSS.
- e) Teaching Methods and Pedagogy
- f) Assessments and Evaluation of the students.

## **2. FEAR OF STUDYING STATISTICS AND MATHEMATICS COURSES**

During my teaching experience at Business School I came across several times with students who had completed all their professional courses and were hanged due to mathematics and statistics courses. One of the major reasons behind this dilemma is the low level of preparedness of students in mathematics before they come into their various programs in Business Education. At the secondary school level mathematics is taught by incompetent and/or inefficient teachers who are hardly able to cover the entire syllabus. Very few students therefore had the opportunity of being taught Statistics as a subject which would have facilitated towards in-depth treatise of basic statistical concepts. Even within the mathematics syllabus topics in Statistics and Probability constitute only about five percent of the course which are usually arranged at the tail end of their secondary education. So, in some cases these topics are not taught to the students at all or, so to say, covered very fast. This situation further worsens the apathy that students generally have towards mathematics.

## **3. LACK OF QUANTITATIVE COURSES IN THE PROGRAM**

As a result of the situation explained in the preceding paragraphs or due to market pressure modified by the faculty politics, some very important subjects like Business Calculus and Operational Research are replaced by routine management courses. The Higher Education Commission of Pakistan no doubt has done a great Job to align the curriculum of all the Business Schools yet there is very obvious difference in the standard of the Graduates from various Business Schools. The MBA program in one school is not the same as in the other. The position of a Business School in market is determined by the contents and Pedagogy for its program. One of the main differentiating features among the program is “Quantitativeness” which can usually be seen in the program pre-requisites. A BBA program that contains Calculus course is much more quantitative as compared to that which has no such requirements.

While eliminating the quantitative courses from the curriculum it should not be overlooked that Mathematics is not only a subject, it is an essential tool to inculcate many useful skills in a student. And what are those useful skills which Mathematics produces in a person is an independent discussion; so in short, it is not possible to teach everything in the class room. It is natural that many topics remain uncovered. Therefore there should be such elements in the syllabus which cover those uncovered things with the help of natural ability awarded only to the human being i.e. intuition and thinking ability and that can only be sharpened by including the relevant areas of Mathematics and Statistics in the Curriculum.

The ranking of the Business Schools is also correlated with an amount of quantitative courses offered by the school. The cause and effect may not be proven however, the outcome is evident in the form of the graduates from some institutions. Since the

beginning of 21<sup>st</sup> century the Business Schools in all over the world are moving away from *theoretical, content, and analysis* towards *practical, skills, and decision*. This positional drift has important implications for the teaching of “statistics”. A Conference on this subject held under the title “Making Statistics More Effective in Schools of Business” abbreviated as (MSMESB) and the positive results of this conference very much support this positional change. The conference found that students are best motivated by exposure to real applications, problems, and cases and suggested that the formal theory in the statistics course should be reduced and intuitive concepts and applications should be emphasized.

#### **4. ADJUSTMENT TO THE CHANGING ENVIRONMENT**

It is inevitable to bring change in our curriculum and methodology according to the drastic changing environment in Pakistan. A new four year Bachelor level Program has been launched by the Higher Education Commission and a long integrated program has been phased out. This shifting is not easy. Up till now, both at college and University level the curriculum was designed at their own by the Universities and Colleges and that usually used to last for years and years. Obviously, this autonomy no longer exists. The Higher Education Commission redefines the place of each subject in the schedule every year according to labour market. This ongoing process is corollary to the institutional and individual cooperation since no one likes changes in his/her teaching.

Statistics has always been taught as necessary part of the curriculum in all educational institutions. Its long tradition and history also makes it more difficult to adapt itself to new changes. As a result of the efforts of Higher Education Commission there is drastic increase of students in the Universities in general and in the Business Education in particular. This conversion of elite –type Business Education to a mass education resulted into descending average standard of students. Ten or twenty years ago usually talented students from good secondary schools went to University so they had quite good basics which could be built on. At present a much wider range of adolescent with very divergent backgrounds comes in the business education so there is no firm common knowledge which can be taken as criteria. This has far reaching consequences on teaching statistics. The most apparent is the lack of ability to cope with formal mathematical arguments which is essential to understand the theoretical side of the discipline.

The multiple numbers of students also makes the teacher-students relationship much weaker too. In mass education practically there is no room for individual balancing, no room for handling personal problems. Sometimes different lecturers are teaching the same course in different sections and therefore they are restricted to teach what they will be asked in the centrally compiled test which is basically not justified as the requirement of one class may be different from the other.

#### **5. USE OF STATISTICAL PACKAGES LIKE MICROSOFT EXCEL, MINITAB OR SPSS.**

The main purpose of teaching Statistics course is to prepare students for doing research in their respective areas. There is missing link between the Statistical Inference and Business Research Method course. After learning the tools of Statistics in Statistical

Inference course the students have to use them in research. However in research they are being told to use the computer software to do the calculations for which they have not been trained before. Consequently the students work with frustration on the SPSS and move here and there requesting various teachers for help. Therefore there is a need to include a course “Computational Statistics” in the curriculum of BBA. In this course they may be given hands on training on the statistical Packages like Microsoft Excel, Minitab or SPSS. Microsoft Excel is important because when the students actually go into the Business World, they may find that the company they work for, does not have SAS, SPSS, etc or other professional statistical programs. The company also will not allow personal software on the company’s computers. However MS-Excel is very common and available in just about all companies.

## **6. TEACHING METHODS AND PEDAGOGY**

The customary method of teaching statistics by chalk and talk method is not very effective. Now, the class rooms in almost all Business Schools are equipped with Computer and Multimedia. The instructors can use them to show lengthy data analysis and routine calculations to best utilize the available time and cover maximum course within stipulated time. The course objectives of Statistics in a Business School are to develop student skill at working with data analysis. In other words the objective is to prepare students to actually do things using statistics, as compared to producing students who understand statistical theory. Usually “doing things” is taught through practice. A course with these objectives should be loaded with problems and examples and practical application of the concepts that they are learning. The classrooms should be highly interactive and equipped with student presentations and discussions. They should be encouraged to offer their ideas and defend them when they think they are correct and concede gracefully when they realize that they are wrong.

## **7. ASSESSMENTS AND EVALUATION OF THE STUDENTS**

It is a common perception that the purpose of assessment is to assign grades to students. However the purpose of assessment should be to improve learning and teaching. Consequently, assessment can be viewed as a vehicle for gathering information about students’ learning. It can be used to provide feedback to students about their learning as well as feedback to the instructor about students’ achievement of course goals. The semester system of usually 14 to 16 week duration, Universities adopt different ways of continuous evaluation system by conducting either Mid-Term of two hour duration or two exams of one hour duration called hourly. During the semester number of Quizzes and Assignments are on the discretion of course instructors. Quiz marks can be distributed uniformly through the whole semester to evaluate all the aspects of learning, like, tabulating course attendance and/or lab participation, asking questions during the lecture, 15 minutes written paper on a particular topic demonstrated in a class, questionnaires during or at the end of a course, group projects, portfolios of student work, tasks where students are required to apply ideas to in different contexts, tasks requiring students to explain information in an article or research report.

One of the major concerns on this issue is the time required to read and grade essays or student projects when faculty are always so short of time and in an environment where

the faculty are rewarded for research, and not for putting extra time into teaching-related activities. However, with experience instructors can learn to engage the students in their work and control their activities like an efficient manager.

### CONCLUSION

In this paper an attempt has been made to summarize the issues based on the personal experience of the author related with the teaching of statistics in Business School. Fear and anxiety with Statistics is very common in Business Schools. The students' fear can be addressed by choosing simple and pertinent real life problems and use of technology in the course. Clear course objectives and clear learning objectives in each session, clearly defined assessment criteria and creating confidence in students to pass the course may reduce Math's phobia. All the Quantitative courses in Business Studies act like pillars on which the whole development of the profession is based. It produces skill based professionals rather than guts based ones.

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## NON-CLOSED MAXIMAL IDEALS IN RINGS OF ANALYTIC FUNCTIONS

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### ABSTRACT

Let  $D$  be a region in the complex plane and  $A(D)$  be a ring of analytic function on  $D$  then  $A(D)$  contains non-closed maximal ideals.

### INTRODUCTION

It has been shown for sometime that a topological nature of a domain in the complex plane is determined by the algebraic structure of certain rings of analytic functions or continuous complex functions on it.

Bers [3] while proving conformal equivalence of two domains  $D_1, D_2$  of the rings  $A(D_1)$  and  $A(D_2)$  respectively of analytic functions on these domains has determined closed maximal ideals.

Royden [4] and Kakutani [5] have determined closed maximal ideals in order to prove conformal equivalence of the domains  $D_1$  and  $D_2$  on which the rings of analytic functions  $A(D_1)$  and  $A(D_2)$  respectively have been defined.

This paper in another direction is a characterization of non-closed maximal ideals in rings of analytic functions. Contrary to closed ideals that I have already determined in [2] in which I have shown that the closed maximal ideals in algebra of continuous complex functions are precisely the [2, Theorem 2.6] principal ideals.

In order to determine the aforesaid non-closed maximal ideals, I have chosen a novel method of non-principal ultrafilters.

### 1. PRELIMINARIES AND NOTATION

Familiarity with the contents of [1] and [6] will be helpful. Following the terminology of [1: Theorem 36 Page 71] and [6, Page 24-26], suppose that  $D$  is a region, that is,  $D$  is [7] a non-empty connected open set.

#### **Definition 1.1:**

Let  $\tau$  be collection of subsets of  $D$  then  $\tau$  is called ultrafilter if  $\tau$  satisfies the following properties:

1.  $\Phi \notin \tau$
2. If  $u, v \in \tau$  then  $u \cap v \in \tau$
3. If  $u \in \tau$  and  $u \subset u'$  then  $u' \in \tau$  and
4.  $\tau$  is maximized with respect to these properties. Property (4) may be replaced by the following:

4'. If  $A$  and  $B$  are subsets of  $D$  with  $A \cup B \in \tau$  then either  $A \in \tau$  or  $B \in \tau$ .

**Proof:**

Let  $\tau$  satisfy (1)-(4) and suppose  $A \cup B \in \tau$ ,  $B \notin \tau$ . Now  $(A \cup B) \cap U$  is a non-empty member of  $\tau$  for every  $U \in \tau$ . Then  $A \cap U$  must be non-empty, (otherwise  $B$  as a superset of  $(A \cup B) \cap U$  would belong to  $\tau$  contrary to assumption) for all  $U \in \tau$ . It is, therefore, easy to see that the set  $U \cup \{A \cap U : U \in \tau\}$  satisfies the above properties (1)-(3) and contains  $A$ . By maximality of  $\tau$ ,  $A \in \tau$ .

Conversely suppose that the properties (1)-(3) and (4') are satisfied. Suppose  $\tau \subset \tau'$  where  $\tau'$  satisfies (1)-(3). Let  $A \in \tau'$  then by (4'), either  $A$  or  $D - A \in \tau$ . But if  $D - A \in \tau$  then  $D - A \in \tau'$ . So  $\phi = (D - A) \cap A \in \tau'$  contrary to property (1). Thus  $D - A \in \tau'$ , so  $A \in \tau$ . Since  $A$  is arbitrary  $\tau = \tau'$ , and (4) is proved.

**Definition 1.2:**

A non-empty collection satisfying properties (1)-(3) above is called a filter. Properties (1)-(3) combined with property (4') is called ultrafilter.

## 2. PRINCIPAL AND NON-PRINCIPAL ULTRAFILTERS:

**Definition 2.1:**

The collection  $\tau$  of all subsets of a region  $D$  containing a fixed point  $D_0$  is called principal ultrafilter.

**Definition 2.2:**

If  $\bigcap_{U_i \in \tau} U_i = \phi$  for each  $U_i \in \tau$  where  $i=1,2,3,\dots$

Then  $\tau$  is called non-principal ultrafilter and conversely.

**Theorem 2.3:**

Suppose the ultrafilter  $\tau$  contains a fixed point in its intersection then  $\tau$  is principal.

**Proof:**

Suppose  $s \in \bigcap_{U_i \in \tau} U_i$  where  $i=1,2,3,\dots$

Then the collection  $\tau'$  of subsets containing  $S$  contains  $\tau$ . But  $\tau$  is maximal  $\Rightarrow \tau = \tau'$

Therefore  $\tau$  is principal.

**Theorem 2.4:**

If  $D$  is infinite then there is a non-principal ultrafilter on  $D$ .

**Proof:**

Let  $\tau'$  consists of all subsets of  $D$  whose complements are finite, the cofinite sets, observe that the properties (1)-(3) and  $\bigcap_{U_i \in \tau'} U_i = \emptyset$  where  $i=1,2,3,\dots$  are satisfied.

Consider all filters that contain  $\tau'$  and order them by inclusion. The union of any chain of filters is again a filter. Let  $\tau$  be the union of any maximal chain of filters containing  $\tau'$  (whose existence is guaranteed by the Hausdorff maximality principle), then  $\tau$  satisfies property (4) and  $\bigcap_{U_i \in \tau} U_i = \emptyset$  where  $i=1,2,3,\dots$ . Which shows that

$\tau = \tau'$  and  $\tau'$  is non-principal ultrafilter.

**Theorem 2.5:**

Let  $D$  be a region in the complex plane and  $A(D)$  be a ring of analytic functions on  $D$  then  $A(D)$  contains non-closed maximal ideals.

**Proof:**

Let  $\Omega$  be an admissible sequence of multiplicity 1 in  $D$  and let  $\tau$  non-principal ultrafilter on  $\Omega$ . Suppose an ideal  $I$  in  $A(D)$  consists of all  $f \in A(D)$  such that  $f(U) = 0$  for some  $U \in \tau$ . Clearly  $I \neq \emptyset$  and  $I \neq (1)$  we want to prove that  $I$  is maximal. Suppose  $f \notin I$ . Then  $Z(f) \cap \Omega \notin \tau$  where  $Z(f)$  denotes the zero set of  $f \in A(D)$  as defined in [1] or [6] so that if  $U = \Omega - Z(f)$  then  $U \in \tau$ . Construct  $g \in A(D)$  such that  $Z(g) = U$  and hence  $g \in I$ . Since  $Z(f) \cap Z(g) = \emptyset$ , we have  $(f, g) = I$ . It follows that  $I$  is maximized, because if  $J \supset I$ ,  $J \neq I$  then  $J$  contains a function  $f \notin I$ . The above construction yields  $g \in I$  with  $J \supset (f, g) = A(D)$ . Moreover,  $I$  is not closed, since it is not principal implying thereby  $Z(I) = \bigcap_{i \in N} U_i = \emptyset$ . The theorem is proved.

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**ASSESSMENT OF THE FACTORS INCREASING THE RISK OF ISCHEMIC  
HEART DISEASE (IHD) USING PRINCIPAL COMPONENT ANALYSIS**

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**ABSTRACT**

The purpose of the present study was to apply principal component analysis to the medical data for ten chemical tests of blood namely cholesterol, high density lipoprotein (HDL), triglyceride, apo protein A-1, apo protein B, low density lipoprotein (LDL), phospholipids, total lipid, glucose and uric acid, which were considered to be the most important factors increasing the risk of Ischemic Heart Disease (IHD). Statistical Package for Social Sciences (SPSS Version 12.0) was used to analyze the data. Step wise Principal Component Analysis was used to explore the effects of these chemical tests which are significantly affecting the patients suffering from Ischemic Heart Disease (IHD). The results indicated that cholesterol, triglyceride, apo protein B, low density lipoprotein, phospholipids, total lipid, and uric acid were recorded to be 236.07, 37.69, 158.79, 142.42, 171.74, 204.86, 922.67 and 6.39 mg/dl in IHD group respectively, while in control group the average estimates were found to be 206.69, 51.66, 129.42, 105.14, 124.67, 181.80, 771.75, 85.80 and 5.17 mg/dl respectively. The above discussed estimates were found to be higher in IHD group as compared to those of control group. High density lipoprotein 37.69 mg/dl and apo protein A-1 99.46 mg/dl were recorded to be lower in IHD group, whereas these estimates were found to be higher in control group and they were recorded to be 51.66 mg/dl and 130.99 mg/dl respectively. Cholesterol was highly correlated with low density lipoprotein ( $R=0.606$ ) and moderately correlated with total lipid ( $R=0.421$ ). Anti image correlations interpreted that variables were relatively free from unexplained correlation. It was observed from communalities extractions that high density lipoprotein and apo protein B has small variances and do not fit in factor solution. Cholesterol, apo protein B and low density lipoprotein belonged to component 1, apo protein A-1, phospholipids and uric acid belonged to component 2, triglyceride and total lipid belonged to component 3 and high density lipoprotein and glucose belonged to component 4. The first four components have explained 60.67 percent component variability. The important finding of this study is that the average cholesterol level, which is considered to be the main factor increasing the risk of Ischemic Heart Disease, was found to be higher even in control group than normal values.

**KEYWORDS**

Principal component analysis, cholesterol, correlation, risk factors, Ischemic Heart Disease (IHD).

## INTRODUCTION

In developing countries, Ischemic Heart Disease is the third major cause of death after HIV/AIDS and Lower Respiratory Infections which causes about 2,484,000 fatalities per year. While in developed countries, it ranks first with the fatalities of 3,512,000 per year (WHO Fact Sheet, 2008).

Pakistan is also facing an increasing burden of non communicable diseases with increasing life expectancy and high prevalence of risk factors. In Pakistan, 11 percent among the deaths are due to ischemic heart disease. One in four adults over the age of 40 years (26.9%) suffers from coronary artery disease, due to high prevalence of known risk factors, including smoking, high blood pressure, raised cholesterol, and overweight (National Health Policy, 2009).

Ischemic heart disease (IHD), or myocardial ischaemia, is a disease characterized by ischaemia (reduced blood supply) to the heart muscle, usually due to coronary artery disease (atherosclerosis of the coronary arteries). Its risk increases with age, smoking, hypercholesterolaemia (high cholesterol levels), diabetes, and hypertension (high blood pressure), and is more common in men and those who have close relatives with ischaemic heart disease (WHO, 2009).

Principal components analysis (PCA) are statistical techniques applied to a single set of variables where the researcher is interested in discovering which variables in the set form coherent subsets that are relatively independent of one another. Variables that are correlated with one another but largely independent of other subsets of variables are combined into factors. Factors are thought underlying processes that have created the correlation among variables (Anderson, 1963). The specific goal of PCA is to summarize patterns of correlation among observed variables, to reduce a large number of observed variables to a smaller number of factors, to provide an operational definition (a regression equation) for an underlying process by using observed variable, or to test a theory about the nature of underlying processes. Some or all of these goals may be the focus of a particular research project (Stockburger, 1998).

Many studies were conducted to assess the risk factors of Ischemic Heart Disease in Pakistan. These factors include age, gender, ethnic origin, marital status, socioeconomic status, blood pressure measurement, smoking history, weight, hip measurement, waist measurement, height, family history of cardiovascular disease, diabetes mellitus, hypertension, serum levels of cholesterol, HDL cholesterol, LDL cholesterol, glucose, urea and hemoglobin etc (Shahid Abbas et al. 2009). In the present study an attempt was made to assess the factors increasing the risk of Ischemic Heart Disease (IHD) by applying sophisticated statistical technique called Principal Component Analysis (PCA).

### **Objectives:**

The specific objectives of the study are:

1. To apply Principal Component Analysis to Ischemic Heart Disease (IHD) data.
2. To explore the factors enhancing the risk of Ischemic Heart Disease (IHD).
3. To develop recommendations for decreasing the likelihood of Ischemic Heart Disease (IHD).

## MATERIAL & METHODS

### Data Collection

The data set used for this study, were collected from Cardiovascular Disease Department, Chandka Medical College, Larkana. In the present study, variables pertaining to ten chemical tests of blood namely cholesterol, high density lipoprotein, triglyceride, apo protein A-1, apo protein B, low density lipoprotein, phospholipids, total lipid, glucose and uric acid were undertaken to know the relationship between them and the membership of group variable. Prior to enter the data, variables were created, labeled and categorized using indicator variable coding scheme (SPSS, 2009).

### Principal Component Analysis

Principal component analysis techniques were performed in R-mode using correlation and covariance for medical data. Principal component analysis is based on the following linear model:

$$Y_{ij} = B_{i1} X_{1j} + B_{i2} X_{2j} + \dots + B_{ip} X_{pj} \quad (1)$$

where  $i, j = 1, 2, \dots, p$

In principal component analysis, multivariate normality implies that relationships among pairs of variables are linear. The analysis is degraded when linearity fails because correlation measures linear relationship and does not reflect nonlinear relationship among pairs of variables. In principal component analysis multicollinearity is not a problem because there is no need to invert a matrix. For most forms of factor analysis and estimation of factor scores in any form of factor analysis, singularity or multicollinearity is a problem, for factor analysis, if determinant of R and eigenvalues associated with some factors approach 0, multicollinearity or singularity may be present.

### Bartlett's test

Bartlett's (1954) test of sphericity is a notoriously sensitive test of the hypothesis that the correlations in a correlation matrix are zero. But because of its sensitivity and dependence on N, the test is likely to be significant with samples of substantial size even if correlations are very low. Therefore, use of the test is recommended only if there are less than say, five cases per variable (Snedecor and Cochran, 1983).

### Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic, which indicates the proportion of variance that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. If the value is less than .50, the results of the factor analysis probably won't be very useful. Kaiser's measure of sampling adequacy is a ratio of the sum of squared correlations to the sum of squared correlation plus sum of squared partial correlations. The value approaches 1 if partial correlations are small. Values of 0.6 and above are required for good factor analysis (Tabachnick, 2001).

### Anti-Image Correlation

The anti-image correlation matrix contains the negatives of partial correlations between pairs of variables with effects of other variables removed. If R is factorable, there are mostly small values among the off-diagonal elements of the anti-image matrix (Tabachnick, 2001).

### Extraction Methods

An important theorem from matrix algebra indicates that, under certain conditions, matrices can be diagonalized. Correlation and covariance matrices are among those that often can be diagonalized. When a matrix is diagonalized, it is transformed into a matrix with numbers in the positive diagonal and zero everywhere else. In this application, the numbers in positive diagonal represent variance from the correlation matrix that has been repackaged as follows:

$$L = V'RV \quad (2)$$

### Communalities, variance and covariance

The communality for a variable is the variance accounted for by the factors. It is the squared loading multiple correlation for the variable as predicted from the factor. Communality is the sum of squared loading (SSL) for a variable across factors. The proportion of variance in the set of variable accounted for by a factor is the sum of squared loading (SSL) for the factor divided by the number of variables (if rotation is orthogonal). The proportion of variance in the solution accounted for by a factor, the proportion of covariance is the sum of squared loading for the factor divided by the sum of communalities (Srivastava, 2002).

### Residual

The residual correlation matrix is the difference between the observed correlation matrix and the reproduced correlation matrix. Notice that the reproduced correlation matrix differs slightly from the original correlation matrix.

$$R_{res} = R - \bar{R} \quad (3)$$

In a good factor analysis the numbers in the residual correlation matrix are small because there is little difference between the original matrix and the correlation matrix generated from factor loadings.

### Factor Scores

Scores on factors can be predicted for each case once the loading matrix is available. Regression like coefficients are computed for weighting variables scores to produce factor scores. Because  $R^{-1}$  is the inverse of the matrix of correlations among variables and  $A$  is the matrix of correlations between factors and variables.

$$B = R^{-1}A \quad (4)$$

Factor score coefficients for estimating factor scores from variable scores are a product of the inverse of the correlation matrix and the factor loading matrix. Factor scores are a product of standardized scores on variables and factor and factor score coefficients, as given below:

$$F = ZB \quad (5)$$

A score on an observed variable is conceptualized as a properly weighted and summed combination of the scores on factors that underlie it. The researcher believes that each subject has the same latent factor structure, but different scores on the factors themselves. A particular subject's score on an observed variable is produced as a weighted combination of that subject's scores on the underlying factors.

### Oblique Rotation

All the relationships mentioned thus far are for orthogonal rotation. Most of the complexities of orthogonal rotation remain and several others are added when oblique (correlated) rotation is used. In oblique rotation, the loading matrix becomes the pattern matrix. Values in the pattern matrix, when squared represent the unique contribution of each factor to the variance of each variable but do not include segments of variance that come from overlap between correlated factors. Once the factor scores are determined, correlations among factors can be obtained. The equations is as under:

$$\varphi = \left( \frac{1}{N-1} \right) F' F \quad (6)$$

One way to compute correlations among factors is from cross products of standardized factor scores divided by the number of cases minus one.

## RESULTS

### Descriptive Statistics

It is evident from Table 1 that the majority of total patients who were suffering from ischemic heart disease had an average cholesterol value of 236.07 mg/dl whereas that of control group was found to be 206.69 mg/dl. High density lipoprotein of ischemic heart disease patients was found to be 37.69 mg/dl whereas the control group had its average value of 51.66 mg/dl. On the basis of average value the patients who had ischemic heart disease their triglyceride level was recorded to be 158.79 mg/dl while that of the control group was found to be 129.43 mg/dl. Apo protein A-1 found in ischemic heart disease patients was found to be 99.46 mg/dl whereas in control group this was recorded as 130.99 mg/dl. The patients possessing ischemic heart disease had an average value of apo protein B 142.42 mg/dl while it was found in Control group as 105.39 mg/dl. On average basis phospholipids found in patients of ischemic heart disease was noted to be 204.86 mg/dl while those who belonged to control group their average value was recorded to be 181.80 mg/dl. Total lipid found in ischemic heart disease patients was found to be 922.67 mg/dl whereas it was recorded in control group as 771.75 mg/dl. Average value of glucose found in ischemic heart disease patients was noted as 88.66 mg/dl while in control group this was found to be 85.80 mg/dl. The average value of uric acid found in ischemic heart disease patients was found to be 6.39 mg/dl while in control group it was recorded to be 5.17 mg/dl.

When the Table 1 studied, it was found that the average values of cholesterol, triglyceride, apo protein B, low density lipoprotein, phospholipids, total lipid, glucose and uric acid were higher in ischemic heart disease patients as compared to those of control group while high density lipoprotein and apo protein A-1 were found to be higher in control group. Though the control group has the normal values but due to increase in average value of cholesterol the people are under heavy risk of increasing the ischemic heart disease.

**Table 1**  
**Descriptive statistics of chemical tests increasing the risk of ischemic heart disease**

Variables	Normal Values in MG/DL	Mean			Std. Error of Mean		
		Ischemic Heart Disease/Control Subject in MG/DL			Ischemic Heart Disease/Control Subject		
		Control	IHD	Total	IHD	Control	Total
Cholesterol	100-200	206.6931	236.0723	231.000	2.41680	1.55897	1.43067
HDL	M 35-55 F 45-65	51.6634	37.6921	40.1043	.99327	.35413	.40339
Triglyceride	50-150	129.4257	158.7937	153.723	2.88905	1.51043	1.42084
Apo Protein A-1	120-150	130.9901	99.4587	104.902	1.97712	.92246	.97005
Apo Protein B	0-120	105.1386	142.4174	135.981	1.52673	1.04907	1.07791
LDL	0-150	124.6733	171.7376	163.612	2.20787	1.46226	1.46594
phospholipids	120-180	181.8020	204.8595	200.878	2.89000	1.85911	1.65589
Total Lipid	500-1000	771.7525	922.6736	896.617	7.83452	6.96674	6.37156
GLUCOSE	R-120-180	85.8020	88.6591	88.1658	.95658	1.41844	1.18565
Uric Acid	M 3.4-7.0 F. M. 2.4-5.7	5.1713	6.3913	6.1807	.08796	.06195	.05673

### Correlation analysis

Correlation coefficients between ten chemical tests for Ischemic Heart Disease are shown in Table 2. It could be observed from this Table that cholesterol has positively high correlation with low density lipoprotein (0.606) and it is moderately correlated with total lipid (0.421). There is negative correlation between high density lipoprotein and low density lipoprotein. The observed correlation of triglyceride with total lipid (0.271) is positively weak. Apo protein A-1 has negatively weak whereas apo protein B has positively weak correlation with low density lipoprotein. There is highly positive correlation observed between low density lipoprotein and total lipid. phospholipids have positively weak correlation with total lipid. Correlation of total lipid with glucose and uric acid is negatively weak and both the glucose and uric acid has negatively weak correlation with each other.

**Table 2**  
**Correlation matrix of various chemical tests increasing the risk of ischemic heart disease**

	Cholesterol	HDL	Triglyceride	Apo Protein A-1	Apo Protein B	LDL	Phospholipid	Total Lipid	Glucose	Uric Acid
Cholesterol	1.000	-.196	.230	-.246	.275	.606	.199	.421	-.086	.057
HDL	-.196	1.000	-.170	.186	-.167	-.241	-.015	-.190	.150	-.029
Triglyceride	.230	-.170	1.000	-.236	.154	.172	-.023	.271	-.036	-.119
Apo Protein A-1	-.246	.186	-.236	1.000	-.218	-.235	-.001	-.086	.004	-.050
Apo Protein B	.275	-.167	.154	-.218	1.000	.377	-.028	.212	-.103	.108
LDL	.606	-.241	.172	-.235	.377	1.000	.307	.413	-.096	.119
phospholipids	.199	-.015	-.023	-.001	-.028	.307	1.000	.118	-.023	-.014
Total Lipid	.421	-.190	.271	-.086	.212	.413	.118	1.000	-.055	-.087
Glucose	-.086	.150	-.036	.004	-.103	-.096	-.023	-.055	1.000	-.049
Uric Acid	.057	-.029	-.119	-.050	.108	.119	-.014	-.087	-.049	1.000

Criteria: > 0.80 Strongly correlated      > 0.30 Moderately correlated  
 > 0.50 Highly Correlated              < 0.30 Weakly Correlated

### Measure of sampling adequacy

It could be observed from Table 3, using the Kaiser-Meyer-Olkin sampling adequacy the obtained value (0.732), which is greater than 0.50 and closer to 1.0. So it can be interpreted that our data is quite useful for factor analysis. In factor analysis, Bartlett's test of sphericity indicates whether correlation matrix is an identity matrix, which would show that our variables are unrelated. The significance value of 0.000 in Table 3 is less than 0.1, which indicates that there is probably significant relationship between variables. Therefore the data is useful for factor analysis.

**Table 3**  
**Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity**

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</b>	<b>.732</b>	
<b>Bartlett's Test of Sphericity</b>	<b>Approx. chi-square</b>	<b>685.355</b>
	<b>df</b>	<b>45</b>
	<b>Sig.</b>	<b>.000</b>

### Anti image correlation analysis

Discussing Table 4, it becomes clear that almost all the values at the lower or upper half of the main diagonal are smaller, i.e. close to zero, which indicates that variables are relatively free from unexplained correlations. In the main diagonal of anti-image correlation matrix, each value describes the measure of sampling adequacy for the respective item. Values less than 0.5 may indicate that a variable does not seem fit with the structure of the variables. In Table 4 all the variables in main diagonal have values more than 0.5, which reveals that, the variables have adequate samples, except uric acid (0.497) whose value is less than 0.5. It shows that the sample is insufficient for factor analysis and should possibly be dropped from analysis.

**Table 4**  
**Anti-image correlation matrix of various chemical test of increasing the risk of ischemic heart disease**

	Cholesterol	HDL	Triglyceride	Apo Protein A-1	Apo Protein B	LDL	Phospho lipid	Total Lipid	Glucose	Uric Acid
<b>Cholesterol</b>	.760(a)	.011	-.089	.115	-.026	-.436	-.043	-.212	.030	-.024
<b>HDL</b>	.011	.816(a)	.082	-.111	.038	.107	-.041	.076	-.128	.013
<b>Triglyceride</b>	-.089	.082	.735(a)	.179	-.049	.014	.065	-.175	.001	.131
<b>Apo Protein A-1</b>	.115	-.111	.179	.745(a)	.112	.080	-.040	-.092	.051	.030
<b>Apo Protein B</b>	-.026	.038	-.049	.112	.769(a)	-.255	.146	-.053	.065	-.073
<b>LDL</b>	-.436	.107	.014	.079	-.255	.700(a)	-.279	-.198	.014	-.114
<b>phospholipids</b>	-.043	-.041	.064	-.040	.146	-.279	.575(a)	-.001	.011	.0501
<b>Total Lipid</b>	-.212	.076	-.175	-.092	-.053	-.198	-.001	.783(a)	-.005	.128
<b>Glucose</b>	.030	-.128	.008	.051	.065	.014	.011	-.005	.688(a)	.036
<b>Uric Acid</b>	-.024	.013	.131	.030	-.073	-.114	.051	.128	.036	.497(a)

### Initial and extraction communalities analysis

In principal component analysis initial and extraction communalities for variables are the variances accounted for the factors. For variance and co-variance analysis initial communalities remain always equal to 1.0. For the extraction communalities, these values

are the proportion to variance of each variable by the rest of variables. The extraction communalities are the sum of squared loadings for a variable across factors, in Table 4 the extraction communalities for cholesterol are  $(.770)^2 + (0.180)^2 + (0.0823)^2 + (0.0877)^2 = 0.639$ . That was Factor1+Factor2+Factor3+Factor4 accounted for 63.9% of the variance calculated for cholesterol. Variances calculated for high density lipoprotein, triglyceride, apo protein A-1, apo protein B, low density lipoprotein, phospholipids, total lipid, glucose and uric acid were 42.1%, 57.6%, 435.4%, 74.7%, 45.5%, 64.1%, 53.6%, 81.6% and 72.3% respectively.

Table 5 reveals that high density lipoprotein and apo protein B has small variance and do not fit in factor solution, so should possibly be dropped from analysis. The Proportion of variance in the set of variables accounted for by a factor is the sum of squared loadings for the factor divided by the number of variables which was calculated 99.1% of the variance in variables. The proportion of co-variance is the sum of squared loadings for the factor divided by the sum of extraction communalities, which were calculated 100%.

**Table 5**  
**Relationship among loading, communalities, variance,**  
**co-variance of orthogonally rotated factors**

Variables	Initial	Factor 1	Factor 2	Factor 3	Factor 4	Extraction
Cholesterol	1.000	.770	.180	0.0823	0.0877	0.639765
HDL	1.000	-.452	.262	0.187	0.337	0.421486
Triglyceride	1.000	.447	-.545	0.282	0.0154	0.576595
Apo Protein A-1	1.000	-.448	.363	0.197	-0.376	0.512658
Apo Protein B	1.000	.548	-.133	-0.350	0.122	0.455377
LDL	1.000	.804	.307	-0.0146	0.0798	0.747246
Phospholipids	1.000	.276	.681	0.315	-0.0459	0.641269
Total Lipid	1.000	.633	-0.002477	0.354	-0.104	0.536827
Glucose	1.000	-.198	-0.009493	0.328	0.818	0.816002
Uric Acid	1.000	0.07920	.311	-0.752	0.235	0.723723
Sum of square of loadings		2.666779	1.202354	1.180417	1.021397	6.070948
Proportion of Variance		0.266678	0.120235	0.118042	0.10214	0.607095
Proportion of Co-variance		0.439269	0.19805	0.194437	0.168243	1

### Component analysis

The Table 6 shows the eigen values and total variance explained for our factor solution. There are ten variables used in the sample, because the aim of factor analysis is to summarize a pattern of correlation with a factor as possible and each eigen value correspond to a different factor, (usually only factor with large eigen values are retained). In a good factor analysis, these few factors define the whole correlation matrix. When no limit is placed on the number of factors eigen values are computed for each of ten possible components as shown in Table 6.

It is quite clear from Table 6 that the first four components has their eigen values over 1 and are large enough to be retained, their variances are 26.65%, 12.02%, 11.79% and 10.19% respectively. These four components describe the 60.67% of the total variance explained as shown in Figure 1.



**Table 6**  
**Component variability percentage correlation analysis by using eigen values**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.666	26.658	26.658	2.666	26.658	26.658
2	1.202	12.022	38.680	1.202	12.022	38.680
3	1.179	11.794	50.474	1.179	11.794	50.474
4	1.020	10.196	60.670	1.020	10.196	60.670
5	.869	8.694	69.364			
6	.791	7.906	77.270			
7	.738	7.382	84.652			
8	.649	6.494	91.146			
9	.531	5.309	96.455			
10	.355	3.545	100.000			

#### Component score coefficient analysis

The component loading matrix is a matrix of correlation between components and variables. The first column is the correlation between the first component and each variable, the second column is the correlation between the second component and each variable and so on. Table 7 reveals that there were very few strong correlations observed between components and their respective variables. A component is interpreted from variables that are highly correlated with it- that had high loadings on it.

It is evident from Table 7 that the variables that had high loading were assumed to belong with component 1, i-e cholesterol (0.289), apo protein B (0.205) and low density lipoprotein (0.302). Likewise in component 2 the variables had the high weights were found to be apo protein A-1 (0.302), phospholipids (0.566) and uric acid (0.259). Similarly triglyceride (0.239) and total lipid (0.300) had the high value and belonged to component 3. With the same way in component 4 the variables had high scores were high density lipoprotein (0.330), and glucose (0.803).

**Table 7**  
**Analysis of component score coefficient matrix**

Variables	Component's			
	1	2	3	4
Cholesterol	.289	.149	.070	.086
HDL	-.169	.218	.158	.330
Triglyceride	.168	-.453	.239	.015
Apo Protein A-1	-.168	.302	.167	-.369
Apo Protein B	.205	-.111	-.296	.120
LDL	.302	.255	-.012	.078
phospholipids	.103	.566	.267	-.045
Total Lipid	.237	-.002	.300	-.102
GLUCOSE	-.074	-.008	.278	.803
Uric Acid	.030	.259	-.638	.226

### CONCLUSION

In case of finding correlations between variables, it was observed that Cholesterol was highly correlated with low density lipoprotein and moderately correlated with total lipid. For checking sampling adequacy it seemed clear that the data were useful for factor analysis. Anti image correlations interpreted that variables were relatively free from unexplained correlation. It was observed from communalities extractions that high density lipoprotein and apo protein B has small variances and do not fit in factor solution. To know the variability between the components, it was found that first four components account for exactly 60.67% of the total variability. These four components adequately described the whole correlation matrix. Finally it was obvious to see that cholesterol, apo protein B and low density lipoprotein had high value and belonged to component 1. In component 2, it was found that apo protein A-1, phospholipids and uric acid had the high scores. The variables that had high loading in component 3 were triglyceride and total lipid. The variables had high weight and belonged to component 4 were high density lipoprotein and glucose.

The important finding of this study is that the average cholesterol level which is considered to be main factor increasing the risk of Ischemic Heart Disease is found to be higher even in control group than normal values.

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**SUSTAINABLE DEVELOPMENT THROUGH MICRO CREDIT AND ITS  
IMPACT ON ALLEVIATION OF POVERTY, A CASE STUDY OF SINDH  
PAKISTAN**

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**ABSTRACT**

This research investigates the sustainability of Micro Credit system in Pakistan. Data were collected from 400 respondents who used Micro credit by using the simple random sampling technique and data were analysis by using SPSS-16-5 version. Interviews of farmers /growers, officers of micro credit, office public and private supporting services, Institutions and other professionals were conducted by using structured interview. Present study attempts to viability of Micro credit system in Pakistan and how its impact on, macro economic policies designed to accelerate growth were combined with appropriate fiscal polices for income redistribution for reducing inequalities. The second style aims at public investment in creating an infrastructure for providing health, education, etc. with a view to promoting quality of life. Results showed that Micro credit has positive impact on alleviate poverty in Pakistan. The case study indicates that 40% of the beneficiaries opened shops/small provision stores, followed by investment in poultry, embroidery and livestock.

**KEY WORDS**

Sustainability, Micro Credit System, Pakistan

**INTRODUCTION**

The concept of sustainability has to be viewed from a broader perspective and multiple dimensions. These include economic, social political, enterprise, institutional and biological aspects and their interface with various sub-systems for balanced development. Eradication of poverty is the ultimate goal of sustainable development. Poverty stem from a number of factors, which are region specific and linked to socio economic conditions and are contextual dimension. Strategy towards poverty eradication incorporates multiple initiatives that require a comprehensive framework encompassing physical, structural, economic, social and political aspects. There is growing evidence across the globe regarding the role of rural financial services for alleviation of food insecurity and poverty. The traditional face of banking is undergoing change since 1999 to 2008. Such institutional credit to the rural sector in particular and to underdeveloped regions in General. Micro means small, credit means the opportunity to borrow money. Micro credit is a small amount of money loaned to a client by a bank or other institution. Microfinance refers to loans, savings, insurance, transfer services, micro credit loans and other financial products targeted at low-income

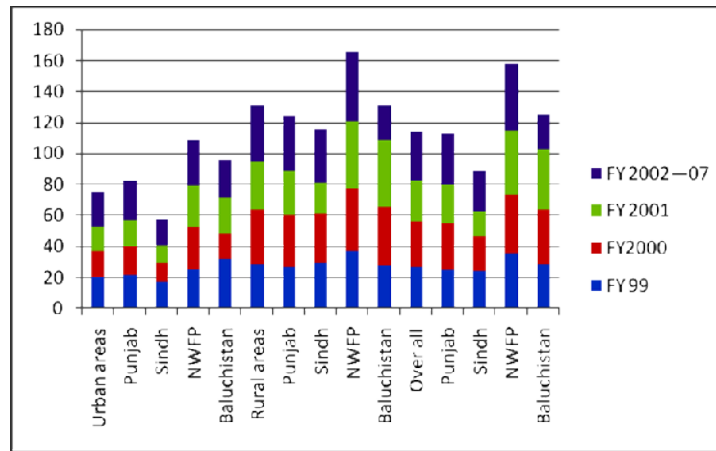
clients. Micro credit is a system where people in poor countries can borrow small amounts of money at low rates of interest even if they have little or no collateral. It works through small banks, which lend money to local people so that they can start businesses and earn their living. Micro credit and Micro finance have changed the lives of people and revitalized communities in the words poorest and also the richest countries. Micro credit has been changing the lives of people and revitalizing communities' worldwide since the beginning of time. Micro credit programs extend small loans to very poor people, for self-employment projects that generate income allowing them to care for themselves and their families (Micro credit summit). In Micro credit, more emphasis is on loans. Micro credit caters commercial needs of poor for enabling them to raise their income levels and improved standard of living. Micro credit means more emphasis on loans while micro finance also includes support service where you open up channels for thrift, market assistance capacity building, insurance, social and cultural programs. So where microfinance is credit plus, there Micro credit is "only credit" In this way, Micro credit refers to making small loans available to the poor through schemes especially designed to meet the Poor's particular needs and circumstances. It has proven an effective and popular measure in the on going struggle against poverty, enabling those without access to lending institutions to borrow at bank rates, and start small business. The concept of Micro credit was pioneered by Dr.Mhhammad Yunus, and first implemented in the Grameen Bank, Bangladesh. Subsequently, Grameen Bank replications have proliferated, and have proven effective in repeating the Micro credit miracle one vast and constantly increasing scale. Numerous schemes, in developing countries in particular, have now shown that micro credit can make a significant contribution to tackling poverty.

### POVERTY-CREDIT INTERFACE

The linkage between economic growth and poverty reduction is rather weak. This calls for the need for sustainable mechanism to provide safety nets for sustainable development of the poor. However, there is a growing evidence now that the promotion of micro credit systems and development alleviation. Through micro finance is not a panacea for the poverty alleviation there is consensus now that the poor through self help approach can be moved out of poverty syndrome. It can be powerful instrument for self powerment by enable the poor especially women to become economically self-reliant. Promoting income generating activities among the poor therefore, seem to be one of the push factors for poverty eradication in Pakistan.

<b>Province</b>	<b>FY 99</b>	<b>FY 2000</b>	<b>FY 2001</b>	<b>FY 2002-07</b>
Urban areas	20.7	16.3	16.1	22.4
Punjab	22.0	18.1	16.9	25.5
Sindh	17.3	11.8	12.0	16.1
NWFP	25.3	26.9	27.2	29.2
Baluchistan	31.8	16.8	23.0	24.3
Rural areas	28.9	34.7	30.7	36.3
Punjab	26.5	33.9	28.3	36.0
Sindh	29.5	31.8	19.6	34.7
NWFP	37.0	40.0	43.4	44.9
Baluchistan	28.1	37.9	42.5	22.5
Over all	26.6	29.3	26.3	32.2
Punjab	25.2	29.5	25.0	33.0
Sindh	24.1	22.6	15.7	26.6
NWFP	35.5	38.1	41.2	42.6
Baluchistan	28.6	35.5	38.4	22.8

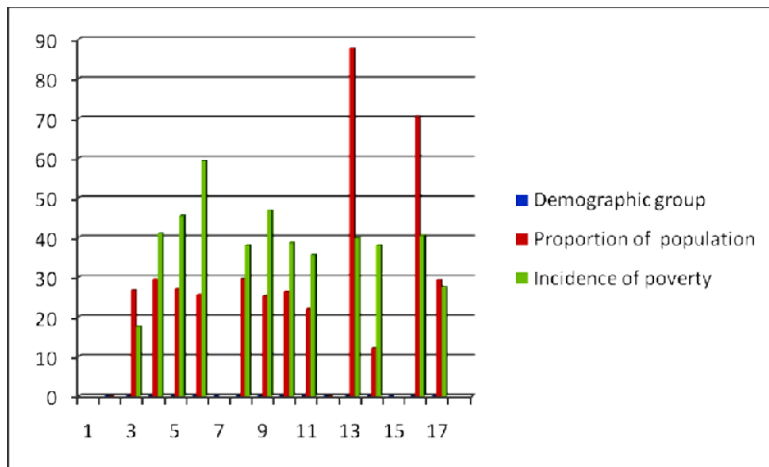
**Source: Asian Development Bank July 2002-06**



**Table 2: Demographic Characteristics of Poverty, 1999-2009-10-onwards**

Demographic group		Proportion of population	Incidence of poverty
Household size	1-4	26.8	17.6
	5-6	29.5	41.1
	7-8	27.0	45.5
	9+	25.6	59.4
Age of household head	<40	29.65	38.1
	40-49	25.3	46.9
	50-59	26.4	38.7
	60+	22	35.7
Gender of household head	Male	87.8	39.9
	Female	12.2	38.1
Migration	Non-migrant	70.6	40.5
	Migrant	29.4	27.6

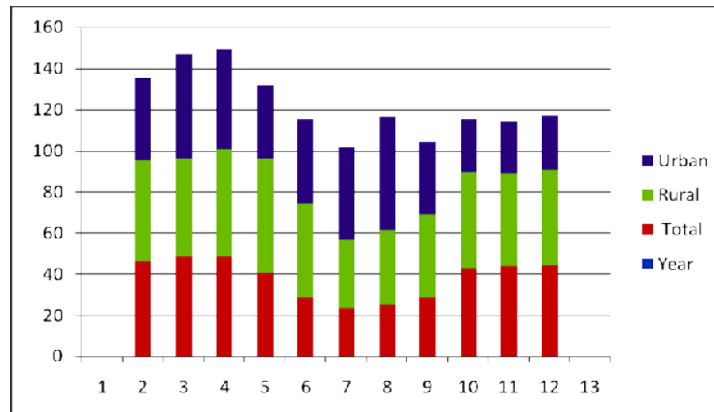
(Source: Survey-2009-10)



**Time Series on Poverty: Head Count (Poor Households as Percentage of Population)**

Year	Total	Rural	Urban
1999-2000	46.24	48.94	40.53
2000-2001	48.50	47.62	50.96
2001-2002	48.53	52.11	48.76
2002-03	40.68	55.51	35.94
2003-04	28.47	45.87	41.17
2004-05	23.32	33.32	44.99
2005-06	25.11	36.59	54.64
2006-07	28.40	40.55	35.50
2007-08	42.60	46.80	25.90
2008-09	43.70	45.60	24.70
2009-10 (June)	44	47	26

Survey-2009-10

**Issues in Micro-Finance Institutions**

Breaking the psychology of poverty is the first issue to be addressed in building group. Poverty has its origin in asset lessens of the poor. The vicious cycle of poverty stems from low income, inadequate savings, and low capital formation leading to low investments.

1. Promotion of micro-enterprises is the next logical step for sustainable development of the poor. It is the enterprise that enables income generation and provides sustainable livelihood systems for the poor income generation is closely linked to investment pattern.
2. Financial viability of micro-finance institutions is a major issue that needs attention. This is one of the important aspects being neglected by various agencies involved in the micro-credit movement in Pakistan. As a matter of fact, many micro finance institutions do not achieve financial viability. This is partly because most of the micro-enterprises of the poor are tiny in nature and do not provide adequate scope for income generation so as to improve their socioeconomic status.

**RESULTS AND DISCUSSIONS**

The appropriateness of micro credit as a tool for reducing poverty depends on local circumstance. Poverty is often the result of low economic growth, high population growth and unequal distribution of resources. The proximate determinants of poverty are

unemployment, reducing poverty requires creating jobs, when poverty results from low productivity and low income, reducing poverty requires investment in human and physical capital to increase worker's productivity. Whether micro credit increases employment and productivity or not is an empirical question which we will explore in this section. Consequently, the best way to reduce poverty is to deal with both problems: increasing productivity by creating employment and developing human capital.

One way to increase the productivity of the poor is through broad-based economic growth. Such growth ensures more inclusive participation in development by providing widespread employment opportunities. Agricultural development provides opportunities for broad-based economic growth. But substantial job expansion within agriculture may not be feasible, since agriculture already provides more than 70 per cent of employment in many low-income countries.

Lack of savings and capital make it difficult for many poor people who want jobs in the farm and non farm sectors to become self-employed and to undertake productive employment-generating activities. Providing credit seems to be a way to generate self-employment opportunities for the poor. But because the poor lack physical collateral, they have almost no access to institutional credit. Informal lenders play an important role in many low-income countries (Adams and Fitchett 1992; Ghate 1992), but they often charge high interest rates, inhibiting poor rural households from investing in productive income-increasing activities. Moreover, although informal groups, such as rotating savings and credit associations, can meet the occasional financial needs of rural households in many societies, they are not reliable sources of finance for income-generating activities (Webster and Fidler 1995). Micro-credit programs are able to reach the poor at affordable cost and can thus help the poor become self-employed.

There are two views regarding the role of micro credit program in poverty alleviation. Detractors view such program as social liability consuming scarce resources without significantly affecting long-term outcomes. Critics argue that the small enterprises supported by micro-credit programs have limited growth potential and do not have any sustained impact on poverty. They contend that these programs make the poor economically dependent on the availability of subsidised credit and such micro credit programs are abandoned. (Adams and Von Pischke 1992).

Proponents of micro credit consider increasing the poor's access to institutional credit as an important means of ending poverty (Yunus 1983). They argue that by virtue of their design such Programs can reach the poor and overcome problems of credit market imperfections. In their view improved access to credit smoothes consumption and eases constraints on production raising the income and production of the poor. It is an empirical question whether micro credit reduces poverty or not.

Many countries have established micro credit program the explicit objectives of reducing poverty by providing small amounts of credit to the poor to generate self-employment in income generation activities. Bangladesh is a leader among the low-income countries offering micro credit. Therefore empirical evidence from Bangladesh regarding the impact of micro credit on poverty alleviation will provide insight regarding effectiveness of micro credit in reducing poverty.

The effects of micro credit Programs on participates can be measured in terms of consumption, nutrition, employment, net worth, schooling, contraception used and

fertility. A survey was carried out and regression technique was used to analyze the impact of micro credit on participants in Bangladesh.

### THE SCOPE OF MICRO CREDIT PROGRAM'S IN PAKISTAN

In the light of successful experience of Bangladesh regarding the role of Micro credit institutions in poverty reduction, Pakistan has also established a Micro credit Bank. The potential of micro-finance market is immense in Pakistan. According to household income and expenditure survey, 6.5 million households are earning less than Rs 3000 per month. Other estimates suggest that there are 45 million individual men and women who are potential Micro finance clients compared to the potential market outreach of microfinance services remains small. The chief Executive of Pakistan Poverty Alleviation Fund estimates that there are 0.8 million clients currently receiving micro finance services. More than 98 per cent of potential clients, approximately 44 million men and women, do not have access to micro finance.

### CONCLUSION

Pakistan is faced with twin challenges of reviving growth and reducing poverty. Poverty alleviation thus has to be effected not only through microeconomic policy, but also by bringing about significant improvement in the structure and functioning of system of governance & organized mechanism of micro-credit to reach over million targeted people by the end of 2007. The case study indicates that 40% of the beneficiaries opened shops/small provision stores, followed by investment in poultry, embroidery and livestock. The paper also provides some technical information on profitability/cost benefit analysis of income generating activities/trades in rural Pakistan

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**ENTREPRENEUR BUSINESS DEVELOPMENT IN SINDH  
THE CASE OF SHIKARPUR DISTRICT**

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**ABSTRACT**

**Purpose:** The current research explore the opportunities for entrepreneurs in Shikarpur District. The strategic development option for local economic development, especially in the rural areas of Sindh. This strategy being also known as homegrown development refers to a process of supporting and encouraging people to become entrepreneurs in order to enhance the economic prosperity of a community, by first, creating the environment being favorable for creativity and innovativeness; second, encouraging entrepreneurship as an eligible career option through entrepreneurial education, facilitation and recognition, and third, developing institutional support system to entrepreneurs. The main aim of this paper is to discuss the economic strength of small and medium-sized enterprises (SMEs) in the economic development of Shikarpur District, and to explore the perception of the Shikarpur entrepreneurs about the role of institutions in entrepreneurship development. The analysis indicates the SMEs have had a weak economic power. Small and medium-sized enterprises, although numerically overwhelming, employ approximately half of the total employed in the City, operate continuously with financial losses, and are oriented mostly to doing business locally. According to the perception of Shikarpur entrepreneurs, the biggest business challenges are caused by problems connected to entrepreneurial environment conditions, i.e. institutional infrastructural conditions, and the least to inappropriate profiles and inefficiency of local work force. Drown from these findings, lessons considering the process of entrepreneurship development in Shikarpur District are discussed as well. It was revealed that government should provide facilities to the entrepreneurs, credit and market facilities.

**KEY WORDS**

Entrepreneurship development; the City of Shikarpur; entrepreneurial framework conditions; institutions.

**1. INTRODUCTION**

Human resource is one of the main contributing factors for economic growth and for social, political, and technological development. In the era of globalization, economic liberation and fast growing ICT, strengthening the national competitive advantage is the concern of the policy makers. Subsequently, various human resource development planning and strategies are formulated and action plan are outlined at various phases of development. Human resource development continued to be given priority in support the

implementation of a productivity-driven growth, which required highly skilled, trainable and knowledge manpower. Emphasis continued to be given to increase accessibility to education at all levels in line with the democratization of the education policy. The high growth rate of the economy was achieved with the price stability and since 1995, with virtually full employment before the currency crisis erupted in the late 1997. The rapid expansion in manufacturing increased employment in the sector sharply during the Sixth Pakistan is the seventh largest population in the world and one of the dense populated countries in the world. Pakistan is recently facing lot of problems like unemployment, and slow growth in Agriculture we imported different agriculture related product from the world. Therefore, we have to look at sectors of the economy that have the potential to provide this employment, and simultaneously we have to ensure that the young are provided quality education and training for these more productive sectors of the economy. The greater growth potential lies in the modern high technology industries but it is also present in the labor-intensive industries of the traditional Small Enterprise sector and in the services that support it. "Young people in the future are more likely to end (therefore) should be working in organizations closer to the entrepreneurial mode" (Allan Gibbs). It is a worldwide phenomenon that Small Enterprises are an important part of a nation's economic and social structure. "Enterprise is the antithesis of command and control". On a global perspective Small Enterprises have acquired a significant stature in the economic development of a country. Globalization has put Small Enterprises directly in the limelight. Small Enterprises are increasingly a major force for national economic growth. The entrepreneurs who drive them are receiving serious attention from economists, planners, multilateral agencies and governments all over the world( Carter, Camille. 1999).

#### **Developing Countries Policies for, Women as Entrepreneurship Business**

Entrepreneur business Development in Turkey and Modalities of Intervention as was the practice of most countries; Turkey also practiced a state directed economy from its inception 1923. Hoping to achieve rapid industrialization it followed import substitution policy and relied on State Economic Enterprises, because it was the common belief that economic growth depended on heavy investment in large, capital-intensive industrial projects. Notwithstanding the imbalance of such a policy there was considerable growth of approximately 7% per annum. However true to the world pattern the growth declined in the 1970s and a new trend emerged in the 1980s. It was the trend based on free market economy and hence structural reforms were undertaken to give the economy a new shape.

#### **2. WOMEN'S LABOR FORCE PARTICIPATION RATES IN PAKISTAN**

Women are highly important contributors to the country's economic and social development. Over the years women participation in the economy has increased rapidly and they constitute almost half of the total population. Since 1990, women's participation in the SMEs business has increased enormously. Even though Pakistan is a newly industrializing country, its female labor force participation rate compares favorably with those of the industrialized countries of the Asia and Pacific region. Women's labor force participation rate has increased over the years, but is still significantly lower than that of men in early decades.

**Table 1: Participation Rates by Gender in SMEs Business 2001-2009**

<b>Gender</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Male	35	30	29	30	32	30	29	28	30
Female	20	35	31	33	35	33	33	35	36
Total	55	65	60	63	67	63	62	62	66

**Survey-2009**

Obviously, it can be seen that employment rates between the three ethnic groups are different: in 2001, 55 % of the total work force employed in SME business the share of women is 20% in sample area. In 2002, 65 % of the total work force employed in SME business the share of women is 35% in sample area, the women of Rural Sindh are so innovative that they can design the different kind of flowers with out using the machines. In 2003, 60 % of the total work force involves in SME business and the share of women is 31%. In 2004, 63 % of the total work force involves in SME business and the share of women is 33%. In 2005, 67 % of the total work force involves in SME business and the share of women is 35%. In 2006, 63 % of the total work force involves in SME business and the share of women is 33%. In 2007, 62 % of the total work force involves in SME business and the share of women is 33%. In 2008, 62 % of the total work force involve in SME business and the share of women is 35%. In 2009, 66 % of the total work force involves in SME business and the share of women is 36%. The above figures indicate that share of women in SMEs business in growing compare with male participation in SMEs business in rural areas of Sindh.

**3. DATA COLLECTION METHODOLOGY**

Data were collected from 300 respondents of four Districts Shikarpur, of Sindh Province, working in SMEs Business age of 15-65 years old, a number of 250 or 86.2 percent are working. A structured questionnaire was developed as a instrument. Almost 30 percent of the respondents have at least one child at the age of less than 6 years old.

**4. ANALYSIS OF WOMEN'S PARTICIPATION IN SMES BUSINESS**

Economic theory indicates that family decisions regarding labor supply, child care quality, birthrates, and other relevant factors are likely to be affected by the SMEs Business growth in Pakistan. A number of researchers have attempted to estimate the behavioral effects on various family decisions (i.e: the women's decision to participate in the SMEs business) of changes in income, wage rates, and the price of finished products. A sampling of earlier studies includes Heckman 1974; Robin & Spigelman 1978; Stolzenberg & Waite 1984; Leibowitz, Waite, & Witsberger 1987; Berger & Black 1991; Blau & Robins 1988, 1989, 1991a, 1991b; Connelly 1992; Hofferth and Wissoker 1992; Leibowitz, Klerman, & Waite 1992; and Ribar 1992, 1995; Michapolos, Robins, & Garfinkel 1992; Kimmel 1993, Averett et.al 1997; Powell 1997; and Anderson & Levine 1999. The more recent research includes Han & Waldfogel 2001; Baum II 2002, Oishi 2002; Doiron & Kalb 2005; Viitanen 2005; Kimmel & Powell 2006; and Lockshin & Fong 2006. For our econometric analysis, we employ the model by Connelly (1992) in which the decision of a woman to participate in the SMEs business is modeled as the

outcome of maximizing her utility over goods. Specifically, we estimate a probit model relating employment to wages and child-care costs such that

$$L^* = \beta_0 + \beta_1 W + \beta_2 Pcc + \beta_3 A + \epsilon$$

$$L = 1 \text{ (participates) if } L^* > 0$$

$L = 0$  (does not participate) otherwise where  $L^*$  is the labor supply of women,  $W$  is the market wage rate,  $Pcc$  is the hourly cost of SMEs product, and  $A$  is a vector of other observed determinants. For other observable determinants  $A$ , we use the age, years of education, working experience, husbands income, number of children, and dummy variable showing the marital status, urban/rural areas, health, and weather or not they live in their born-area. The problem is that women are not observed in the samples that are not employed. Similarly  $P$  is observed only in the sample of who left children at the formal care. Therefore, we make estimation of the market wages and price of child care. The sample size used for estimation was 300 women. Summary statistics of the variables used are as shown in Table 5. With a sample size of 3000 women at the working in SMEs Business age of 15-65 years old, a number of 250 or 86.2 percent are working during the survey. Almost 30 percent of the respondents have at least one child at the age of less than 6 years old.

**Table-2: Summary Statistics**

Variables n=300		Frequencies	Percent
<b>Location</b>	<b>Shikarpur</b>	<b>300</b>	<b>100</b>
<b>Age-Manimum-18</b>	<b>19-30</b>	<b>150</b>	<b>50</b>
<b>Maximum-50</b>	<b>31-50</b>	<b>150</b>	<b>50</b>
<b>Race</b>			
	<b>Sindhi</b>	<b>200</b>	<b>66.66</b>
	<b>Balouch</b>	<b>50</b>	<b>16.66</b>
	<b>Punjabi</b>	<b>30</b>	<b>10</b>
	<b>Urdu</b>	<b>20</b>	<b>6.66</b>
<b>Education</b>			
		<b>Male</b>	<b>Female</b>
<b>Primary</b>	<b>Shikarpur</b>	<b>17%</b>	<b>3%</b>

## 5. FACTORS INFLUENCING THE INCREASE OF EMPLOYED WOMEN

The increase in the participation rate of women in SMEs business in Pakistan could to a certain extent be explained by the above analysis because due to factors that women has no access to market and other amenities facilities. The increase in the female labor force participation may be attributable to improving economic incentives in employment and policies favoring the employment of women. In addition, the combined effects of improved maternal and child health care, access to family planning services, increased years of schooling, leading to arise in the average age at marriage, have allowed women to take advantage of the increased employment opportunities

Despite their significant role of women in SMEs Business, they have been largely ignored in the government's programs until recently, and the effects of the current programs focusing on income-generating activities such as food processing and handicrafts remain to be seen, iii) Women's low earning can be attributed to lifetime choices between work and family formation (from the viewpoint of labor supply) and to employment discrimination (from the viewpoint of labor demand). Since women usually have a greater role than men in caring for the family, they may invest less in their own education and may work for shorter periods and in occupations that require fewer hours or less effort than men. This combined with interruptions in labor-force participation limits women's access to better jobs and promotions. Furthermore, employers, in turn, may invest less in nurturing women's skills through training or education because women are expected to drop out of the labor force while they are raising young children or, in many circumstances, to stop all work outside the home once they are married.

## 5. CONCLUSION

Much progress has been achieved in the past few decades in narrowing the gender gap in Pakistan. It can be shown in the developments in women's roles, both in absolute and relative terms, in the major socioeconomic aspects of the country's development: increasing rates of female labor force participation, gains in productive activities of women and their strengthened economic standing and their increased participation in education. Pakistan's impressive economic growth has been accompanied by the greater Participation of women in the formal workforce and in a range of other activities. There are equal opportunities for employment for both men and women workers in Pakistan. Based on the Labor Force Survey, in the first quarter of year 2002, women a made up 35.5 per cent of the labor force. Policy statements in the Government's also provide opportunities for women in SMEs business and economic participation as well as participation in education and training. Viewed from this perspective, women as active actors, in both the private and public spheres-should be trained with their male counterparts focusing not only on their domestic role but also on their productive role.

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**IMPORTANCE OF HUMAN RESOURCE (HR) IN ORGANIZATION  
DEVELOPMENT (OD) – CONTEMPORARY PRACTICES AND CHALLENGES**

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**ABSTRACT**

We should not consider people as mob or resource only, they are human beings. People are often the most valuable resource an organization has. To remain competitive in today's global marketplace, organizations must change. One of the most effective tools to promote successful change is organization development (OD). As HR increasingly focuses on building organizational learning skills and workforce productivity. The effective use of OD helps to achieve company business goals and strategies in order to become a broad HR competent as well as a key strategic HR too.

This study focuses that the best techniques for an organizational development and structure along with optimized strategic goals can't produce quality products without right team and group of peoples. As researchers Cummings and Worley point out, OD practices are of direct value regarding organizational workforce skills and learning, including goal setting through performance management, reward systems, career planning and workforce diversity, the main focus of this paper is on integration of human resource management and organizational development and challenges faced by them in today's fast moving business economy. The paper also focuses on the limitation faced for effectual human resource planning such as : Forecasting future people needs (demand Forecasting), forecasting the future availability of the people (supply forecasting), drawing up plans for matching supply with demand in synchronized order, furthermore, the paper discusses how these may combat with present HR practices. Our hypothesis is: HRM have positive impact on process of Organizational Development, this study is survey and library based whose results show that there is a high correlation between human resource planning and development on organizational development and change.

**KEYWORDS**

HRM, Organization's Effectiveness, Human resource planning, Workforce, HR development, Strategic goals, globalization and HR, Organizational development and structure.

**INTRODUCTION**

Evolving nature of HR function has changed HR practitioners' role what was in the past. HR practitioners have moved away from being seen as personnel having a

traditional administrative role, working on corporate strategy and driving the talent agenda within a firm. Future HR Competencies<sup>3</sup> are: mastering the decision science of HR, understanding and managing people, discerning, creating and adapting culture/mindset, rethinking organization and agility, creating collaboration through out organization, responding to social expectations and public policy, learning to play new roles. In order to meet the goals organizations must train and develop individuals to meet the challenges of industrialization and globalization. HRM must be prepared to deal with the effects of the changing world of work for them. This means to understand the implications of globalization technology, change work force diversity, change skills initiate the contingent work force, decentralize work sites and enhance employee involvement.

### LITERATURE REVIEW

As HR, in the role of strategic business partner, leads initiatives aimed at organizational design, process and performance, OD offers HR professionals a wealth of tools, models, theories and competencies invaluable for a competitive business environment. However, until recently, OD and human resources were considered distinct and separate entities. For example, OD has roots in social sciences and applied behavior, with values based in humanistic psychology, whereas the field of human resources is based in human capital theory, behaviorism and performance engineering.<sup>4</sup> Today, the division between OD and HR is less clear. In fact, the literature indicates that these two disciplines are melding together, with a growing collaboration and integration between OD and HR<sup>5</sup>

From a historic perspective, the OD field began about 50 years ago. Changing and dynamic, organization development is a values-based interdisciplinary profession with a behavioral science approach, drawing from many fields: anthropology, business, counseling, economics, education, management, organization behavior, psychology, public administration and sociology. OD helps improve organizational effectiveness, with its major focus on both the total system and the interdependent parts of the company. OD professionals work to increase organizational effectiveness and performance, working closely with many stakeholders--from employees and management to customers, stockholders and the community at large<sup>6</sup>

In 1988, researchers Jelinek and Litterer expanded OD by referring to it in terms such as team building, group decision; job design and helping teams cope with stress.<sup>8</sup> Today, HR leaders can use the collaborative approach of OD, through thoughtfully planned and long-range strategies, to address organizational challenges in today's dynamic business environment.

Human resource management has changed in name various times throughout history. The name change was mainly due to the change in social and economic activities throughout history. Industrial welfare was the first form of human resource management (HRM). In 1833 the Factories Act stated that there should be male factory inspectors. In 1878 legislation was passed to regulate the hours of work for children and women by having a 60 hour week. During this time trade unions started to be formed. In 1868 the 1st trade union conference was held. This was the start of collective bargaining. In 1913 the number of industrial welfare workers had grown so a conference organized by



Seebohm Rowntree was held. The welfare workers association was formed later changed to Chartered Institute of Personnel and Development.

It all started when Mary Wood was asked to start engaging girls during the 1st world war. In the 1st world war personnel development increased due to government initiatives to encourage the best use of people. In 1916 it became compulsory to have a welfare worker in explosive factories and was encouraged in munitions factories. A lot of work was done in this field by the army forces. The armed forces focused on how to test abilities and IQ along with other research in human factors at work. In 1921 the national institute of psychologists established and published results of studies on selection tests, interviewing techniques and training methods.

In the 1970's industrial relations was very important. The heated climate during this period reinforced the importance of a specialist role in industrial relations negotiation. The personnel manager had the authority to negotiate deals about pay and other collective issues.

In the year 2000, growth in the use of internet meant a move to a 24/7 society. This created new jobs in e-commerce while jobs were lost in traditional areas like shops. This meant an increased potential for employees to work from home. Organizations need to think strategically about the issues these developments raise. HRM manager's role will change as changes occur.

<u>STRATEGIC MANAGEMENT -&gt; HR PLANNING → STRATEGIC PLAN</u>	
Organizational goals	Values
Organizational goals	
Strong and weak parts	Mission
Strong & weak points	
Opportunities and threats	Goals and Priorities
Opportunities & threats	
Sources of Competitive advantage	Resource Allocations
Source of Competitive advantage	
Identify People related matters	Define HR strategies,
Implement Hr Processes	Goals & plans, Policy & Practices

*The link between HR Plan and Strategic Management [Bohlander et as (2001)]*

Poor HR Planning and lack of it in the Organization may result in huge costs and financial losses. It may result in staff posts taking long to be filled. This augments costs and hampers effective work performance because employees are requested to work unnecessarily overtime and may not put more effort due to fatigue. If given more work this may stretch them beyond their limit and may cause unnecessary disruptions to the production of an organization. Employees are put on a disadvantage because their existing programmes are disrupted and they are not given the chance to plan for their career development.<sup>9</sup>

### **HYPOTHESIS**

The hypothesis is, “Human resource management is playing effective and efficient role to develop organization and achieve its long term objectives.”

## METHODOLOGY

This basal research study used a structured questionnaire as the instrument for data collection. It was designed to elude information on demographic and psychological aspects such as behavior, awareness, trends, adoptability of the respondents. The demographic aspect included age, gender, and education level and field of study. The psychographic variable included attitude towards adaptability and knowledge of HRM, tolerance behavior influence, ethical and legal issues.

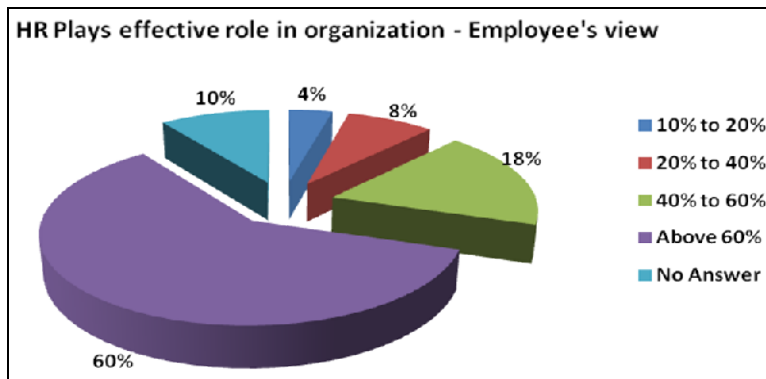
The sample comprised of 300: 115 (employees: employers) male/female professionals from diverse fields i.e. businessmen and industrialists, and peoples from various social and ecological domains whose ages ranged from 23 to 60 years. Moreover, they are engaged in different professions and field of studies / specialization. The 415 respondents were selected on the basis of goal-directed sampling. Out of the total number of questionnaires, 23:09 were dropped from the analysis on counts of incomplete/ fake / selecting all dimension or choices data entry at the respondents end. Therefore, the analysis presents data of 277:106 respondents, i.e. n= 383. For the purpose of survey two main cities of Pakistan were selected i.e. Karachi and Islamabad. In addition to the primary research, secondary data were collected from articles published in latest academic journals, industry and governmental surveys and reports.

## DATA ANALYSIS AND FINDINGS

### 1. HR Plays effective role in organization - Employee's view

Among all respondents surveyed, a significant number of employee's majority reported that now a days due to technological advancement and other parameters of globalization, HR is playing vital role in organization at all.

Survey of employers also reveals that modern business practice requires an integrated human resource system to replace manual processes for the operational control of employee relations. This has resulted in reduced labor requirements and administrative processes. The corresponding increase in productivity due to centralized computing streamlines operations and assists managers to focus on more mission critical aspects of human resource management.



Although paperwork hasn't been totally reduced, human resource managers can now spend more time on core business objectives as opposed to attending to minor administration tasks.

One area where a computerized human resource system is fully utilized is in the screening, tracking and reporting on application processes associated with filling vacancies. With internet integration, job posting, the tracking of open positions and the ability to store resumes electronically, human resource managers can fulfill recruitment, screening and conduct all operations from a centralized computer terminal. The ability to perform searches, and track jobs and applications greatly expedites processes that would otherwise be very time consuming to execute.

## **2. Alignment of HR policies with organizational needs**

Respondents were asked to rank whether in organizations, human resource services and functions were collectively prioritized according to organization and customer-needs. Result shows that 47 percent of respondents agree that their organizations' goals and HR practices in organization are synchronized. 30 percent claims that their organizations are practising generic policies and don't tend to adaptation and alteration in accordance with organizations' needs. And rest of the respondents was different in their responses.

## **3. Organization's strategic plan and workforce planning**

During survey, out of total respondents, 53% have knowledge about the organizational strategic plan (though most of respondents were doing strategic and tactical level planning), so it was observed that mostly employees faced job insecurity due to unawareness of employer and top level management, while they are strategically planned for organization as whole.

## **4. Different HR- Issues**

The survey also shows following HR-related issues aggregately on organizational level.

### **a) Job Training Programs**

The HR should place emphasis on the organization of effective training and development programs for its new as well as existing employees so that these are gradually updated regarding the recent developments in the field of organization

### **b) Employee Health Benefits**

One of the most important benefits that one should get at work is a health benefit or medical plan. Make sure that one may always be insured adequately. Human resource should identify need of employee's health benefits and make policies according to employees rather than their own.

### **c) Unique Atmosphere**

Human resources should provide friendly environment between employees and employer, and among employees. Employees must have respect and regard for their employers and both should try to reduce chances of misunderstanding among them.

### **d) Checking Employees' Backgrounds**

Nowadays it seems quite a difficult to tell what kind of people we are dealing with. Human resource department should assess well an ideal candidate for a vacant position and should take all possible efforts to check one's background.

There are issues of security with information, ware, or money depending on the type of business one may have. Employer would never put oneself into jeopardy by appointing a person who has been convicted and been in prison for misapplication in any capacity of his work.

**e) The Importance of Employee Development**

When employees are well trained, they add more to productivity and reputation of an organization. Employees' development programs are essential in order to improve morale and motivate the employees' effective performance. Employees like to learn new skills to meet challenges and they are more motivated when they feel there is great potential for personal growth.

Similarly, some other roles of HR such as right person for right job, hiring qualified and reliable people, employees' bonus- packages and rewards programs, protection of gender discrimination and sexual harassment, health and safety and that of employees incentive programs included.

### CONCLUSION AND RECOMMENDATIONS

Human resource is playing vital role in organizational development, and it is backbone of any organization. Modern business practices require an integrated human resource system to replace manual processes for the operational control of employee relations. This has resulted in reduced labor requirements and administrative processes. This corresponding increase in productivity due to centralized computing streamlines operations and assists managers to focus on more mission critical aspects of human resource management. Although paperwork hasn't been totally reduced, human resource managers can now spend more time on core business objectives as opposed to attending to minor administration tasks. Nowadays world has become a global village, global economy has been integrated, every organization wishes to meet global challenges, and expand its business globally. Owing to such rapid changes, importance of human resources has increased in every organization.

It is suggested that, for effective strategic planning ( organizational development ), an efficient analysis should be conducted for demand and supply forecasting of human resource along with available tools for those purposes such as ration trend analysis, work study techniques, forecasting skill and competence requirements etc.

Finally, we can conclude that by viewing above mentioned survey based facts and library research, besides of numerous challenges and hurdles, especially in case of low income countries like Pakistan, we can say that there exist the highly positive relation between organization and its development with emerging human resource management.

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**A STUDY ON AWARENESS ABOUT OSTEOPOROSIS  
AMONG GRADUATE STUDENTS OF LCWU, LAHORE**

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**ABSTRACT**

Osteoporosis is a bone disease that leads to an increased risk of fracture. The aim of the study was to assess the level of knowledge about osteoporosis among the graduate students. The data was collected with the help of a questionnaire. A sample of 266 students was selected. Descriptive analysis and multivariate analysis was applied with the help of the software SPSS. It was observed through the extracted factors that level of awareness about Osteoporosis is low among the students. It is necessary to increase this level of awareness as Osteoporosis is becoming more common day by day.

**KEYWORDS**

Osteoporosis, Bone Loss, Women, Factor Analysis, Awareness.

**1. INTRODUCTION**

Osteoporosis is a metabolic bone disease in which the amount of bone tissue is reduced sufficiently to increase the likelihood of fracture. Usually there are no specific symptoms. Therefore, Osteoporosis is known as the “silent disease”. The first signs about the presence of disease are fractures and these occur mostly in spine, wrist or hip.

Osteoporosis may occur to both men and women. Women have smaller, thinner bones than men to begin with and they lose bone mass more rapidly after menopause, usually around age 50 when they stop producing a bone-protecting hormone called estrogen. In the five to seven years following menopause, women can lose about 20% of their body mass. Post-menopausal women are more susceptible to bone loss than, men, because their bodies produce less estrogen. This hormone supports osteoblasts survival and tips the balance of bone remodeling in favor of bone formation. Women are more likely to sustain any Osteoporotic fractures than men. Lifetime risk of any fracture ranges between 40-50% in women whereas it ranges between 13-22% in men.

Some of the factors that can greatly affect the chance of experiencing osteoporosis are smoking and alcohol consumption. These factors were not included in the study as the use of tobacco and alcohol is forbidden in Muslim countries.

**2. LITERATURE REVIEW**

A lot of work has been done in order to assess the level of knowledge about osteoporosis and its related risk factors. Some of these are as follows.

**Drozdowska et al. (2003)** took a sample of 1065 women of the ages 16-72 years to assess their knowledge about osteoporosis and their attitude towards its way of prevention. A decrease was observed in the correct answers with respect to age, where as an increase was observed with the level of education and personal experiences had no significant influence. High level of education and young age greatly improves the knowledge about osteoporosis. **Terrio and Auld (2002)** wanted to determine the extent and integration of osteoporosis knowledge in three age groups of women and they compared it to the amount of calcium intake and the weight bearing physical activity (WBPA). It was found that the knowledge about osteoporosis was limited and was not associated with age, calcium intake or WBPA. Similarly calcium intake and WBPA were not associated with age. **Davis (1999)** investigated about the knowledge of osteoporosis and its related issues among 16-year-old girls. A multiple choice questionnaire was distributed in five schools of Borough of Wolver Hampton. The results showed that the awareness about osteoporosis among teenage girls is very poor. It is necessary to increase awareness about osteoporosis especially in relation to diet and exercise.

**Yeap et al. (1998)** assessed that whether relatives with low BMD could be identified by using historical, biochemical and genetic markers for osteoporosis. It was suggested that if osteoporosis is present in first degree relatives than it has to be one of the important indications to have one's bone density measured because they have a higher risk for developing osteoporosis.

### 3. METHODOLOGY

Factor analysis is a mathematical tool which can be used to examine a wide range of data sets. Factor Analysis is based on a model, in which the observed part is partitioned into an unobserved systematic part and an unobserved error part. The error vector is considered as uncorrelated or independent and the systematic part is taken as a linear combination of a relatively small number of unobserved factor variables.

Factor analysis attempts to explain the correlations between the observations in terms of the underlying factors, which are not directly observable. The main interest of FA is in the 'underlying factors', the observed variables are of little interest.

#### 4.1 Assumptions of Factor Analysis

Factor analysis is designed for interval data, although it can also be used for ordinal data (e.g. scores assigned to Likert scales). The variables used in factor analysis should be linearly related to each other. This can be checked by looking at scatter plots of pairs of variables. Obviously the variables must also be at least moderately correlated to each other; otherwise the number of factors will be almost the same as the number of original variables, which means that carrying out a factor analysis would be pointless.

The critical assumptions underlying factor analysis are more conceptual than statistical. From statistical standpoint, the departures from normality, homoscedasticity and linearity apply only to the extent that they diminish the observed correlations. Only normality is necessary if a statistical test is applied to the significance of the factors, but these tests are rarely used. In fact, some degree of multicollinearity is desirable, because the objective is to identify interrelated sets of variables.

## 4.2 Factor Analysis Model

Factor model can be thought of a series of multiple regressions, predicting each of the observable variables  $X_i$  from the values of the unobservable common factors  $f_i$ :

$$\begin{aligned} X_1 &= \mu_1 + l_{11}f_1 + l_{12}f_2 + \dots + l_{1m}f_m + \varepsilon_1 \\ X_2 &= \mu_2 + l_{21}f_1 + l_{22}f_2 + \dots + l_{2m}f_m + \varepsilon_2 \\ &\vdots \\ X_p &= \mu_p + l_{p1}f_1 + l_{p2}f_2 + \dots + l_{pm}f_m + \varepsilon_p \end{aligned}$$

The variable means  $\mu_1, \mu_2, \dots, \mu_p$  can be regarded as the intercept terms for the multiple regression models.

The regression coefficients  $l_{ij}$  (the partial slopes) for all of these multiple regressions are called factor loadings. Where,  $l_{ij}$  = loading of the  $i$ th variable on the  $j$ th factor. These are collected into a matrix as shown here:

$$L = \begin{pmatrix} l_{11} & l_{12} & \dots & l_{1m} \\ l_{21} & l_{22} & \dots & l_{2m} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ l_{p1} & l_{p2} & \dots & l_{pm} \end{pmatrix} = \text{matrix of factor loadings}$$

And finally, the errors  $\varepsilon_i$  are called the specific factors. Here,  $\varepsilon_i$  = specific factor for variable  $i$ . The specific factors are also collected into a vector:

$$\varepsilon = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \cdot \\ \cdot \\ \varepsilon_p \end{pmatrix} = \text{vector of specific factors}$$

In summary, the basic model is going to look a bit like a regression model. Each of response variables  $X$  is going to be written as a multiple regression, predicting each  $X$  variable as a linear function of the unobserved common factors. All these equations are multiple regressions, but where the explanatory variable are unobserved factors  $f_1, f_2$  through  $f_m$ . Thus, explanatory variables are  $f_1, f_2$  through  $f_m$ . Therefore, there are  $m$  unobserved factors that control the variation among data.

Generally, we reduce this into matrix notation as shown in this form here:

$$X = \mu + Lf + \varepsilon$$

Note: In general we want  $m < p$ .



#### 4. DATA COLLECTION

In this study the objective was to explore the factors affecting the awareness about osteoporosis among graduate students of Lahore College for Women University, Lahore. The study was based upon the data and information collected through a questionnaire. Factor analysis was found to be the appropriate method to analyze the required data. The design of the study was cross-sectional.

##### 4.1 Sample Selection Scheme and Collection of Data

Appropriate sample size was decided by using the following formula given by Yamme (1967)

$$n = \frac{N}{1 + Ne^2}$$

where,

N = size of the population

e = the degree of reliability

By assuming a 95% confidence level and precision rate of  $\pm 5\%$  and degree of reliability

$$e = 0.05.$$

##### 4.2 Questionnaire

In order to collect the data for this study, a questionnaire was designed. The questionnaire consisted of 41 questions. Questionnaire used in this study almost covers every aspect regarding the awareness about osteoporosis. It includes the questions about their life styles, family history, diet, health and knowledge about osteoporosis.

#### 5. ANALYSIS AND INTERPRETATION

The objective of this study was to assess the level of knowledge about osteoporosis among the graduate students. The necessary data was collected by using questionnaire. The questionnaire was constructed by keeping in mind the relevant factors that can measure awareness about osteoporosis. The questionnaire consisted of the following characteristics:

- Facts about Osteoporosis
- Knowledge about Osteoporosis
- Causes of Osteoporosis
- Ways of avoiding Osteoporosis
- Role of Parathyroid Hormone
- Family History
- Effect of Lifestyle
- Importance of Health
- Importance of Proper Diet

Descriptive statistics summarizes the variables in a data set. For example, vegetables are essential for a healthy body. **14.7%** gave no importance at all to this fact; where as **46.2%** gave little consideration to it on the other hand **2.6%** were of the view that

consumption of vegetables is highly important. Respondents were asked if they were aware of the negative effect of coffee, tea and fizzy drinks. **13.9%** thought it had no effect on our bones, where as **54.5%** thought it had very little effect on our bones and **3.8%** had a strong view that these had negative effect on the bones. **10.5%** were fully aware of the importance of calcium where as **28.9%** were some what aware and **13.9%** didn't know of this fact. Calcium is important for our body but due to eating disorders we lose vital calcium. **27.1%** were aware of this fact, on the other hand **46.6%** had enough knowledge and **5.6%** had no knowledge what so ever about this fact.

Factor analysis is a data reduction technique. Factor analysis was applied to minimize the number of variables consequently maximizing the amount of information in the analysis.

Factor analysis identified ten factors from the list of 41 attitudes. These factors are represented by the specific statements written to reflect the ten attitudes towards awareness about osteoporosis among graduate students.

The first factor is named as **Causes of Osteoporosis**. The variables that fall in this factor are, long term medication; effects certain ethnic groups; experience bone fracture; tension or depression; fate, chance or bad luck; leanness. The second factor deals with **Diet Awareness**. Vitamin – D is essential; onions reduce bone loss; milk is enough to overcome deficiency of Calcium; importance of Calcium are the variables that fall in factor two.

Similarly, the names of the rest of the factors are, **Family History, Awareness of recent research about osteoporosis, Awareness about Parathyroid hormone, Effect of Osteoporosis, Osteoporosis awareness, Impact of Life style, Awareness about dietary factors** and **Awareness about supplements**.

## 6. CONCLUSION

The factors that were extracted were related to Osteoporosis and its related risk factors. It was observed that the awareness about Osteoporosis and its related factors is very poor.

The knowledge about diet and lifestyles is poor. The factors especially as the importance of vegetable consumption, negative impact of coffee, tea, awareness about Osteoporosis, importance of exercise and such other factors show a very low level of awareness. It is necessary to increase this level of awareness as Osteoporosis is becoming more common day by day.

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**ADVERTORIAL MUSIC INFLUENCE ON CUSTOMER  
BUYING BEHAVIOR- CASES FROM KARACHI**

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**ABSTRACT**

This study examines the advertorial music influence on customer buying behavior; Customer buying behavior is influenced by social and cultural values in which we purpose that the age and gender are the factor that can influence on customer buying behavior and its effects on their persuasion and attractiveness. The types of music in studies bring the conceptual linkage among these variables about their interrelationship. This study finds the influence on buying behavior by music in advertise is not very substantial effects but have some influences on early agers, especially in female and bachelors found more interested in music in advertise, specially female respondent are keen of music in advertise moreover male persuade more on buying product as female, therefore it is very substantial for advertise maker to consider that variables with respect to the product while making effective advertise.

**KEYWORDS**

Buying behavior, advertisement, advertorial music, effective ads

**INTRODUCTION**

Music in human life has very much importance, it is called the food of soul, because music is one who give relaxation to human psyche therefore it automatically reaches to the human body so that music relax human mentally and physically, according to this view marketers or advertiser thought that music must have positive effect in advertisement and will certainly be helpful to attract the targeted customers, so that advertiser put music in almost every advertise which is transfer through multimedia devices like radio, TV or MMS as well as they also keep eye on the type of music that which music for which customer for example if targeting children so present funky music, if targeting young so present fast music if targeting old give light or calm music etc so that segment were made what for children what for girls, boys, old, young, male female, man women teens etc so that for knowing the exact factual this report is written which will tell what for whom. Further Chapter has explained that which musical factors in advertise are there that a rational customer attracted toward product, it may be by the connection of age, gender on persuasion and attractiveness.

### LITERATURE REVIEW

In general there are four level of marketing segment mass, segmented, micro, niche (mazhar manzoor, 2009) and advertisement is mean through which any of level can be knocked there may be some content that may the effectors like age can be very important factor as David Huron says advertisers can take up celebrates on the basis of group influence, vital groups being those related with race, sex, age etc (David Huron, 1989), Ageing is the changing in an living object over time (Bowen RL, 2004) children and teenagers have little money to spend on buying goods but they spend more as other agers as well as it can be said that their preference are influenced by their parents buying behavior. (Krulwich, Robert, 2006). Krulwich also stated that young people are marketers central target because they have income but less responsibilities expenses as well they attract toward new product more easily because they do not usually have fixed buying habits and television is the ideal medium to knock that range of customer(Krulwich, Robert, 2006) so that while making any decision of making an advertise marketer has to keep eye on the age of the target customer, it is usually concern according to the nature of the product if we talk about gender so gender is also a demographic variable that can effect buying behavior, gender has been describe in the literature that Gender is an attain position of a person that which is create through psychological, cultural, and social way(Don H. Zimmerman, 1987)gender effect the awareness of person (Ellen Garbarino, 2004)so that it can be said that each gender has his own specific choice which may be bit similar and Roper also affirmed that women are not much involved in the Internet than men (Roper, 1998) but in online purchasing women are found more anxious than men with the threat of exchange or buying online (Kehoe et al., 1998). females give importance on preserving contact, but that they also exchange words with other more frequently (Tannen, 1990).Ellen has proved that genders don't differ in mean age, keeping eye on gender difference many marketers spotlight also on male or on female consumers, (Ellen Garbarino, 2004) therefore it can surely be said that choices also differ from gender to gender and while making advertise or making decision of making advertise gender of targeted receiver must be consider Attractiveness is a physical gravity toward something, it is also referred as the process of getting someone at desired point while ignoring other things. (Bryden, M.P. 1971) Consumers possibly will have an association with the music and then form an attraction (MARY S. Wagner, 2008) to the brand. the purpose of attractiveness in advertisement is to get ATTENTION that also means to get the concentration of the targeted customer, considering other content essential but advertise must persuade viewer to buy the advertised product PERSUASION may be defined urging ones sentiment, sensation, it is an mature issue in psychology and not easy to apply to advertising (Michael L. Ray, 1982), C WHAN PARK did the research on how music in commercial as a device persuasion that can help in brand attitude formation and he has found it depends on type and level on connection(C WHAN PARK and S. MARK YOUNG, 1986) Mary S Wager stated that in advertising people are persuaded by nonverbal factor exclusive of verbal traces. Scott argue that music has power evoke, culture-dependent representative scheme (Scott, L. M. (1990)so that advertise not only give entertainment attractiveness and other feature but it has also to persuade the viewer to buy company product, and business is what advertisement made for, and try to put that music which persuade viewer to but he advertised product, while making advertise

## METHODOLOGY

Data has been collected from two different sources Secondary Sources that are, Published Articles, websites, L.E.J digital Lab (University of Karachi), Maulvi Abdul Haq Library (Federal Urdu University Karachi, Gulshan Campus) Primary data Collection Model Colony North Karachi Nazimabad No.1 Others The Close ended questionnaire will be used to collect primary data, It is basically a qualitative research, This research is a descriptive research, causes of the music to influence on customer buying behavior, The research is done in the month of December 2009 In this research we are going to select total 80 students of Karachi living in different areas and different ages, Students would be the sample unit of the research The research methodology is area sampling.

## RESEARCH FINDINGS

### Descriptive

**Table 1.1: Descriptive Statistics**

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Age	80	3	2	5	2.51	.941	.886
Gender	80	1	0	1	.49	.503	.253
Attractiveness	80	4	1	5	2.76	1.275	1.626
Persuasion	80	4	1	5	2.96	1.382	1.910

### Frequencies

**Table 2.1: Statistics**

	Age	Gender	Attractiveness	Persuasion
N	80	80	80	80
Missing	0	0	0	0
Mean	2.51	.49	2.76	2.96
Median	2.00	.00	3.00	3.00
Mode	2	0	3(a)	3
Std. Deviation	.941	.503	1.275	1.382
Variance	.886	.253	1.626	1.910
Range	3	1	4	4
Minimum	2	0	1	1
Maximum	5	1	5	5

## AGE

We have selected agers below 15 but we didn't collect data from them because according to our perception they are not decision maker of the family. Therefore regarding age the question was asked from the respondent and the data obtained are summarized, in which ordinal scale is used. We have identified the mean, median, mode, standard deviation; variance and range for our convenience but all these are worthless for analyses of age. We have collected data from total 80 respondent in which

### GENDER

Regarding gender the questions were asked from the respondent and the data obtained are summarized, in which nominal scale is used. We have identified the mean, median, mode, standard deviation; variance and range for our convenience but all these are worthless for analyses of gender. We have collected data from total 80 respondents in which we have collected data evenly with male respondents 40 and female respondents 40.

### ATTRACTIVENESS

With regard to attractiveness, questions were asked from the respondent and the information obtained are summarized, in which ordinal scale is used and mean is used as a statistical tool, We have identified the mean, median, mode, standard deviation, variance and range but we will use only mean for analyses because analysis could give us a better result for analyses it means mean is only enough for the analyses, that's why we will use only mean for analyses. The Mean of attractiveness from advertorial music is 2.76 which showing a positive response from the respondent that the musical advertisement highly attracts the people. Therefore in cross tabulation we will make the analysis only on very high rating scale which will indicate the positive relation and left the other rating scale Cross tabulation shows that attractiveness from advertorial music among 16-25 ager are 15.0%, 26-35 agers are 3.8%, 36-45 ager are 1.3% and above 45 agers are 1.3 %, from our analysis it is proved that attractiveness in advertorial music among 16-25 agers are higher among all ages, Cross tabulation shows that attractiveness from advertorial music among female respondents are 11.3% and male respondent 10% that mean attractiveness of advertorial music among female is higher than male respondents, that mean attractiveness in musical advertisements is very high among female as compare to male.

	Frequency	Percent	Valid Percent	Cumulative Percent
Very High	17	21.3	21.3	21.3
High	18	22.5	22.5	43.8
Neutral	19	23.8	23.8	67.5
Low	19	23.8	23.8	91.3
Very Low	7	8.8	8.8	100.0
Total	80	100.0	100.0	

### PERSUASION

Regarding Persuasion, questions were asked from the respondent and the information obtained are summarized, in which ordinal scale is used and mean is used as a statistical tool. We have identified the mean, median, mode, standard deviation, variance and range but we will use only mean for analyses because analysis could give us a better result for analyses it means mean is only enough for the analyses, that's why we will use only mean for analyses. The Mean of persuasion by advertorial music is 2.96 which showing a positive response from the respondent that the musical advertisement highly persuade the people to buy the product. Therefore in cross tabulation we will make the analysis only

on very high rating scale which will indicate the positive relation and left the other rating scale Cross tabulation [Appendix C, Table 3.1.4] shows that persuasion by advertorial music among 16-25 ager are 11.3%, 26-35 agers are 2.5%, 36-45 ager are 2.05% and above 45 agers are 1.3 %, from our analysis it is proved that persuasion by advertorial music among 16-25 agers are higher among all ages Cross tabulation shows that persuasion by advertorial music among female respondents are 7.5 % and male respondent 10% that mean persuasion of advertorial music among male is higher than female respondents, that mean persuasion in musical advertisements is very high among male as compare to female,

	Frequency	Percent	Valid Percent	Cumulative Percent
Very High	14	17.5	17.5	17.5
High	17	21.3	21.3	38.8
Neutral	25	31.3	31.3	70.0
Low	6	7.5	7.5	77.5
Very Low	18	22.5	22.5	100.0
Total	80	100.0	100.0	

### CONCLUSION

According to our research the two demographic factors of advertorial music, that is age and gender highly influence on the customer to buy the product, so the advertiser has to focus on these two main factors in musical advertisement, so the likeness of music and type of the music should be consider in terms of customer buying behavior. The likeness of advertorial music among 16-25 agers is higher among all ages, likeness of music in advertisements is very high among female as compare to male.

### RECOMMENDATION

Effectiveness of age and gender on attractiveness and persuasion found positive, therefore while making an advertise marketers has to keep close eye to that factors so that advertise is effective and efficient.

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**ESTIMATION OF THE PRODUCTION OF (MATIYARI SUGAR MILL SINDH)  
USING SPSS THROUGH COBB-DOUGLAS MODEL**

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**ABSTRACT**

The production function is the combination of the Labor and Capital. It is really a business concept that defines the maximum rate of output approaching from specified input rates of capital and labor. The least cost capital-labor combination for the production or the output rate would yield maximum profit, are not the objectives of this function. This function is only shows the maximum output should be obtain from any input combination. Economists use the variety of functional form to describe the function, but the most frequently used function is Cobb-Douglas production function. It was proposed by Charles Cobb and Paul Douglas in 1928. It is widely used in economics because; it has properties, representative of much production process. Almost the every production manager is interested to maximize his production. He attempts to minimize the cost or maximize production, subject to producing a specified output rate. In this sense estimation of production plays the crucial role for the planning of maximum production but the main problem is that which procedure of estimation should be used for the forecasting of production this problem seriously depends on the behavior of production curve, while Cobb-Douglas is a non-linear model therefore the behavior of this model is curvilinear.

In this paper, our objective was to estimate the sugar production for the next two years (i.e. 2010, 2011). Due to the fixed capital<sup>1</sup> the production is mainly depend on labor that is why this paper also provides the optimal labor input as appendix information. All these analysis is carried by using the Statistical Package for Social Science SPSS. This is widely used statistical package for the linear and non-linear regression analysis. The behavior of production is normally non-linear, can be analyzed trough Cobb-Douglas function. This function consists of two independent variables i.e. labor and capital. In this software linear and non-linear regression analysis can be performed via Curve Estimation procedure, but Cobb-Douglas model is analyzed trough *Non-linear regression menu*, during the model building of Cobb-Douglas starting values of parameters are essential to given. In production function Return to Scale refers to a technical property of production that examines the changes in output following to proportional changes in all inputs. Usually many functions have a property called constant return to scale, means if an increase of an equal percentage in all factors of production causes and increase in output of the same percentage. In the SPSS during the modeling of production function the

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<sup>1</sup> Matiari Sugar Mill's production area uses fixed capital. In any condition of impairment or depreciation of capital it is reviewed and recovered till previous fixed amount.

assumption of the constant return to scale is followed which is the sum of parameters are exponents (i.e.  $\alpha$  and  $\beta$ ) on capital and labor variables must be equal to one. Estimation procedure makes iterations<sup>2</sup>, due to these iterations the model select the best parameters values for estimation.

In this study, estimated model for sugar production of Matiari Sugar Mill of Sindh for the collected data was found to be satisfactory, with the some diagnostic checks such as *standard deviation of regression* and *coefficient of determination (R-square)*; all these practices followed by SPSS.

## 1. INTRODUCTION

In the social science the mathematical and statistical analysis of actual economic phenomena based on the concurrent development of theory and observation is known as econometrics. Economical phenomena can be classified as micro and macro level, but the one of the most inevitable economical phenomena is production theory, which belongs to the both micro and macro level of economics. All businessmen as well as industrialist are very much concerned about the theory of the firm in order to make correct decisions regarding about what item should be produce and how much and how to produce? All these situations can be handled by the awareness of economical production theory.

The production of the firm is mainly depending upon the factors of production, which can be classified as capital and labor. The production is considered as explained or dependent variable, which depends on two independent variables are labor (L) and capital (K). Letting the Y denotes the amount of output of production, then the production function can be written as;

$$Y = f(K, L) \quad (1.1)$$

Generally the firm has to face the problem is to determine how much labor and capital to employ to produce most efficient output, because the every production manager wants to increase his production till maximum point at the available factors of production. The appropriate utilization of labor and capital to maximize the production of the firm is the main objective of this paper. Ideally the production function is the microeconomics concept, which specifies the relationship between physical output and input. It is interesting to note, that the production analysis of Matiari Sugar Mill is also a case of Microeconomics.

The equation (1.1) describes the general behavior of the production, which depends on labor and capital. The true relationship between the factors of production is likely to be close to Cobb-Douglas model. This model is widely used in theoretical and empirical analysis of production of the firm in the sense of microeconomics. The statistical concept of the estimation can be applied through Cobb-Douglas production function. This function predicts the production (output) using the different combinations of the factors of production (input). The computation of this model is not laborious and mostly production processes can be regressed by this model. This function does not imply

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<sup>2</sup> Iterative process is most frequently used in model building. Iteration means repetitions of model until to achieve appropriate values of coefficients are used in model.

directly to estimation by the simple regression method. It is a non-linear relationship and technically, the method of Ordinary Least Square (OLS)<sup>3</sup> is used on linear relationship, therefore the Cobb-Douglas function must be in a linear form by logarithmic transformation, in order to use OLS.

Besides the advantages of Cobb-Douglas production function, some drawbacks are also faced by this function. One of the most important drawbacks is that, it cannot handle a large number of inputs. Serial correlation<sup>4</sup> and Heteroscedaticity<sup>5</sup> are the common problem, which affect this function. The selected production function has constant shares of the factors of production over time, create a doubt in analysis. Neither Cobb nor Douglas provided any theoretical reason, why the coefficients  $\alpha$  and  $\beta$  should be constant over time. Remember that the nature of machinery and other capital goods differ between the time periods. Similarly the skills of the labor are also changed due to the changing of time. In the present study, not large numbers of inputs are used therefore variations in the nature of capital and labor has not significant impact on production level and constant values of  $\alpha$  and  $\beta$  are allowed to use in analysis.

Computer software makes our works easy to perform. In this paper the production function of Cobb-Douglas is performed by SPSS. It is most widely used program for statistical analysis in social science. According to this paper, the selected model is non-linear regression function, because the relationship between the dependent and independent variables is non-linear. This type of regression model in SPSS is performed in the *analysis menu* through *Non-linear Regression* option. The level of data in this option must be in quantitative (i.e. ratio scale) form, therefore the selected data for this paper belongs to the performance of the labor and capital is recorded in quantitative form.

The rest of the paper is organized as follows. In the next section, we provided the comprehensive literature review about Cobb-Douglas production function. The section-3 provides the data information. In section-4 the discussion about the methodology for the production estimation is given, that includes the description about Cobb-Douglas model, SPSS, optimal employment of labor and some major diagnostic checks on regression are also defined in this section. Results of the estimation and discussion are presented in section-4. Finally, the conclusion is offered in section-5.

## 2. LITERATURE REVIEW

Business concept of production from specified input rate of the capital and labor is known as Cobb-Douglas Production Model. Many studies have been carried out on this production function. Our literature review discusses the work on production function which has been done by different research scholars.

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<sup>3</sup> Method of least square is used to estimate coefficients of model and provide best fitted line than the other method.

<sup>4</sup> Correlation between the members of series of observation with respect to time is called serial correlation and it is also called the autocorrelation.

<sup>5</sup> The variance of the error variable  $\epsilon_t^2$  is required to be constant. When this requirement is violated, then the condition is called heteroscedaticity.

Jesus Felipe and F. Genrard Adams (2005), observed that the Cobb-Douglas production function is found everywhere in the form of theoretical and empirical analysis of growth of productivity. They performed the comprehensive work on production model and conclude that, the model has very serious implications for today's work in macroeconomics.

K.V. Bhanumurthy (2002), argued that the Cobb-Douglas production has merits and it is looked a simple tool, which can be handled easily. He discussed many merits and demerits of this function and found two main demerits, which were "it cannot handle large number of input" and "serial correlation and Heteroscedasticity affect continually this function this function too", while the merits were the production function facilitates computation and properties of parsimony and flexibility.

In (2010), Husain, Muhammad Zakir, Al-Amri and Khalid Said studied on Cobb-Douglas function. The objective of their study was to select the most suitable production model for measuring the production process of major different industries of Oman. Their estimated results suggested that major industries of Oman indicate Increasing Return to Scale.

J. Felipe and JSL Mc Combine (2003), attempted to evaluate the performance of aggregate production function. This production has been criticized by many scholars. In their study, they concluded that the hypothetical basis of the aggregated function is problematic.

In (2002), the Edward, J. Balisteri, Christine A. McDanid and Eiva Vivian reviewed the relationship between labor and capital with the U. S. industry level. They accepted and put forward a concept, the true relationship between capital and labor is likely to be close to Cobb-Douglas Model.

The study of Prajneshu (2008), is belongs to the fitting of Cobb-Douglas Model. According to his, the production function is usually fitted as a linear model through logarithmic transformation and then applying method of least square. He discussed advantage and disadvantages of this function and finally conclude that the assumption of Cobb-Douglas is rarely satisfied in Practice.

### 3. DATA

Collection of data is the first and very much essential part of analysis. The present study belongs to the estimation of sugar production through Cobb-Douglas model. For this purpose production data of sugar was collected from Matiari Sugar Mill Sindh. Sugar production data is compiled yearly and the range of data for present study is of 10 years; from 2000 to 2009 and on the average the every season of sugar is consist of 4 months.

The collected data can be classified in six columns, which are Capital, Labor, Sugar Production, Total Wage, and Wage<sup>6</sup> per Unit (ton) and Sugar Prices per (kg). According

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<sup>6</sup> Average production of a labor =  $\frac{\text{sum of production of 10 years}}{\text{total number of income in 10 years}}$

then, Wage per ton =  $\frac{\text{total wage}}{\text{average product of a Inbot}}$

to the annual report of Matiari Sugar Mill, the mill has fixed capital in rupees that is RS 65,250,000. For the analysis, we divided total capital into 6525 units and each capital's cost is RS 10,000. Sugar production is measured in Tons and represented in this paper as (production/100). Following graph represents the general behavior of the production data; the graph clearly shows the upward trend and positive relationship. Depiction of figure: 1 shows sugar production is mostly depends on the labor rather than capital because capital has minor and fixed affect on production.

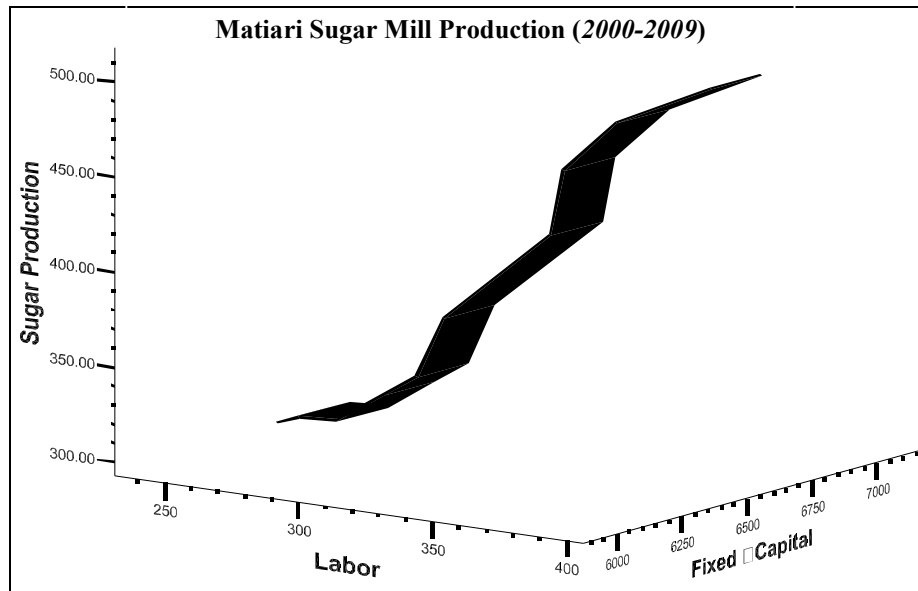


Figure: 1 Sugar Production of Matiari Sugar Mill

#### 4. METHODOLOGY FOR PRODUCTION ESTIMATION

##### 4.1 Cobb-Douglas Production Function

Relationship between the production and factors of production can be expressed through Cobb-Douglas model. It was proposed by Knut Wicksell (1851-1920) and reviewed by Charles Cobb and Paul Douglas in 1928. Cobb and Douglas published a study in which, they modeled growth of the American economy. They considered a simplified view of the economy in which production output is determined by the amount of labor involved and amount of capital invested.

$$Q = AK^{\alpha}L^{\beta} \quad (4.1.1)$$

- $Q$  = Total Production.
- $A$  = Total Factor Productivity.
- $L$  = Labor Input.
- $K$  = Capital Input
- $\alpha$  and  $\beta$  output elasticities of Labor and Capital respectively and also measure the contribution of Labor and Capital.

#### 4.1.1 Returns to scale

It is refer to a technical property of production that examines changes in output subsequent to a proportional change in all inputs. If output increases by that same proportional changes then there are constant returns to scale (CRTS) and sometimes referred to simply as returns to scale. If output increases by less than that proportional change, there are decreasing returns to scale (DRS). If output increases by more than that proportion, there are increasing returns to scale (IRS).

- Constant Return to Scale (CRTS).                      •  $\alpha + \beta = 1$
- Increasing Return to Scale (IRS).                      •  $\alpha + \beta > 1$
- Decreasing Return to Scale (DRS).                      •  $\alpha + \beta < 1$

#### 4.2 Coefficient of Determination (R-square)

The coefficient of determination is defined as the square of the coefficient of multiple correlation, is denoted by  $R^2$  and when it is multiplied by 100, it gives the percentage of variance in *dependent* variable which is associated with the variance in *independent* variables. The Range  $R^2$  belongs to -1 to 1, if the value of  $R^2$  is close to 1 shows the positive relationship and imply that more of the variability in *dependent* variable is explained by the regression model. The sample coefficient of determination is given by:

$$R^2 = 1 - \frac{SS(\text{Residual})}{SS(\text{Corrected})} \quad (4.2.1)$$

It is a most common measure of how well a regression model fits the data. Therefore it is a very necessary statistic to compute for determination of validity of regression model.

#### 4.3 Standard Deviation of Regression

Standard deviation of regression is always computed to diagnose correct regression model. It is also called standard error of estimates, here we estimate three coefficients  $A$ ,  $\alpha$  and  $\beta$  therefore the degree of freedom ( $n - 3$ ) is used in this statistic. It is simply the standard deviation of *dependent* variable' values about the estimated regression and is often used as summary measure of the "goodness of fit" of the estimated regression line. The sample standard deviation of regression denoted by  $s_{reg}$  and is given by:

$$s_{reg} = \sqrt{\frac{\sum u_i^2}{n - 3}} \quad (4.3.1)$$

$$\text{where } \sum u_i^2 = \sum (Q_i - \bar{Q}_t)^2 \quad (4.3.2)$$

#### 4.4 Optimal employment of Labor

Every production estimation problem cannot solve without considering the labor input rate. In our present study, due to the fixed capital the production problem is heavily depending upon labor employment. Production manager and analyst want to employ an

optimal amount of labor. For this purpose, the basic principle is that additional units of the variable output should be hired until the marginal<sup>7</sup> revenue product (MRP) of the last unit employed is equal to the cost of the input. In general, marginal revenue product is equal to marginal product is multiplied by constant price (P):

$$MRP_L = P.MP_L \quad (4.4.1)$$

Thus labor is hired until  $MRP_L$  equals the wage rate ( $w$ ):

$$MRP_L = w \quad (4.4.2)$$

From equation (4.4.1) and (4.4.2) we form:

$$w = P.MP_L \quad (4.4.3)$$

$$\text{where } MP_L = \frac{d}{dL} Q = \frac{d}{dL} AK^\alpha L^\beta \quad (4.4.4)$$

Hence the optimal labor can be found as:

$$w = P. \frac{d}{dL} AK^\alpha L^\beta \quad (4.4.5)$$

#### 4.5 SPSS

SPSS (originally, Statistical Package for the Social Sciences) was released in its first version in 1968 after being developed by Norman H. Nie and C. Hadlai Hull. SPSS is among the most widely used programs for statistical analysis in social science. Many statistical functions can be performed through this software but in present study we are interested to solve Cobb-Douglas function from *non-linear regression menu*.

Non-linear regression is a method of finding a non-linear relationship between the dependent variable and a set of independent variables. In this paper Sugar Production (Q) is used as a dependent variable, while other two variables Labor (L) and Capital (K) are used as an independent. Non-linear model building is accomplished by using iterative estimation algorithm and iterations play very important role to finding the optimal values of coefficients. In the present study, the model building of Cobb-Douglas uses three iterations. Besides the iterations, the choice of good starting values is also very important and in this study, according to the assumptions of basic Cobb-Douglas model the values of  $\alpha$  and  $\beta$  both use 0.5, while  $A$  uses 100 because of three digits data (e.g. 604). Two constraints  $\alpha \geq 0$  and  $\beta \geq 0$  are the essential part of the model which shows the coefficient  $\alpha$  and  $\beta$  cannot be negative.

## 5. RESULTS AND DISCUSSION

The general behavior of the production data in figure: 1 clearly shows upward slope and also provides evidence the production is significantly depends on labor skills. For this purpose the model building of the Cobb-Douglas function between production and

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<sup>7</sup> Marginal means, the change in dependent variable associated with a one-unit change in independent variable. Marginal function is usually dealt as derivative.



factors of production (i.e. capital and labor) is performed by SPSS and estimated coefficients are present in table 5.1.

**Table 5.1: Estimated Parameters of Cobb-Douglas Production Function**

Parameter	Estimate	Std. Error
A	.271	3304377.416
alpha	.453	1390485.671
beta	.576	.265

Hence the estimated Cobb-Douglas production model for Matiyari Sugar mill from 2000 to 2009 is:

$$Q = 0.271K^{0.453}L^{0.576} \quad (5.1)$$

As we discussed in section (4.1.1), return to scale shows the elasticities of labor and capital with production, which is calculated by summing of exponent coefficients<sup>8</sup>.  $\alpha + \beta = 1.029$ . The above calculated is greater than one, hence the present production data has increasing return to scale.

Two diagnostic statistics *R-square* and *standard deviation of regression* are used for the correct fitting of regression model. The ANOVA table 5.2 presents sum of squares and mean squares, that's why the value of  $R^2$  is 0.724, which shows the adequacy of model and standard error of estimate with  $n - 3$  degree of freedom is 46.35 tons.

**Table 5.2: ANOVA**

Source	Sum of Squares	df	Mean Squares
Regression	1530404.731	3	510134.910
Residual	15044.399	7	2149.200
Uncorrected Total	1545449.130	10	
Corrected Total	54523.974	9	

Optimal employment is the appendix part of this paper which was discussed in the section (4.4), to find out the labor input rate. In this section, we need wage per unit (ton) of labor and sugar price per kg and  $MP_L$ :

$$MP_L = 0.1561 \frac{K^{0.452}}{L^{0.424}} \quad (5.2)$$

The optimal input rates of the labor for year 2010 and 2011 are present in table 5.3.

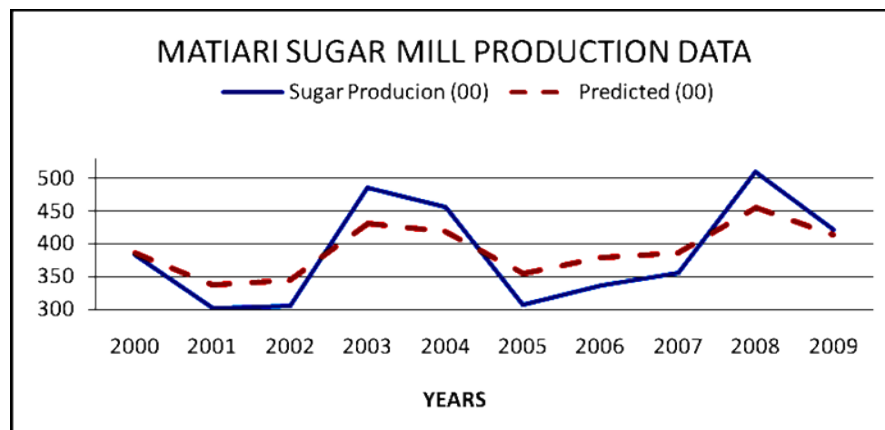
**Table 5.3: Estimation table for labor and Production of year 2010-2011**

Years	Capital (units)	Labor (units)	Sugar Production (00) tons	Total Wage	Wage / ton	Sugar Price RS (per kg)
2010	6525	114	252.65	7000	56	50.11
2011	6525	166	274.22	7000*	56	58.56*

\*wage and sugar price for 2011 is to be expected.

<sup>8</sup> The coefficients of Cobb-Douglas function  $\alpha$  and  $\beta$  are placed in a function as an exponent.

The sugar production of 2010 and 2011 is estimated on the basis of estimated labor input while the estimation of labor input is depends on wage<sup>9</sup> per ton and sugar price<sup>10</sup> per kg. If wage rate per ton is lower or per kg price of sugar is higher, more labor will be purchased, as we discussed in table 5.3 and it also shows 52 units of labor has increased, which improved production from 252.65 to 274.22 tons.



**Fig. 2: Original and Predicted Sugar Production of Matiari Sugar Mill**

The above diagram shows appropriate fitting of the production of Matiari sugar mill data from 2000-2009.

## 6. CONCLUSION

This paper has illustrated that Cobb-Douglas function perfectly satisfy the production process and is also useful to determine the optimal input rate. The value of  $R^2$  is 0.724 that shows the goodness of fit of the estimated regression line, because 72% variation in the production is associated with the variation in Labor and Capital. Fig. 2 provide evidence of better fitting of model because the difference between estimated line and original is moderate and predicted line is following to the original line. We conclude that Cobb-Douglas model is better fit on Matiari Sugar Mill production data and determine optimal labor input rate for 2010 and 2011, which are 114 and 166 respectively.

## 7. ACKNOWLEDGEMENT

This paper is basically depends on Cobb-Douglas theory and SPSS non-linear modeling. We are very grateful and obliged to Sir Syed Aijaz Ali Shah for their coordination, cooperation and highly appreciation during the research paper working. Paper accomplished with the collaboration of different people and institutes (i.e. Labor Department and Matiari Sugar Mill) and we are also thankful to all these.

<sup>9</sup> Source of the wages of workers: Government Labor Department Hyderabad Sindh.

<sup>10</sup> Source of the sugar prices: sugar book 2007 and SMEDA.

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SOME RESULTS ON EXPONENTIAL DISTRIBUTION

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ABSTRACT

A recurrence relation is developed for the moments of *i*th order statistics of a doubly truncated exponential distribution. It is shown that these moments as well as the moments of *i*th order statistic based on a random sample from an exponential distribution can be expressed in terms of its ordinary moments. Some additional results are found for characterization an exponential distribution.

1. RECURRENCE RELATION

Balakrishnan and Gupta (1992) established recurrence relation of order statistics in his technical report, they also discuss the recurrence relation of right truncated exponential distribution. Memon (2008) develop recurrence relation of moments of order statistics based on Weibull distribution. Here we drive recurrence relation of doubly truncated exponential distribution of order statistic.

We consider a random sample of *n* observation from an exponential distribution that is truncated as follows.

$$\eta_{t_1, t_2}^\alpha = E\left(X_{i,n}^\alpha \mid t_1 < X_{i,n} < t_2\right) \tag{1.1}$$

$$\psi_{t_1, b}^\alpha = E\left(X_{i,n}^\alpha \mid X_{i,n} > t_1\right) \tag{1.2}$$

$$\xi_{a, t_2}^\alpha = E\left(X_{i,n}^\alpha \mid X_{i,n} < t_2\right) \tag{1.3}$$

given that

$$F(x) = 1 - e^{-\beta x} \tag{1.4}$$

We denote the order statistics by  $X_{1,n}, X_{2,n}, \dots, X_{n,n}$ .

Also let

$$\underline{F}(x) = 1 - F(x)$$

$A_{i-1, n-i} = G_{X_{i,n}}(t_2) - G_{X_{i,n}}(t_1)$ , where  $G_{X_{i,n}}(x)$  denotes the cdf of  $X_{i,n}$

$$B_{\alpha, i-1, n-i+1} = \frac{1}{\alpha} \left[ \left[ t_1^\alpha [F(t_1)]^{i-1} [\underline{F}(t_1)]^{n-i+1} - t_2^\alpha [F(t_2)]^{i-1} [\underline{F}(t_2)]^{n-i+1} \right] \right] \tag{1.5}$$

**Theorem 1.1:**

The  $\alpha$ th moment of the  $i$ th order statistic  $X_{i,n}$  based on the exponential distribution (1.4) is related to its  $(\alpha - 1)$ th moment as

$$\eta_{X_{i,n}}^\alpha = \frac{\alpha}{\beta(n-i+1)} \eta_{X_{i,n}}^{\alpha-1} + \frac{(i-1)A_{i-2,n-i+1}}{(n-i+1)A_{i-1,n-i}} \eta_{X_{i-1,n}}^\alpha + \frac{\alpha B_{\alpha,i-1,n-i+1}}{(n-i+1)B(i,n-i+1)A_{i-1,n-i}} \quad (1.1.1)$$

**Proof:**

We have

$$\begin{aligned} \eta_{X_{i,n}}^{\alpha-1} &= E\left(X_{i,n}^{\alpha-1} \mid t_1 < X_{i,n} < t_2\right) \\ &= \frac{1}{B(i,n-i+1)A_{i-1,n-i}} \int_{t_1}^{t_2} x^{\alpha-1} [F(x)]^{i-1} [\underline{F}(x)]^{n-i} dF(x) \end{aligned} \quad (1.1.2)$$

Since an exponential distribution is characterized by the condition

$$F'(x) = \beta[F(x)] \quad (1.1.3)$$

the  $(\alpha - 1)$ th moment can be expressed as

$$= \frac{\beta}{B(i,n-i+1)A_{i-1,n-i}} \int_{t_1}^{t_2} x^{\alpha-1} [F(x)]^{i-1} [\underline{F}(x)]^{n-i+1} dx$$

On integrating and again the substitution in (1.1.3) we get

$$\begin{aligned} &= \frac{\beta}{B(i,n-i+1)\alpha A_{i-1,n-i}} \left[ -\alpha B_{\alpha,i-1,n-i+1} + \beta(n-i+1) \int_{t_1}^{t_2} x^\alpha [F(x)]^{i-1} [\underline{F}(x)]^{n-i+1} dx \right. \\ &\quad \left. - \beta(i-1) \int_{t_1}^{t_2} x^\alpha [F(x)]^{i-2} [\underline{F}(x)]^{n-i+2} dx \right] \\ &= -\frac{\beta B_{\alpha,i-1,n-i+1}}{B(i,n-i+1)A_{i-1,n-i}} + \frac{\beta(n-i+1)}{\alpha} \eta_{X_{i,n}}^\alpha - \frac{\beta(i-1)A_{i-2,n-i+1}}{\alpha A_{i-1,n-i}} \eta_{X_{i-1,n}}^\alpha \end{aligned}$$

and thus the result (1.1.1) follows.

**Remark:**

For least order statistic the expression (1.1.1) is express as

$$\eta_{X_{1,n}}^\alpha = \frac{\alpha}{\beta n} \eta_{X_{1,n}}^{\alpha-1} + \frac{\alpha B_{\alpha,0,n}}{A_{0,n-1}}$$

for the connivance we can say

$$\alpha B_{\alpha,0,n} = B_\alpha \text{ and } A_{0,n-1} = A$$

$$\eta_{X_{1,n}}^\alpha = \frac{\alpha}{\beta n} \eta_{X_{1,n}}^{\alpha-1} + \frac{B_\alpha}{A} \quad (1.1.4)$$

**Theorem 1.2:**

The  $\alpha$ th moment of the first order statistic  $X_I$  based on the truncated exponential distribution (1.4) is related to its any lower moment as

$$\eta_{X_I}^\alpha = \Gamma(\alpha+1) \left[ \sum_{i=0}^{j-1} \left\{ \frac{B_{\alpha-i}}{\Gamma(\alpha-i+1)A(\beta n)^i} \right\} + \frac{B_{\alpha-j} \eta_{X_I}^{\alpha-j}}{\Gamma(\alpha-j+1)(\beta n)^j} \right]; \quad j = 1, 2, \dots, \alpha \quad (1.2.1)$$

**Proof:**

Since by (1.1.4), we may write

$$\eta_{X_I}^{\alpha-1} = \frac{B_{\alpha-1}}{A} + \frac{(\alpha-1)}{\beta n} \eta_{X_I}^{\alpha-2} \quad (1.2.2)$$

We have

$$\eta_{X_I}^\alpha = \frac{B_\alpha}{A} + \frac{\alpha B_{\alpha-1}}{\beta n A} + \frac{\alpha(\alpha-1)}{(\beta n)^2} \eta_{X_I}^{\alpha-2}$$

The repeated use of (1.1.3) provide the following recurrence relation

$$= \frac{B_\alpha}{A} + \frac{\Gamma(\alpha+1)B_{\alpha-1}}{\beta n A \Gamma \alpha} + \frac{\Gamma(\alpha+1)B_{\alpha-2}}{(\beta n)^2 A \Gamma(\alpha-1)} + \frac{\Gamma(\alpha+1)B_{\alpha-3}}{(\beta n)^3 A \Gamma(\alpha-2)} + \dots + \frac{\Gamma(\alpha+1)B_{\alpha-j} \eta_{X_I}^{\alpha-j}}{(\beta n)^j \Gamma(\alpha-(j-1))}$$

and thus the result (1.2.1) follows.

For  $j = \alpha$  in above theorem the following corollary can be obtain

**Corollary 1.2.1:**

$$\eta_{X_I}^\alpha = \frac{\Gamma(\alpha+1)}{A} \left[ \sum_{i=0}^{\alpha} \frac{B_{\alpha-i}}{\Gamma(\alpha-i+1)(\beta n)^i} \right] \quad (1.2.3)$$

**Corollary 1.2.2:**

The  $\alpha$ th moment  $\eta_{X_I}^\alpha$  can be alternatively expressed as

$$\frac{\Gamma(\alpha+1)}{A} \left[ t_1^\alpha [F(t_1)]^n \sum_{i=0}^{\alpha} \frac{1}{\Gamma(\alpha-i+1)(t_1 n \beta)^i} - t_2^\alpha [F(t_2)]^n \sum_{i=0}^{\alpha} \frac{1}{\Gamma(\alpha-i+1)(t_2 n \beta)^i} \right] \quad (1.2.4)$$

**Corollary 1.2.3:**

The  $\alpha$ th moment  $\psi_{t_1, b}^\alpha$  defined by (1.2) is given as

$$\Gamma(\alpha + 1)t_1^\alpha \left[ \sum_{i=0}^{\alpha} \frac{1}{\Gamma(\alpha - i + 1)(t_1 n\beta)^i} \right]$$

**Corollary 1.2.4:**

The  $\alpha$ th moment  $\xi_{a, t_2}^\alpha$  defined by (1.3) is given as

$$\frac{\Gamma(\alpha + 1)[\underline{F}(t_2)]^n t_2^\alpha}{[\underline{F}(t_2)]^n - 1} \left[ \sum_{i=0}^{\alpha} \frac{1}{\Gamma(\alpha - i + 1)(t_2 n\beta)^i} \right]$$

**Remark:**

Since  $0 \leq F(x) \leq 1$ , From eq. (1.1.2) for  $i=l$  we can write

$$\left| \eta_{X_1}^\alpha \right| \leq \frac{n}{A} \int_{t_1}^{t_2} |x|^\alpha dF(x) < \frac{n}{A} \int_0^\infty |x|^\alpha dF(x)$$

which is clear  $\eta_{X_1}^\alpha$  exists provided  $E(X_1^\alpha)$  exists.

**2. PROPERTIES****Property 1:**

Let  $X$  be exponential random variable defined on (1.4), then the following property holds

$$\underline{F}(x+t) = \underline{F}(x)\underline{F}(t) \quad (2.1)$$

where  $t \in ]0, \infty[$ , the proof is trivial.

**Property 2:**

Let  $X$  be exponential random variable defined on (1.4), then the following property holds

$$f(x+t) = \underline{F}(t)f(x) \quad (2.2)$$

where  $t \in ]0, \infty[$ , the proof is trivial.

**Property 3:**

Let  $X$  be exponential random variable defined on (1.4), then the following property holds

$$h(t) = \frac{f(x+t)}{\underline{F}(x+t)} = \frac{f(x)}{\underline{F}(x)} \quad (2.3)$$

where  $t \in ]0, \infty[$  and  $h(t)$  is hazard function, the proof is trivial.

### 3. TRUNCATED MOMENTS

**Theorem 3.1:**

The truncated moments of exponential distribution can be expressed as ordinary moments about truncated point.

$$\Psi_{t_1, \infty}^{\alpha} = E(X + t_1)^{\alpha} \quad (3.1.1)$$

**Proof:**

by definition we know that

$$\Psi_{t_1, \infty}^{\alpha} = \frac{\int_{t_1}^{\infty} x^{\alpha} f(x) dx}{\underline{F}(t)} \quad (3.1.2)$$

and

$$= \frac{\int_0^{\infty} (t_1 + x)^{\alpha} f(x + t_1) dx}{\underline{F}(t)}$$

using property (2.2)

$$= \int_0^{\infty} (t_1 + x)^{\alpha} f(x) dx \quad (3.1.3)$$

hence the proof follows.

**Corollary 3.1:**

From above theorem equation (3.1.3) can also be written as

$$\Psi_{t_1, \infty}^{\alpha} = \sum_{i=0}^{\alpha} \binom{\alpha}{i} t_1^{\alpha-i} \int_0^{\infty} x^i f(x) dx \quad (3.1.4)$$

or

$$\Psi_{t_1, \infty}^{\alpha} = \sum_{i=0}^{\alpha} \binom{\alpha}{i} t_1^{\alpha-i} E(X^i)$$

**Corollary 3.2:**

From equation (3.1.4) truncated moments express as

$$\Psi_{t_1, \infty}^{\alpha} = \sum_{i=0}^{\alpha} \binom{\alpha}{i} \frac{t_1^{\alpha}}{(\beta t_1)^i} \Gamma(i+1)$$

or

$$\Psi_{t_1, \infty}^{\alpha} = \sum_{i=0}^{\alpha} \frac{\alpha!}{(\alpha-i)!} \frac{t_1^{\alpha}}{(\beta t_1)^i}$$



**Theorem 3.2:**

The  $\alpha$ th moments of the order statistics based on Exponential Distribution can be express as ordinary  $\alpha$ th moments.

$$E(X_{i,n}^\alpha) = CE(X^\alpha) \quad (3.2.1)$$

$$\text{where } C = (n-i-1)! \sum_{j=0}^{i-1} \frac{(-1)^j (n-i+j+1)^{-(\alpha+1)}}{j!(i-j-1)!}$$

**Proof:**

$$E(X_{i,n}^\alpha) = \alpha \int_0^\infty x^{\alpha-1} [1 - G_{X_{i,n}}(x)] dx$$

and

$$1 - G_{X_{i,n}}(x) = \sum_{j=0}^{i-1} (-1)^j \binom{i-1}{j} [n-i+j+1]^{-1} [1-F(x)]^{n-i+j+1} \quad (3.2.2)$$

$$\begin{aligned} E(X_{i,n}^\alpha) &= \frac{\alpha}{\beta(i, n-i+1)} \sum_{j=0}^{i-1} \frac{1}{n-i+j+1} (-1)^j \binom{i-1}{j} \int_0^\infty x^{\alpha-1} [1-F(x)]^{n-i+j+1} dx \\ &= \frac{\alpha}{\beta(i, n-i+1)} \sum_{j=0}^{i-1} \frac{1}{n-i+j+1} (-1)^j \binom{i-1}{j} \int_0^\infty x^{\alpha-1} e^{-\beta x(n-i+j+1)} dx \\ &= \frac{\alpha \beta^{-\alpha}}{\beta(i, n-i+1)} \sum_{j=0}^{i-1} \frac{1}{(n-i+j+1)^{\alpha+1}} (-1)^j \binom{i-1}{j} \int_0^\infty z^{\alpha-1} e^{-z} dz \end{aligned}$$

substituting  $z = \beta x$ , we complete the proof.

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**OPTIMAL SELECTION OF INVESTMENTS FOR THE SHORT RUN AND  
LONG RUN IN CONTINUOUS TIME FINANCIAL MARKETS**

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**ABSTRACT**

The main purpose of this study is to analyze the optimal selection of investments for short and long run in continuous time financial markets. The study is conducted on the basis of available literature and relevant primary and secondary data so collected were analyzed. This paper studied the optimal selection of investment in local and foreign markets as well as investment in the field of foreign currency. It presents the result of questionnaire study among local investors and individuals, who are investing in the field of stock markets, insurance fields, foreign currency, government funds and other investment fields. The results indicate that the most important factors for the selection of optimal investment are the risk as well as the expected returns on the investments. This study also suggests that investors prefer short run investments rather than long term investments and the intention of the investors is the immediate return on the investments. This as well proves that majority of the investors uses both fundamental and technical analysis. The results indicate that it is very hard to determine a reasonable investment strategy when the rules of the game change on a day-to-day basis. What may work for today could be a disaster tomorrow when the Government changes the rules.

**KEYWORDS**

Investments, Optimal selection, Financial Markets, Risk, Expected returns

**1. INTRODUCTION**

The process of investing concerns financial decision-making about where to place wealth to provide future returns, and the process of selection of optimal investment strategy concerns the allocation of wealth into various assets that are expected to yield optimal future returns. Typically, an investment concerns the transference of money. The main distinguishing features of alternative investments are expected returns and risks. Expected returns arise from three sources.

First, given that an investment represents a delay in current consumption, the investor will require a return to induce an individual to forgo money now and defer the money to future date. Hence the return reflects the time value of money; in essence, the rate of return is the rate of exchange between future consumption and current consumption and is known as the pure rate of interest.

Second in time of inflation future prices are expected to raise meaning that a dollar today can be commanding greater purchasing power than a dollar tomorrow. Investors require a return to compensate for the loss in purchasing power caused by the rate of inflation that is expected over the period of investment.

Third investor requires a return to compensate them for any uncertainty associated with the future cash flows associated with the investment. Current wealth is money in hand and no uncertainty. However, investment wealth is dependent on future events and outcomes that will lead to future cash flows. As the future is uncertain, so the future cash flow from an investment is also uncertain.

#### **SCOPE**

- (1) This research aims to identify the efficient and effective management of the investment to achieve future goals.
- (2) Investigation of the optimal strategy for the short run
- (3) Investigation of the optimal strategy for the long run
- (4) To examine the role process and merits of optimal strategy
- (5) To understand the effectively and efficiently manage investment in order to keep maximum returns with minimum risks.

#### **LITERATURE REVIEW**

The idea of optimal investment strategy, first time, in the history of modern theory, Markowitz described the relation between risk and return, and he constructed the so famous theory "Markowitz portfolio theory". According to the "Markowitz portfolio theory" investors can select the optimal investments. William Sharpe said about Markowitz that he came up with an idea and there was a light and an order in how investors were going to choose their stocks. Since that point, a lot of literature has tried to identify ways in constructing optimal selection of investments. However, so many perfectly logical models failed when applied in practice. Furthermore, there is a lot of noise in data. Gene Fama, the one who described the theory of the random walk, said that with so many changes in prices it is extremely difficult to predict the future returns. Moreover, W. Sharpe (one of the authors of Capital Asset Pricing Model) agreed that we see in practice only realized returns. For emerging markets, prediction seems to be just a nice term.

Since the prediction is difficult to be made in selecting optimal investment, it would be reasonable to say that constructing the optimal investment strategies is quite difficult in practice. This is why it seems that it is better to adopt some investment strategies by taking into account the appetite toward risk of different groups of investors. Alessandro Fedele Paolo, M.Penteghini, and Sergio Vergalli (April 2010): show empirically and by using some mathematical models related to financing that tax rate uncertainty affects the optimal investment timings and financial strategies.

The most important factors (Heidi Falkenbach October 2009) for the markets selections are the safety of the property rights and titles as well as the expected returns on the property investments.

One important finding is the Intertemporal Investment Strategies under inflation risks. The recently approach defined by Carl Chiarella Chih-Ying, Hsiao, and Willi Semmler (September 2006). Meulbroek (2002), Statman (1987), and Goetzman and Kumar (2004): show empirically that investor failure to diversify leads to inefficient portfolio. This failure is not consistent with economic Theory, since a diversification can reduce volatility holding the same expected returns.

One important finding is the empirical observation that many individual investors hold a small number of stocks than necessary to eliminate the idiosyncratic risk (e.g., Blume and Friend, 1975; Statman, 1987; Kelly, 1995; Odean, 1999; Polkovnichenko, 2004; Goetzmann and Kumar, 2004)

The recency approach defined by Barron and Erev(2003), suggest that investor will be influenced by the recent outcome and will tend to choose the “winner” and the “loser” of previous round. In this case, he will tend to choose one asset (or small number) and not the market portfolio (under the recency approach investors will not invest in a fully diversified portfolio).

### **RESEARCH HYPOTHESIS**

H<sub>0</sub>: Investing in Insurance companies, Government funds, National Savings, Stock Markets, and Foreign Currencies, based on Technical and Fundamental Analysis, yield optimal future returns for long term or for short term.

### **METHODOLOGY**

The study was conducted as a questionnaire directed to nationally as well as internationally investing investors and individual investors who are investing in the field of Insurance, Stock Markets, Government Funds, Foreign Markets as well as investing in the Foreign Currency. The questionnaire included questions of the background of the respondent organisation and their investment fields as well as questions on national and international investment. Some of the questions were asked about their basic strategy of the investment process that they followed. The sample for this research study comprised 115 people from different organizations. Respondents were full time employees and most of them were running their business as an investor. In order to participate in this study respondent must have more than three years of experience of investing in different investment fields such as Karachi Stock Exchange, Foreign Currency, Insurance Companies, Government funds, National Savings as well as Foreign Markets. Stratified sampling technique was used for grouping members of the population into homogeneous subgroups before sampling.

### **DATA ANALYSIS AND DISCUSSION**

#### **1 Investment Strategies**

In the first part of the questionnaire, the respondents were asked to mark which of the following strategies are the best choice to determine the optimal investment in Stock Markets or other investment categories. It has been found that majority of the investors use both fundamental and technical analysis for devising investment strategies. Out of the total respondents, 27% use investment strategies based on Fundamental analysis, 20%

use technical analysis based strategies while 48% use both. It is also cleared that 5% respondents do not follow any strategy.

## **2 Selection of Optimal Investment**

In order to investigate the perception of the respondents regarding the value of the different investment group, seven statements were provided in the questionnaire. The result suggests that:

- i) A majority of the investors is willing to invest in the field where risk factor is minimum and the future returns are maximum.
- ii) 72% respondents agree to invest in Stock Markets because of high returns
- iii) 68% respondents partially agree to invest in the insurance field that yields optimal returns but respondents anxious about the time horizon of the investing in insurance fields.
- iv) Almost all the respondents agree to invest in Government guaranteed securities and funds.

## **3 Risk Involvements**

Risk is the main factor that affects the overall investment procedure. In order to understand the risk factor, seven statements were provided in the questionnaire survey, and respondents were asked to rate their opinion. These results show that.

- i) A majority of the respondents thinks that investing in Stock Markets is a risky decision but according to some skilled and experienced respondents, Investing in Stock Markets is the safe and riskless investment.
- ii) A majority of the respondents agrees about the investment in National Savings that is the riskless investment because this is guaranteed by the Government.
- iii) The analysis showed that the riskless investment are: Government funds, Insurance fields, National Savings and Foreign currencies such as Dollar and Euro.
- iv) A majority of the respondents did not agree to increase their risks for potentially higher returns This. indicates that all respondents are considering the risk factor on the priority basis.

## **4 Time Horizon**

In order to understand the time horizon of the investment process, seven questions were asked by the respondents. The result shows that majority of the respondents expects immediate returns after investment. According to the analysis, the time horizon can be divided into three parts or groups: Short Term, Medium Term, and Long Term. It can be seen from the above graphical representation that majority of the respondents intends to invest short term and this type of investors cannot take any chance with their money. Some skilled investors invest their money for long term basis. According to some respondents investing long term yield optimal future returns.

## **5 Foreign Exchange**

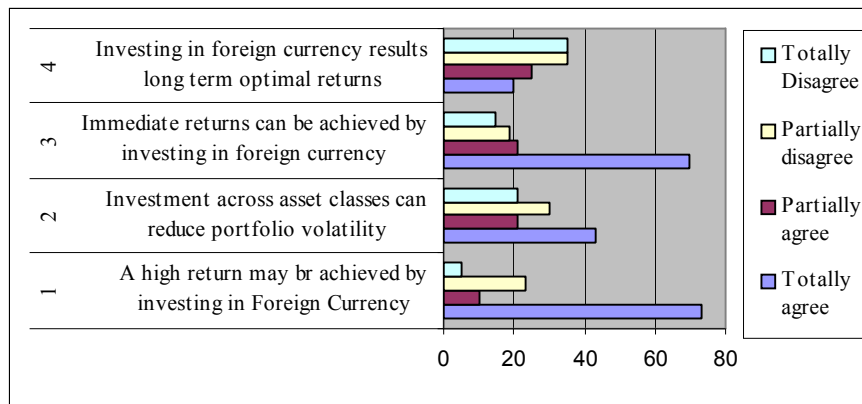
In order to understand the investing in the foreign exchange two statements were provided in the questionnaire. 68% respondents agree to invest in the foreign markets. The analysis throws up response by respondents. There is no variance in their collective response as well as an individual response.



**6 Foreign Currency**

Four statements were presented in the questionnaire survey concerning about investing in the foreign currency. The results show that:

- i) Majority of the respondents believes that investing in foreign currency yield optimal returns and almost 74% respondents fully agree to it.
- ii) Some respondents believe that investing in foreign currency yield optimal returns but after a long period of time.



### CONCLUSION

The report presents the result of the questionnaire concerning the optimal selection of investment for short run as well as long run continuous markets. The survey result presented in this paper show that the majority of the investors use both fundamental as well as analysis while investing in the various fields of investment. The result shows that investing in the field of Stock markets, Government Funds, Insurance fields, foreign currency as well as the foreign exchange yield optimal returns. However, this is due to involvement of risk factor in stock markets that some investors do not invest in the stock markets. Long run investors are excited to invest in stock markets because they are expecting high returns after a long period of time and according to opinion of long run investors, risk factor can be minimized by investing long run. In this report hypothesis concerning “Investing in Insurance companies, Government funds, National Savings, Stock Markets, and Foreign Currencies, based on Technical and Fundamental Analysis, yield optimal future returns for long term” is analyzed and the validity of the hypothesis being observed. On the basis of the questionnaire, it concluded that the hypothesis assumed in this study is valid with some factors such as the risk and time horizon.

### RECOMMENDATIONS

In the light of above analysis and conclusion the following suggestions are made: On the basis of above analysis, time horizon can be grouped into three parts i.e. short term, medium term, and long term. It is recommended that short term investors should invest in guaranteed securities such as high interest rate or certificate of deposit. Medium term investors can invest in both stock and bond. The allocation of wealth of medium term investors should be less wealth in stock and more wealth in bond. Similarly, long term investors can invest a majority of their wealth in most risky investments such as Stock. It is also suggested that the financial strategies should always be scientifically valid, technical and fundamental analysis may be a better support for the investors or individuals whose intension is to invest in the coming future.

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**BANK INTERNAL AUDIT - EFFICIENCY THROUGH AUTOMATION**

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**ABSTRACT**

Despite the increased workloads, majority of banks in Pakistan are using manual and paper-intensive processes for conducting their internal audit, using excel/word as a main reporting tool, spending countless hours manually preparing work-papers and audit reports along with associated documentation. Since internal audit functionality is not directly involved in the profit generation, therefore this study can help banks to decide whether they invest in the automation of their function if they feel significant value addition in case they adopt automation. The basal study is survey based. A questionnaire were administrated related to ease of audit process, major benefits, standardization of audit approach, analysis of audit data, tracking of audit data/audit entities, ease of audit reporting, effective audit planning and strengthened audit follow-up. The experienced auditors have participated in the survey with minimum experience level of 2 years and conducting internal auditing for different banks of Pakistan and abroad. The automation is new for internal auditors in Pakistan. Majority of the respondent (80%) has less than a year experience of using automated system and not a single respondent have greater than 5 years experience of using automated system. Only 20% respondents have some experience between 2 and 5 years of using automated system for conducting or management of internal auditing practices. The results delineated that banks' internal audit efficiency can be improved dramatically through automation.

**KEY WORDS**

Bank Internal Audit, Ease of Audit Process, Standardization of Audit Approach, Analysis of Audit Data, Tracking of Audit Entities, Audit Reporting, Audit Planning, Audit Follow-up

**INTRODUCTION**

The Institute of Internal Auditors (IIA) has developed the globally accepted definition of internal auditing, as follows: *Internal Auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined*



*approach to evaluate and improve the effectiveness of risk management, control, and governance processes* [1].

Majority of banks in Pakistan are using manual approach to conduct their internal audit functionality. Most of the precious time is wasted in the preparation of documentations for reporting purpose and generation of centralized MIS Reporting. It is very difficult for them to generate analytical data. Consequently, banks are now serious to look for the solution to automate their internal audit function.

Automation of internal auditing direction will lead to

- ease the audit processes
- enhance the productivity
- reduce documentation/reporting time significantly
- remotely accessible
- real time availability of audit data
- paper less audit process
- track audit progress
- reduction in audit cycle times,
- A faster, cheaper, more efficient, and more effective audit process,
- Availability of MIS reports for all modules like planning, audit performed, rectification and following-up etc.

### **SCOPE**

This research aimed to make some conclusion whether automation can benefit the banks internal audit functionality.

### **REVIEW OF LITERATURE**

Arthur Leong presentation is showing audit cost can be reduced through automation. First/introduction slide showing the software is covering major audit module i.e. Planning, Scheduling, Execution, Documentation and Analysis. Emphasizing their point of view i.e. through automation audit cost can be reduced by taking advantage of remote auditing capabilities, Retention of skilled workforce and experience, Reduce the need for storage space and audit work papers. Showed some of the issues that auditors faced and how automation is saving the cost. The discussed cost centers are recruitment cost, traveling cost, running cost.

David Coderre (2008), in his book is trying to convince the organizations to use the computer aided software for internal auditing. He has highlighted the fact that the technology trend is now changed from electronic data processing (EDP) to enterprise wide information management (EIM). Through the use of technology now business processes have no boundaries. For example purchase order is initiated in England, modified in USA, and then sent to the processing plant in Mexico. Now in order to do the audit, the auditor should also have thorough knowledge of technology. Like other areas, audit is also progressing towards less paper or paper less organization. The audit trail is now also available electronically, therefore not easy to trace exceptions. Now the latest trend is force us to do more with less efforts. Auditors must have to perform better;

this can be done by using technology. By harnessing the power of computer, auditor will better evaluate and manage the data resulting manage their activities rationally. CATTs will increase auditor personal as well as audit functions. Improve audit functions during planning, conduct, reporting and follow-up phases of the audit as well as improve overall management of the audit. The cost is decreased and great output has increased. User interface has improved. Extract the data from one application to another is now possible. SQL can also be used to extract the data. No need to be master of technology, programming knowledge is no longer required, in order to use computer based system. So many tools like instructor-led-course etc. are available to increase basic understanding on how to use automated software (self learning).

Andrew J. Dahle and Mike Gowell (2001), concluded that through adopting right technology, internal audit functions can significantly enhance their performance and can maximize value to their stakeholders. Technology itself can not produce the desired results simply be being implemented. Due diligence efforts are required for “right” automation so that larger strategic goals can be achieved.

Mark Salamasick, Wayne Fraczkowski and Robert Wallay (1995), intelligent utilization of groupware can benefit auditors for every type of audit communication. Groupware supports included word processing, electronic mail, downloading files, electronic workpapers etc. Consequently papers can be reduced, faxes can be eliminated, ability of fast searching of documents, speed up decision making process. Due to improved communication audit efficiency and productivity can be improved.

### **METHODOLOGY**

This research study used a structured questionnaire as the instrument for data collection. It was designed to get feedback on measureable areas like ease of audit process, standardization of audit approach, analysis of audit data, tracking of audit data/audit entities, ease of audit reporting etc., that definitely helped to make the final conclusion. Two renowned banks of Pakistan were visited to gather views of the people involved in conducting the internal audit. Stratified sampling is used feedback is taken representing each area of internal audit life cycle like Auditors responsible for planning, research assessment, review findings, rectification and follow-up, field work auditors (both team Leader and team Members). The sample was chosen on availability/convenience basis.

### **PROBLEM STATEMENT**

Can automation significant improve the efficiency of internal audit process?

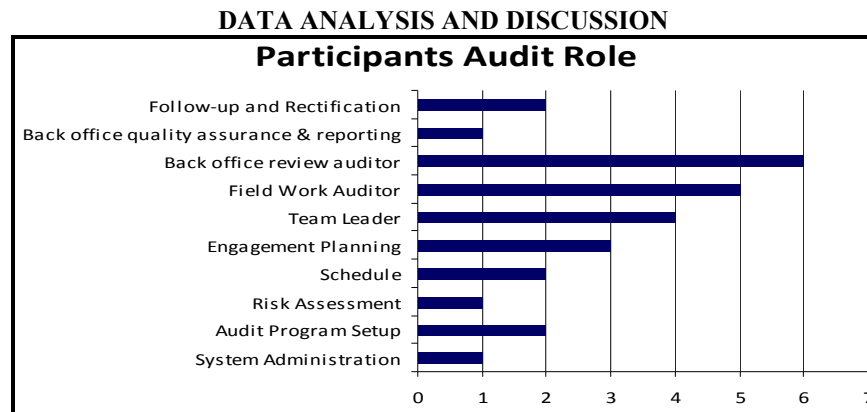


Fig. 1: Participants Audit Role

The involvement of participants/respondents in conducting internal audit. They are as a whole participating in entire audit life cycle from system administration till follow-up and rectification. Majority of participants were back office review and field work auditors which is back-bone of internal audit process.

### EASE OF AUDIT PROCESS

One of the core function organization can definitely look if they decide to go for the automatic management of their internal audit is how easily they can perform their functions. The following areas were covered regarding ease of audit process by the use of automation in internal audit process, internal audit life, reduction in audit documentation time, generation of complex MIS reports, tracking of audit entities, ease in replying management queries, organization of work distribution. It can be seen from the above graphical representation, majority of respondents are either totally or partially agree that automation making ease in the audit process. The reply of few respondents was neutral means neither agrees nor disagrees. Not a single respondent was disagreeing. Based on above results we can easily say that automation is increasing internal audit efficiency through making ease in the audit process.

### MAJOR BENEFITS

The following areas were covered regarding major benefits organization can take by the use of automation in internal audit process. reduction in audit documentation time, improvement in every area of audit life cycle, contribution in standardize the audit approach, strengthen audit follow-up, more time for analysis due to time saved in preparing different documents, tracking of audit entities and data security. It can be seen from the above graphical representation, majority of respondents are either totally or partially agree above the above major benefits organization is enjoying due to use of automated approach in doing internal audit.

### STANDARDIZATION OF AUDIT APPROACH

This is one of the real challenges for organization to standardize their audit approach that is the only way organization can force effective audit practices through implementing industry best practices. The following areas were covered in respect of standardization of

audit approach due to automation in internal auditing. Automation contribution in standardization of audit approach, standardize work papers and knowledge-based library to standardize/improve audit reporting. Once again graphical representation shows majority of respondents totally or partially agreement that automation is playing effective role in making standardization in audit approach.

#### **Analysis of Audit Data**

It is expected from any automated solution that different analysis can be performed that is impossible or hard to perform manually. The following areas were covered in respect of analysis of audit data; trend analysis, analysis rather than tedious documentation and generation of complex MIS reports. The above graphical representation shows majority of respondents totally or partially agreement that through automation auditors can do effective analysis of audit data. The reply of few respondents was neutral means neither agrees nor disagrees. Minor respondents were not agreeing that analysis of audit data can be improve through the use of automation in internal auditing. Based on above results we can conclude that through automation analysis of audit data is improved a lot due to the fact that analytical data is easily available for the auditors.

#### **Tracking of Audit Data/Audit Entities**

Without proper and timely tracking of audit data and entities organizations' can not judge their progress. The following areas were covered regarding tracking of audit data/audit entities: current stage of entities in audit life cycle (under planning, field work, review etc.), response to management queries, information accessibility, generation of complex MIS reports, ability to maintain separate reporting version for member, lead auditor and reviewer. It can be seen from the above graphical representation that majority of respondents totally or partially agreement that through automation audit data and current stage of entity at audit life cycle whether at planning, field work or under review etc. can easily be tracked.

#### **Audit Documentation - Ease of Audit Reporting**

Taking benefit of the automation organization just have to provide fact and figures, automated processes will do the formatting, consolidation, version maintenance, generation of complex MIS reports like final audit report, submission of audit data etc. This reduction in audit documentation time will benefit the organization utilizing the same time in more productive activities. The above graphical representation clearly shows that majority of respondents totally or partially agreement that auditors can reduce audit reporting documentation time significantly and spend their valuable time in other more important areas like planning, analysis etc. Based on results we can say that through automation organization can reduce tedious documentation time and can utilize their time in more productive work like planning, standardization, analysis etc.

#### **More Effective Audit Planning**

Annual audit planning is one of the core functions where organization decide which entities should be targeted for current year. The planning includes proposed entities, their schedule, audit team and teams' task assignment. The following areas were covered

regarding effective audit planning: work distribution among team members, resource management and assignment, effective annual audit planning. It can be seen from the above graphical representation that majority of respondents totally or partially agreement that automation really benefit organization in conducting planning for their proposed audits. Organization can better decide which entities should be targeted, appropriate audit team and their assignments.

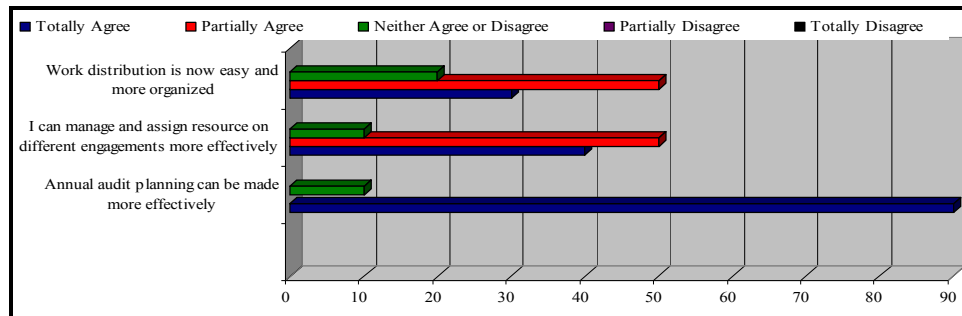


Fig. 2: More Effective Audit Planning

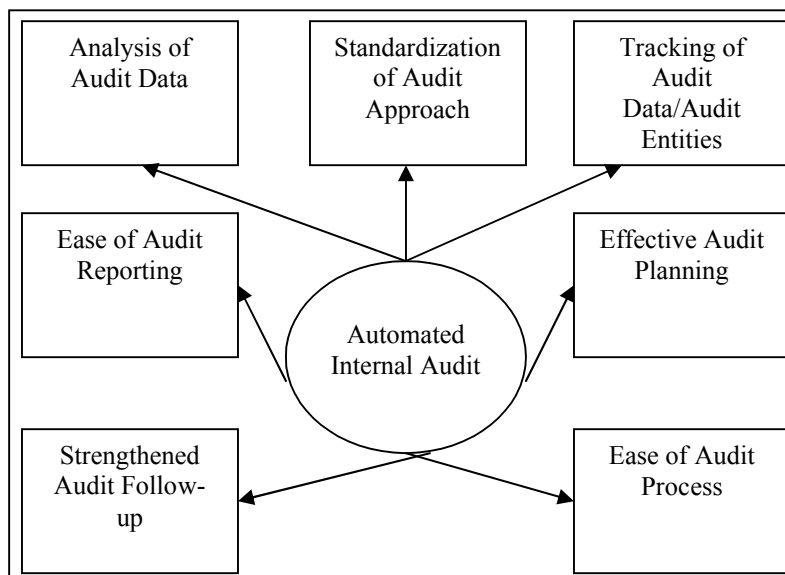
### Strengthened Audit Follow-up

Audit follow-up is one of the important functions of internal audit that make sure implementation of corrective action within the given timeframe. The following areas were covered in respect of strengthened audit follow-up: generation of complex MIS reports and audit follow-up. It can be seen from the above graphical representation that majority of respondents totally or partially agreement that automation has strengthened audit follow-up.

## CONCLUSION

The banks' internal audit efficiency can be improved dramatically through automation. The possible benefits could be: Ease of audit process due to reduction in audit documentation time, generation of complex MIS reports, tracking of audit entities, ease of replying management queries and effective organization of work distribution. Major benefits organization can avail could be reduction in audit documentation time, improvement in every area of audit life cycle, standardize audit approach, strengthen audit follow-up, more time for analysis, tracking of audit entities and data security. Automation can play effective role in the consistency of the audit approach through standardize work papers and knowledge-based library to standardize/improve audit reporting. Analysis of audit data can be improved due to availability of data for analysis, trend analysis, generation of complex MIS reports and more time for analysis due to the fact the documentation time can be reduced significantly. Senior management requires current status of the audit department efficiency at any point of time. Their queries must be answered on urgent basis no matter process is manually or automated. Automation can facilitate their need and they shall be able to generate this type of information at any time. Organization can reduce tedious documentation time and can utilize their time in more productive work like planning, standardization, analysis etc. They can also look for paperless internal audit. Auditors just have to collect fact and figures, automated

processes can do the rest like formatting, consolidation, version maintenance, generation of complex MIS reports, preparation and submission of audit report. Automation can play effective role in conducting audit planning through suggesting high risk auditable entities for the period, effective resource planning and distribution of tasks to them. Automation can strengthen the audit follow-up through periodic alerts and generating complex MIS reports. The system generated formats can be used for follow-up and feedback.



### RECOMMENDATION

Like other areas automation is equally beneficial for the internal audit functionality of banks in Pakistan. This research report recommends banks in Pakistan that they should automate their internal audit functionality at their earliest, so that their efficiency in this area can be improved significantly.

In addition, this report recommends further work to avoid a big misconception of banks that usage of computer (word, excel etc) means their operations are automated.

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**IS CUTTING OF FOREST UNDER STATISTICAL DATA IN  
OVER COUNTRY A CRIME OF NOT?**

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**ABSTRACT**

Crime means an act that is foolish or morally wrong. No one can deny the critical role that forest play in the existence of mankind. Apart from the role of sustaining life on the planet, forests are also very important for building the economy of country. Forest products are the third most valuable commodities after oil and gas. The chief economic product of forest is timber but the economic benefits in the terms of climate control, pollution abatement, and wildlife maintenance, have rarely been calculated.

Forest and people are connected, and have been since ancient times; we have always had a special relationship based on survival. It was a delicate chain of existence that we once treated with respect and appreciation. But people began to upset this balance. A major reason for this predicament is the illegal cutting of trees, carried out by influential people who have forcefully encroached forestlands.

Pakistan has a total Geo-graphical land area of 80,00 million ha.

- Pakistan has a land of cultivated area of 22,3 million ha (28%).
- About 18 million ha of the cultivated land is irrigated while the remaining is rain fed or is under dry farming.
- The soil resources inventory reveal that 12.4 million ha irrigated land has high agricultural potential, and its production can be doubled if soil is managed on proper scientific lines.
- We have five percent of the total area under forest which is far less than 20 percent considered necessary for a balanced economy of an agricultural country. The details of both productive and protective categories of forest in Sindh are as under.

Category	Type	Area million	% of total land area of Sindh
Productive	Riverine forest	0.596	1.71
Forests	Irrigated forests	0.203	0.58
Productive	Mangroves 0.825	2.45	
Forests	Range – Lands	1.131	3.25

While influential people have occupied 206 acres of forest through illegal allotments, while 31 acres of Miani forest and 20 acres of Kathari forest (Hyderabad) have been vacated from encroachers. Out of the country's total forest of 4.2 million hectares (mh), 1.3 mh (30%) is located in the Khyber Pakhtun Khwa which has a forest covered area of 17 percent. Corruption, deforestation and smuggling of timber is the biggest threat.



A WWF-P official at its Sakrand site office told the delegation that forest spread over 1.933 hectare, was under pressure from influential land grabbers. Around 250 acres of the forest had been encroached upon by influential people of the area.

This paper will enlighten the significance and awareness factors of illegal cutting of tress by masses and also provide evolutionary change in the human behavior.

### KEY WORDS

Crime: An Act that is foolish or morally wrong.  
 Grab: To take something firmly and suddenly, roughly or rudely.  
 Evolution: The process of gradual development.  
 Aware: Having knowledge of somebody or something.

*FEAR death? \_\_\_to feel the fog in my throat, The mist in my face,  
 When the snows begin, and the blasts denote, I am nearing the place,  
 The power of the night, the press of the storm, The post of the foe,  
 Where he stands, the Arch Fear in a visible form, Yet the strong man must go:  
 For the journey is done and the summit attained, And the barriers fall,  
 Though a battle's to right are the guerdon be gained, The reward of it all.  
 I was ever a fighter, so ---one fight more, The best and the last!  
 I would hate that death bandaged my eyes, and forebore, And bad me creep past.  
 No! let me taste the whole of it, fare like my peers, The heroes of old,  
 Bear the brunt, in a minute pay glad life's arrears, Of pain, darkness and cold.  
 For sudden the worst turns the best to the brave, The black minute's at end,  
 And the elements' rage, the fiend-voices that rave, Shall dwindle, shall blend,  
 Shall change, shall become first a peace out of pain, Then a light, then thy breast,  
 O thou soul of my soul! I shall clasp thee again, And with God be the rest!*

*(Robert Browning)*

### CRIME

According to Oxford learner dictionary Crime means “An offence for which one may be punished by law”.

A crime is an act of commission or omission, contrary to municipal law tending to the prejudice of the community for which punishment can be inflicted as the result of judicial proceedings taken in the name of the state. The great difference between the legal and the popular meanings of word crime is, that where as the only perfectly definite meaning which a lawyer can attach to the word is that of an act or omission punishable by law; the popular or moral conception adds degrading kind law is a body of principles called the rules or norms recognized and applied by the state in the administration of justice as rules recognized and acted upon by the court of justice.

### INTRODUCTION

The forests in Pakistan reflect great physiographic, climatic and edaphically contrasts in the country. Pakistan is an oblong stretch of land between the Arabian Sea and Karakoram mountains, lying diagonally between 24° N and 37° N latitudes and 61° E and 75° E longitudes, and covering an area of 87.98 million hectares.

Forests and woodland constitute about 4.8 percent or 4.224 million hectares of total land in the

Country. The share of Sindh in the country's total forests is only 0.678 million hectares or about 16 percent. Out of this, 35 percent is riverian and 51 percent coastal. According to Sindh Forest Department reports, forest resources especially those of Sindh are depleting due to natural, social and official constraints. The northern mountain system, comprising the Karakoram, the great Himalayas, and the Hindu-Kush, has enormous mass of snow and glaciers and 100 peaks of over 5,400 m. in elevation. K-2 (8,563 m.) is the second highest peak in the world. The mountain system occupies one third of this part of the country. The western mountain ranges, not as high as in the north, comprise the Sufed Koh and the Sulaiman while the south-western ranges forming a high, dry and cold Balochistan plateau. Characteristically, the mountain slopes are steep, even precipitous, making fragile watershed areas and associated forest vegetation extremely important from hydrological point of view. The valleys are narrow. The mountains are continuously undergoing natural process of erosion. The nature of climate with high intensity rainfall in summer and of soil in the northern regions renders these mountains prone to landslides.

#### **THE FOLLOWING FOREST TYPES ARE FOUND IN PAKISTAN**

- Littoral and Swamp forests
- Tropical dry deciduous forests
- Tropical thorn forests
- Sub-tropical broad-leaved evergreen forests
- Sub-tropical pine forests
- Himalayan moist temperate forests
- Himalayan dry temperate forests
- Sub-alpine forests
- Alpine scrub

#### **ONCE THE LARGEST IN THE WORLD**

The mangrove forests are located at four geographic locations along the 1046 km coastline. The Indus delta constitutes 98 percent of coastal forests. The mangrove forest of Sindh, once the sixth largest in the world, used to cover 26,000 km. Owing to a combination of natural causes and human exploitation, the area has now decreased to 2,600 km.

- Sindh Forest Department had administrative control over 280,470 hectares on the Indus Delta mangroves.
- The Board of Revenue controlled 260,000 hectares.
- Port Qasim Authority 64,400 hectares.
- Karachi Port Trust 2,547 hectares.

However, the mangroves are shrinking at a rapid rate due to colossal illegal cutting of forest.

### FOREST CUTTING

According to the counsel, Khabrani Forest alone is spread over 3,000 acres with precious species of plants, animals and birds. Besides, the forest is the only source of grazing for more than 50,000 cattle the counsel submitted that the forest department issued lease of compartments 13, 13-A, 14 and 14-A for Khabrani reforestation to some influential people by overruling the conservation principles, and the person had been up rooting trees from time to time. The forest department for the distribution of 55,000 acres of forest land of Hyderabad Afforestation Division and Matiari reverine forest are illegal almost of some politically influential people in the fake names of some windows and helpless people to keep the possession with them. This criminal activity of deforestation under the nose of the forest department was void ab initio, which violated such provision of the constitution as well as the law of the nature.

The petitioner prayed to the court to grant injunction against the deforestation in general, particularly in the Khabrani Forest, and declare that all forest all over 750,000 acres in Sindh as national assets and protected zone to escalate the conservation status of forests.

### FAST VANISHING FOREST CONTRIBUTES TO ENVIRONMENTAL DEGRADATION

While there are many issues that affect environment in Sindh but fast losing forest cover in the province and illegal occupation of forest land is most important of all. World Environment Day being observed on June 5, with the theme of "Biodiversity ecosystem management and the green economy" but it seems that the government remains least concerned to protect forest in Sindh. Over 2.5 million acres of land used to be cultivated on the banks of River Indus in the kutch area which led to production of served as vital source of wood in forest.

Poor inflow in Indus have changed area's climate. Non-existence of trees had affected rains. Fast deleting River Indus flows continues to affect forest besides livestock and fisheries resources, considered vital for economy.

According to scientific studies, warming in Himalayas has been much greater than global average of 0.74 degree Celsius over the last 100 years and since Indus is glacier fed river and its flow would drastically reduces after glacier's melting and climate change will raise sea level to inundate coastal belt.

Figures released by World Wide Life Fund indicate that Sindh forest department manages eight percent of the province's land out of which 2.3 percent is productive forest.

S.No	Productive Forests	Area (million acres)	% (percent)
1.	Riverine Forest	0.596	1.7
2.	Irrigated Plantation	0.203	0.57
	Total		2.3

S.No	Protective Forests	Area (million acres)	% (percent)
1.	Mangrove	0.852	2.45
2.	Rangelands	1.131	3.25
	Total		5.7

Forest degradation process is around three to four decades old, but forest department never gave serious thought to its protection with the result that tree felling continued unabated coupled with encroachment of the forest land. As a retired senior forest official puts it, out of around 600,000 to 700,000 acres of forest around 100,000 or 130,000 acres of it remained under encroachment till 2008, causing huge monetary losses to provincial kitty on the one hand and contributing to environmental degradation on the other. If Rs.2 to Rs.3 billion for Sindh's kitty per year.

Climate change has affected average rains in Sindh considerably and badly affected ecology. Sindh is rapidly losing its forest cover in riverine area and delta. It's a major cause of depleting stock of biodiversity and associated loss of livelihood for communities which survive on subsistence economy. It further aggravation of situation to deforestation and land grabbing by political elite. WWF is working with forest department to effect changes in Sindh Forest Act 1827 and Sindh Wild Life Ordinance 1972 to make them community-oriented so that local people start owing the land and forest protect them against land grabbing which is too fast.

In Sindh, forest land have been converted into kitties by powerful feudal lords and landholders where efforts to recover forest land by successive government has remained a far cry. The recovery can result in monetary benefit to Sindh even if lease money is ridiculously calculated at Rs 1000 per acre annually. Forest officials in connivance with revenue officials have entered fake entries in the record.

### **CRIMINAL LAW**

Criminal law, in broad sense is the body of law that defines criminal offences, regulated, the apprehension charging, and trial of suspected persons and fixes penalties and modes of treatment applicable to convicted offenders.

Criminal law is only one of the devices by which organized societies protect the security of individual interests and assure the survival of the group. The interpretation of such law clearly provides various ways and means to settle problems of cutting trees under in law.

### **LEGISLATION**

Although all the areas covered by the Forest Act and manual are also under ordinary law and for major offences punishment can be awarded under Pakistan Penal Code and Forest Cutting; Forest products in transit and the safety of all timber has to be ensured whether float drift or stranded logs. It has to be made known through a legal document that any pilferage of the timber in transit or theft of the waif wood which become the property of the Government is punishable. Also the forest service must be vested with definite powers to deal with the offender effectively. Only a legally powerful forest service can render the protective function a policing job in addition to its usual function of a Forest Manager.

### **PROTECTED FORESTS**

\* **Power to Make Rules for Protected Forests:**

The provincial Government may make rules to regulate the following matters.

- (a) The cutting, sawing, conversion and removal of trees and timber, and the collection, manufacture and removal of forest produce, from protected forest.
- (b) The protection and management of any portion of a forest closed under Section 30.
- (c) The exercise of rights referred to in Section 29.

**\* Any Person who commits any of the Following Offences, Namely:**

Fells, girdles, lops, or burns any tree reserved under Section 30, or strips off the bark or leaves from or otherwise damages, any such tree; penalties for acts in contra vent ion of notification under Section 30 of rules under Section 32.

**\* Nothing in this Chapter to Prohibit acts done in certain Cases:**

Nothing in this chapter shall be deemed to prohibit any act done with the permission in writing of the Forest Officer, or in accordance with rules made under Section 32, or except as regards any portion of a forest closed under Section 30, or regards any rights the exercise of which has been suspended under Section 33, in the exercise of any right recorded under Section 29.

### **AFTERMATH OF FOREST CUTTING ON ENVIRONMENT**

“Corruption doth appear on land and sea because of (the evil) which men’s hands have done.”

#### **(Al-Rum: 41)**

Hill and riverine forest cover directly contributes to reduced losses from natural disasters like earthquake and flooding and in the Indus river actually means inundation of the riverine area resulting in rehabilitation of the deforested area and improvement of the damaged forest cover. The riverine area of Indus means natural forest. The Indus through the floods inundates the forest by virtue of a natural system; forest provide resistance for protecting the non-reverine area from the destruction of flood water, but we have changed the flood in the Indus into a disaster by cutting 617,545 areas of reverine forest of Sindh.

It directly and indirectly effects on:

1. Psyche of amasses.
2. Economic devastation.
3. People loss their beloved; homes.

Owing to the menace of deforestation, worldwide, 796 tree species are facing extinction. The species facing extinction in Malaysia are 197, in Indonesia 121, in India 48, in Brazil 38 and in Pakistan 2 tree species are facing extinction.

### **FOREST AND DEVELOPMENT**

Forests have been associated with human beings since the very beginning. Forests, a part from embellishment of the landscape, play a significant role in the agricultural and industrial development and economics of a country.

Forests cover almost one third of the land area of the world and over half land of developing countries. Annual world production of forest products exceeds \$120,00 million: total trade of globe amounts to more than \$30,000 million.

**FOREST AREAS AND RANGELAND (IN ha)**

Forest Type	NWFP	Punjab	Sindh	Balochistan	Northern Areas	Azad Kashmir	Total
Coniferous	1105	29	-	131	285	361	1911
Irr. Plantation	-	142	82	-	2	-	226
Riverain Forests	-	51	241	5	-	-	297
Scrub Forests	115	340	10	163	658	1	1284
Coastal Forests	-	-	345	-	-	-	345
Mazri Lands	24	-	-	-	-	-	24
Linear Plants	2	4	-	-	-	-	6
Private Plants	159	-	-	-	-	-	159
Range Lands	150	2683	490	787	2104	195	6409
Total	1555	3249	1168	1086	3049	557	10664

**BENEFITS OF FORESTS ARE EITHER**

**1. Tangible Benefits:**

- \* Provide subsistent and shelter.
- \* Forest act as a natural mechanism of air filtration.
- \* Reduce noise pollution.
- \* Increase the amount if annual rainfall.
- \* Adds the fertility of the soil.
- \* Acts as a barrier during wind storms, reducing their speed and intensity.

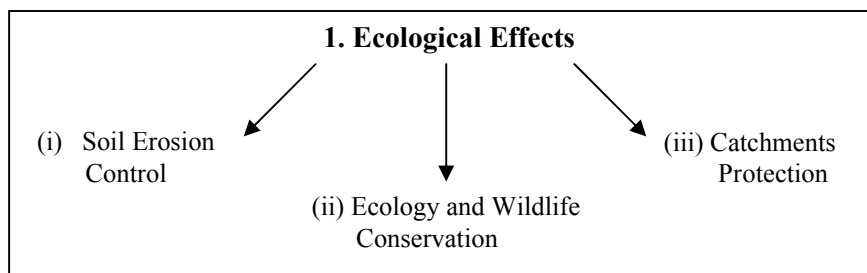
**2. Intangible Benefits:**

- \* Provide employment.
- \* Provide resources for the development of other sectors.
- \* Readily convertible and largely self-regenerating store of wealth.
- \* Provide innumerable products.

**ROLE OF FORESTRY IN DEVELOPMENT**

Forests are a great natural asset of inestimable value to the people. Forestry sector greatly helps in enhancing the development of a country in certain respects. These are as follows:

1. Ecological Effects.
2. Indigenous Consumption.
3. Industrial Uses.



Forests are outwardly grand but fragile ecosystems. Their overall impact with consequent benefits to mankind is so often that the interaction of elements of ecosystem.

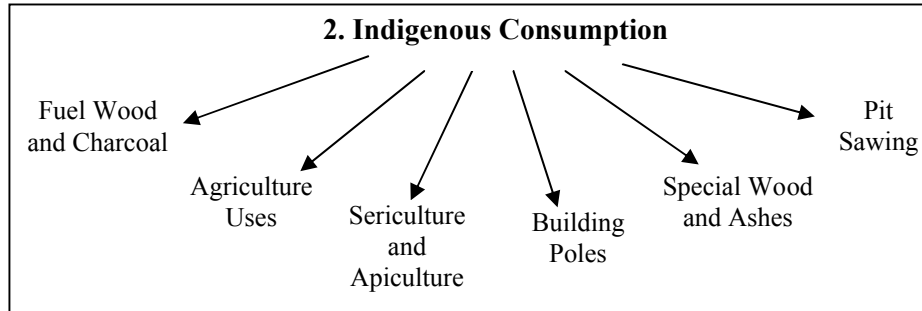
The ecological impact of water greatly affects on water catchments. Forest in catchments areas act as porous reservoirs by retaining water in the roots and releasing it as a sustained flow over a long period of time. In this way forest protect the land from

- (a) Erosion (b) Reduce flooding (c) Minimize sitting of rivers, canals and dams.

By modifying the micro climate and shelterbelts, forest can reduce wind erosion, and slow by:

- (a) Man-made plantation (b) Planted shelterbelts (c) By natural forests.

Forest areas provide a habitat for wildlife, many species of which can't survive in an unfavored environment. They provide recreational outlets and for city dwellers, as well as places to live for those whose live hood comes from forests.



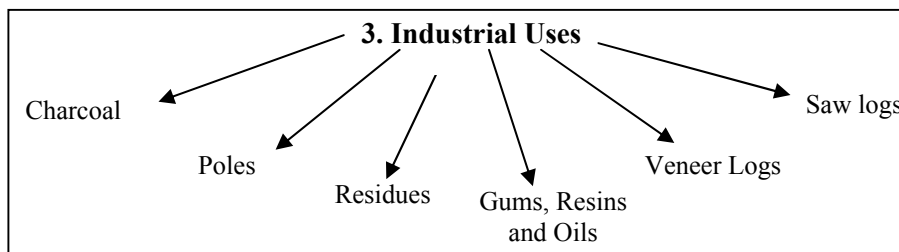
The major use of the forest in developing countries is as a source of fuel as fire wood or as charcoal.

90% of annual wood consumption in developing countries is used for fuel.

There is substantial positive interaction between forest and food production. Forest provides different food materials such as; fruits, nuts, berries, and mushrooms etc.

Trees indirectly improve soil fertility by fixing nitrogen (e.g. certain acacias) and by adding organic matter.

The role of forests is generally recognized in providing wood for building poles, sawn boards, and furniture. In addition the forest provide materials for wearing a habitat for food and material produced by insects such as honey, silk, wanes and is a sources of special woods and ashes used in the manufacture of ornaments artwork.



Wood enters into more activities in a modern industrial economy. Though, processed wood products are quantitatively the most significant and best leather goods, paints, glues and packing materials. Medicines are dependent upon various gums resins, waxes and oils taken from forests as essential ingredients.

Another category which grows rapidly with rising incomes is composed of the products of pulpwood, newsprint, paperboard, writing paper, domestic tissues, containers, packing, textiles and clothing.

Countries with forest stocks may obtain economic benefits in the form of:

- \* Increased employment
- \* Generation of foreign exchange (through the export)

Depending on a country state of development export may range from round wood, sawn timber board and plywood veneer to pulp and paper and manufactured goods of all kinds.

The existing forest stock in developing countries (estimated as 1400 million hectares mature forest) is currently being consumed at the rate of 15 million to 20 million hectares a year. At this rate, assuming no growth in demand, the remaining tropical forest will be consumed in about 60 to 80 years.

Allowing for population growth in developing countries with no growth in exports, the current forest stock likely to be consumed in less than 40 years. Without proper management and far reaching implication we can't tackle the situation properly.

- **Environmental Disruption:**

Larger environment if not accompanied by deforestation may lead to rapid run-off, soil erosion silting and flooding in the rainy season, followed by reduced downstream. Studies have shown that the incident of flooding in the Indus River System in Pakistan has been higher in the last 25 years than during the previous 60 years.

Increased flooding which is attributed to the denudation of catchments areas has been accompanied by serious silting of the dams and canals of Pakistan's Irrigation System. The undesirable effects of uncontrolled forest exploitation have been widely publicized in present century. Dust bow is flash phenomena have been partly caused by uncontrolled forest exploitation in wide spread areas.

- **Population Growth and Encroachment:**

Today, although digital technology has engulfed the entire globe, man is dependent on trees for many of his need, violate the natural systems.

Some 10% of the world's population lives in mountain areas, but another 40% live in adjacent lowlands means half of mankind is intimately affected by trends in watershed environments.

Increasing population pressure forces the cultivation of mountain slopes, where crops and topsoil quickly wash away. Forest resources which are vital for flood control and soil stabilization are used for fuels replace once fertile pastures.

### **UNCONTROLLED COMMERCIAL EXTRACTION**

Many developing countries with extensive natural forest stocks allow commercial extraction of forests wood, which generates useful economic activity valuable foreign exchange. Using semi able cutting plans, commercial cutting can take place without reducing the total area of sustainable yield of standing forest. And with minimal damage



to watershed cover. Most of the countries have failed to introduce or enforces controlled cutting plans as a result of that they faced a devastating destruction of watershed environment.

The failure to adopt a controlled forest policy is attributable to:

- (a) A lack of political will.
- (b) Short sighted view.
- (c) Primitive attitude towards forest.

This situation has usually been exacerbated by a lack of appropriate institution through which controlled extraction programs and orderly forest management can be implemented and introduced.

These terms encourage log export rather than domestic processing and manufacture of wood products.

Because funds are lacking, reforestation and afforestation have lapsed in many countries below the level, needed to an adequate supply of food.

The divergence of economic and social objective so often observed in developing countries tends to be more accentuated in the forestry sector. Due to this divergence there is often little political advantage to be found by diverting funds and forest development.

### **STRATEGY FOR FOREST DEVELOPMENT**

An obvious disparity can be seen between the role of forests in development and observable experience in developing countries. In almost every country, the environmental benefits from forestry are ignored. The reasons are:

- (a) The balance of ecology is upset.
- (b) Population pressure is increased.
- (c) The rate of forest exploitation is being breached.
- (d) Tenets of good forest management are disregarded.

This awakening is manifest is a reorientation of perception about the ways in which forest can be used to further the goals of development.

### **CONCLUSION**

In a nut sheep, the cutting of forest causes the ecological imbalance. This criminal activity resist through the promulgation of laws synchronize with the awareness of dynamic important of forest.

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## IS POPULATION A FACTOR OF SOCIAL EVIL IN 21<sup>st</sup> CENTURY?

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### INTRODUCTION

#### **Population:**

According to Oxford advanced learner's dictionary 8<sup>th</sup> edition, "Population means all the people who live in a particular area, city, or country". Population can be defined as including all people or items with the characteristic. Population day celebrated on 11<sup>th</sup> July. It celebrated internationally as UNDP and currently year its title is "every one count". UNDP was held in WSSD in 2002 in this conference some goals are permitted. To achieve this 8<sup>th</sup> goals launching for development international conference.

#### **Historical Background:**

Our world war not a populous place since 9th century the popular explosion first appeared during 20<sup>th</sup> century with the availability of connection and advancement of help science. Though help in reducing mortality rate.

#### **8<sup>th</sup> millennium Development Goals:**

Following goals are kept for this development:

- To eradicate extreme poverty and hunger.
- Achieve primary education.
- Promote gender equality and empowerment of women.
- Reduce child mortality.
- Improve maternal health.
- Combat HIV/AIDS, malaria and other disease.
- Ensure environmental stability.
- Develop global partnership for development.

World population day is to think about population related issues in a world that is increasingly getting the world population day crowded by the day. The world population was 6.06 billion in 2000 to 2007. Thus census bureau estimates that the world population will be roughly to 10.5 billion people living in the world in 2050.

Below table shows census in our country.

**STATISTICAL DATA**

Province/Region	Population				
	1951	1961	1972	1981	1998
Pakistan	33,740,167	42,880,378	65,309,340	84,253,644	132,352,279
Rural	27,754,670	33,225,806	48,715,689	60,412,173	89,315,875
Urban	5,985,497	9,654,572	16,593,651	23,841,471	43,036,404
Khyber Pakhtunkhwa	4,556,545	5,730,991	8,388,551	11,061,328	17,743,645
Rural	4,051,800	4,972,475	7,192,896	9,395,675	14,749,561
Urban	504,745	758,516	1,195,655	1,665,653	2,994,084
Punjab	20,540,762	25,463,974	37,607,423	47,292,441	73,621,290
Rural	16,972,686	19,988,052	28,424,728	34,240,795	50,602,265
Urban	3,568,076	5,475,922	9,182,695	13,051,646	23,019,025
Sindh	6,047,748	8,367,065	14,155,909	19,028,666	30,439,893
Rural	4,279,621	5,200,047	8,430,133	10,785,630	15,600,031
Urban	1,768,127	3,167,018	5,725,776	8,243,036	14,839,862
Balochistan	1,167,167	1,353,484	2,428,678	4,332,376	6,565,885
Rural	1,022,618	1,125,016	2,029,094	3,655,604	4,997,105
Urban	144,549	228,468	399,584	676,772	1,568,780
Islamabad	95,940	117,669	237,549	340,286	805,235
Rural	95,940	117,669	160,908	135,922	276,055
Urban	-	-	76,641	204,364	529,180

S.No.	Country	2008	Population 2010
1	China	1,330,044,544	1,339,117,000
2	India	1,147,995,904	1,186,790,000
3	United States	303,824,640	310,080,000
4	Indonesia	237,512,352	234,181,400
5	Brazil	196,342,592	193,252,604

**DATA ANALYSIS**

Pakistan's population has increased from 34 million in 1951 to 144 million in mid 2001. The addition of over 108 million Pakistanis in just five decades is due to the high population growth rates in the last thirty years. Continuing high population growth will amount to Pakistan's population reaching 220 million by the year 2020. Coupled with poor human development indicators such as low literacy, high infant mortality and low economic growth rates, such a large population will undermine efforts being undertaken to reduce poverty and to improve the standards of living of the populace.

While Population Growth Rate (PGR) has declined from over 3 percent in previous decades to its current level of 2.1 percent per annum, Pakistan still has an unacceptably high rate of growth compared to other developing countries. Therefore the Government of Pakistan is attaching the highest priority to the lowering of the population growth rate (PGR) from its current level to 1.9 percent per annum by the year 2004 and to reaching replacement level of fertility by the year 2020.

Pakistan is faced with its ever-largest adolescent population, because of its high levels of fertility over the last few decades and its very recent fertility decline. The adolescent population, in the age group of 15-24, as it enters into its reproductive phase embodies potential population growth for several decades. It constitutes population momentum in the future that has serious implications for provision of schooling, health services and other basic amenities of life for the coming decades. The Population Welfare Programme has been able to create universal awareness about family planning with the current contraceptive prevalence rate of 30 percent. The challenge is to ensure continuous use by current users and increase existing CPR by meeting the percent unmet need for family planning services of currently married women along with sustaining the demand of new entrants in the reproductive age group.

Over one third of Pakistanis are living in below the poverty line. The impact of population growth on poverty is obvious, since poorer families, especially women and marginalized groups bear the burden of a large number of children with much fewer resources further adding to the spiral of poverty and deterioration in the status of women. This large part of the population is constrained to live in poor housing and sanitation conditions and lack of access to safe drinking water. In particular, income poverty leads to pressures on food consumption and adversely affects caloric intakes and increasing malnutrition in poorer families and contributes to high levels of child and maternal morbidity and mortality. Furthermore, rapid population growth contributes to environmental degradation and depletion of natural resources.

The dynamics of Pakistan's demographic variables compel that a vigilant eye be kept on the phenomena of population growth. The Population Policy of Pakistan 2002 is in congruence with the ICPD paradigm shift to holistic care of the family, client centered quality care in family planning & RH. The government's Poverty Reduction Strategy and the Population Sector perspective Plan 2012 framework sets out improvements in the quality of life of all persons, including children, adolescents, adults, and aged, both male and female.

Population and development inter-relationships have been elaborated most comprehensively in the ICPD Program of Action in 1994 to which Pakistan is a signatory. The main thrust of ICPD is that each country brings into balance its resources with population through a policy, which is in accordance with its own social, cultural, religious and political realities.

This Population Policy is designed to achieve social and economic revival by curbing rapid population growth and thereby reducing its adverse consequences for development. It is intended to achieve a reduction in dependency ratios, to alleviate pressures on dwindling resources and to help in the reduction of poverty. The Population Policy has several wide-ranging consequences for the economy, polity, human rights and the long-term prosperity of Pakistan.

The Population Policy is the outcome of a participatory process and enjoys the consensus of all stakeholders and partners, within government, NGOS and, civil society.

### FACTOR OF SOCIAL EVILS

The geneses of crime start from our mind and completes in our action but its effects can be short and long. There is a lot of factors and actors (social, psychological, biological and geographical) compel our mind for criminal activity. But these above mentioned factors and actors are not hundred percent applicable for age group because every age group has its own requirements, demands and approach. The psyche of child is different than young and the psyche of young is different than dot age person. In this regard the crime and violence intensity of all age group will be totally different to one and another, if the requirement, demands and approaches are different than the investigation and research tools and techniques should be different.

According to the judicial dictionary 9<sup>th</sup> edition 1984 “Crime is an act of commission, for which punishment can be inflicted as the result of judicial proceeding taken in the name of state. Simply it may be religion. Defined as an act or omission by law.

All the acts against religion are considered sin thus sin can be defined as the transgression of divine law. It's very based on religion.

Population in 21<sup>st</sup> century may utilized to curb many crimes Like:

- Human Trafficking
- Honour killing
- Hoarding
- Smuggling
- Hate crime
- Fake marks sheets and other educational certificate Human trafficking
- Kindness and ransom
- Serial killing
- Camel race with jockey kids
- Exchange drugs
- Financial crime including
- Prize bond, money laundering, banking & cooperative scandals
- White color crime                      cyber crime
- Land related crime                      crime related to juveniles
- Tax related crime                      laboures related crime
- Food related crimes                      crimes in jail
- Human related crime                      (crime of pharmacy)

Criminologists analyzing what works to prevent crime:

Prestigious commission and research bodies would health Assembly Resolution 56-24 for government to implement nine recommendations, which were:

Quranic verses:

Sly not you children with the fearing a fall of poverty, we shall provide for them and for you, lo. They saying of them is great sin. (Surah Bani Israil).

Say Lo, my lord enlarge the provision for home he will of his bondmen and narroweth it for him, and what so every ye, spend for goods he replacet it, and e is the best provider (Surah Saba).

It is very difficult to prove that population is a factor of the social evil, but when we goes through the news on media so we can sight huge reference in the sense of street crime several studies shows that all the social evils is the sprit of un trained, un educated and uncivilized population. These are the following solution of there above crime.

### **SOLUTION**

It is very difficult to prove that population is a factor of the social evil but when we goes through the news on media so we can sight huge references in the sense of street crime several studies shows that all the social evils is the spirit of un trained, un educated and uncivilized population. These are the following causes of there above crime.

It does not develop the character of students of right direction and religious educations have no place in the modern education system. Education play cordial role in solving the social, economical, political issues of our country as well as individual.

“Our holy prophet (PBUH) has advised us to seek knowledge even if you have to go all the way to china”.

No grasp or understanding of the material studied or original thinking is encouraged. Scholars advising us to recite Aayate karima to prevail over all evils and worries. We should also recite Shurah Ayaat 83-84: “O Almighty Allah, give me knowledge and wisdom and let me join the pious people and give me fame among posterity and give me the inheritor of the blessed garden of paradise”.

### **CRIME PREVENTION**

Criminologists analyzing what works to prevent crime:

Prestigious commission and research bodies would health Assembly Resolution 56-24 for government to implement nine recommendations, which were:

1. Create, implement and monitor a national action Plan for Violence Prevention.
2. Enhance capacity for collection data of evidence
3. Define priorities for, and support research on the cause, consequences, costs and prevention of violence.
4. Promote Primary Prevention responses.
5. Strengthen responses for victim of violence.
6. Integrate violence prevention into social and educational Polices.
7. Increase collaboration and exchange of information on violence prevention.
8. Promote and monitor adherence to international treaties. Laws treaties, laws and other me chiasms to protect human right.
9. Seek practical, internationally agreed responses to the global drugs and global arms trade.

### ECONOMIC CAUSES

**Poverty:** Poverty can be defined as scientifically a person who is not eaten 2500 calories in a day.

**Socially:** A person who is not fit a slogan food clothing & shelter.

Pakistan is going through a transitory phase.

Poverty in Pakistan is a growing concern to Pakistan with a population of 173.5 lm in 2010.

The 6<sup>th</sup> most populous country in the world then 20% people lives below the poverty line. Great qualities and their innate abilities usually poverty is considered to be curse it is want of money & money is required for obtaining ones bare necessities of life. if one has no money to get there things with, then we things of dishonest ways to get then because same how he must get then poverty makes him yield to temptation of various kinds. Even forget his self respect & begs some time he stoop to such activities as stealing cheating, dishonesty using the many of other people for his own use. He is not able to keep his promises to his creditors & he often line before then especially when he has dependants.

There are two schools of thought one that believes that population growth causes poverty and other thinks that poverty causes population growth. Those who think that population growth causes poverty advocate programmers in family planning and population growth favour emphasis on economic development, including employment opportunities as they believe that if development is taken care of, birth rate will come down automatically. Poor people often want more children because children reply from of social security available to parents in their old age.

### UNEMPLOYMENT

Unemployment is a major economic and social problem of our country. It is rural as well as urban. It is very serious and alarming and it has given birth to many evils. there are millions of laboures, peasants and unskilled or half-skilled workers who are unemployed.

Youth commit suicide when they are frustrated by extreme poverty and continued unemployment. Many others turn to thieving, picking pockets, robbery etc. Among the people who are seen creating disturbances, causing violence, etc. in that majority are the unemployed people.

Official reports acknowledge that over 400,000 industries workers have lose their jobs and country's industries are facing an annual monetary loss of over Rs240bn and this is just a brief view of the catastrophic socio economic implication of the issue. Even more alarming is the fact that the phenomenon of load shedding appears to be beyond arrest even in a couple of years. Violent demonstrations because of load shedding have been taking place across the country since 2006.

An examination of the country's energy history shows that other then the regimes of the 60s and 70s, none did justice to this important sector.

Although the country experienced over 100% growth in terms of installed capacity over the last two decades, hardly any value engineered projects were developed over this period. Other than the 1450mw ghazi brother's project and a couple of nuclear power plants there is not much to be satisfied about. Suicide bombing and large scale violence is a great threat for the sustainable development of any country. Unfortunately Pakistan is confronted with suicide bombing and large scale violence, it may be said that Pakistan is a soft state in northern areas. The media and newspaper mostly highlights the several events of suicide bombing and violence which are occurring in the different region of the country. Above mentioned all situations are creating hurdles for the development of country.

### INDUSTRIALIZATION

In industrial towns many thousands of laborers and tends to split the ratio of men to women which consequently encourages sex crime. Many girls from rural areas and deceived with promises of employment and brought to town where they are forced to adopt prostitution.

The under developed rural sindh holds an enormous potential for investment that can revive industrialization, generate employment improve house hold income and reduce poverty. But it is not possible without political will consistent policies and programmer development of infrastructure facilities and restoration of law and order.

Investment plan to revitalize rural economy through increased local and foreign investment in agro processing, aquaculture, livestock, poultry, dairy, energy, stone and granite mars transit, municipal services, and tourism development

Religious teach us to loving charitable and counter acts the evil of lower.

A poet says that:

Love the poor & the rich  
 Love the friend & foe  
 Love the haughty & the high  
 Love the humble and lead

### ADVANTAGES OF POPULATION GROWTH

The advantages of population growth on the economy can be that there is a lot of man power available so if used properly then the economy can develop at a faster rate than it is developing.

Overpopulation means more people and more people means they can do more work and more work means more output. Therefore, if there is any work to do then it could be done in the less in time. As per the theory of survival of the fittest- only those individuals will survive who is the fittest therefore individuals who survive will be better than the others and the future race will be better.



### **POPULATION DENSITY**

In the 21<sup>st</sup> century population rampantly grew in many countries, population has been dramatically doubled. Increasing scaling also continued and thus, the number of proletarians likewise continued to grow. The landless farmers did not have the security they had previously when working for a land owning farmer. Modern farmers did not have help for a whole year anymore, but only for the harvest season. Because they now only produce one or two crops, the harvest season was very short as well. The economy needed teams of harvesters that went from town to town. Many people moved around in Western and also in Eastern Europe after the abolition of serfdom in 1861. By 1850, the countryside had become very overcrowded; partially because of the rural industry that was located there. The Industrial Revolution brought with it an increase in population and urbanization, as well as new social classes. The increase in population was nothing short of dramatic. England and Germany showed a growth rate of something more than one percent annually; at this rate the population would double in about seventy years. In the United States the increase was more than three percent, which might have been disastrous.

Population growth is a good thing for the world because it adds diversity to society, creates more responsible and moral citizens in the world, and it contributes to the maintenance of order in society.

### **NEW ADVANCES**

Population growth is also important because we need a new generation of people who can think positively for the betterment of society. When new babies are born, some may grow up to invent new technologies that can ensure safe food production methods for us.

### **HAPPINESS**

As humans, we were designed with the need to enjoy healthy relationships. We may have the latest gadgets which allow us to communicate with each other, but it's not the same as a warm hug, a beautiful smile or a meaningful face-to-face conversation. This is why we need population growth.

### **CONSIDERATIONS**

Even if population growth includes those who are disabled or who are of a culture we do not like, we can learn to love them unconditionally and try to understand their situations because they too are blessings to the world.

### **POPULATION AGEING**

**Population ageing** or **population aging** occurs when the median age of a country or region rises. With the exception of 18 countries termed by the United Nations 'demographic outliers' this process is taking place in every country and region across the globe.

**Ageing, well-being and social policy**

The economic effects of an ageing population are considerable. Older people often have higher accumulated savings per head than younger people, but may be spending less on consumer goods. Depending on the age ranges at which the changes occur, an ageing population may thus result in lower interest rates and the economic benefits of lower inflation. Some economists (Japan) see advantages in such changes, notably the opportunity to progress automation and technological development without causing unemployment. They emphasize a shift from GDP to personal well-being.

The second largest expenditure of most governments is education and these expenses will tend to fall with an ageing population, especially as fewer young people would probably continue into tertiary education as they would be in demand as part of the work force.

Low population growth rates keep business innovative, employment rates high, productivity high, and that generates sound and solid economic gains. However, it exposes Social Security for the Ponzi Scheme it is, and politicians don't like their lies exposed, or their power over others challenged.

Population growth increased significantly as the Industrial Revolution gathered pace from 1700 onwards. The last 50 years have seen a yet more rapid increase in the rate of population growth due to medical advances and substantial increases in agricultural productivity, particularly beginning in the 1960s made by the Revolution. In 2007 the United Nations Population Division projected that the world's population will likely surpass 10 billion in 2055.

**INDUSTRIALIZATION**

Faster crime such as murder, assault, disturbance, robbery, etc. industrialization has encouraged crime also due to another reason. Housing becomes a problem in an industrial town when the population increases beyond a problem

In industrial towns many thousands of laborers and tends to split the ratio of men to women which consequently encourages sex crime. Many girls from rural areas and deceived with promises of employment and brought to town where they are forced to adopt prostitution.

The under developed rural sindh holds an enormous potential for investment that can revive industrialization, generate employment improve house hold income and reduce poverty. But it is not possible without political will consistent policies and programmer development of infrastructure facilities and restoration of law and order.

Investment plan to revitalize rural economy through increased local and foreign investment in agro processing, aquaculture, livestock, poultry, dairy, energy, stone and granite mars transit, municipal services, and tourism development

Religious teach us to loving charitable and counter acts the evil of lower.

A poet says that:

Love the poor & the rich  
 Love the friend & foe  
 Love the haughty & the high  
 Love the humble and lead

### SUGGESTION

It is an obligatory duty of the policy makers to think about “the population mess” and provide some technique to align their wheels properly by some ways and manners so our sphere where there is a life may be called a place of easily living. This study facilitate the scholars the scholars to understand the way and means clearly to avoid to thing that population is not a cause of social evil in 21<sup>st</sup> century.

It is regretted to say that millennium development goals given in the favors of the people could not solve they mentioned issues by any corner but with help of this paper we can curve the ways and means to solve the human related issues like: positive utilization of population mess because the pages of history witness they human dignity may be obtained by their hard word, incessant struggle and those programmed modern techniques in the field of social as well as natural sciences which government of Pakistan declared at present era just like: Benazir Bhutto Sashayed Youth Development Program, National Internship Program and National Vocational Technical Education Centre these all are program are producing skills in our youth and that is a successful step for reducing the social evils.

Many thousands of young people with good health and education, ability are standing on the end of bridge at life’s crossing. They hope they are on the right way they think they are doing the right and yet they do not the dare to turn bridged they have just crossed, they wants a chance for retreats in case they have made mistake. Hey can not dare the thought of cutting off all possibility for turning back the lack of power to decide conclusively what course they will take.

If we arable our all non arable land make it possible to arable and invest youth there, they could produce well and good crops because youngster have pursuit to quest something different so in this way we can pull off a large part of our population and result will produce in the form of economy as well as development of the country.

A healthy nation is a prosperous nation. Youngster can play vital role to eliminate corruption from government institution because youngsters have potential and determination to achieve their aims they must denied for taking and given bribe. They may establish organize clubs in their collages against corruption and gradually arrange seminars to curb the problem. It can also bring awareness others among.

According to transparency international youth are only the power who can be helpful to solve the problem of corruption dishonesty, mismanagement. So we must encourage the new generation to bring new change in the society Pakistan youth should inform to concur authorities about get corruption no matter where ever it be and bring it in front of media so that these corrupt and dishonest elements may be high light. Youth only the power who can change the destiny of the country.

**GROWTH OF MOBILE INDUSTRY AND ITS IMPACT  
ON PAKISTAN ECONOMY**

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**ABSTRACT**

Purpose of research is to know the existing growth of mobile industry and its impact on Pakistan economy and also future prospects exists for current players and to attract foreign investors in the development of our country. The current situation clearly indicates the success of policies adopted by the government of Pakistan in Telecom sector. Pakistan telecom sector has witnessed steady growth over the past years and it may absorb 5-7 billion dollars investment during the next ten years. There is a dire need to assess whether telecom is really a success story or we are just bashing about its success.

Pakistan is on 4th number in cellular subscriber growth in industry, number one is china, which is due to its large population. The telecommunication sector in Pakistan has done remarkably well in the past few years primarily due to trade and investment liberalization, privatization and openness to modern technology. Study focuses on survey from randomly selected customers; i.e.; youth and businessmen who spend most of their time on mobile activities; we designed structural questionnaires having multiple choice questions to find out their feedback on existing telecom performance and innovations in the sector.

Survey also conducted via different mode of traditional and modern methods which reveals that rapid growth of mobile industry also changes the social and economical aspect of life. Study also focus on legal and ethical aspects of this growth on Pakistan Society. Furthermore, the advance technology is either appropriate to adopt readily by users.

**KEYWORDS**

Growth; Mobile / cellular industry; Economy of Pakistan; telecommunication.

**INTRODUCTION**

The telecommunication plays a basic role in rapid growth, development, and modernizing a country. This is the reason the demand of telecom services is increasing day by day. Pakistan is on 4th number in subscribing growth in industry. Pakistan telecom industry consists of 6 sectors mobile sector, fixed line sector, wireless local loop sector, payphone services, internet services, voice over IP. Their growth of telecommunication is so intense that all companies are trying to take nice position to each

other in order to provide advance and low packages at low rates. The telecommunication sector in Pakistan has done remarkably well in last few past years primarily due to trade and investment liberalization, privatization and openness to modern world. The overall growth of mobile industry if increases with the same speed so it's obvious that very soon it will be on top of the world in enhancing economy of Pakistan with its growth. Tele density (telecom access per inhabitants) is a crude method to gauge the telecom access across the countries, if we look into it we can say that we are competing with countries, which are much ahead of us in terms of economic development like Malaysia and Singapore

The purpose of this paper is to study the growth of Mobile industry and its impact on Pakistan economy. The research is conducted as questionnaire survey among mobile phone users. Following this introductory section this paper is dividing into seven more sections. In the following sections, Literature review, Methodology, Research Hypothesis, Data Analysis as well as conclusion is discussed.

### **SCOPE OF THE STUDY**

When you say scope of telecommunication it means you want to know available prospects in this field. What make telecommunication system all the more important is that it is not only essential for promoting economic, trade, commercial and information exchanges but is also imperative to foster national integration as well as increasing regional and global trade. To find the reason of tremendous growth in Pakistan Telecom Industry, Mobile Operators Performance and Share in the Market, Rate of Cellular subscriber Growth, Cities & Villages covered, Company-wise cell sites, Cellular Penetration, to study the role of PTA, to study upcoming trends in telecom industry.

### **METHODOLOGY**

In order to select the samples, Random Sampling method was used on the customers who spend most of their time on telecommunication activities such as SMS, MMS, and mobile phone chatting as well as calling on mobile phone. In order to find out the feedback on existing telecom performance and innovation in the sector, structural questionnaire having multiple-choice questions were provided to the respondents. Moreover, the personal interview method was adopted for those who did not want to fill the questionnaire and the telephonic interview was also conducted for the remote people. In addition to the primary data, secondary data was also collected from different sources such as newspaper, published articles, research reports and from Internet as well.

### **HYPOTHESES**

Our database indicates that more than half of customers are happy with current services by the operators but they are also agree their packages always have ambiguity with hidden conditions and charges. The customer is driving this revolution and will see more unique offerings coming his way. The 3G, which will pave the way for 4G and the VAS services, will keep the customer asking for more.

### **REVIEW OF LITERATURE**

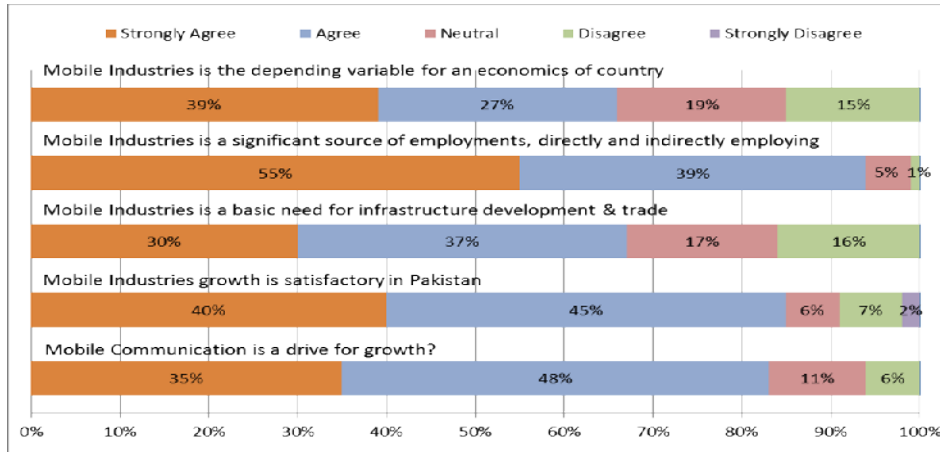
Steady progress made by the mobile phone industry since 2001 brings new hope to formulate solutions. Such hopes were fueled by the ability of mobile phone telepenetrate into the bottom of the pyramid sector. In Sri Lanka, a 23% growth in the use of mobile

phones was reported among the bottom of the pyramid communities between 2001 and 2006. In the Philippines and Thailand, the percentage figure stood as high as 60% and 76% by 2006 (Samarajiva, 2007). Research indicates mobile access has somewhat contributed to the improvements of poor lives and supported poverty reduction (Silva & Zainudeen, 2007). ‘M-pesa’ – the mobile phone base money transfer model is revolutionizing the banking sector in Kenya, especially where traditional banking structures are not wide-spread in the rural landscape (Fleishman, 2009). Ghana based Trade Net is a unique model of mobile phone being applied to rural farmer trading (Bartlett & Kutsoati, 2008). Learning from these emerging models, Sarvodaya-Fusion launched Farmer Net, an online mobile trading platform in mid 2009 (Goonewardana, 2009). The model specifically targets the micro-finance beneficiary rural farmers in Sri Lanka. The majority of these farmers are constrained by their limited access to markets, and therefore do not receive a reasonable price advantage.

According to PTA, the cellular subscription has declined by 69% YOY in Sept 2009. The government has stopped granting licenses to cellular operators, and this decision has had a significant monopolistic impact on the overall performance of the existing telecom sector. The existing players may experience high growth opportunities as the number of players are put on hold. This may trigger major investments from key players, such as Orascom - Mobilink, who has invested in excess of US\$2.5 billion in its containing network expansion programme. Warid plans to invest USD 500mn in cellular business, whereas Wateen has recently emerged as the largest wireless player and has launched its WiMAX services.

**DATA ANALYSIS**

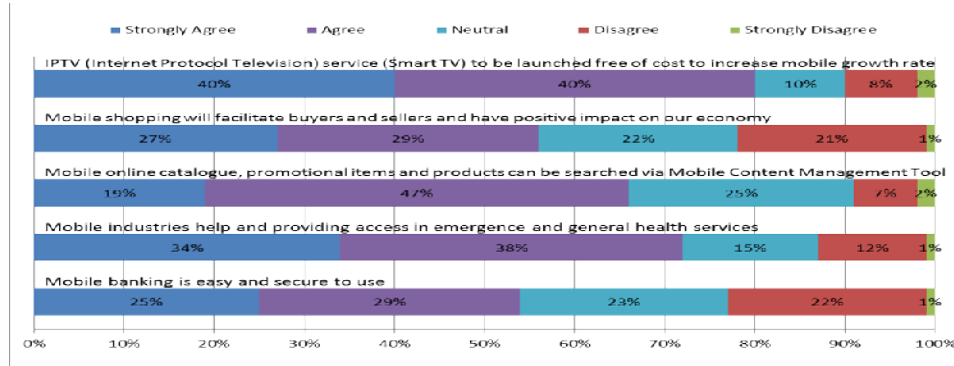
**Mobile Industries Contribution in Pakistan Growth**



The impact of telecommunication has major part on economy of Pakistan. The sector is currently contributing 2% GDP out of 7% to the Government of Pakistan. Pakistan is on 4th number in cellular subscriber growth in industry, number 1 is china, which is due to its large population The mobile phone has depicted the greatest growth trend in the telecom sector of Pakistan. 66% people think that telecom revolution is the most attractive sector in

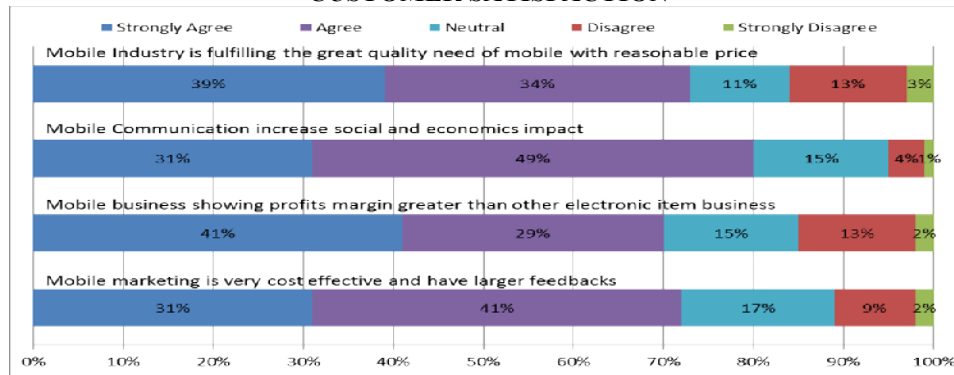
Pakistan in terms of Foreign Direct Investment coming into the country, 94% People agree that mobile industry is significant source directly or indirectly employment. Mostly people (67%) agree that mobile industry contributes in country development and trade. Similarly, 83% people agree that mobile communication is the major source of growth because of availability of information within seconds everywhere.

**RESPONSES AGAINST MOBILE NEW FEATURES**



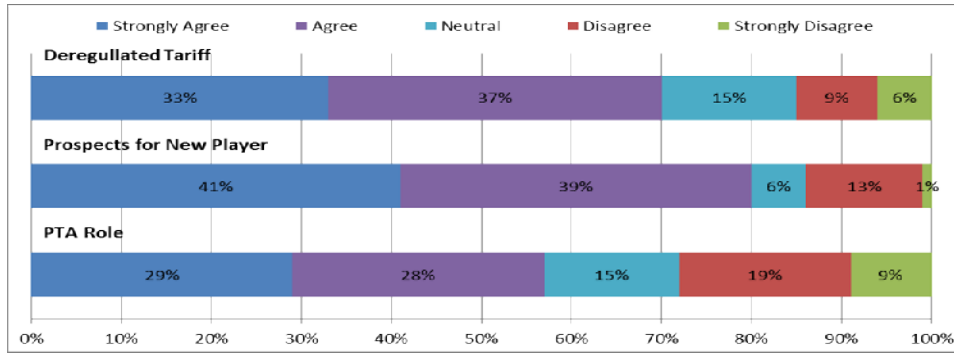
I receive a mix response on the issue because mobile shopping is new to our society. 56% people think that shopping through telemarketing is time saving and very convenient to them while 21% people think that they enjoy in physical shopping after proper verification. 80% people favors on Mobile TV to offer free of cost but 10% people are against it because of its negative impact on society, 72% people favors on General Health Facilities through Mobile because of rapid growth in our society.

**CUSTOMER SATISFACTION**



73% people believes that the existing increasing competition among operator which has led to falling prices are very beneficial for users with quality of service while some people disagree because of hidden charges and poor quality service observed in some areas, 80% people agree that mobile change their economic and social life because of its affordability and high benefits to the society, 70% People agree that Telecom is the largest segment of the IT sector; it contributes more to GDP than computing, software or services.

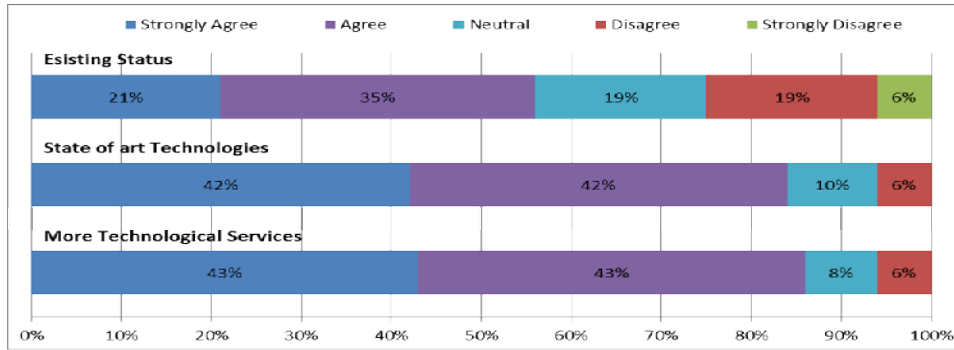
**PAKISTAN REGULATORY AUTHORITY ROLE**



The most of people (70%) think that if PTA role to control minimum prices is eliminated, so they can enjoy better call packages while 6% people disagree on the issue because they assume that Operator will make a cartel if PTA doesn't interfere. The operators will decide their tariff keeping in view of following factors:

- Network Accessibility
- Call Setup Time

**EXISTING STATUS AND EXPECTATION FROM MOBILE INDUSTRIES**



Neutral responses are received on the issue, 56% people still feels that it is under developed but other agree on the progress as reports that shows, Pakistan had 91 million mobile subscribers. Pakistan is ranked 4th in terms of broadband Internet growth in the world Present growth of state-of-the-art infrastructures in telecom sector during the last four years has been the result of the PTA's vision and implementation of deregulation policy. Most of the people agree that the mobile operator should offer more services as Pakistan Government also decided to issue 3G licenses to mobile operators from FY 2010-11.

**CONCLUSION**

Conclusion from above facts that telecommunication has emerged as the success story in the present regime where win situation is for everybody, the government getting more revenues, consumers getting wide choices, lower tariff and investors who are earning profits.



The impact of telecom deregulation on overall economy is quite obvious. This contribution has major impact on economy of Pakistan. The sector is currently contributing 2% GDP out of 7% to the Government of Pakistan. Telecom sector has generated, after deregulation, hundreds of thousands of new jobs through public call offices, calling cards and pre-paid card companies, Internet Service providers, mobile phone companies, broad band services, and other value added services under the private sector. The current situation of telecom in Pakistan clearly indicates the success of policies adopted by the government of Pakistan in telecom sector. Pakistan telecom sector has witnessed steady growth over the past years and it may absorb 5-7 billion dollar investment during the next ten years.

### RECOMMENDATION

73% people believes that the existing increasing competition among operator which has led to falling prices are very beneficial for users with quality of service while some people disagree because of hidden charges and poor quality service observed in some areas. Some of major factors contribute to rise in prices:

- Rising operational & maintenance cost
- Increasing tariff costs
- Increasing marketing costs
- Strict policies adopted by PTA regarding the sale of new connections
- Increase in Govt. Taxes

The most of people (70%) think that if PTA role to control minimum prices is eliminated, so they can enjoy better call packages while 6% people disagree on the issue because they assume that Operator will make a cartel if PTA doesn't interfere

Telecom sector is contributing about 2% in GDP directly and if we include its indirect contribution in other sectors this share comes to about 5%. If the Government provides further incentives to this sector, it can bring revolution in Pakistan.

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**ROLE OF KNOWLEDGE MANAGEMENT (KM) IN RECRUITMENT  
AND SELECTION – A GLOBAL PERSPECTIVE**

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**ABSTRACT**

The successful implementation of new technologies is dependent on many factors including the efficient management of human resources. Furthermore, recent research indicates that intellectual assets and resources can be utilized much more efficiently and effectively if organizations apply knowledge management techniques for leveraging their human resources and enhancing their personnel management. The human resources departments are well positioned to ensure the success of knowledge management programs, which are directed at capturing, using and re-using employees' knowledge. Knowledge Management ('KM') comprises a range of practices used by organizations to identify, create, represent, distribute and enable adoption of what it knows, and how it knows it. Knowledge Management programs are typically tied to organizational objectives such as improved performance, competitive advantage, innovation, developmental processes, lessons learnt transfer (for example between projects) and the general development of collaborative practices. Knowledge Management is frequently linked and related to what has become known as the learning organization, lifelong learning and continuous improvement. Knowledge Management may be distinguished from organizational learning by a greater focus on the management of knowledge as an asset and the development and cultivation of the channels through which knowledge, information and signal flow. The purpose of this study is to find the answers of questions such as Why we need knowledge management in this era? , What role knowledge management is playing in Pakistan? , By using the knowledge management in recruitment and selection how the organization can be effective? Barriers that organizations face in spreading the knowledge management culture, Implementation Measures for Facilitating Knowledge Management.

**KEY WORDS**

Knowledge management, human resources, recruitment and selection.

**INTRODUCTION**

Employing knowledge to the piece of work is cooperated to business functions majorly. Knowledge management is actually a business process regarding the humanity, resourcefulness, of an enterprise and acknowledges the basic paths to determine, applying

and re-applying the knowledge regarding the rational values of an enterprise for the benefits. Knowledge governance is actually the perspective of RE-ENGINEERING of Business Functions. Although some of the grounds are very noticeable to pursue the response of WHY of utilizing the knowledge governance in this time period? In order to make it the center of attraction what things enforce us to divert our mind for considering the knowledge management as centering unit? Following are the most noticeable points to ponder:

- The market places are becoming more aggressive because of the increasing globalization and this increasing rush needs the ground breaking ideas for getting the benefits for private enterprise.
- The most important business knowledge is appreciated by the manpower of the organization and it is being reduced by the agonistic insistence.
- Time is moving very fast in the current era and it has been very difficult to gain and educate the knowledge.

The leading responsibility of a business section enterprise is its quality to add supporters, execute and supervise the true qualities and expertise in the style that cannot simply be copied by other different enterprises, recognized as the major and valuable tool in maintaining the capital benefits.

### **SCOPE**

In this agnostically polluted system organizations are exhibiting keen involvement in sustaining the knowledge management in the organization with its execution as it includes multiple organizational ways of management.

- Conveying knowledge and the capability of being creative is all influenced by environment, rule and regulations, methods, management and techniques.
- Being creative implies that to connect and make the people able to share the thoughts and adapt to step up the related knowledge accessible for employment in their organizations.

### **METHODOLOGY**

From the reliable roots stuff has been collected to justify our conception, which may contain the data from the issued international journals, private websites, etc. a well planned process of data gathering will be maintained for every function.

In today's fast moving environment this particular study tells us the basic fundamentals of knowledge management. More specifically in Pakistan how is it helping in the organizations? Will it hold the knowledge about the obstacle and temporary suspension of tasks in the execution of knowledge management? How can they be avoided?

### **LITERATURE REVIEW**

Knowledge management actually helps the organization to be more agnostic and achieving and helps the organization perspective more vast by increasing the innovative approach, and problem solving expertise in the enterprise. It promotes the exchange of ideas environment within the enterprise. Organizations when learn the value of knowledge management it can achieve the aggressive agnostic culture.

The process of adding the new man power to the organization is exhibit a vital role. Because organization is more or less but definitely compare its organization on the grounds of staff and employees with those they work together. And by adhering to the fact that selection of compatible employees, organizations gain more advantages and help develop more sophisticated environment. The aims of organizations are normally bound with the platforms of knowledge management, such as better behavior, agnostic benefits, creation, growing functions, conveying of information perceived, and the comprehensive evolution of cooperative exercises. Firms can get the concepts of strategic planning, problem solving techniques, and decision making abilities simply by deploying the practices of knowledge management. Employees can be very innovative, and know that how to well behave in this fast tracking world by having the sufficient knowledge management skills.

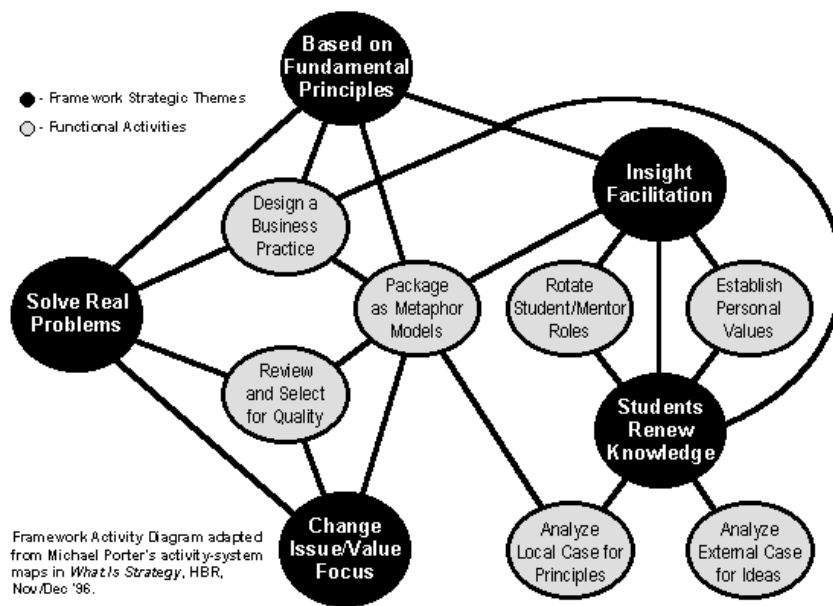
In order to have the competitive solution for the organization, organization should maintain an environment of developing the skills of employees, so that they can have the better perception regarding the genuine facts, respond technically to complex situations, and contribute to the solutions of problems.

Following describes a KM system:

- Technology that allows the innovation/manipulation/sharing of well defined documents is a kind of Document based KM system, such as web, Lotus Notes, Distributed data bases etc.
- Likewise Document based KM, we have Ontology/Taxonomy KM system. Similar in the way that a system of arranging and classifying is deployed to concise the documents.
- KM system gives us the mathematical layout of the organization representing the way of connections or links between the abstract entities, and the single one.
- Constitutive style has been followed for the enhancement of KM system.
- To model the problem domain AI technologies are being deployed.

To maintain the significance of knowledge management for an organization, it is the basic and most measureable duty of an organization to adjust with the dynamic environment. (Auster and Choo, 1995). The goal of knowledge management is to pull out the implicit knowledge that already individuals possess, to learn from their observations and lesson they receive from their cognition. Instead of having what we are explicitly provided. Knowledge management is actually a way of collection, innovation, accumulation, and using and again re-using of knowledge and information, stated by Davenport in 1993. The accomplishment of an organization is vitally based on the true knowledge management. Instead of fulfilling the place of job only, organizations can reduce the gap of knowledge management via crossing the function of adding manpower and choosing the right individual for suitable place. And for this organization can conduct I.Q, aptitude, and emotional and mental tests, that uniquely characterized an individual, and mark him as suitable employee for organization. Managers should show the high concern for knowledge sharing and should plan some precious time for employees. And afterwards managers must conduct the activity of giving honor and encouragement and also appreciate the significance of knowledge management to the workers. Only through taking part in decision making the managers and employees exchange their ideas and reduce the communication gap.

### Core Competency Knowledge Management Framework



### POINTS OF MAJOR CONSIDERATIONS

#### 1. The Use of Knowledge Management in Recruitment and decision making

When making the decision for worker organization must make it sure that the employee knowledge is compatible with the norms of organization and fulfill the desired suited place. And in this goal company must add these new member in the field that most suits the environment of exchange of ideas and can be helpful to reduce the gap. By bringing out the new educating plans, organizations can moreover enhance the expertise of that individual who has the knowledge of knowledge management only needed some enhancement. The new educating plans should contain the new tools of current technology that exchange the ideas. By crossing through the step of innovation for the new tools for management purpose, enterprises can upgrade the level of innovation, and gaining the control over sharing the stuff of knowledge in the organization.

Wherever we go for the competitive advantage company should have to have the environment and also the allotted slot for maintaining the culture sharing knowledge. In this way knowledge management exhibit the very instinct part for the workers who require a little enhancement. Organizations should develop a scheme for executing knowledge management structure as we are polluted with the condensed competitive environment where every member has idea about the chances of winning and also the curative standards in order to enhance the procedures, systematic flows, innovative steps for organization, steady struggle is mandatory. Also there should be reduction or completely vanishing steps for filling the gap of communication among the workers and top managers.

## **2. View of knowledge management in Pakistan:**

Shifting of implicit knowledge to explicit knowledge is needed for the management system and the technology. And Pakistani organizations normally don't show interest in the very required environment. Pakistani organization's civilization is frozen in its peak settings but it is deficient in transferring and sharing the knowledge and it is against the goals of knowledge management. Eventually we find two obstructers:

- Lack of interest in sharing and conveying the knowledge and new ideas. And the sense of insecurity of their position and place.
- Pakistani culture is lacking in promoting the workers to take part easily at all levels and to discuss on any point. Freedom is actually a point of dispute both in public and private sectors in Pakistan. Therefore Pakistani organizations should bring out the revolutionary change in their environment in order to assist in transferring the valuable information. And it is only possible by creating the knowledge cells under the true guidance of commanding roles of organizations.

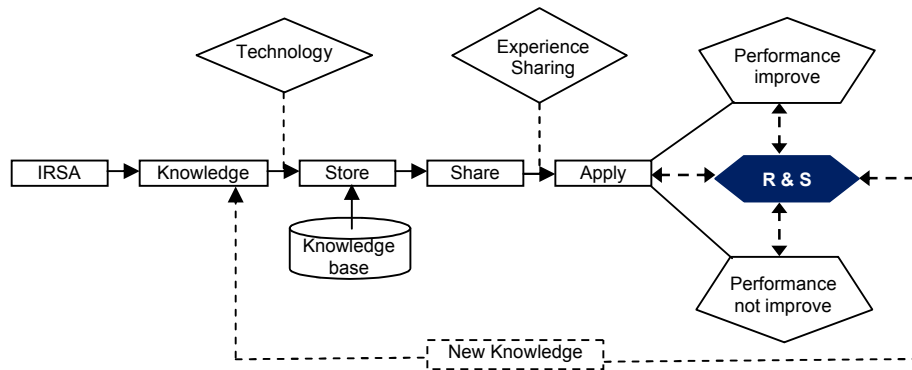
## **3. Knowledge Management Issues:**

Each and every organization should show the intense interest in managing level, because while implementing the knowledge management, some of the hurdles may come across. Some of them are directly or indirectly connected to organizations and some of them linked with the workers. Following are the different issues:

- Shortage of experts and people are unaware of the fact of knowledge management in organizations.
- A strong link between customers and suppliers needs a very handsome amount for investment. And it eventually looks a barrier.
- Another issue of knowledge management is the gap between employees and managers on communication level.
- International dealings are reduced because of time difference.
- Language problem most of the times left some of the people helpless to understand the facts on which talks were conducted.

## **4. Solution to overcome these issues:**

By getting the facts clear about the terms that knowledge management should be a strongly associated with the organization. Then here come a point the way that how we can effectively manage the steps of knowledge management in any organization. The very important steps for every organization is that each organization should develop a culture of having a technical knowledge cell where sharing of knowledge is indeed become possible and easier for every individual. This requires a strong connection between managers and employees, in order to upgrade the knowledge functions. It is all possible through the proper assistance of experts of knowledge management. Whereas the matter of adding the new personnel and selection of those members concerned, the organization must include the new competitive power who actually owns the skills beneficial for organization to maintain the culture of knowledge management. For effectively executing the steps of knowledge management, organizations must have very true and clear perspective points and it should encourage the workers for omitting the issues of knowledge management. For this organizations must have a definite framework for knowledge management. A tentative framework is proposed below.



### CONCLUSION

Here we can conclude that after having the clear vision of knowledge management, all the measures and standards of knowledge management are very worth full and accountable for showing knowledge regarding the employees and other workers of an organization, which are definitely a strong ground of an organization. Moreover the issues we have in knowledge management also have the plans to recover from them.

Process of placing the right person for the right place on right time for the right skills can be done easily through the passage of selection and recruiting, where the expertise of an employee are judged by the authorized personnel in order to attain the idea of suitability for that particular job. Organizations can very well use the standard tools of I.Q, aptitude, emotional and mental test to get an idea that how well this member be compatible with the already required task.

It is therefore, acknowledged through this paper that each and every organization should implement, maintain and rule the system of knowledge management to secure the desired consequences on the level of creativity and agnostic culture.

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## CAUSES OF MOBILE INDUSTRY GROWTH IN PAKISTAN

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### ABSTRACT

The mobile industry is perhaps the only field in our country Pakistan, which has grown up rapidly and has made communication fast, easy and affordable. The mobile industry in Pakistan is the only way which will yield greater return on investment and maximize profit. The overall consensus of industry analysts is that Pakistan is one of the countries with a high potential for telecom growth and an attractive investment environment. According to business monitor international (BMI) positioned Pakistan as a important country for the growth of telecom growth. The (BMI) positioning is due to number of elements including industry situation, Growth potential, competitive landscape and affordability and political risks. In this study focus on causes of mobile industry growth in the Pakistan particularly either providing services to customers or price of mobiles and its network. That is the providing services to customers include Coverage, call quality, network services and customer care services. On the other hand the price of mobile and its network include Affordable packages, cheapest cause of china mobile sets, easy availability and affordable price, dual Sims Mobile feature. This study based on survey, conducted to most audience of now a day mobile phone and network. Users such as teenagers, young and elder adult, students, professional, technical and non technical people. Meanwhile further scope of this study is to analyze those surveys, if possible to establish a correlation among various variables like response of mobile users after attending call and reading sms, economical situation, political environment, market potential etc. Furthermore, it highlight few legal and ethical issues of both mobile service operators and as well as mobile phone companies. It has been found that important causes of mobile industry growth in Pakistan are providing excellent, outstanding services to customers which includes network coverage, voice quality and connectivity, better network facility and customer care services as well as the price of mobile and its network which includes affordable packages or rates, company connection as a status symbol, cheapest cost of china mobile set and easy availability of mobile sims.

### KEY WORDS

Mobile phone companies & mobile service operators, customers, network services, price, competition, Cheapest cost china mobile sets.



## INTRODUCTION

The Telecommunication is considered, one and only field in Pakistan which has showed improvement and got economical with the passage of time. When PTCL first introduced and launched its services, getting a telephone connection was a difficult and hard task. Connections were given on first come first serve or priority basis but today you can get the mobile phone and mobile phone connection without getting into any formalities and it is also a reason why increased extent use of PTCL has been replaced by the cell-phones. It was not very long ago, when the cell-phones were launched and introduced in Pakistan they had the symbol, sign and status of a luxury owned by the limited few who could afford it. However, today, in a span of a few years cell-phones are in easy reach and access of everyone. Too many people it is a necessity and to others a necessity as well as a means of entertainment and pleasure. The quick and fast growth of the cell-phone industry is due to great deal of war and competition among the companies selling cell-phone and cell phone services and also because it has made the talking, chatting, messaging and communication simpler, easier and cheaper. Companies are doing all out effort to extend their network before the market moves and touches toward saturation (though still quite far). Another result of this competition is the introduction of different Packages to get attention of the users. The increased use of cell-phones is also a result of motivating and allowing a person to keep more than one SIM or Dual Sims and more than one mobile phones and encouraging the night free like packages. Without a doubt, cell-phones and their service providers have brought a remarkable growth in mobile industry Pakistan.

## LITERATURE REVIEW

Michel Anglo, (2009) reached that Pakistan awarded six licenses for mobile operators, namely Mobilink, Ufone, Warid telecom, Paktel, Telenor and Instaphone, which has meant that the doors have now closed for new operators to enter the market. Unless new operators merge or get, the present operators will compete among themselves to benefit from the phenomenal predicted growth. The operators believe with affordable and cheap calls on top of falling handsets costs, demand for mobile phone is rising rapidly in the country's though 12 in 100 now have a mobile phone connection. Cellular call prices dove quickly as the competition increased and services like incoming calls, which were in the past charged hefty, soon became without any charges. Other services like text or sms messages became really the least expensive and rose, emerged as a fresh and highly frequent kind of interaction. To further appeal to youngsters, special low prices were introduced for late night calls with additional discount available for a personally picked number on the same net. cell phone appearance and presentation improved significantly, tremendously, Allowing cell phone users to carry smart, small and compact, more manageable phones that were fairly easy on the pocket. Parvez Ali kazmi, (2009) has found that Chinese and resold stolen phones were also widespread at significantly lower prices with entire malls selling these phones. Mazhar abbas, (2009). Cellular phone corporations gave users with a substantial number of Pricing choices and packages. Many companies offered a pre-paid and post paid payment choice, with many convenient places to pay for bills or get credit. Scratch cards were broadly spreaded, circulated and were obtainable in nearly all retails shops, large and small. Very quickly a

cell phone became an important part of everyday life. It was thought of an easily accessible and a useful way to contact in case of emergencies.

It is assessed that almost 19000 cell sites have been installed by five mobile service providers in different urban and rural areas of the Pakistan, in which Mobilink is on the top and Ufone following on the similar track with almost more than 4536 cell sites and others seems to be growing. It is always viewed that network coverage performed significant role for mobile industry growth and cellular network to be on top of market with the help of value added services, as the network coverage still the important factor for increments in subscribers within months. The Ministry of Information Technology Mobile cellular policy has made a policy, Telco operators are restricted to roll out minimum 70% network coverage of tehsil headquarters in four years with minimum 10% tehsils in all provinces.

### **QUALITY AND FACILITIES BY NETWORK**

As voice distortion, call hangings, anonymous connectivity, call connection time, air interface blocking, call completion rate, call quality etc are remain the same problems for users faced in rural and urban areas. I am confident that customer acquisitions and customer services are equally important. Where Telco's are spending in the customer acquisition offers, they must offer reliable services to satisfy the current customers and making good referrals for their services from the existing customers. This will not only decrease the cost of acquisitions, but it will also support operators to strongly develop brand equity.

### **COMPETITION**

The competition in mobile industry increases quality, features and benefits, and decreases price of Mobile sets and cellular service providers. Thus competition is also important factor of mobile growth industry in Pakistan.

### **RESEARCH METHODOLOGY**

This research study exploits the structured questionnaire as a tool to obtain data including both demographic and psychographic viewpoints. The sample was taken by 100 respondents from various professionals, college, university, and individual from different societal and ecological areas, age group from teens to elderly respondents. The 100 respondents were chosen on the basis of goal directed sampling. No respondents were dropped out from the analysis on counts of incomplete/fake/selecting all dimension or choice data entry at the respondent end. Therefore, the analysis represents data of 100 respondents that is 100 for the purpose of survey from different areas of Karachi, Pakistan was chosen like North Nazimabad, North Karachi, Gulshan-e-Iqbal, Nazimabad. In addition to the primary research, secondary research data was obtained from articles published in recent academic journals, news papers, websites and government survey reports.

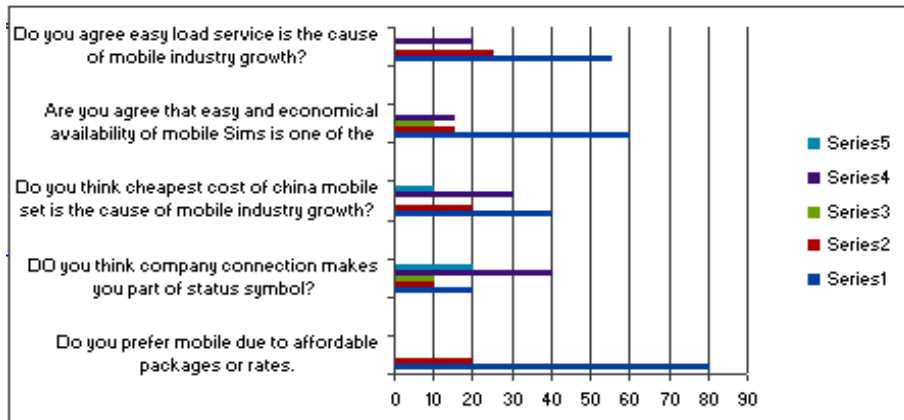
### **DATA ANALYSIS AND DISCUSSION**

#### **Providing Services to Customers**

One of the causes of mobile industry growth in Pakistan is depend on Services provided by mobile network companies to their customers. It is clearly showed from

above graphical representation, majority of Respondents were totally agree or partially agree while few were neither Agree nor disagree or partially disagree or totally disagree that providing Services to customers lead to mobile industry growth in Pakistan. Based on above results it can be said that providing services to customers Leads to mobile industry growth in Pakistan.

### The Price of Mobile and its Network



Another cause of mobile industry growth in Pakistan is related to the price of mobile and its network providers. It is clearly showed from above graphical representation, majority of Respondents were totally agree or partially agree while few were neither Agree nor disagree or partially disagree or totally disagree on that price Of mobile and its network providers brings mobile industry growth in Pakistan. Based on above results it can be said that price of mobile and its network Providers lead to mobile industry growth in Pakistan.

### EASE OF MOBILE USE & ITS SERVICES

Third one the cause of mobile industry growth in Pakistan is depend on Small and compact size of mobile phones which helps their users to easily Carry it from one place to another. It is clearly showed from above graphical representation, majority of Respondents were totally agree or partially agree while few were neither Agree nor disagree or partially disagree, not a single respondent was Totally disagree that smart size of mobile phones causes mobile industry Growth in Pakistan. Based on above results it can be said that providing services to customers Leads to mobile industry growth in Pakistan.

### PROMOTION OF MOBILE SERVICES PROVIDERS

Another cause of mobile industry growth in Pakistan is based on How effectively mobile service providers promote their offers. It is clearly showed from above graphical representation, majority of Respondents were totally agree or partially agree while few were neither Agree nor disagree or partially disagree or totally disagree that promotion

Of mobile service providers leads to mobile industry growth in Pakistan. Based on above results it can be said that promotion of mobile service Providers lead to mobile industry growth in Pakistan.

### **THE NUMBER OF USERS OR DUAL SIM**

Another cause of mobile industry growth in Pakistan is based on how many there are number of users and dual sim holders. It is clearly showed from above graphical representation, majority of Respondents were totally agree or partially agree while few were neither Agree nor disagree or partially disagree or totally disagree that increased Number of mobile users and dual sims holders leads to mobile industry growth In Pakistan. Based on above results it can be said that increased in numbers of mobile users and dual sim holders lead to mobile industry growth in Pakistan.

### **CONCLUSION**

Pakistan is among the five countries of Asia in terms of increased penetration of mobile phones. Iran and Maldives top the list; Pakistan is at the third position, followed by Sirilanka and Bhutan. The mobile industry as a cash cow in some countries like Pakistan. The substantial population of above a hundred and fifty million Pakistanis was a key incentive for "mobile phone" and "cellular" companies all over the globe and inspire of licenses being handed to good many big international firms, the pie was big enough for all to take pleasure in and prosper. The advantages of mobile industry growth in Pakistan are manifold-it has made the communication easier, faster and cheaper. It helps, support in better economy of Pakistan. It has provided many job opportunities to technical, on technical and professional persons. The premise of this paper was to study what are the causes of mobile industry growth in Pakistan which were providing excellent, outstanding services to customers which includes network coverage, voice quality and connectivity, better network facility and customer care services as well as the price of mobile and its network which includes affordable packages or rates, company connection as a status symbol, cheapest cost of china mobile set and easy availability of mobile sims. The results and data analysis of this study might be helpful and will provide a futuristic guide line based on fact that what should cellular companies do effectively and in efficient manner so that they could satisfy their customers, increase loyalty, brand image and equity. Ultimately, get maximum market share and profit. Data have proved that cause of mobile industry growth in Pakistan enables us to understand all the reasons and factors that involve in the rapid growth of mobile industry in Pakistan. Without a doubt, cell-phones have brought a considerable change in our society and its ethical and right use calls for our responsibility. Concrete measures should be taken to get rid of the unethical and wrong use of cell-phones. A lot of can be done by registration of sims and increase awareness of our responsibilities. For example, consider the choice of ring tone and the selection of silent or general mode as the situation requires. How many times the maximum volume ring tone of a song has disturbed you while you were offering your prayers in the mosque? You might also have listened ring tone with Qur'an verses which is such a bad thing to do as so many times people only give missed calls in which case the sense and meaning of the verse changes as the verse is not recited fully.

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## CRIMINAL TRENDS IN ENGLISH LITERATURE IN TERMS OF STATISTICS

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### ABSTRACT

According to the 7th edition of Oxford Advanced Learner's Dictionary Crime can be defined as "activities that involve the breaking the law or an increase in violent crime. Crime was felt and heard but not seen but when literature took roots in society than it was depicted from human mind to the canvas of vision and crime was observed in the form of characters in different literary fields such as drama, poetry, novel and short stories.

Crime novel is the form of fiction had its origins in 18th century and like the procedural, is a derivative of detective story. It is a very general term for a sub-genre concerned with crime (of many different kinds) in which police detectives are likely to be involved and in which the emphasis is on criminal (e.g. murderer, blackmailer, forger, kidnapper, thief, drug-smugglers, etc) and criminal psychology. Often the identity of the criminal is known from the outset and the response and interest of the narrative depend on psychological state of the criminal (etc fear, guilt, remorse) and what he or she does to evade the law and justice.

The pioneer of the modern crime novel was Francis Iles ,whose real name was Anthony Cox(1893-1971) and who also wrote conventional , detective stories under the name of Anthony Barkeley since then novel about crime , the under-world and criminal activities is general have proliferated- especially from 1960s onwards. A large numbers of professional writers themselves to this form of fiction 28 novel were written.

Kriminalgeschichte (G. criminal history) A term applied primarily to the miscellaneous writing about crime and criminals in 18th-19th century, when there was (and sometimes morbid) interest in violent crime. True criminal stories were popular reacting. An early twenty volume collection of criminal histories appeared in France titled "Causes Celebreset Interessantes" (1734).This was translated into German and published under the title of "Der Pitaval" (1747-68) since 1747-1842 seven top most stories were written in French. In 1829 "Adolf Mullner" published what is very probably the first detective story in general. "Der Kaliban". In fact, the detective story (Detektivroman) did not develop in Germany as it did elsewhere.

The crime novel has also been very popular in America where the influence of Raymond Chandler and Dashiell Hammet in their detective stories has been considerable. Two other notable novels were High Sierra (1940) and Asphalt (1949). John D. Macdonald (1916) was extremely popular; three of his best known books are, The Deep Blue Goodbye (1964), A Purple Place of Dying (1964) and Darker Than Amber (1966).

When crime was presented in drama in the form of character such as Hamlet, Othello, King Lear, and Mcbeth by William Shakespeare; Dr. Faustus by Christopher Marlowe; Oliver Twist by Charles Dickens interpreted the internal conflict in form of dialogues.

When crime comes in poetry it revealed the mental anguish, betrayal from the society. In novel short story and film the element of detective in crime was started, such as the character of James Bond, Spiderman and Batman.

This paper will help to give the intensity of crimes in different English literary periods. From present to past, which crimes were popular in what sense, are theft, murder, robbery and seduction etc.

### INTRODUCTION

According to Judicial Dictionary, 9<sup>th</sup> Edition 1984, by K.J Aiyar's, crime is an act of commission or omission contrary to municipal law tending to the prejudice of the community for which punishment can be inflicted as a result of judicial proceedings taken in the name of the state. The great difference between the legal and the popular meanings of the word crime is, that whereas the only perfectly definite meaning which lawyer can attach to the word is that of an act or omission punishable by law; the popular or moral conception adds to this the notion of moral guilt of a specially deep and degrading kind.

If asked from a common man, he will consider murder, theft and seduction as the only crime but there are many crimes behind the curtain which not only destroys our economy and reputation but also made us morally inferior. To cover the crime which are happening daily is difficult to some extent, therefore the modern crime which are the product of this mechanical world are necessary to deal on the scientific basis. Often the identity of the criminal is known from the outset and the response and the interest of the narrative depend on the psychological state of the criminal (fear, guilt or remorse) and what he or she does to evade the law and justice. Long before the social sciences evolved and long before the psychoanalysis was a gleam in Freud's eye, writers and artist were aware of how poverty could lead to crime. This is dramatically illustrated in fiction by Charles Dickens, and by Dostoyevsky in Crime and Punishment.

### ANCIENT GREEK PERIOD

Greek civilization is recognized as the house of tradition and culture. However, this age was also disturbed by the crime. The most popular crime was that the fathers and brothers of that age were authorized to sell their daughters and sisters respectively. They were habitual of committing incest. Woman's dignity and virtue disappeared, and men avenged by hatred and scorn the indignity they had themselves inflicted on the weaker sex. Aeschylus was the first of the three ancient Greek tragedians, and is often recognized as the father of tragedy. In Agamemnon, wife murders husband in anguish on the sacrifice of daughter and keeping a concubine. The "Libation Bearers" carries the revenge and killing. Sophocles (496-413 B.C) in his Oedipus Rex drastically depicts the society by his King of Thebes, Oedipus, who unwillingly kills his father and marries his mother. For this incestuous act the God curse him and his land with a virulent epidemic and famine. In Medea, Euripides (480-406 BC) highlighted the hatred and jealousy of the woman. Medea kills her two children and second wife of Jason (Medea's husband) in order to take revenge from her husband. In Hippolytus, Euripides portrayed the criminal attitude of Theseus, the king of Athens, who murdered the king of Troezen and his sons for thirst of power and also had an illegitimate son of Hippolytus.

### ANCIENT ROMAN PERIOD

The Rome of Ovid Naso (43B.C-18A.D) was entangled with noise, smoke and voluptuousness. Virgil and Horace were away from this vanity show but Ovid did crime with skill. Though Virgil (70 BC-19 BC) in his Aeneid traces crime like suicide, revenge and murder/killing. But Ovid in his work, *The Amores*, tells us of the Cupid's theft of his Epic. In another book, *The Cure for Love*, he shows his optimism by writing against the suicide after some failure especially in love. Ovid's writing *Ars Amatoria* was concerned with the serious crime of adultery.

### 14<sup>th</sup> CENTURY

The earliest English Literature was embellished with Christian sentiments and the vices sticken to it. The writer of this age boldly attacks the social and ecclesiastical abuses of the day, the greed and hypocrisy of clergy and the avarice of tyranny of those who sit in high places. Giovanni Boccaccio (1313-1375) in his famous *Decameron* took subjects from every aspect of life and every man of the world. The stories which are concern mainly with our research are of *The Tale of Notorious Ser Ciappelletto*, other are disloyal and diddling wives; sexual fervencies of Nuns and Priests and the stories of lust and greediness. *Genesis* and *Exodus* which appears to be executed about the middle of the 13<sup>th</sup> century, which depicts the character of the form of itself. Geoffrey Chaucer's (1340-1400 A.D) descriptions in *Canterbury Tales* are pleasurely conventional i.e. in *Tale of Miller*, on the minor crime of theft of grains, the ridiculous punish of seduction of his wife was given; and in the *Tale of Prioress*, murder is there. In William Langland's *The Vision of William Concerning Piers The Plowman* Lady Meeds portrays Bribery.

### 15<sup>th</sup> CENTURY

History of fifteenth century is evident of criminal waves of intellectuals i.e., Nicholas Udall, the writer of first English comedy *Ralph Roister Doister* (1550), was a good scholar but a harsh master as he whipped poor Tusser on husbandry. Thomas Wilson, creator of the remarkable *Art of Rhetoric* (1553), Queen Elizabeth made him the master of *St. Katherine Hospital*, which he tried to rob. The biographies of the fathers of English sonnet Sir Thomas Wyatt and Henry Howard, tells us about the dates and facts of the criminal trends in middle 15<sup>th</sup> century. Sir Thomas Wyatt had his share of imprisonments which were lot of King Henry's courtiers. Earl of Surrey, Henry Howard, his lamentable fate was simply due to the delirium of jealousy and blood-thirstiness. He was condemned and beheaded in January 1547, nine days before Henry himself went to his own place.

### 16<sup>th</sup> CENTURY

Witchcraft was the mainstream that leads to crime from mid 15<sup>th</sup> to mid 16<sup>th</sup> century. In Edmund Spenser's great allegorical romance *THE FAERIE QUEENE* (1590), the characters of Archimago and Duessa from Book-I all the time strives to do as much harm as possible to Red Cross Knight and to Una through their witchcraft. In *The Tragical History of Doctor Faustus* (1604) by Christopher Marlowe (1564-1593) witchcraft intensifies the thirstiness of power and lust. Christopher Marlowe's *Jew of Malta* is a story of different criminal activities woven together. The name of the main character Barabas comes from the biblical figure of Barabbas, a notorious bandit and a murderer. Edward Fairfax wrote *Discourse and Scott in Demonology* encurtain the witchcraft



prevailing in their times, by which they themselves troubled. William Shakespeare (1564-1616) Julius Ceaser portrays the conspiracy against the Roman dictator Julius Caesar, his assassination and its aftermath. The Tragedy of Macbeth is a play about a regicide and its aftermath. The Tragedy of Hamlet, Prince of Denmark, vividly explores themes of treachery, revenge, incest, and moral corruption. Othello, The Moor of Venice is a criminally woven tragedy which contains stealing, fraud through enticement, killing due to suspicion of committing adultery, and finally commits suicide. The readers confronts with betrayal, killing, deceit and slain in King Lear as well. Thomas Heywood in A Woman Killed with Kindness (1607), John Webster in White Devil (1612) and Willaim Painter in Palace of Pleasure (1566) depicted the popular crimes of their age.

### 17<sup>th</sup> CENTURY

John Milton (1608-1674A.D) in his Paradise Lost mentions seduction and temptation of Eve by Satan and then of Adam by Eve. In his Samson Agonistes, he deals with the last part of life of Samson; Samson killed the philistine lords as well as himself.

### 18<sup>th</sup> CENTURY

In 18<sup>th</sup> century the reformation was returning again, the people of Britain were restored their privilege and rights. Though the Act of 1809 limited the hours of child labour to eleventh hours which was yet insufficient and pitiable but it was a positive step towards healing the crime. William Blake (1757-1827), especially accomplice with the children as in the Chimney Sweeper in his book "Songs of Innocence and Experience", he was against child labour. The greatest ever misanthropist Jonathan Swift (1667-1745) in Part-II, Chapter -6 of Gulliver's Travels (1726) shows us a vivid picture of Gulliver's country.

*"A heap of conspiracies, rebellions, murders, massacres, revolution, banishments and very worse effects that avarice , faction, hypocrisy, perfidy`ousness, cruelty, rage, madness, hatred, envy, lust, malice, and ambition could produce."*

Daniel Defoe (1659 – 1731), was an English writer, journalist, and pamphleteer, who gained enduring fame for his novel Robinson Crusoe (1719), it tells of a man's shipwreck on a deserted island and his subsequent adventures. Defoe's next novel was Captain Singleton (1720), a bi-pirated adventure story, whose second half taps into the contemporary fascination with piracy. Colonel Jack (1722) follows an orphaned boy from a life of poverty and crime to prosperity. Moll Flanders is first-person picaresque novel of the redemption of alone woman in 18<sup>th</sup> century England. The titular heroine appears as a whore, bigamist and thief, commits adultery and incest, and yet manages to keep the reader's sympathy. Later Defoe as journalist wrote "True Histories of Criminals". Samuel Richardson (1689-1781) wrote two novels i.e. Pamela and Clarissa Harlowe. In both the novels the heroines i.e. Pamela and Clarissa have been raped by their lover's. Sexual harassment and seduction were very popular in 18<sup>th</sup> century work places, which was the main stream of the novels of the age. Henry Fielding (1707-1754) in The History of The Adventures of Joseph Andrews and of His Friend Abraham Adams, Joseph Andrews, the servant, is dismissed from service because he has repulsed Lady Booby's attempts to seduce him. After that he is also beaten up by the robbers. In his novel The History of Late Mr. Jonathan Wild the Great (1743), Fielding tries to satirize the hollowness of great people and compared their actions from that of basest criminals. In his master piece Tom

Jones, we come across in the novel by the crimes such as Adultery and Sexual Harassment on the part of females. In Oliver Goldsmith's (1728-1774) *The Vicar of Wakefield*, Dr. Primrose suffers a series of misfortune. *The School for Scandal* is a play written by Richard Brinsley Sheridan (1751-1816) which is the reflection of meanness, flirt, drinking, and gambling.

### 19<sup>th</sup> CENTURY

The early years of the nineteenth century marked by great social unrest as a direct result of Industrial Revolution. Samuel Taylor Coleridge (1772-1834) in his poem *The Rime of Ancient Mariner*, the ancient mariner inhospitably killed the pious bird of good omen Albatross. Alfred Tennyson (1809-1892) in his poem *A Dream of Fair Women* describes eight beautiful women in his poem; out of them two were sacrificed by their fathers. In his another poem *Maud*, we come across the crime like murder. Robert Browning (1812-1890), another Victorian poet in his poem *Pippa Passes*, Pippa sings a songs hearing which several groups gives up their ill purposes. Matthew Arnold (1822-1888), next great poet after Tennyson and Browning, in his tragedy *MEROPE*, painted crime like murder and revenge. Dante Gabriel Rossetti (1828-1882) in his *The King's Tragedy* woven the story of the murder of James I, the King of Scotland, is told by Catherine Douglas, one of the Queens Women. Charles Dickens (1812-1870), in his novel *Oliver Twist*, tries to portray that Victorian point of view of crime was wrong. He designed his novel to show that some criminals are drawn or forced into crime rather than being born criminal. He presents some criminals as innocent victims that have been pulled into a life of crime through desperation and despair, such as Oliver and Nancy, however some criminals such as Sikes have not been drawn into crime, they rather choose the life of crime that they live. *Barnaby Rudge* is the complicated story of intrigue and murder. *A Tale of Two Cities*, a historical novel, shows the corrupt laws prevailing in that age, inequality and nepotism, in which consequence, the violence broke out in the form of revolution. *Jane Eyre* is a famous and influential novel by Charlotte Bronte (1816-55) in which we find ill-treatment of an orphan by her Aunt. *Wuthering Heights* is a gothic novel, and the only novel by Emily Bronte (1818-48). There dwell the themes of brutal revenge, betrayal, and gambling, drinking and physical abuse. George Eliot (1819-1880) his works are a mere canvas on which writer displays the colours and forms of the society. In *Adam Bede* a pretty girl is punished because she has murdered her illegitimate son. *Silas Marner* in which we come across with theft and a healthy attitude of adopting an orphan girl. *Felix Holt, The Radical*, it deals with bribery and poverty and by the legal questions of the transom estate. Sir Richard Burton's (1821-1890) *Arabian Nights* tales have their origin in the culture of India, Arabia and Persia. *Ali Baba and Forty Thieves* is the best instance to quote in this relation. Thomas Carlyle (1795-1881) in *Past and Present* gives the picture of the miserable England and diagnose the social diseases in Book-I Proem Chapter-1, he points out an incidence when in 1841's Autumn ,parents are found guilty of poisoning their children to defraud the burial society of some 38pounds due on the death of each child.

### 20<sup>th</sup> CENTURY

As a literary form, the detective story has a place of importance in twentieth century English literature. Several hundred detective stories or crime stories have been published each year in early twentieth century. A detective story raises readers' expectation to find

a situation in which a crime has been committed, and in which there is a doubt about the means, motives, and criminal. The father of detective fiction is Edgar Allan Poe. The honor of writing the first detective novel belongs to Dickens' close friend, Wilkie Collins. The book is *Moonstone* and the year of its appearance is 1868. A detective story is not a thriller. A detective story asks questions that Who, Why, and When; a thriller, dealing also in violent matters, simply tells us How.

Thomas Hardy (1840-1928) painted *Tess of D'urbervilles* with brush of crime. This novel tells that a crime gives birth to another crime. William Butler Yeats (1865-1939) in *The Shadowy Waters* presents piracy, killing and robbery. Robert Louis Stevenson (1850-94), in *Kidnapped* portrays crime like murder, kidnapping and crime related to illegal possession of land. Thomas Stearns Eliot (1888-1968) depicts seduction, rape, and lust in his *The Waste Land* (1922). The starting point of *The Waste Land* is the seduction of a German girl. And in his another poetic drama crime of blackmailing is present. John M. Synge (1871-1909) in his *The Playboy of the Western World* keeps the interest of the reader by mentioning the killing of father by the hands of the son, his fleeing from the police and his playboy nature. Sean O'Casey (1880-1964) beautifully knit the miserable condition of a wife who tolerates a drunkard husband in his *Juno and Paycock*. Graham Greene (1904-1991) a Catholic novelist, *Power and the Glory* and *The Heart of the Matter* possess the crimes of alcoholism, adultery and suicide. Ian Lancaster Fleming (1908-1964) was a British author and journalist, most famous for his novels about the British spy *James Bond*. Fleming chronicled Bond's adventures in twelve novels and nine short stories. Raymond Thornton Chandler (1888 -1959) was an Anglo-American novelist and screenwriter who had wrote 8 novels. These are the criminal cases of Philip Marlowe, a Los Angeles private investigator. He had also written crime short stories which are 23 in number. Samuel Dashiell Hammett (1894-1961) was an American author of hard-boiled detective novels and short stories. Among his five novels, *Red Harvest* listed in the 100 best English-language novels. William Riley Burnett (1899 -1982), an American novelist, is best known for the crime novel *Little Caesar*. In *High Sierra* (1941), Roy Earle a hard-bitten criminal who rejects his life of crime to help a crippled girl. In *The Asphalt Jungle* (1949), the most perfectly masterminded plot falls apart as each character reveals a weakness. In *The Beast of the City* (1932), the police take the law into their own hands. John Dann MacDonald (1916-1986), an American author, his best-known works include the popular and critically Travis McGee series which consists of 21 novels. *The Deep Blue Good-Bye* is the first novel in the series. All McGee novel titles have a color in them like *Darker than Amber* or *A Purple Place of Dying*. Batman is a fictional character created by the artist Bob Kane and writer Bill Finger. A comic book superhero, Batman first appeared in *Detective Comics* in 1939. Unlike most superheroes, he does not possess any superpowers; he makes use of intellect, detective skills, science and technology, wealth, physical prowess, an indomitable will and intimidation in his continuous war on crime. While Superman is a fictional character, a comic book superhero appearing in publications by DC Comics, created by American writer Jerry Siegel and American artist Joe Shuster in 1932, the character first appeared in *Action Comics* (June 1938). Very early he started to display superhuman abilities, which upon reaching maturity he resolved to use for the benefit of humanity.

## STATISTICAL DATA

S#	Name of Writer	Genre	% of Crime Depicted	Sort of Crime
<b>ANCIENT GREEK PERIOD</b>				
1.	Aeschylus	Drama	70	Concubinage, revenge, murder.
2.	Sophocles	Drama	50	Killing, incest.
3.	Euripides	Drama	80	Revenge-killing, adultery.
<b>ANCIENT ROMAN PERIOD</b>				
1.	Virgil	Poetry	50	Suicide, murder and killing.
2.	Ovid	Poetry	80	Voluptuousness, theft, adultery.
<b>14<sup>th</sup> CENTURY</b>				
1.	Giovanni Boccaccio	Poetry	50	Adultery by nuns and priests.
2.	Genesis and Exodus	Poetry	40	Child-trafficking.
3.	Geoffrey Chaucer	Poetry	50	Theft, seduction, murder.
4.	William Langland	Poetry	30	Bribery.
<b>15<sup>th</sup> CENTURY</b>				
1.	Biographies of literary personalities	History	80	Robbery, child abuse, murder, adultery, beheaded.
<b>16<sup>th</sup> CENTURY</b>				
1.	Christopher Marlowe	Drama	70	Witchcraft
2.	Fairfax and Scott	Prose	50	Robbery, human trafficking, murder.
3.	George Gascoigne	Satire	30	Bribery, deceit.
4.	William Shakespeare	Tragic drama	100	Assassination, conspiracy, incest, moral corruption, regicide, revenge, murder, theft, deceit, slain adultery.
5.	Thomas Heywood	Tragedy	20	Isolation
6.	John Webster	Drama	40	Adultery, murder, ruffianism.
7.	William Painter	Drama	20	Ruffianism.
<b>17<sup>th</sup> CENTURY</b>				
1.	John Milton	Poetry	50	Seduction, killing, suicide, massacre.
<b>18<sup>th</sup> CENTURY</b>				
1.	William Blake	Poetry	50	Child labour, child trafficking.
2.	Daniel Defoe	Fiction	90	Piracy, assault, whorism, theft, adultery, incest.
3.	Samuel Richardson	Novel	90	Sexual harassment, seduction.
4.	Henry fielding	Novel	80	Seduction, robbery, adultery.
5.	Oliver Goldsmith	Novel	80	Fraud, seduction, ruffian, revenge.
6.	Samuel Johnson	Novel	30	Killing.
7.	R.B. Sheridan	Novel	40	Gambling, drinking, flirt.
8.	S.T. Coleridge	Poetry	20	Killing.
<b>19<sup>th</sup> CENTURY</b>				
1.	Alfred Lord Tennyson	Poetry	30	Human-Sacrifice, Murder.
2.	Robert Browning	Poetry	20	Murder, Regicide.
3.	Matthew Arnold	Tragedy	60	Murder, regicide, slain.

S#	Name of Writer	Genre	% of Crime Depicted	Sort of Crime
4.	Arthur Henry Clough	Poetry	40	Crime as Crime.
5.	Charles Dickens	Novel	50	Child Abuse, Nepotism, Massacre.
6.	Charlotte Bronte	Novel	40	Child Abuse, Suicide.
7.	Emily Bronte	Novel	80	Gambling, Drinking, Seduction.
8.	George Eliot	Novel	60	Murder, Adultery, Theft, Bribery.
9.	Richard Burton	Fiction	20	Theft, Deceit.
10.	Thomas Carlyle	Prose	20	Child-Murder, Fraud.
<b>20<sup>th</sup> CENTURY</b>				
1.	Thomas Hardy	Novel	20	Seduction, Murder.
2.	Samuel Butler	Novel	60	Crime as Disease.
3.	William Butler Yeats	Poetry	30	Piracy, killing and Robbery.
4.	Robert Stevenson	Novel	30	Murder, Kidnapping,
5.	Thomas Sterns Eliot	Poetry	40	Rape, murder, blackmailing.
6.	John M. Synge	Novel	50	Killing, Fleeing from police.
7.	Sean O'Casey	Novel	20	Alcoholism, betrayal.
8.	Graham Greene	Novel	30	Alcoholism, adultery, suicide.
9.	Malcolm Lowry	Novel	40	Alcoholism
10.	Ian Lancaster Fleming	Novel	90	Crime (Detective)
11.	R. Thornton Chandler	Novel	80	Crime
12.	S. Dashiell Hammet	Novel	80	Crime

### RESEARCH AND DISCUSSION

It is the real commentary on our civilization that although we had made strides in many areas such as science, technology, and communications, we have significantly surpassed our forefathers in reducing the crime. Literature is a mere canvas on which writer displays the colors and forms of the society. When society is over-shadowed, with the immorality, injustice, and inequality it gives birth to crime. A person can be involved in a crime either by instinct or by circumstances. Certain writers have portrayed the immorality prevailing, in the society, in their works like Thackeray in *Vanity Fair*, Henrik Ibsen *A Doll's House* and *Pillars of Society*, D.H. Lawrence in *Sons and Lovers*, and Ernest Hemingway in *Farewell to Arms*. But this presentation of 'immorality' cannot be headed under crime. We also have noticed that poverty and injustice provokes a rebellious act which can be deal as crime as in *Oliver Twist* and *Tess of D'urbervilles*. Revenge culture is present since human creation and is the root-cause of several crimes as it is pre-dominantly present in the works of Euripides, Aeschylus, Shakespeare, Oliver Goldsmith, and Emily Bronte. None of us can posses everything, or be everything we wish. All of us have to cope with mild, moderate, or severe frustrations and deprivations. The more these frustrations and deprivations threaten us, the more vulnerable we feel and the greater the wish to crime. As this world is becoming more and more civilized the techniques of committing crime are also developing. If Shakespeare's character is using a 'poisoned sword' but Dickens character won't go for it rather prefer a 'gun' over it. Today's criminals tries to attempt those techniques which have less chances of errors and more accuracy and are more efficient.

### **SUGGESTIONS**

Literature has been used as the Panacea for the diseases present in the society but at the same time some people extract the false notions presented in it. It is our conviction that the crime in all our hearts can be tamed and overt violence diminished.

- Whatever the characters are present in literature, all are present in our societies, and therefore one should develop self –understanding and human-understanding in the light of literary characters.
- Every person should be involved in healthy and productive activities so that they don't get spare time to be indulged in bad activities. It will also increase our G.D.P rate.
- Media should play his positive role and should not provoke anxiety, nausea and anguish.
- Sense of responsibility and understanding of rights and wrongs should be injected in everyman. Common man should not attribute justice in his own hands.
- Boys should not be provided with the weapons and violence creating toys but should be endowed with such toys which would not provoke violent feelings in them like sports toys.
- Work with schools to establish drug-free, gun-free zones; work with recreation officials to do the same for parks.
- We should not look forward for super natural heroes like SUPERMAN who flying to control the crime, but we should create within realistic BATMAN who, through his intellect and scientific techniques, combats the crime.

### **RECOMMENDATIONS**

- Law and order should be strictly implanted and worked out, so that justice will prevail and crime could not give birth to another crime. And the fear of punishment would decrease the intensity of crime.
- Counselling session should be given to every individual. Moreover, Psychology should be introduced as a subject at secondary level.
- Government and private sectors should provide anger-management; stress-relief and conflict-resolution training for their employees; so they can help built an anti-violence climate at home, at school, and in the community.
- Prisoners should be provided with the lectures and supplied with the books on how to be a good human being.
- Import and manufacturing of weapon toys should be banned.
- Specialized Detective and forensic department should be introduced to curb the crime.

### **CONCLUSION**

Literature presents crime not to promote it but to present its aftermath, so that people should avoid crime. The statistical data presented in this paper tells that which crime has a certain period and to what extent the writer has penned it down. This paper will help us to prevent crime because the given suggestions and recommendations, if strictly followed, will furnish with desired outcome.

We would like to share our feelings with gratitude which we experience during our research. The course of this research provoked criminal feelings and thoughts that we

begin to dislike our kith and kin, but we kick off these criminal thoughts and feelings, as we are well-aware and well-awakened. Last but not least, we would like to invite all those who are interested in joining hands with us in this research as there are still untouched areas on which we can work upon.

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**IMPORTANCE OF TEACHING OF STATISTICS  
IN EARLY EDUCATION IN OUR COUNTRY**

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**INTRODUCTION**

Importance of anything may be understood with the efficacy of those particular things in the sense of importance of teaching of statistics in early education in our country so the statistics as a subject whole shows great importance because without statistics we cannot estimate the destruction of flood, enumerate the literacy rate, ascertain the actual position of anything an analyze the situation cannot evaluate whole life.

According to Oxford Advanced Learners Dictionary statistics means a collection of information shown in numbers. Thus it is defined as “statistics are the numerical statements of facts capable of analysis and interpretation and science of statistics is the study of the principles and the methods of applied in collecting, presenting analysis and interpreting numerical data in any field of inquiry”.

Aforementioned approach candidly explains the significance of statistics in human life. Thus it plays pivotal role in every field of life either it is of social, economical, psychological, biological, ethical or casual. In the real sense statistics helps to simplify the complexities, and remove the chances of errors, planning without statistics cannot be imagined. Albeit people are unaware about the importance of the subject but it is the arithmetic of human welfare.

Statistical data and modern statistical method have been found increasingly useful in research in different field similarly in the field of medicine and public health the efficacy of the new medicine can be found by collecting such statistical data and making use of statistical method in the field of commerce statistical study the causes of variation of different products from their standard quality.

Briefly for a research worker, the application of statistics or statistical method are not only useful but mandatory as for as the importance of statistics in early education is concerned so, it is the high time to inculcate in child’s mind the facts and figures, values and analyze, evaluation.

Albeit, statistics was not introduced as subject in the early ages but it is present since the time immemorial. Later it was named by the savant researchers. History of Homo-sapiens witnesses that his presence is due to the accurate quantity in the world and quality in the heaven. So, the need of the hour is to introduce the subject statistics from the early classes.



### EXTRACT FROM HOLY QURAN

Whenever person analyze himself, certainly, he moulds himself in fit frame work by which he reaches to his destiny that is Ehsan-e-Taqweem, cream of creation, vicegerent of Allah Almighty the greatest status in divine scheme As Allah says in Az-Zariyat: 56.

“I have not created the Jinn and INS (humankind) for any other purpose expects that they worship Me.”

“Lo! Your Lord is Allah Who created heavens and the earth in six days.” (10:04)

“You shall assuredly pass on from one stage to another”. (84:19)

The Ayahs basically show the calculation of human life, statistics in the light of Islam same as the five prayers, rotation of earth, revolving of sun and moon, and the Day of Judgment. Above mentioned keys of life actually impel the attention towards the evaluation, enumeration, and analyze the life.

Nature has endowed birds, ants, bees, fish, spiders and other animal with a remarkable sense of direction. This allows them to locate their position from a built-in global positioning system (GPS) that senses the earth’s magnetic field with great accuracy, and allows them to travel in desired directions without getting lost. Same as the man has created on the same set and accurate scheme. Evaluation is the systematic process of collecting and analyzing data in order to make decision”. Says L.R. Gay

Quaid said, “There is no doubt that the future of our state will and must greatly depend upon the type of education and the way in which we bring up our children as future servants of Pakistan. Education does not merely mean academic education, and even that appears to be very poor type. What we have to do is to mobilize our people and build the character of our future generations”. Briefly, the crying need of time is to produce the active minds that lead our country towards amelioration, and prosperity.

Our country is in the grip of torrential rains and macabre floods. Livelihoods, assets and structure have been damaged. About two-and a-half thousand of the people have been killed while hundreds of thousands have been marooned. Millions have had to move to safer locations. Rescue and relief have become most difficult tasks as no safe location or structure worth the name can be found in the vicinity of the flood affected areas. This disaster has many lessons to offer which point towards corresponding solutions.

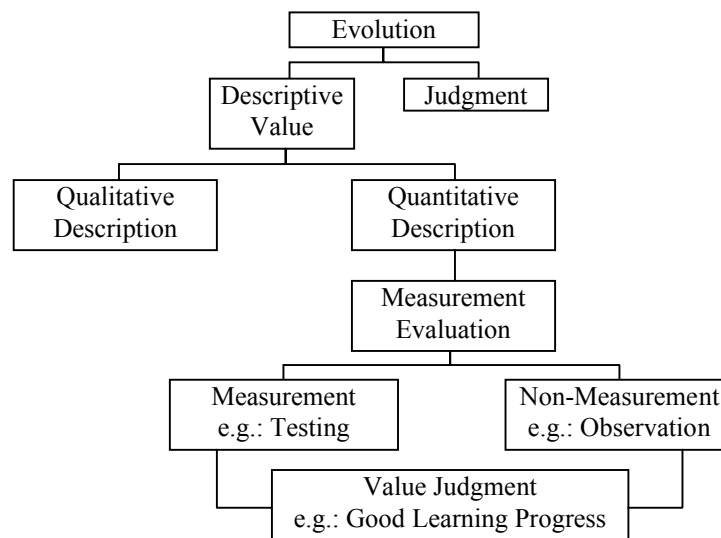
Education, especially early education is a key factor improving both individual and national wellbeing. Most importantly, education must prepare young, adults to become an integral part of their communities as responsible citizen and civic leaders. In an increasingly independent world, values such as tolerance, communication, respect and collaboration with others, often different cultures are crucial to survival. Truly, the early education plays key role to build the best and technical minds. For assessing reading and math’s skills early and primary school provides an opportunity to indentify children with low learning achievement and take remedial measures that can help prevent drop out and grade repetition. The child suffers in learning a fundamentally when parent, teacher, and manager try to deliver triangularly in fruitless manner. Three key facilitators create a more complex and challenging environment for the child. Each one of them is unplanned, haphazard and short-sighted in developing true educated potential of the child.

The same has been expressed in Dawn August 1, 2004 – books and Authors allow me a little liberty. If to err is human, and to forgive divine, then to have regrets – well that's just as human as erring. Regret essentially, and obviously, is futile. It is more often than not a derivative of a misplaced curiosity, a wondering of what might have been. There isn't much to be gained from wondering what might have been had you done something differently, simply because you didn't.

The Universal Children's Day is celebrated on 20<sup>th</sup> November, it was first observed on November 20, 1954 by United Nations General Assembly. General Assembly adopted the Declaration of the Rights of the Child, in 1954, and the Convention on the Rights of the Child, in 1989. In 2000 the World's leader outlined eight goals known as the Millennium Development Goals (MDG's), though the goals are for all humankind, they are primarily about children. The universal primary education is emphasized and health as well. The Convention of the Rights of Children (CRC)'s

### IMPACT OF STATISTICS

Evolution is the systematic process of collecting, analyzing and interpreting information to determine the extent to which pupils are achieving of objectives (Nomen E. Glonlund)



In teaching statistics plays pivotal role to evaluate students' behaviour of study their social communication, and value of judgment.

### MATHEMATICS

As Mathematics is the mother of all sciences so the crying need of time is to introduce the statistics in early classes in the way that students feel pleasure not boredom.

**Introduction of Statistics Differently from Class Nur to 5<sup>th</sup>**

S.No	Class	Diff: Form of Stats	Remarks
01	Nur-Prep	Poems (Numbers)	Primary
02	First	Listing the Things Around	
03	Second	Mode (By Play Cards)	
04	Third	Median (By Exercises)	
05	Fourth	Mean (By Exercises)	
06	Fifth	Drawing Graphs (Bar)	

**Introduction of Statistics Differently from Class 6<sup>th</sup> to 10<sup>th</sup>**

S.No	Class	Diff: Form of Stats	Remarks
01	Sixth	Data Collection	Primary
02	Seventh	Data Classification/Graphs	Simple
03	Eight	Types of Means (Harmonic)	Frequency Distribution
04	Ninth	Intro: to Biostatistics	
05	Tenth	Geometric Mean/Index Number	

Undoubtedly, Statistics cannot be separated from mathematics whereas it is core heart of math and taught under the title of “Mathematical Statistics”. Most of the mathematicians contributed towards statistics such as Prof. Jacques Bernoulli (1711) developed the mathematical theory of Probability, which really a remarkable contribution to the development of statistical series. In fact the theories of Insurance, Sampling, and Normal Law of error all depend on the theory of Probability. It is therefore a high time to include the introduction of Probability in First Year and Second Year Classes. If this pattern is followed then students can meet the different challenges in future.

**BIOLOGY**

Statistics is closely related to the development or biological theories. As Galton set up a Biometric laboratory to study the variations with the application of statistical methods. Same as Mendel’s theories have proved that Genetics that studies the relations between the characteristics of group of individuals in successive generations is essentially, a statistical approach. Moreover, the important methods of statistics such as Sampling and Analysis of variance are being used in biological experiments frequently.

Generally, biology in terms of statistics can be taught from grade six onwards because technically it is bit new for nascent of primary classes.

**Biostatistics from Class 6<sup>th</sup> to 10<sup>th</sup>**

S.No	Class	Diff: form of Stats	Remarks
01	Sixth	Classification (Phylums)	
02	Seventh	Blood Sampling	
03	Eight	Measurement of B.P	
04	Ninth	Info: Genetics Re: Crops Pests	
05	Tenth	Population/Census	

Albeit the said topics are novel for grade six and seventh but are interesting enough. With the help of this syllabus creativity and mental faculties will be enhanced and hidden talent will wake up.

## ECONOMICS

The Father of Economics Adam Smith defines Economics as a “Science of Wealth.” Certainly economics is correlated with statistics and this reflects in the quote of savant Prof. Marshall, “statistics are the straws out of which I like every other economist, have to make bricks.” Again he expressed in 1907, “that higher and more difficult task must wait upon the slow growth of statistics.” The statement clearly indicates the indispensability of the science of statistics and economics.

Moreover, during the last century Economics, Statistics and Mathematics got so much inter-related with each other that the founding of Econometric Society in U.S.A in 1930 evolved a new science of econometrics. The Econometric aims at making economics more realistic and practical science. The union of these sciences proved useful for the development and progress of all the sciences.

Thus these facts show that economics must be taught under the head of Statistics and Mathematics. This will obviously produce the great, competent and creative businessmen technocrats for future they will bring marvelous change in the economy of Pakistan. For that in early education some initial topics must be taught such as the below mentioned table shows.

**Econometrics from Class 6<sup>th</sup> to Metric**

S.No	Class	Diff: form of Stats	Remarks
01	Sixth	Inflation/Deflation Rate	
02	Seventh	Marginal Utility	
03	Eight	Business Cycle	
04	Ninth	Quantitative Data	
05	Metric	Intro: to Budget Framing	

The progress of any country depends on her economics that is why it is high time to introduce these sciences into the syllabus of early classes. As if foundation is strong then the infrastructure is strong.

## ASTRONOMY

As for as astronomy is concerned so it contributed a lot for the development of statistics such as the method of least squares, which was first, introduced by an astronomer. He collected the data in order to locate the best position of planets, for that he used the technique of the Normal law of error, which is based on the method of least squares. In early classes, the science subject namely the study of planet is taught in terms of statistics, the student will find the new world with accurate facts and figures.

## METEOROLOGY

The scientific study of the earth’s atmosphere and its changes, used especially for forecasting weather.

Statistics is related to meteorology as it helps a meteorologist in averaging the data, relating to temperature, humidity of air and barometric pressure. Weather forecasts and

various comparisons in meteorology are made by averaging the figures so as to study their trends and fluctuations. Obviously, all this cannot be done without the application of statistical methods. Hence the science of statistics is of great help in the study of meteorology. (Page 03, Elements of statistics)

The attracting force of the subject statistics diverts the attention of the students in the new dimensions such as the experiments in Chemistry, Physics, Biology and Math.

### **AGRICULTURE**

Agriculture is greatly benefited by statistics. The analysis of variance, which is an important method in statistics, is of immense use in agriculture for testing the differences between different groups of data for the purpose of homogeneity. Similarly, correlation methods are of great use to determine the factors, which influence the quantity and quality of crops. In a nutshell, statistics is so deeply related to agriculture that the study in the field of agriculture cannot be made without the application of statistics.

In this regard the study of aforementioned methods must be introduced in early classes, with the name as (plants/around us) and animals, so that the future student of agriculture will get ground. As Pakistan is agro-based country so the agriculture must be introduced with the addition of statistical experiments i.e. growing plants the time of seed fertilization, the production of fruit numbers and colours of flowers in the plants, No: of plants in garden or school ground.

### **ENGINEERING**

Statistics and engineering cannot be separated from each other both are indispensable for each other. Measurements of projects, graphical representation, and statistical data provide the exact results for the required task. Practically, engineering either of mechanical, electronics, soft ware, architecture, civil, agricultural, industrial, etcetera, demands the statistical assistance.

The statistics plays pivotal role in every field of life either it is of social, economical, psychological, biological, ethical, or domestically. No one can deny that statistics helps to simplify the complexities, and remove the chances of errors.

As it is declares by the great eminent of the field or the other that:

“Statistics are the numerical statements of facts capable of analysis and interpretation and science of statistics is the study of the principles and the methods applied in collecting, presenting, analysis and interpreting numerical data in any field of inquiry.”

At present, the teaching of statistics in early education is badly needed. The history has proved that nations were build through proper education, policies, and the total change from grass root level. Truly, education is panacea for every evil of the society and the only remedy for the decline factors of life as well.

### **CHEMISTRY**

The entire life of a human being is based on facts and figures, the heart beating, breathing, eye-winkling, diet plans, sleeping and waking schedules, even the emotions of love and hate. The elements in human body, the quantity and real proportion of the elements, planets' composition of gases, the composition of matter, the preparation of fertilizers, made of certain set quantities. In this connection, statistics is the key component of chemistry.

In fact, chemistry closely related to statistics so it can be taught in grade 9<sup>th</sup> and 10<sup>th</sup> expressively with the help of statistics. The periodic table, electronic configuration, nomenclature, chemical and ionic bonding etceteras are the instances of the statistics significance in the subject chemistry.

### **LIBRARY SCIENCES**

Books are the best offer of knowledge. The father of English essay Sir Francis Bacon expresses in his essay "OF STUDY".

"Some books are to be tested, some are to be swallowed, some of few to be chewed and digested."

The books are as old as the men are. When books were printed, libraries were come into existence. Owing to the need of expansion of libraries the subject library sciences was introduced for the enumeration of books. Basically, statistics helps in the classification and cataloguing.

In a nutshell, statistics gives a bird's eye view in the short span of time. The statistical data of books helps the student to find his or her book of interest without any fix. Statistics is an art of accuracy that must be taught in the early classes.

### **CRIMINOLOGY**

According to the judicial dictionary 9<sup>th</sup> edition 1984 "crime is an act of commission or omission, for which punishment can be inflicted as the result of judicial proceedings taken in the name of state. Simply it may be defined as an act or omission by law".

Criminology is the study of crimes its occurrences, time, avenues, consequences, etc. Statistics is the subject, which helps to compare and contrast the crimes accordingly that helps the responsible in maintaining peace and tranquility in the society. On the basis of statistical data and analysis of the criminal proceedings of misdemeanors and felony are treated.

### **SUGGESTIONS**

- Aforementioned syllabus paved the way for new generation to work with facts and figures.
- Aforementioned data/syllabus will provide the interest among students because such type of activity enhances the mental faculties. It will also helpful for day-to-day life.

- We need to quickly carve our strategies, and then work towards realizing this plan for materializing to the actual cause.
- The awareness, the flow of information, the spread of knowledge and truth will reduce militancy in areas where technology is not available. The innovation in our syllabus in early education is essential for our survival and as a peace loving and vibrant nation.
- At the same time, the crying need is to produce the best minds in medicine, the sciences engineering and statistics.
- In this modern era, we have to train our children to face the challenges. We need to act as constructivists. The need of the hour is to facilitate our students providing them with the opportunities to construed their own knowledge and theories through interaction of materials, ideas and experiences that stimulate thinking.
- The philosophy of thinking outside the box demands that understanding should come about through the child's own struggle with the data rather than memorization of it and that would be possible if our class rooms are child directed.
- In early education/ classes' students must give the chance to enhance their mental faculties. Statistics helps the children in diverting the attention towards practical.

### **COCLUSION**

As education is the panacea for all the evils, so it must be inculcate in an appropriate way. Primary education is the foundation of future destiny. The great scholar Allama Imdad Ali Imam Ali Qazi said.

“When one wants to teach, one first minded to do that. If you have no intention to teach, your teaching would not be effective”.

Aforementioned adage diverts attention towards amelioration so; the emeritus must pay heed on the educational standard and revision of the policies. Truly where there is a will there is a way.

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**THE ROLE OF STATISTIC IN THE DEVELOPMENT  
OF QUALITY EDUCATION**

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**ABSTRACT**

Statistic is a potent and effective tool for the development in quality education. Quality education is a basic requirement in global employment market now a days young generation access to quality education another learning environment is fundamentally important the future well being of children, Young people and adults. A quality education is one that satisfies basic learning needs and enriches the lives of learners and there over all experiment of living. Statistic is a tool of research which based on collecting data is helpful to rating the classification on class level graphing. So improve quality education with the help of statistical methods, it is generally used for analyzing the experiment, result, educational planning. Policy management, monitoring and evaluation.

The quality education can only be resolved through the use of courageous and creative human intelligence.

It involves not only man intelligence but his feelings and his human being. The need to statistical education to produce human beings with trained morality and sensitive intelligence is essentially a challenge to educators and educational institution. The aims of education is to en lighted the inner of person, to control the abnormal behavior, to understand the problems in daily life. Utilize the God gifted qualities and also.

It creates an en lighted society which plays an important role to become a responsible citizen of any society.

He struggles for values another basis for optimism is that empathy. Like intelligence can be made more functional and effective through quality education in the development.

If it is trained it can become meaningful for the individual and adaptive for the educated society. If it is understand, it becomes random misdirected or it atrophies. The acceptance of the responsibility to reinforce man's empathic capacity as an integral part of the responsibility to train intellect is now the clear challenge of relevance confronting mainly our contemporary education institutions.

The paper will address the role of statistic in the development of quality education, and open the new vistas in the field of natural sciences as well as uplift the standards of our young generation.



### DEFINITION

The process of training and developing the knowledge, skills, mind character etc. Specially by formal schooling, teaching and training.

Education is a process that contribute to individual development in several different areas for example cognitive development, psychomotor development, character effective development.

### CONCEPT OF EDUCATION IN ISLAM

Islam is the religion of PEACE, and it is one of most sacred and trustworthy religions, which has given us education with knowledge which has no limits. The Holy Quran is the most sacred book of Allah revealed on prophet MUHAMMAD (SAW) for the uplift men guidance and enriched messages to the humanity.

Allah Says: Read; in the name of thy Lord who createth, createth man from a CLOT. Read; and thy Lord is the most bounteous, who teacheth by the pen, Teacheth man that which he knew not.

*(Surah AL – Alaq 96 1 to 5)*

#### 5 words (on learning) in the first 5 verses

Revealed in an age which was not information.

Age in a society of Ummiy- yoon where extremely few knew how to read and write.

### WORLD STATEMENT

“Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.” Article 26, Universal Declaration Of Human Right 1948.

### EDUCATION AND DEVELOPMENT

The concept of development has transformed and extended from the traditional indicators of economic growth. Education is a vital investment for human or socio-economic development.

Statistic is a branch of applied mathematics. It can be used in various field from simple to complex. Statistic as a discipline is the development and application of methods to collect analyze and interpret data.

Modern statistical methods involves the design and analysis of experiments and surveys, the quantification of biological, social and scientific phenomenon and the application of statistical principles

To understand more about the world around us. To days, statistic on important toll in the work of many academic disciplines such as medicine, psychology, sociology, physics, education, etc.

Statistic is necessary for the formulation of policies to start new courses consideration of facilities available for new courses etc.

Statistic play a vital role in the development of quality education. The power of statistic are recognized educational planning, policy, formulation, management, monitoring and evaluation. Policy provide the framework for the provision of education services. It provide guideline for action and therefore as a toll for the regulation of quality.

### **UNIVERSAL CONCEPT OF QUALITY EDUCATION**

The issue of the quality of education is increasingly becoming an area of interest and concern to many nations of the development world. Because many countries have realized that education plays a crucial and pivotal role in development at national regional and international levels.

One of the key issue The Dakar Frame Work for action gave new impetus to the promotion of quality education based on the consensus that expanding access to education will have a beneficial impact on individual and society only if the education is of good quality. (EFA Global Monitoring Report 2002)

### **EDUCATION AND THE MILLENNIUM DEVELOPMENT GOALS**

Education is a major catalyst for human development. As nations prepare for the High – level meeting on the Millennium Development Goals (MDG Summit) at the UN on 20-22 September, UNESCO look at how rapid advances in education can help to achieve all of the MDGS.

### **WHAT IS QUALITY EDUCATION**

Quality assurance is a process-driven approach with specific steps to help define and attain goals. Quality is a multi faceted concept. It encompasses how learning is organized and managed, what the content of learning is, what level of learning is achieved, what it leads to in terms of outcomes, and what goes on in the learning environment (EFA Global Monitoring Report 20).

Education is the most effective method of changing the attitude of its recipient particularly that of the young generation. Quality education provide of transmission of culture from one generation to another generation. The quality education is directly related to the statistical method. Used in classrooms. For example; Focus on course, process, analysis and supervision. Improving all aspects of the quality education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially numeracy and essential life skills. Quality education generate the learning environment is fundamentally important to the future well- being of children, young people, and adults.

Quality education aims not only at forming trained professional workers but also contributes to the development of individuals who possess the skills to act and interact in a just society.

Education and society are considered to have an important relationship in which both inform, impact and transform each other. Education is viewed as a necessary condition for socio economic development emancipation and freedom then there is its relationship with social justice.

### USE OF STATISTIC IN QUALITY EDUCATION

Quality education process are many and diverse, but those most commonly associated with statistics are educational planning, policy formulation, management, monitoring and evaluation Good policy provides the framework for the provision of education service

<b>Input</b>	<b>Process</b>	<b>Out Comes</b>
School Curriculum Content Textbook & Learning Materials	School Climate	Achievement Cognitive Development
Teacher qualification, Training moral and commitment. Adequate Facilities Parent Community Support	High Expectation Strong Leader ship Positive Teacher attitude	Literacy, general skills. Good citizen ship Personal development

<b>Student Characteristics</b>	<b>Sate and Gender</b>	<b>Positive Attitude</b>
Aptitude and ability Commitment Nutrition and health School readiness	Sensitive environment Incentives for good result	Towards learning Healthy behavior

<b>House hold community characteristics</b>	<b>Teaching &amp; Learning</b>	<b>Attainment</b>
Parental attitudes House hold income Community economic and labor market conditions Cultural / Religious factors	Sufficient time Active teaching methods integrated system for assessment and feedback appropriate class size appropriate use of language	Formal completion Diploma / qualification Standards Official learning objectives

This was a time when there was great need to make investment in building, infra structure. There is need to build statistical program which is capable of informing the achievement of good quality education is development on the quality of statistics which inform the policy formulation, educational planning, management and monitoring process.

Quality education is the life line of any developed country and there is thus no denial to the fact that it alone is pivotal to human progress. Most important key to development and so vital for poverty alleviation.

The need for accurate and timely statistical information becomes more crucial when we realize that economic recession has worsened in Pakistan.

### **FOCUS ON QUALITY EDUCATION**

Although some of the international treaties, by specifying the need to provide education on human right, reproductive health, sports and gender awareness, touched on educational quality. The education produce encouraging learners, creative and emotional development, in supporting objectives of peace, citizenship and security in promoting quality and in passing global local cultural values down to future generations.

Qualitative curriculum is the heart of education. They provide critical thinking, problem solving and the innovative application of knowledge to provide students the competitive edge they will need in educational academy and in their careers “Improving every aspect of the quality of education and ensuring their excellence so that recognized and measurable learning outcomes are achieved by all, especially in literacy numeracy and essential life skills”. ( Goal 6; Dakar Frame Work Action 20001

### **INPUT PROCESS AND OUTPUT INDICATORS IN QUALITY LEARNING MODEL**

#### **Inputs**

- Policy administration
- Aims and objectives.
- Administrative bodies.
- Building and physical facilities
- Curriculum and textbooks
- Library instructional materials.
- Equipments

#### **Teacher**

- Personality And Other Traits
- Academic and professional qualifications

#### **Process**

- Climate of school
- Work environment and relations
- Teaching learning process
- Examinations and assessment
- Student feed back system
- Character building activities
- Parent school community relation ship

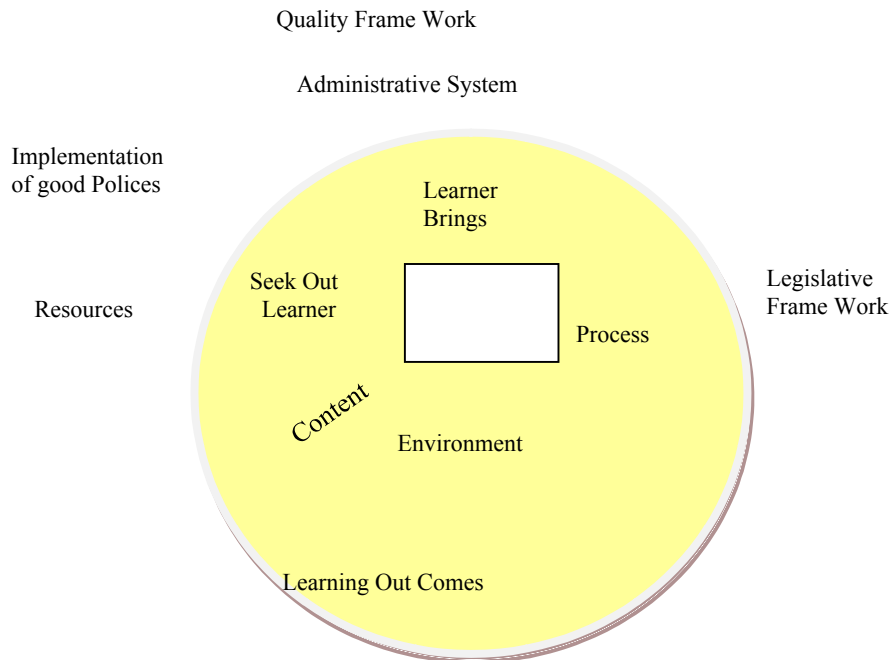
#### **Quality Output**

- Academic Achievement
- Knowledge, Skills And
- Healthy and well nourished
- Curious and creative.

### USE OF STATISTIC IN MONITORING OF QUALITY EDUCATION

Statistic use for analyzing, result, testing, educational planning policy, management, monitoring the evaluation. Focus on individual learners, results and accountability, changes in information technology.

#### INSUFFICIENT DATA TO MANAGE AND PLAN SYSTEM



Quality of application of international student to data reported by countries quality of the data collection and processing by international agencies.

Develop a quality education statistic to gather with national an international stakeholder to address jointly. Consider national approaches towards improved measures of system performance and learning achievement.

#### SUGGESTION / RECOMMENDATION

The basic purpose of this paper to enhance understanding and awareness of “ The Role OF Statistic In the development Of Quality Education” in the front line actors of the education proocess at the school level.

#### QUALITY A GOOD EDUCATION

Cognitive Development  
Reading, writing, numeracy  
Creative and Emotional Development;

The promotion of attitudes and values necessary for effective life in the community.

Personal Social Benefits;

Better health, lower fertility, lower exposure to HIV AIDS

Higher personal income

Stronger national growth

Additional Resources Improve Quality Education

- ✚ Low pupil teacher ratios
- ✚ More and better textbooks
- ✚ Time spent learning in school or at home
- ✚ Teacher qualifications and experience.

### **CURRICULUM**

Relevant, balanced with carefully defined aims.

Learning Materials

Strong impact on learning but small percentage of education spending goes to textbook.

### **LANGUAGES**

Successful models start in mother tongue and make gradual transition to second or foreign languages.

School Environment

Safety, health, sanitation for girls and boys, access for disable.

### **IMPORTANT RESOURCES OF QUALITY EDUCATION**

- ✚ Best equipment and infrastructure.
- ✚ Strong leadership
- ✚ Emphasis on learning skills
- ✚ Orderly and secure school environment.
- ✚ High expectations of pupil attainment.
- ✚ Frequent assessment progress.

### **CONCLUSION**

Quality education is the most effected method of changing the attitude of its recipient particularly that of the young generation. quality education aims not only at forming trained professional workers but also contributes to the development of individuals who possess the skills to act and interact in a just society.

Quality education provides educational planning, policy formulation, management, monitoring and evaluation. Statistical education have been regarded as vital for the formulation of policy, coverage, equity, efficiency and relevance. Statistical education provide many different techniques that can be used to promote quality education. Statistical data based activities, program to provide with broad range of activities and skills. The learners those strategies and create new techniques required a conceptual frame work.

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## IMPORTANCE OF ENUMERATION IN OUR DAILY LIFE

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### ABSTRACT

The word Enumeration comes from Numeracy which means a good basic knowledge of mathematics; the ability to understand and work with numbers.

Statistics is defined as the “Science of collection of information shown in numbers, presentation analysis and interpretation of numerical data”, basically statistics or numbers in itself has all the ingredients that make it a universal language shared by all human beings irrespective of culture, religion or gender. The language of numbers is very much related with our daily business without them we would find it difficult to reach at important decision and in the performance of every day task. This world revolves around the numbers as circulation of blood, movement of the earth, sun, moon, even every passing movement is related to Numeracy as well as statistics, which provide awareness.

The science of statistics serves the following major functions.

“It helps in collecting data in a systemic manner, presenting collected data in logical form, highlighting important features of the collected data, facilitates comparison, formulating and testing hypothesis through observed data, and formulating of suitable policies”.

There is hardly and field whether it be trade, industry, commerce, economics, biology, botany, physics, chemistry, psychology, meteorology or defense science where statistical techniques are not applicable, Modern business executive is largely dependent on statistical data analysis knowledge of the exact composition of the population is essential to a government for making decision concerning the day-to-day policies of a country. Before introducing a new scheme for unemployed persons, the administration needs to know the exact level of unemployment, the classification of unemployed persons similarly for providing better facilities to Hujjaj, the Ministry of religious affairs must have statistics of expected Hujjaj even all the ministries and government departments whether they be finance, transport, defense education, health, food, agriculture, telephone and telegraph or railway etc, depend heavily on factual data for their efficient functioning.

Statistics is an important member of the mathematics family. Statistics is a branch of applied mathematics which specializes in data. Apart from the use of probability, averages, dispersion, inference and estimation which, through, are basically statistical methods, are to a large extent, employed in mathematics too. Similarly, the techniques of pure mathematics like differentiation, integration, algebra and trigonometry are used in statistics.



Statistics is the backbone of research work. Most of the advancement has taken place because of experiments conducted with the help of statistical methods. For example experiments about crop yields and different type of fertilizers and different type of soil or the growth of animals under different diets and environments are frequently designed and analyzed with the help of statistical techniques. Statistical techniques are also used in research work carried out in medicine and public health infect there is hardly any research work today that one can find complete without the application of statistical data and statistical techniques.

This paper will exhibits the ways and means importance and methodologies of enumeration and statistics that how could be useful and fruitful it in our daily business.

## INTRODUCTION

### **Definition:**

The word Enumeration comes from numeracy which means a good basic knowledge of mathematics; the ability to understand and work with numbers.

According to Oxford Advanced learner dictionary Statistics is defined as the “Science of collection of information shown in numbers, presentation analysis and interpretation of numerical data”.

Horace Secrist in his book “An introduction of statistical methods” statistics is defined as “statistics means aggregates of facts affected to a marked extend by multiplicity of causes numerically expressed, enumerated or estimated according to reasonable standards of accuracy, collected in systematic manner for a predetermined purpose and placed in relation to each other.”

### **Mathematical Definition:**

According to A. L. Bowley; “*Statistics is the science of collection*”.

### **Social Definition:**

According to A. L. Bowley; “*Statistics is the science of measurement of the social organism, regards as a whole in all its manifestations.*”

### **Functional Definition:**

According to W. I. King; “the science of statistics is the method of judging collective, natural or social phenomena from the results obtained from the analysis or enumeration or collection of estimates.”

Since numbers are more precise then words, they are particularly well suited for communicating scientific results subsequently, the reflection of modern pattern of numbers shaped as statistics. Statistics is the art of gathering, analyzing and making conclusions from data. From Accounting to Zoology, even every aspect of life catered with the help of statistics and numbers.

As quoted in “Mark Twain’s autobiography”.

“*You can prove anything with statistics*” (1)

Basically statistics or numbers in itself has all ingredients that make it a universal language shared by all human beings irrespective of culture, religion or gender. The

language of numbers is very much related with our daily business without them we would find it difficult to reach at important decision and in the performance of every day task. This world revolves around the numbers as circulation of blood, movement of the earth, sun, moon even every passing movement is related to Numeracy as well as statistics, which provide awareness.

Numbers are part and parcel of our talk, walk and work. In daily work as Time management, planning calculation, accurate ratio at the time of cooking, scores in game, money exchange work with the knowledge of statistics and numbers, as well as at the high level as administration, business, social sciences, natural sciences, banks, agriculture sector all are functioned through statistics. Astronomers used statistical methods and discovered valuable laws relating to the movement of planets.

### **HISTORICAL BACKGROUND**

The word “Statistics” derived from the Latin word Status. The word Statistic is found in Shakespeare’s Hamlet (1602) which is used in the sense of a person who is well-versed in state matters, helping high state officers and framing Governments policies. W. Hooper in 1770 used the word “statistics” in his translation of Elements of Universal Erudition Bielfeld.

During the 18<sup>th</sup> century the word “statistics” became more and more popular and began to be used in the sense of numerical statements relating to a state and thus the Royal Statistical Society was founded in England in 1834, During the 19<sup>th</sup> century the growth of official data was continuous, and numerical statements accordingly began more and more to displace the verbal descriptions of early days (1).

### **IMPORTANCE OF STATISTICS IN VARIOUS FIELDS**

#### **Planning without statistics cannot be imagined:**

Modern age is the age of planning. The days of laissez-faire are gone. Now the future is very largely being planned, and this planning must be based on the correct analysis of complex statistical data. If we study the Economic Plan implemented in Pakistan, we will find that all of them are a statistical study of the economic resources of Pakistan and they suggest the possible ways and means by which these resources can best be utilized. Thus we find that in the field of economic planning the use of Statistics is indispensable.

#### **Statistics is indispensable to the state:**

Statistics is of immense help to the State as it helps in its administration. All the modern States of the world today make extensive use of the statistical data in the field of various social problems. Before taking any decision in the enforcement of some policy, a State has to examine its pros and cons and this can only be done with the help of adequate statistical data. The evils of crime and drinking, etc., in the country can investigated by collecting statistical data adequate for the purpose.

#### **Statistics is indispensable in social studies:**

Statistics helps the sociologists. Sociologists can find the relationship between suicide and poverty by collecting and adequate statistical data. Thus sociologists are greatly benefited by the adequate knowledge of statistics in their study of social problems.

**Statistical constitute a record of the past knowledge:**

Past knowledge of statistics helps in comparing the results from year to year and in finding out the reasons for changes and the effects of such changes in future.

**Utility to Bankers:**

In fact banks have to depend, to a considerable extend, on statistical information. The banks have to conduct constant enquiries regarding, deposits under different categories, the nature of demand for daily withdrawals, the amount to be kept in readiness to meet the daily demand, amount of credit that can be easily created, etc. this information helps them in forming “Banks Policies” .

**Utility in Agriculture:**

Our present agriculture abundance can be partially ascribe to the application of statistics to the design and analysis of agriculture experiments, This is an area in which statistical techniques were used relatively early, some questions that the methods of statistics help to answer are : which type of corn gives the best yield ? What kind of mixture of grass seeds gives the most tons of hay per acre? All of these questions, and hundred of others, have a direct effect on all of us through the local supermarket.

**Utility to the Government:**

Statistics is used by the Government as well. Economic data are studied and affect the policies of the Government in the areas of taxation, funds spent for public works (such as roads, bridges, etc.), public assistance funds; and so on Statistics on unemployment affect efforts to lower the unemployment rate. Statistical methods are used to evaluate the performance every sort of military equipment.

**Utility of Business and Management:**

One thing common to all the problems which the business managers have to face is to make decision in the face of uncertainty and the essence of modern statistics helps in the development of general principles for dealing wisely with uncertainty. Application of statistics are made in the selections of personals, investment policies, the design of industrial experiments, quality control of manufactured products, economic forecasting, auditing, the selection of credit risks and many others. All these management movement need all collection of statistical data and their intelligent interpretation.

**Usefulness in Commerce:**

Statistics is an indispensable to business and commerce. As a matter of fact today the situation is that a businessman succeeds or fails according to his forecasts to be accurate or otherwise. In fact, when a man enters in some business, he enters the profession of forecasting.

**Importance in Economics:**

Statistics is of immense importance in the field of economics. It is almost impossible to find a problem in economics which does not require an extensive use of statistical data. Important phenomena in all branches of economics can be described, compared and correlated with the help of statistics.

**Desirability in research:**

Statistical data and modern statistical methods have been found increasingly useful in research in different fields. Experiments on the growth of animal life under different

types of diets and environments and crop yield with the application of different types of fertilizer and different types of soils are analyzed by the application of statistical method. Similarly, in the field of medicine and public health, the efficacy of the new medicine can be found out by collecting such statistical data and making use of statistical methods. In the field of industry and commerce; statisticians are engaged to study sources and causes of variations of different products from their standard quality. Quality control of manufactured products is entirely a statistically work in nature. Thus we find that for a research worker, the application of statistics or statistical methods are not only useful but necessary.

#### **Universal Applicability:**

We thus find that statistical methods are of wide use, almost universal applicability, in fact, all types of persons like Astronomers, Meteorologists, Economists, Zoologists and Astrologers make use of statistics and statistical method, this indivisibility of statistics is enough to prove its importance, utility and indispensability to the modern world (1).

### **RESEARCH AND DISCUSSION**

#### **Time Management:**

Time is more important than money. As different people have different amount of money to spend, but everyone gets to have the same amount of time. If money spend it can get again, but spending time can never back again. That is why time management takes great importance in our daily life.

#### **Time Frame:**

A person gets  $24 \times 60 \times 60$  seconds i.e. 84,400 seconds each day, same as 24 hours in a day. If we distribute 24 hours equal manner i.e.  $8 \times 3 = 24$ , as 8 hours for our study, 8 hours for daily activity and 8 hours for prayers.

24 Hours	8 Hours study
	8 Hours sleeping
	8 Hours Prayers and other daily activities

It's a perfect daily rotten time frame that will provide the discipline in our life.

#### **Planning:**

Planning is useless without prioritizing, as the day-to-day decisions would lead to our ultimate goals. For planning if we analyze the priority, the perfect way to list down all activities then we can't forget important task. A very effective way of grading priorities is shown as below.

1 <sup>st</sup> quadrant: Urgent and important	2 <sup>nd</sup> quadrant: Non urgent and important
3 <sup>rd</sup> quadrant: Urgent and unimportant	4 <sup>th</sup> quadrant: Non urgent and unimportant

#### **Four Quadrant Rule:**

According to the rule draw a square and it divide into four quadrant, left side named as urgent, right as non urgent, top as important and bottom as unimportant.

1. First quadrant as urgent and important for any emergency at home or office.

2. Second quadrant as non urgent and important for self grooming, it's very important that ignored mostly, it contain our important future planning as personality, carrier, family relationship, about health, exercise etc.
3. Third quadrant is urgent and unimportant work as urgent submission of bill, due to last date, sudden coming of guest without schedule and other urgent problems that have to face at a time.
4. Four quadrants as non urgent and unimportant for when we face extra amount of work then for relaxation through TV and other activities.

We can divert our attention from confusion of priority and enlighten from balance schedule.

**The importance of numbers in superstition in our daily activity:**

“The general root of superstition,” said Bacon, “is that men observe when things hit, and not when they miss; commit to memory the one, and forget and pass over the other.”

In western culture, the number 13 is perceived as unlucky; 12a is, sometimes, used as a substitute while several building s skips floor 13 completely. Opening an umbrella in doors is thought to result in 21 hard days. Most Americans believe that a two-dollar note brings misfortune.

Europe has its full quota of superstition. In Sweden, collecting seven or nine different flowers on a mid-summer eve and putting them under your pillow means that you will dream of your future spouse.

Asia is the most fertile breeding- ground for superstition. In china Japan and Korea, number 4 is unlucky. The Chinese word for 4; si, sounds nearly the same as the word for death. as such mobile phone numbers having the digit 4 in them sell far less and some buildings even omit level 4, labeling it the 5<sup>th</sup> floor instead.

### STATISTICAL IMPORTANCE IN SPORTS

**Duckworth–Lewis statistical method:**

In the sport of cricket, the Duckworth–Lewis method (D/L method) is a mathematical way to calculate the target score for the team batting second in a one-day cricket or Twenty20 cricket match interrupted by weather or other circumstance to.

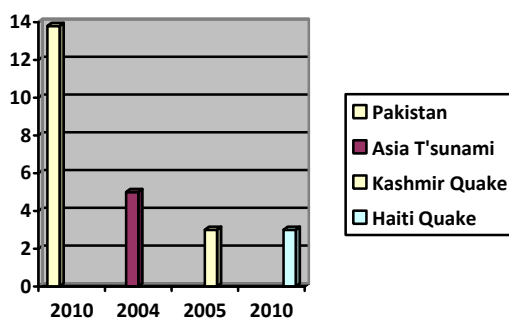
**D/L method in 2010 ICC World T20 matches:**

During the 2010 ICC World T20, the D/L method was used in the group stage match between Sri Lanka and Zimbabwe. Sri Lanka scored 173/7 in 20 over batting first and Zimbabwe was 29/1 in 5 over when rain interrupted play. Sri Lanka won the match by 14 runs according to the D/L method.

On the same day, another group match between England and West Indies was also decided by the D/L method. England scored 191/5 in 20 over, and rain interrupted play after 2.2 over of the chase when West Indies had scored 30/0. According to the D/L method, West Indies were set a target of 60 runs in 6 over, which they achieved with a ball to spare.

## IMPORTANCE OF ENUMERATION IN THE CATASTROPHIC FLOODS IN PAKISTAN

- **Pakistan's worst-ever disaster:**



According to UN report the number of people suffering from the massive floods in Pakistan could exceed the combined total in three recent mega disasters - the 2004 Indian Ocean tsunami, the 2005 Kashmir earthquake and the 2010 Haiti earthquake (2). The death toll in each of those three disasters was much higher than the 1,500 people killed so far in the floods that first hit Pakistan two weeks ago. But the Pakistani government estimates that over 13 million people have been affected - two million more than the other disasters combined.(3)

With the help of some statistical data I explain the destruction in different sectors due to recent flood of Pakistan.

### **Pakistan-Monsoon Flood Affected Districts in Pakistan (source dawn 23 august):**

S#	Province	Districts	Injuries	Homes damaged	Population Affected
1	Balochistan	45	98	25,261	522,371
2	Khyber Pakhtunkhwa	1000	1000	273,372	4,355,909
3	Punjab	103	150	500,000	8200,000
4	Sindh	21	408	462,251	3,534,267
5	A J and k	69	83	6,671	245,000
6	Gilgit Baltistan	185	60	2,320	8,541
7	Total	1,539	2055	2,226,672	19,195,308

### **Statistical data of loss and damage in different sectors:**

S#	Damage Sector	Loss	Damage
1	Village affected		5,700
2	Health sector	Rs. 3 bln	Taluka Hospital and 100 basic health unit
3	Education	Rs. 27 bln	6,800
4	Highway and Roads	Rs. 38 bln	1,800 km (Highways) and 4,500 Km (Roads)
5	Agriculture sector	Rs 113 bln	3.1 mln acres land
6	Live Stick and fisheries	Rs.12 bln	-

### PAKISTAN BUREAU OF STATISTICS LAUNCHED

The government has approved the reorganization of the federal statistical system and introduced a new entity named Pakistan Bureau of Statistics (PBS) to make it more responsive to the national requirements.

For the purpose of increased autonomy and credibility the federal bureau of statistics, population census organization, agricultural census organization, and the technical wing of statistics division have been merged into the PBS (4).

### RECOMMENDATIONS

Census provides detailed information firstly, the population estimation, also in all sectors like social economical, agricultural and other aspects of life. it take great importance in the formulation and evaluation of public policies .Pakistani government should designed some strategies to modernizes statistical sector.

- With the help of statistical profile of destruction of recent flood, government can take important measures in the new strategy of policy making and the solution of variety of objectives like rehabilitation, destruction, inflation, decline of GDP, economic recession and other important factors.
- Government should take short census in every five year. It is the best way for the development of the country.
- Pakistan mostly relied on ad hoc schemes. There is urgent need to providing accurate, reliable and timely data on various economic and social variables for the purpose of farming and evaluating welfare augmenting public policies in the social and economic field.
- Government should focus in the establishment of permanent and truly autonomous and economic commission to identify and fill the various lacunae in Pakistan's economic management and information system.

### CONCLUSION

“We reap what we sow, so the saying goes” In the matter of statistics, if not economics, the failure to sow is more often by design than by accident. It ensures from the mentioned facts and research that a modern life style seems completely handicapped and at times, highly improbable in the absence of statistics and its application. We would find difficult to reach at important decision and perform everyday task without the help of statistics.

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**HUMAN RESOURCE DEVELOPMENT AND TRAINING**

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**ABSTRACT**

Human are the backbone of universe and whole world is created for them so they are most precious and important capital. They are strength of any country n strongest resource ever calculated. Human resources is a relatively modern management term, coined in the 1960s and used to describe:

“The individuals who comprise the workforce of an organization.”

No one is perfect in the world and need some basic training to develop their skills and abilities. Human Resource Development (HRD) is the framework of helping employees to develop their personal and organizational skills, knowledge, and abilities. Human Resource Development includes such opportunities as employee training, employee career development, performance management and development. It can also be defined as:

“A set of systematic and planned activities designed by an organization to provide its members with the necessary skills to meet current and future job demands.”

Industrial Revolution increases need for trained workers to design, build, and repair machines used by unskilled workers;

Companies started machinist and mechanical schools in-house;

Shorter and more narrowly-focused than apprenticeship programs;

To increase the performance and capability of work, under the supervision of HRM a department is designed to perform the following task:

1. Training and development (T&D)
2. Organizational development
3. Career development

- 1. Training:** Improving the knowledge, skills and attitudes of employees for the short-term, particular to a specific job or task – e.g.,  
Employee orientation  
Skills & technical training  
Coaching  
Counseling

**Development:** preparing for future responsibilities, while increasing the capacity to perform at a current job  
Management training  
Supervisor development



2. **Organizational Development:** The process of improving an organization's effectiveness and member's well-being through the application of behavioral science concepts  
Focuses on both macro- and micro-levels  
HRD plays the role of a change agent
3. **Career Development:** Ongoing process by which individual progress through series of changes until they achieve their personal level of maximum achievement.  
Career planning  
Career management

In this paper, an exclusive attempt has been made to display the Human Resource Development and Training along with its significant, impact and essence. Furthermore, the cardinal functions have been described with a detail. It also includes the critical and analytical approach towards the human resource development and training which will assist for the betterment and prosperity in our country.

## INTRODUCTION

The Human Resources Management (HRM) function includes a variety of activities, and key among them is deciding what staffing needs you have and whether to use independent contractors or hire employees to fill these needs, recruiting and training the best employees.

Note that some people distinguish a difference between HRM (a major management activity) and HRD (Human Resource Development, a profession). Those people might include HRM in HRD, explaining that HRD includes the broader range of activities to develop personnel inside of organizations, e.g., career development, training, organization development, etc.

"HR Department" as playing a major role in staffing, training and helping to manage people so that people and the organization are performing at maximum capability in a highly fulfilling manner.

Training and development encompasses three main activities: training, education, and development

### **What is a Human Resource**

Human resources is a term used to describe the individuals who comprise the workforce of an organization.

### **Definitions of Training development**

Training and development is a process dealing primarily with transferring or obtaining knowledge, attitudes, and skills needed to carry out a specific activity or task.

### **Difference between Training and Development**

Training is concerned with the immediate improvement of the employee, i.e. the ways to make the employee more effective in his current role whereas development is a process to make the employee efficient enough to handle critical situations in the future, i.e. how well he can equip himself for the future demands.

## **TRAINING AND DEVELOPMENT OBJECTIVES**

There are four other objectives: Individual, Organizational, Functional, and Societal.

### **Individual Objectives**

Help employees in achieving their personal goals, which in turn, enhances the individual contribution to an organization.

### **Organizational Objectives**

Assist the organization with its primary objective by bringing individual effectiveness.

### **Functional Objectives**

Maintain the department's contribution at a level suitable to the organization's needs.

### **Societal Objectives**

Ensure that an organization is ethically and socially responsible to the needs and challenges of the society.

### **Importance of HR Training and Development**

Training and Development helps in increasing the productivity of the employees.

Training and Development helps in inculcating the sense of team work.

Training and Development helps to develop and improve the organizational health culture and effectiveness.

Training and Development helps building the positive perception and feeling about the organization.

### **Types of training and development**

There are seven types of training and development programs.

1. Technical training,
2. Quality training,
3. Skills training,
4. Professional training,
5. Functional training
6. Team-bonding activity,
7. Managerial training.

### **Steps of training and development**

1. Analyze
2. Design
3. Development
4. Implementation
5. Evaluation.

### **Six types of Training and development Techniques**

1. On-the-job Training and Lectures
2. Programmed Instruction (PI)
3. Computer-Assisted Instruction (C)

4. Audiovisual Techniques
5. Simulations
6. Business games

### **ISSUES IN TRAINING PROGRAMME**

- Lack of Alignment With Needs
- Failure to Recognize Non training Solutions.
- Lack of Objectives to Provide Direction and Focus.
- The Solution Is Too Expensive  
Regarding Training As An Event.
- Participants Are Not Held Accountable for Results.
- Failure to Prepare the Job Environment for Transfer.
- Lack of Management Reinforcement & Support.
- Failure to Isolate The Effects of Training
- Lack of Commitment & Involvement From Executives.
- Failure to Provide Feedback & Use Information About Results.

#### **Training evaluation**

The process of examining a training program is called training evaluation.

#### **Purposes of Training Evaluation**

The five main purposes of training evaluation are:

1. Feedback.
2. Research.
3. Control.
4. Power games.
5. Intervention.

#### **Process of Training Evaluation**

1. Before Training.
2. During Training.
3. After Training.

#### **Techniques of Evaluation**

The various methods of training evaluation are:

- Observation
- Questionnaire
- Interview
- Self diaries

### **BENEFITS OF TRAINING AND DEVELOPMENT**

Benefits of training are intangible and investing in training benefits both, organization and employees for a long period. Training enhances a worker level of skills. It provides sense of satisfaction, which is an intrinsic motivator. Training also provides organization multi skill employees. Training increases an employer commitment to their job and their organization. Better understanding of jobs reduces accidents.

### **CONCLUSION**

Training and development is an important part of human resource management. This field focuses on diverse organizational activities,

- Helps in understanding and carrying out organizational policies in a more enhanced manner.
- Develops leadership skills, motivation, and loyalty.
- Better attitudes among the employees.

### **RECOMMENDATIONS**

1. A training and development program must align with needs and requirements of an organization.
2. Training should have some defined Objectives To Provide Direction And Focus
3. Management Reinforcement & Support should also be provided
4. Provide Feedback & Use Information About Results
5. Commitment & Involvement From Executive is necessary for affective training and development.
6. For training programs to be successful, participants must individually drive performance.

## IMPACT OF CLIMATE CHANGE ON FLORA AND FAUNA IN PAKISTAN

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### ABSTRACT

The term flora and fauna means the plants and animals respectively. Flora, fauna environment and man form a natural balance. They all are biologically inseparable because of their interrelationship. This relationship is very much important for the survival of them.

Pakistan is a very beautiful country. It has a long stretch of high mountains in its North and North West plateaus in Balochistan, and potohar, plains of Indus and patches of desert in Punjab and Sindh. This environmental and climate variety support an immense diversity of both flora and fauna. It includes blue pine (*Pinus exelsa*), chir pine, chalgoza pine (*Pinus giradiana*), deodar (*Cedrus deodar*), fir, juniper, and olives etc found in the mountains of northern and north western part of Pakistan. The mosses, lichens, and members of family Ericaceae, and Rosaceae formed the ground flora in these areas. The Flora of desert region consists of Acacia, Euphorbia, cappariss, Neem, Sheesham, etc and. The flora of plains included wheat, maize, rice, sugar cane, cotton, pea, potato, tomato, grains, mangoes oranges bananas, walnut, almond etc. and variety of algae in fresh water and marine plants. The Pakistan is also full of fauna consist of sheep, deer, wild goat, squirrels, wolves, leopards, lynx, Tenebrionid beetles, mantis, grass hoppers, insects, amphibians, reptiles and mammals and fishes included Rohu, pullah, khagga, skates etc and migratory birds.

Unfortunately, the man made activities included rapid deforestation, emission of large amount of green house gases ( $\text{CO}_2$ , methane, chlorofluorocarbon,  $\text{SO}_2$ , nitrogen oxide) pollution and industrialization change the natural environment of the world. These activities make the natural phenomenon unbalance and are main reason behind the climate change. Climate includes patterns of temperature, humidity and seasons. The climate change refers to the statistical distribution of weather over period of time. The climate change is the biggest environmental threat in the modern times and is likely to have profound consequences on the all aspects of life. Fastly melting glaciers, Rising Ocean, wide spread flooding and acid rains are the result of climate change.

It affect on availability and use of water for drinking and irrigation alternately food production, forest health and management of natural resources. That is why the flora and fauna of many regions now going to distinct. In a nut shell it disturbs the whole biodiversity of a region.

It is the fact that Pakistan contributing only 0.43 percent of the world's total green house gases and is on 135<sup>th</sup> in world's ranking, yet it is faced severe problems due to climate change. It is because that the flora and fauna of Pakistan mostly depend on the rivers which arise from the Himalayas range. Any disturbance in the quality and quantity of water may damage the whole food cycle.

This paper will make help to suppress the damage of climate change on flora and fauna because it plays main role in their socio-economic development.

## INTRODUCTION

Pakistan is lying in the west part of south Asia; between the latitudes of 23.45 and 36.75 norths latitude and between the longitudes of 61 and 75.5 east, the country is surrounded by the Himalayan in the north. It has an altitude ranging from 0 to 8611 m. The total area of Pakistan is 796,096 km<sup>2</sup> and stretches over 1,600 km<sup>2</sup> north to south and about 885 km<sup>2</sup> broad east to west (1).

## CLIMATE OF PAKISTAN

It refers to the long term patterns in the earth weather. It includes patterns of temperature, humidity and seasons. Tendencies of the large areas of planet to the wet, dry, hot or cold are example of climate, as Pakistan is located in north of the tropic of cancer, it has a continental type of climate, characterize by extreme variations of temperature.

According to the Koppen Geiger classification of climatic zones, where zones are defined on the basis of monthly temperature and precipitation data, there are 11 distinct as well as overlapping climatic zones in the country. These range from zones characterized by mild, moist winters and hot dry summers in the north to semi-arid and arid zones in the west and parts of the south. The north-eastern mountainous and sub-mountainous areas receive more than 1,700 mm annual precipitation with a major share (over 1,000 mm) from the summer monsoon. On the other hand, the extremely arid plains of southwest Balochistan province receive only 30 mm during the whole year. Thermal regimes exhibit extreme diurnal, seasonal, and annual variations as the temperatures can fall as low as -26°C over the northern mountains and go as high as 52°C over the central arid plains. In the semiarid plains, temperatures of 42°C are recorded at various stations in the months of May and June (2).

## IMPACT OF CLIMATE CHANGE

The climate change refers to the statistical distribution of weather over period of time, commonly known as global warming, caused by emission of heat trapping gases produced by vehicles, power plants, industrial process and deforestation, Over heating the planet and threaten flora, fauna, our health, our economy and our environment.

Pakistan is among the countries which will be hit hardest by effects of climate change. Climate Change is causing damage to Pakistan's environment which causes biodiversity loss, rise in sea level, increasing droughts, shifts in the weather pattern, increasing flooding, changes in fresh water supply and an increase in extreme weather events. Climate change would impact slowest in tropical and subtropical coniferous forests, temperate forests, so called mountain grass lands and shrub lands. But Deserts, mangroves, grassland and savannah would be hit fastest (Daily Dawn; Species face race against climate change).

S#	Changes due to climate	In figure
1.	Increase in temperature	6 <sup>o</sup> C
2.	Increase in Sea Level	9cm – 88cm
3.	Increase in un-seasonal rains	Estimated to be 90%
4.	Warm and dry air	66% possibility in 21 <sup>st</sup> century
5.	Glacier melting	7% per annum

Source: Daily dawn; Wake-up call on climate change across the globe today; 21 Sept., 2009.

### IMPACT OF CLIMATE CHANGE ON FLORA

“Lo! Allah (it is) who splitteth the grain of corn and the date stone (for sprouting). He brings forth the living from the dead, and is the bringer-forth of the dead from the living. Such is Allah. How then are you prevented?”

(Surah Al-An’ am, Ayah 96)

Pakistan has a rich and diversified flora with many ecosystems, habitats and species of global significance because of the wide variety of soils, topography, and climate change.

- **Pakistan’s Forest land Area:**

S#	Regions	Total Land area	Land area in%
1	Pakistan Forest	4.224 million ha	4.8%
2	Agriculture land	79.9 million ha	-
3	Canal irrigated	18 million ha	-
4	Seasonal irrigated land	4 million ha	-
5	Cultivated land	22 million ha	23.4%
6	livestock grazing	28.509million ha	32.4%
7	forest area of Sindh	0.678 million hectares	16%
8	Forest area of Punjab	608,000 ha	
9	Khyber Pakhtunkhwa	1,684,000 ha	40 %
10	Balochistan	59,000 ha	
11	Azad Kashmir	275,000	15.8 %
12	Northern areas	666,000	6%

Changing climate would affect competitiveness of species or groups by altering growth and mortality rates differentially as well as the regeneration success rate. The life cycles of plants, animals, and soil organisms could be potentially affected also.

- **Flora in Pakistan:**

S#	Flora	No of Floral Species	Endemic species
1	Flowering Plant species	6000 (1)	400
2	Wild plant species	6000	-
3	Species grow in mountainous region	400	-
4	Medicinal plants	700	-
5	Angiosperm	5700 (2)	380
6	Gymnosperm	21	?
7	Pteridophyte	189	-
10	Mangroves tree	8	-
11	Zygophyllaceae family	8 genera +22 species	-

Source: Nasir, E. and Ali, S.I., 1969-1989, Flora of Pakistan, Nos. 1-190, Department of Botany, University of Karachi and PARC, Islamabad, Shinwari et al. 2006

S#	Region	Size of Flora (No of Species)	Total No. of Medicinally Important Species	Threatened Flora
1	Chitral	± 1,600	800	150
2	Kashmir	1,500	900	200
3	S.Warizistan	425	323	??
4	Sindh	1,185	700	100
5	Hazara	1,759	>1000	??
6	Swat	1,550	500	87
7	Balochistan	1,330	700	>150
8	Kurram Agency	1,200	>600	>100

#### Effect of increasing temperature:

Increased temperature alone or in combination with increased CO<sub>2</sub> concentration in general results in northward and upward movement of cold and temperate conifer forests in Pakistan. The first-order effects of an increase in temperature could be the timberline moving up the mountain slopes, disappearance of alpine grasslands in those areas where mountain tops are just above the timberline, and changes in plant composition, cover, and location.

Fourteen crops (eight field crops, three vegetables and three fruits) were considered for evaluating the potential vulnerability of crops to heat stress under a climate change scenario of a rise in temperature of 0.3°C per decade. The crops like wheat, cotton, mango, and sugarcane are more severely affected, as the prevailing maximum temperature is more than 10°C higher than the optimal range. Any fractional rise in temperature would therefore have serious adverse effects as would considerably increase the growing degree-days. This would not only affect the growth, maturity and productivity of crops but also would require additional amount of irrigation water to compensate heat stress rather cooling of crops might become an essential element of the crop production system.

Pakistan is predominantly an arid country and the maximum temperature in summer exceeds more 40°C in the central and southern parts of the country. A small increase in mean temperature can translate into much higher ambient temperatures in the planting and growing periods. A significant increase in growing degree days reduces the growing season length for the crop, and may result in reduced yields.

High temperature and increased precipitation reduces the dormant period for insects and increases the length of active period. Moreover, longer summers with early onset of growth may lead to more development of weeds in spring, which in turn can aggravate the spread of forest pests and pathogens. This may result in greater damage to forest vegetation due to the increase in prevalence of defoliating, sap sucking and stem boring insects. The spread of pests and weeds may also pose additional challenges to the relevant departments in charge of forest protection and management

It is apparent that impacts of a changing climate on the coniferous forests of northern Pakistan include (1) an increase in area, (2) an increase in productivity, and (3) changes in species composition. The total area of 3 main coniferous forest biomes (cold, temperate, and warm conifer) increases under all climate change scenarios (5)



**Effect of Droughts (Reduced rainfall):**

Areas comprising Pakistan have seen Changes in the availability of water since 1975 have resulted in a significant shift in cropping patterns. There has been an increase in cropping area for high water demanding crops like rice, cotton, sugarcane, and a decrease in low water demanding crops like coarse grains and fruits and vegetables.

Eight mangrove species are reported along the coast of Pakistan, with *Avicennia marina* being the most dominant. Some species have been reported to be rare or have disappeared from the delta because of human activities coupled with adverse physical and environmental research.

Rainfall patterns have become very erratic, Precipitation has decreased 10 to 15 per cent in the coastal belt and hyper arid plains over the last 40 years while there is an increase in summer and winter rains in northern Pakistan, the duration of the cropping period has shrunk, with a forward shift in sowing time and an earlier harvest.

**Effect of Floods (Increased Rainfall):**

Foreign Minister Shah Mehmood Qureshi also said that Pakistan's flooding "reconfirms our extreme vulnerability to the adverse impacts of climate change". Sixty-seven percent of world's glaciers are retreating at a startling rate in the Himalayas and the major causal factor has been identified as climate change (Ageta and Kadota, 1992; Yamada et al., 1996; Fushinmi, 2000). Glacial melt will affect freshwater flows with dramatic adverse effects on biodiversity and livelihood.. These conflicting findings make the impact of climate change on Karakoram glaciers and resultantly make Indus River flows very uncertain. Excessive rainfall results in floods water logged soil causes plants roots to rot and heavy rainfall damages tender young plants. It damages the crops and irrigated land area.

As a result of 2010 flood In Pakistan, in Sindh region 700, 000 acres kharif crop destroyed.

**According to federal government by Sindh agriculture department (Aug-6-2010)**

S#	Crops	Area of Sowing	Target production	Last year Production
1	Rice	464,000 ha	2.052 mln tons	2.4 mln tons
2	Cotton	568,491 ha	4 mln bales	4.208 mln bales
3	Sugar Cane	269,000 ha	15.17 mln tons	13.41 mln tons

There has been a shift in the potential boundaries of cotton during the last 30 years due to a rise in the water table in cotton growing areas. In order to cope with this situation, the areas of central Punjab and Sindh province, which previously produced cotton, shifted to other crops. Food crops in Pakistan are normally grown on flat surfaces using basin irrigation. However, due to shortage of water and change in plantation and irrigation methods, the farmers are now growing onions, potatoes, tomatoes, cauliflower and cabbage on ridges using furrow irrigation. The most common and widely accepted adaptation method was the use of high yielding cultivars of wheat, rice, maize, cotton crop, and chemical fertilizers during the Green Revolution period.

### IMPACT OF CLIMATE CHANGE ON FAUNA

“There is not an animal (that) lives on the earth, nor a being that flies on its wings, but (forms part of) communities like you”.

(Sura Al-Anam, Ayah 38)

The diverse and surprising composition of fauna of Pakistan is mainly due to its affinities to two of the major faunal regions:

- 1) The Palearctic region west of the Indus, and
- 2) The oriental region east of the Indus.

The diversity of life forms has been affected by human activities. These activities have caused environmental degradation ranging from pollution to biological invasion from the introduction of exotic species in the region and leading to decrease and loss of biodiversity.

S#	Animal type	Species found in Pakistan	Endemic species	Endanger species	Vulnerable Species
1	mammal species	174	6	44	20
2	bird species	668	?	25	22
3	reptile species	177	13	10	3
4	amphibians	22	9	1	-
56	Fresh water fish specie	198	29	1	-
7	Marine fishes	788	-	5	-
8	Invertebrates				
	Echinoderms	25	-	2	
	Marine Molluscs	769	-	8	-
	Marine Crustaceans	287	-	6	
	Marine Annelids	101	-	1	

Source: Third National Report- Pakistan and biodiversity action plan for Pakistan 2000.

Biodiversity in Pakistan is under serious threat due to excessive depletion of natural resources.<sup>1</sup> Pakistan: Strategic Country Environment Assessment by WB (Sep, 2007) The latest red-list of endangered species in Pakistan, released by the World Conservation Union (IUCN), includes the Blue Whale, Fin, Whale, Hotson's Mouse-like Hamster, Indus River Dolphin, Markhor, Urial, Snow Leopard, Woolly Flying Squirrel, Brown Grizzly Bear, Western tragopan, Hobara Bustard, Siberian White Crane, Olive ridly turtle, Green turtle, Marmot, Blackbuck and Sand Cat.

The Following list include all mammals which occur in Pakistan and are rated as critically endangered or vulnerable species in 2005 IUCN Red list of threatened animals.

S#	Name of vulnerable species	Scientific names
1	Argali	Ovis ammon
2	Asiatic Black Bear	Ursus thibetanus
3	Blackbuck	Antilope cervicapra
4	Dugong	Dugong dugon
5	Eurasian Otter	Lutra lutra
6	Fishing Cat	Prionailurus viverrinus
7	Geoffroy's Bat	Myotis emarginatus
8	Humpback Whale	Megaptera novaeangliae

9	Lesser Horseshoe Bat	Rhinolophus hipposideros
10	Mediterranean Horseshoe Bat	Rhinolophus euryale
11	Mouflon (or Urial)	Ovis orientalis
12	Sind Bat	Eptesicus nasutus
13	Smooth-coated Otter	Lutrogale perspicillata
14	Wild Goat	Capra aegagrus

Large reduction in productivity of both warm water and cold water fishes due to depletion of oxygen in aquatic system. Freshwater wetlands will face fundamental changes in temperature, water flow, salinity, and geographical patterns due to climate change. Climate warming could result in higher surface water temperatures and extended intervals of thermal stratification. Higher groundwater temperature could increase the river water temperature throughout the year, with adverse effects on freshwater fisheries.

As a result of sea level rise, large scale inundation of coastline and recession of flat sandy beaches; upstream incursion of saline water in the Indus delta; and risk to mangroves, coral reefs and breeding grounds of fish.

Warming seas are causing corals to bleach. Normally corals recover from bleaching episodes, but now reefs are dying, destroying fisheries, because oceans are absorbing growing amount of CO<sub>2</sub> and becoming increasingly acidic (Coral climate crisis puts 250 million at risk: United Nations).

Areas now comprising Pakistan have experienced several droughts, of which the most recent and perhaps the most severe occurred in 1999-2000. The drought occurred in several districts of the provinces of Sindh and Balochistan. . It was also reported that about 30 million livestock were affected, including over 2 million that have died.

Wildlife experts believe that some 80 per cent decline has been witnessed in the population of migratory birds in Punjab in recent years mainly due to vanishing of forests, hunting, poaching, environmental pollution and massive construction activities. Millions of migratory birds enter the wetland areas of Pakistan from Europe and Central Asian states to escape winter.

The migratory birds which include falcons, cranes, swans, ducks, flamingos, waders and geese start reaching Pakistan early September till February and start flying back to Europe and Central Asia by March.

The UN has warned that 84 per cent of migratory birds have the potential to be affected by climate change. Lowered water tables, changes in food supplies and prey range, rising sea levels, and increased storm frequency are the biggest threats to birds, said the UN officials. Around 19 per cent of all known birds are considered to be migratory, of which 11 per cent are 'globally threatened or near threatened'.

## CONCLUSION

In the light of above mentioned facts it is crystal clear that climate change is not only affecting the flora and fauna but destroying very fabric of eco- balance which in turn causing economic instability in Pakistan .with the help of mentioned suggestion recommendation the climate change factor may be reduced. Pakistan is emerging as a

vulnerable country for climate change. This harrowing situation not only dangerous for Pakistan but in this dreadful scenario, the dream of a peaceful world with its natural eco-balance cannot be full filled. Now, it is the need of the hour to bring this important issue on the international forum otherwise, this catastrophe will engulf the whole world one-day.

### RECOMMENDATIONS

#### Marine Protected Areas (MPA);

Marine protected area is an area in the coastal zone of land or sea specially dedicated to protection and maintenance of biological diversity and of natural and associated cultural resources and managed through legal and effective means. Pakistan needs to designate Marine protected area MPA's in order to restore mangroves and its eco system, corals and coral reef fishes, marine turtles , whales and dolphins, and planktons and pelagic environment. There are number of species and habitat that require conservation and for this purpose designation of marine protected areas along the coast of Pakistan is inevitable because they ensure better management of ecosystem and environment further linked with economic and social stability provided by the sustainable use of resources. The need is also in line with commitment of the government of Pakistan under the international biodiversity convention to establish MPAs in Pakistan.

### SUGGESTIONS

- There is a dire need to term strategy to maintain essential ecological habitat, preservation of genetic diversity and sustainable of species and ecosystem.
- The municipal solid waste is mainly disposed off by dumping it in a landfill. The landfill is a large hole in the ground or even a bare piece of land.
- The use of that petrol which contains lead must be prohibited.
- Recycling process can be very beneficial in controlling climate change.
- Green revolution can be used as a better strategy to confront the harrowing effect of climate change.
- The dumping down of liquid waste in sea is destroying of ecosystem of ocean.
- The use of environmental friendly products must be appreciated.
- Media can play pivotal role in awaring general masses with the harrowing outcomes of climate change and can teach alternative measures to reduce carbon emissions.

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**NUMERACY: IS AN EFFECTIVE TOOL TO EVALUATE THE  
EFFICACY OF ALL LABOUR POLICES OF A COUNTRY**

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**ABSTRACT**

Numeracy is a basic knowledge of mathematics; enhances understanding to work with numbers.

Since the creation of Pakistan several labour polices have been announced by government. All these polices basically laid down the parameters for the growth and development of trade unionism; protection of workers' rights; the settlement of industrial disputes and shows the number of developments took place in the intervening periods.

Numeracy is a basic unit for the measurement the efficacy of anything so that the labour unrestness and low productivity may also be evaluated with the help of numeracy.

The recent labour situation all over the country shows that most of the labour polices were not helpful because one or some other reasons so it is dire need of practicable suggestion and recommendations to the government, think tanks and policy makers for the required changes in the labour market as well as in our industries. The labour force of a country is an agent of productivity and development; the tool of numeracy gauge the accurate labour potential of a country that leads the absolute materialization of labour force in the required field will bring the outrageous economic stability. The polices of 1955, 1959, 1969, 1972, 2002 and 2010 may bring some results for the labour market and workers betterment; therefore the tool of numeracy or statistical data clearly evaluate the maximum and minimum industrial production, growth of trade, employed and unemployed labour force of a country; also effective to detect the various flaws in the labour polices provide the sense of direction to turn these flaws into result oriented mechanism that can run parallel to the labour market and escalate the socio-economic development of a country.

The analysis of all labour polices in the light of numeracy will instigate the demand of new technology and training activities and guide the correct methodology for the solution of labour unrestness including less industrial productivity, trade deficit will also provide understanding to increase the efficacy of labour polices.

Numeracy or and statistical approach will also helpful to check and arrest social evils and the various hurdles that impede the smooth implementation of labour polices accordingly.

In this paper an attempt has been made to promote the sense of understanding through analysis of all the labour polices under the support of numeracy for the betterment of labour related issues in Pakistan; in the light of statistical data acquired from different data collection organization and institution level which helps to evaluate our present

labour unrestness in and appropriate manners and will motivate the policy makers to take proper measures for effectiveness and efficiency in various social, political and economic divisions by bringing certain changes in labour polices.

## INTRODUCTION

Numeracy is a basic knowledge of mathematics that enhances ability to understand and work with numbers.

Since the birth of mankind; he witnesses the need of numeracy that links the divine bounty to human ability to read, write or count. Numbers have always speak, the simple and unique language as they can easily be understood and memorized rather than of any other language. Men equip himself with remarkable contribution of numbers that is present & gauge in our daily routine in the form of calendar and time clock that give the accurate sense to conduct and manage the daily business likewise syllabus of social and natural sciences designed to enlighten the hearts and minds of the people also aims to impart education and develop skills. A part from it introducing numeracy in the shape of (i) line graphs, (ii) Bar graphs (iii) Histogram (iv) Circular graphs. The lines, may they be zigzag; smooth or circular speak the facts that attract the readers the same way as in palmistry. The graph is often an effective method of clarifying a point or text. As a matter of fact the lines in graph or chart tend to attract and arrest the reader's attention more readily in comparison to the world of words or figures.

The sprit of formation of any policy is to provide a framework for further process in the relevant business that's why the forest policy, Anti narcotics policy and labour policies are all always considered as a guide line to fulfill the duties well.

The labour policies of 1955, 1959, 1969, 1972, 2002 and 2010 given after the creation of Pakistan but all the labour laws and rules that were in practice in undivided India at the time of partition came into force in Pakistan.

Following salient features of all labor policies may clearly explain the causes of labor unrestness, productivity and bilateralism in industries in our country

### **Labour policy of 1955**

- i. Healthy and appropriate trade unionism.
- ii. Resolution of the dispute by the mutual consultancy.
- iii. Mutual mediation, conciliation and arbitration.
- iv. Worker's rights.
- v. To emancipate the workers from forced work
- vi. Welfare of the workers.

### **Labour policy of 1959**

- i. Obligation of the all conventions of ILO ratified by Pakistan.
- ii. Promotion of healthy trade union.
- iii. To Promote and harmonize relationship between employee and employer for the better production.
- iv. To provide social facilities as education, health, residence and recreation.
- v. Establishment of employment agencies and also employment program.

**Labour policy of 1969**

- i. To increase production and fair distribution of gain profit.
- ii. Settlement of industrial disputes by the mutual dialogues.
- iii. Promotion of the establishment of trade union.
- iv. Solution of industrial disputes
- v. Prohibition of strikes in the department of basic utilities.
- vi. Estimation of minimum wages of the workers.
- vii. Establishment of worker's welfare fund.

**Labour policy of 1972**

Labour policy of 1972 envisaged workers participation in the management, extent ion in the scope of labour laws, enactment of laws relating to employees old-age benefits, workers children education, introduction of statutory bonus and group insurance schemes establishment of quasi-judicial body namely: N.I.R.C National Industrial Relations commission and the procedure for redress of workers individual grievances.

**Labour policy of 2002**

Under the labour policy of 2002, I.R.O, 2002 enacted to amend, consolidate and rationalized the law relating to formation of trade unions, regulation and improvement of relation between employer and workmen and avoidance and settlement of any differences or disputes arising between them.

IRO, 2002 was comprised on principles, aims and objectives which clearly shows that ordinance was given some weight age in respect of promotion of trade unionism by social dialogue mechanism. It was added that child labour and bounded labour will be eradicated and the worker in the agriculture sector, home based workers, seasonal workers and contractor worker were safeguarded.

**Labour policy of 2010**

The labour policy of 2010 is the need of hour. It will protect legitimate rights and interests of workers and employers and minimize the area of friction which compels either of them to agitate or emphasis an opportunities for productive, remunerative and safe work; skill development and employment. And the main element of this policy is human resource development.

All the labour policies basically laid down for the parameters for the growth of trade unionism; the protection of workers rights; the settlement of industrial disputes and redressed of workers grievances.

Fundamental rights concerning labour as laid down in the constitution of the Islamic republic of Pakistan and international labour standards enunciated in ILO conventions ratified by Pakistan provide necessary frame work for evolving a sound and stable mechanism for ensuring care labour rights, the labour laws and the system of labour administration in Pakistan.

Of all the previous policies, the labour policy of 1972 was the most progressive one, which reformed the labour laws and set out benchmarks including new administrative infrastructure to manage the worker's welfare viz. workers welfare fund ordinance; employee old-age benefit Act; amended industrial relations ordinance with enhanced protection of workers rights like imposing condition on the authority of employer to

terminate workers job. The scope of labour laws was enhanced and benefits such as workers participation in factory management; increase in workers share in company's profits from 2% to 4% and then to 5%; nomination/election of shop-stewards to disputes through works council; establishment of workers children's education cess; representation of workers on the governing body establishment under workers welfare fund ordinance; and increase profit sharing, statutory bonus, group insurance scheme, group incentive scheme, etc were granted.

The decade of 60's and 70's were turbulent period in the history of industrial relation in Pakistan, strikes, go-slow, lockouts and litigations were the most distinctive features of employees workings together in close cooperation to ensure productivity, profitability and growth of business and security of employment was largely non-existence. As and consequence, both the entrepreneur and labour in fact the economy of the country as a whole have suffered greatly there difficulties have been composed by exploding population influx of Afghan refugees which have further aggravated unemployment and depress the job market but slowly and steady the workers education brought source changes trade unions in most of the organizations discarded militancy and employees recognized the need and benefit of co-opting labour as partners in productivity.

### **BILATERALISM**

Bilateralism was the core element of the former labour policies. The principle objective and action program of the former policies were to concentrate on the creation of relationship of trust and co-operation between employer and employee under the strategy of least intervention by the state. A visionary approach adopted in the labour policy is and focus on dignity of labour, fair balance of bargaining power and productivity-based work culture with fair and equitable distribution of gain and proceeds of industry amongst employee, entrepreneurs and the society at large.

### **HISTORY OF LABOR LAWS**

Islamic Republic of Pakistan emerged on the map of the world on 14<sup>th</sup> Aug, 1947 from the outset; the country was beset with tremendously complex socio-economic, political problems, though Pakistan won its independence from British, Hindus rule, yet no stone were left unturned by them in creation enormous problem in Pakistan.

At the time of the Independence, the parts of the sub-continent, which included in Pakistan, was very backward in industrial development out of 887 large industries of Indo-Pak, Pakistan inherited only 34 large industries viz 16 cotton, 9 sugar, 5 cement and 4 glass factories.

Pakistan adopted the same system of labour administration and labour laws which were prevalent in the sub-continent, before partition.

Under the constitution of Islamic Republic of Pakistan, 1962, the labour was brought on the concurrent list. Thus in year 62, the subject labour was also looked after by West Pakistan Government and East Pakistan Government.

History of labor laws and issues are very interesting, very clear picture appeared after the formation of ILO in the year 1919. Labor legislation in our country began with the



industry dispute Act 1947, then industrial disputes ordinance in the year 1959, 1969, then IRO 1969, 2002 and IRA 2008, the same was rejected on the basis of the retrogressive nature of the law but the same remain functional for at least 2 years and repealed on the 30<sup>th</sup> April 2010 under section 87(3) of the same law.

An interesting situation appeared when high court in Karachi, Summoned secretary for labors regarding the non-availability any remedies for the workers all over the Sindh. Honorable Judge of High Court stated that, “It is highly regrettable and painful to not that since after repealing of the above Act, the laborers and workers at the mercy of their employers, which is the matter of grave concern and reflect the apathy in difference of those responsible for providing protection to the down trodden”. But the constitutional petition D- 1432 of 2010, in the court of Justice Gulzar Ahmed and Justice Shahid Anwar Bajwa the order of IRO 1969, dated 18/6/2010 came back operational. After few days Sindh Assembly took up this matter and hitherto the real shape of constitution did not observed. Courts have stopped to peruse the cases; governor of sindh revived the same law through the notification dated: July 05, 2010.

In the current paper the matter which is pointed out that how the pell-mell in workers and uncertainty of rights affects on Industrial production and labor laws proved to help full in maintaining industrial peace. In this regard if we pay reflection in the history of industrial conflicts so it will needless to say that countless conflicts has been solved by labor court, NIRC, SLAT and high courts; many of them are in pending and on the basis of research new solutions can be found.

Since creation of Pakistan, 6 labor policies have been announced by the governments in the year 1955,1959,1969,1972, 2002 and 2010.

All these policies basically laid-down the parameters for the growth of trade unionism; the protection of worker’s right; the settlement of industrial disputes and redressed of worker grievances.

Labor un-rest ness and lacking of labor rights always remain a great cause of less productivity in our industrial economy, further the time to time spiritless and ad-hoc policies prove it a great impediment in over all development. It is argued, that labor laws in Pakistan became outdated, and that’s why the industrial peace is not established yet, in most of the industrial units and areas in our country.

The role of government agencies regarding the framing and implementing the existing, various labor laws is not effective because, most of the labor laws and time to time amendments were not considered according to their real wants and spirits.

Following labor laws became ineffective due to several flaws. All these laws may be amended under the requirement as suggested in the recommendations.

- 1) West Pakistan shops and establishment ordinance 1969.
- 2) West Pakistan hazardous occupation rules 1963.
- 3) Payment of wages Act 1936.
- 4) Minimum of wages ordinance 1961.
- 5) Factories Act, 1934.
- 6) West Pakistan industrial and commercial employment (standing order) ordinance 1968.

**IMPACT OF LABOR POLICIES****GDP**

Sr. No.	Years	Percentage
1	1988-89	7.4
2	1989-90	6.5
3	1990-91	8.7
4	1991-92	7.5
5	1992-93	7.9

**Source:** planning commission, eight five year plan. Islamabad: Government of Pakistan

**Daily wages of Rural Workers for Various Years Constant Prices of 1959- 60**

S.No.	Years	Real wages Rate (Rupees per day)	Annual Growth Rate for the period since the last mentioned year
1	1951-52	1.75	-
2	1959-60	2.02	1.81
3	1964-65	2.34	2.99
4	1969-70	3.44	8.01
5	1974-75	4.68	6.35

**Source:** M. Ghaffar Chaudhary (1982), Green revolution and redistribution of rural incomes: Pakistan experience. Pakistan Development Review, Volume XXI, No.3, p.88

**Trade Trends of Pakistan**

S.No.	Years	Exports (Rupees billion)	Imports (Rupees billion)
1	1947-48	0.44	0.32
2	1950-51	0.54	1.17
3	1960-61	0.54	2.17
4	1970-71	2.00	3.60
5	1980-81	29.28	53.54
6	1988-89	90.18	136.00
7	1989-90	106.47	149.00
8	1990-91	138.28	171.00
9	1991-92	171.73	230.00
10	1992-93	177.03	259.00
11	1993-94	205.00	259.00
12	1994-95	251.00	321.00
13	1995-96	198.00	286.00

**Source:** Extracted from economic survey of Pakistan 1993-94 Islamabad: Government of Pakistan, finance Division, p.138 (statistical appendix)

## CONCLUSION

The labour policy of 1955 reflects the economic impact in our economic business because the relationship between employee and employer remains in balance during the tenure of the policy. Additionally the development and the growth along with the production also boost up and the same was appreciated in the economic communities of the world.

Under the labour policy of 1959: Pakistan ratified several convention and protocol for the betterment of the workers that's why convention 87 and 98 of ILO provide a right to form a trade union; revisiting all amicable settlement of various problems/dispute between two groups.

The labour policy of 1969: given a right of Bilateralism created friendly atmosphere for the industrial relation resultantly wages of the workers settled down along with the formation of welfare fund for the workers.

In the light of mentioned policies including the labour policy 2010 the following recommendations may be counted as the part and parcel for the formation of up to date labour laws for understanding the grievances of the workers scientifically.

It is interesting to note that, only 5% workers, in our country are unionized which is not a good omen for industrial peace and tranquility. The devolved matter related to labor affairs have been identified on serial number 26, 27 and 30 of concurrent list where welfare of labor, provident funds, employer liability and workmen's compensation, health insurance including invalidity pensions, old age pensions are mentioned while Serial no 27 is concerned with, trade unions and industrial labor disputes. Finally Serial no 30 is related with regulation of labor and safety in mines, factories and oil fields.

## RECOMMENDATIONS

1. It is observed during the court proceedings that some time the spirit of the dispute or psyche of workers never provide any passage to judiciary to comprehend the same properly so, the retired persons/officer who is deemed fit may be appointed as solicitor or judge in a Labour court.
2. There should be institutions for training the concerned in the field of trade unions, conciliation and especially for the process of collective bargaining.
3. Trade unionism needs maturity; we should have first focused on sustainability of our economy with the help of positive Labour activities in our industry.
1. Our history of industrial and business development is actually history of denial of Labour right in our industrial phenomenon, which automatically encouraged weak enforcement of Labour laws. The finance Bill 2006 effectively increases daily work hours to 12 from eight reduced over-time compensation, and created a new category of temporary workers who are not entitled to any benefit allowed under the Labour laws, so it is suggested that;
4. Women the Labour most be covered under the separate Labour laws. It should be framed in the light of the female body chemistry.
5. More and more Labour inspections certainly unearthed the violation, so it should be covered under some Labour code also.

6. Labour leaders should provide Labour educations regarding activities in our country.
7. The Labour wings of religious as well as some other political parties may also be used as a tool to eliminate all sort of labour dispute.
8. There should be a Labour management committee like school management committee comprises workers employers and officials to resolve the dispute.
9. Equality and non-discrimination regarding gender are the important issues which need for a careful reading of the conventions underlying the declaration or even the constitution.
10. The wages of works should be increased the need of the time.

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**SOCIO-ECONOMIC DIFFERENCES AMONG DISTRICTS OF THE PUNJAB:  
A Cluster Analysis Approach Based on Multiple Indicator Cluster Surveys**

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**ABSTRACT**

In this paper we are trying to form internally homogenous groups of the districts in Punjab on the basis of their socio-economic indicators. The methodological approach is based on cluster analysis. The government of Punjab is committed to attain Millennium Development Goals (MDG) for poverty, health, education and water & sanitation. Districts are clustered using the data of Multiple Indicator Cluster Survey (MICS) 2007-08. On the basis of this analysis we have classified districts into five clusters and different poverty, health, education and water & sanitation indicators show marked differences in these groupings. Government planning can benefit from this study while preparing annual development plans for future and allocate resources according to the development indicators.

**KEYWORDS**

Cluster Analysis; Multiple Indicator Cluster Survey; Millennium Development Goals; hierarchical method.

**1 INTRODUCTION**

In a developing country like Pakistan, socio-economic progress is very essential in order to achieve a stronger economy. For any chance of success in achieving targets for improvement in indigenous socio-economic outcomes, policy makers need to understand where relative and absolute need is greatest. Punjab is the most populous province of Pakistan and its contribution to gross domestic product (GDP) is more than 50 percent. The government of Punjab is committed to attain the Millennium Development Goals (MDGs) regarding education, health, poverty and water & sanitation. Towards this end, the government has started to conduct a periodic survey to assess the gains of the efforts and to point out where the further improvements are required. So, in the present study we focus on the district level of the province of Punjab. Our aim is to examine the socio-economic differences among these districts and to classify them into relatively homogenous groups. At present, Punjab is divided into 35 districts.

The methodology used in this work includes multivariate statistical method - cluster analysis. It is the standard approach for analyzing socio-economic disparities between

territories. Similar analyses were already done for some countries (see for example Ozimek (1993) for US, Openshaw (1995) for UK and Soares et al. (2003) for Portugal).

When the number of factors (socio-economic indicators) is large, then factor analysis may be used prior to cluster analysis (Everitt, 1993). With factor analysis, the information contained in a wide range of observed variables is summarized. On the basis of the formed factors, cluster analysis is performed. However, in our case, where district data are analyzed, we have only a small number of suitable variables, so there is no need for factor creation and we also do not want to lose information.

Other papers applying multivariate statistical analysis to socioeconomic problems and, particularly, to the classification of different types of administrative divisions (municipalities, counties or regions) can be found in the literature: Cziráky *et al.* (2005), Aragon *et al.* (2003), González and Morini (2000), Soares *et al.* (2003), Peschel (1998), Pettersson (2001), Rován and Sambt (2003) or Rúa Vieites *et al.* (2003). Those studies are restricted to a smaller area inside Europe, specifically Croatia, the Midi-Pyrénées Region, Tenerife Island, Portugal, the Baltic Sea countries, a Swedish county, Slovenia and the Spanish region of Galicia in their respective cases. There are other contributions outside of Europe e.g. Stimson *et al.* (2001) focused on the United States of America and Hill *et al.* (1998) on Australia.

The rest of the paper is organized as follows: in Section 2, we describe and characterize the data used in this work. Section 3 is dedicated to finding clusters of regions presenting similar characteristics of development. Results and discussion is presented in section 4 and finally conclusions are stated in Section 5.

## 2 DATA DESCRIPTION

Multiple Indicator Cluster Survey (MICS) is an international household survey program developed by UNICEF. It has been conducted in more than 100 countries of the world. In Balochistan, first MICS was conducted during 2003-04 at district level with the technical and financial assistance of UNICEF. In Punjab, first such survey was conducted in 2003-04. The second survey was conducted with expanding the number of indicators and the sample size. The socioeconomic variables considered in the present study (Table 1) were selected from the Punjab Multiple Indicators Survey (2007-08).

**Table 1: Regional Indicators Considered in the Study**

<b>Indicator</b>	<b>Description</b>
Literacy rate 10+ years	Number of household members age 10 years or older who are able, with understanding, to both read and write in any language divided by Total household members age 10 years or older surveyed
Infant Mortality Rate	Probability of dying by exact age 1 year
Care provided by Lady Health Worker (LHW)	Number of women aged 15-49 years that were visited by a Lady Health Worker (LHW) in the last month divided by Total number of women surveyed aged 15-49 years

Indicator	Description
Skilled attendant at delivery	Number of women aged 15-49 years with a birth in the 2 years preceding the survey that were attended during childbirth by skilled health personnel divided by the total number of women surveyed aged 15-49 years with a birth in the 2 years preceding the survey
Use of contraceptives (any method)	Number of women currently married aged 15-49 years that are using (or whose partner is using) a contraceptive method (either modern or traditional) divided by Total number of women aged 15-49 years that are currently married
Reported tuberculosis	Number of household members who reported that they were diagnosed with tuberculosis in the past year divided by Total household members surveyed
Physical access to drinking water (within dwelling)	Number of household members living in households using improved sources of drinking water divided by Total number of household members in households surveyed
Use of sanitary means of excreta disposal	Number of household members using improved sanitation facilities divided by Total number of household members in households surveyed

On the basis of the variables described we will conduct cluster analysis to identify several groups of the districts in Punjab. For the purpose of this analysis all the variables considered have been standardized. The method employed in this paper does not make any distributional assumptions, so no other transformation of the data has been performed.

Ward's hierarchical procedure was first used to define the number of clusters, whereas the *K*-means non- hierarchical cluster procedure, using the cluster centers obtained with the Ward's method as the initial seed points, was used to improve the results.

### 3 ANALYSIS

#### 3.1 Descriptive statistics

The descriptive statistics shown in Table 2 reflect some huge asymmetries among the districts of Punjab. The most remarkable one is the percent of household members who were diagnosed with tuberculosis in the past year (1:7 the ratio between lowest and highest number of tuberculosis). Also the value of coefficient of variation is highest for this variable. Another variable with great inconsistency is Number of women aged 15-49 years with a birth in the 2 years preceding the survey that were attended during childbirth by skilled health personnel [medical doctor, Nurse/midwife or Lady Health Visitor] divided by the total number of women surveyed aged 15-49 years with a birth in the 2 years preceding the survey (1:5.67 also indicated by the value of CV). The access to the Lady Health Worker (LHW) and the use of contraceptive methods has also large discrepancies among the districts (with 32.29% and 31.71% CV).

**Table 2: Descriptive Statistics of the Regional Indicators**

Item	Min.	Max.	Mean	Median	Mode	S.D	C.V	MDG
Literacy rate 10+ years	33	81	57.74	56	45	11.32	19.61	88
Infant Mortality Rate	40	110	76.86	78	78	17.93	23.33	40
Care provided by Lady Health Worker	18.3	83.10	56.67	60.50	31	18.30	32.29	100
Skilled attendant at delivery	12	68	41.06	39	35	14.52	35.36	>90
Use of contraceptives	13	50	30.03	29	23	9.52	31.71	55
Reported tuberculosis	0.10	0.70	0.33	0.30	0.40	0.14	41.64	.0045
Physical access to drinking water	76	100	92.40	94	99	6.54	7.08	93
Use of sanitary means of excreta disposal	32	95	66.49	66	54	14.59	21.95	90

Finally, it should be noted that skewness is not present in the data in almost all the variables. Some of the variables show excess kurtosis but and, therefore, do not follow normal distributions.

### 3.2 Ward's hierarchical method

In the first step we have used Ward's hierarchical method. The graphical presentation of results with dendrogram (Figure 1) shows a fairly clear picture. On the vertical axis we can easily notify two big jumps of the values of the between-group sum of squares – namely at two-group and at five-group level. Hierarchical methods impose that once a cluster is formed, it cannot be split, whereas a non-hierarchical method is more flexible, allowing cases to separate from clusters that they previously integrated.

Consequently, following the procedure suggested by several authors (e.g. Lattin et al, 2003; Punj and Stewart, 1983), a non-hierarchical k-means clustering procedure has been performed. Empirical evidence suggests that we come very near to global optimum if we take centroids from hierarchical methods as initial seed-points for the *K*-means method. In our case centroids from the Ward's method have been used.

### 3.3 *K*-means method

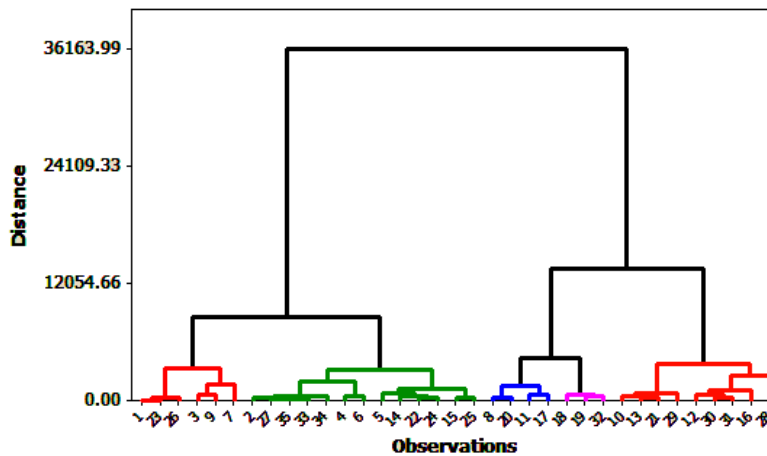
Ward's hierarchical method has given us the initial number of groups (clusters) and the group centroids. In the second step we have used *K*-means method to improve the results of Ward's method. Namely, the main deficiency of the Ward's method (and also of all other hierarchical method) is, that the allocation of units is final, with no possibility of reassignment to another (more appropriate) group during the procedure. The results of the Ward's method will be used as an input for the *K*-means method, so at this stage we will not comment on them into more details.

## 4 RESULTS AND DISCUSSION

To search for groups of districts of Punjab, different agglomerative hierarchical clustering procedures were carried out. The objective of this first step was to analyze the agglomeration schedules and dendrograms in order to establish the number of clusters to choose. A dendrogram is a two-dimension diagram that illustrates the fusions made at each



successive stage of the process. The observations (in this case, the districts) are listed on the horizontal axis and the vertical axis represents the successive steps. The best interpretative cluster solution can be illustrated by the dendrogram shown in figure 1, corresponding to Ward’s method and squared Euclidean distances (other authors emphasize the performance of this method – Everitt, 1993, 2001; Punj and Stewart, 1983; Millingan, 1980).



**Figure 1: Dendrogram - Ward’s method**

We will focus on the solution with five groups of districts, because it offers a more detailed picture about socio-economic differences among districts and because we believe that the results are logical and very informative (the list of districts by five groups is presented in Table 3).

In general, the differences between groups (clusters) are characterized by their unique combination of means of socio-economic indicators. For 6 out of 8 variables the mean values are monotonically increasing or decreasing from the first to fifth group and at the same time most of these variables are indicators of socio-economic development. For that reason the given groups can clearly be ranked with regard to the socio-economic development.

**Table 3: Clusters of the districts of Punjab (MICS 2007-08)**

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Attok	Faisalabad	Bhakkar	Layyah	Bahawalnagar
Chakwal	Gujranwala	Hafizabad	Muzaffargarh	Bahawalpur
Gujrat	Lahore	khanewal		D.G.khan
Jhelam	Nankana	Mandi Baha-ud-din		jhang
Rawalpindi	Sargodha	Mianwali		Kasur
Sialkot	Sheikhpura	Multan		Khushab
Toba Tek Singh		Narowal		Lodhran
		Vehari		Okara
		Sahiwal		Pakpattan
				R.Y.kahn
				Rajanpur

First cluster contains northern areas of the Punjab and three districts from central Punjab i.e. Gujrat, Sialkot and Toba Tek Singh. Second cluster presents the eastern districts of the Punjab. Two western districts Layyah and Muzaffargarh form a separate cluster. The number of districts in each group is different. To have a detailed look into these clusters, we describe them with respect to each indicator separately in the following subsection.

#### 4.1 Cluster-wise summary statistics of the socio-economic indicators (MICS 2007-08)

The cluster analysis has classified the districts of the Punjab into five different groups. These groups are heterogeneous with respect to the indicators used for analysis.

**Table 4: Cluster-wise Summary statistics for education**

Literacy rate 10+ years	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Minimum	63	55	50	45	33
Maximum	81	74	69	53	58
Mean	71.86	64.50	57.22	49.00	47.09
Median	73	63	56	49	48
S.D	6.74	7.48	6.24	5.66	6.27
C.V	9.38	11.59	10.91	11.54	13.31

The summary statistics for the education are presented in Table 4. The average literacy rate is highest in the first cluster while cluster 5 has the lowest average literacy rate among the children aged ten years and above. The minimum value of literacy rate in cluster 1 is 63 and maximum is 81 whereas in cluster 5 minimum and maximum values are 33 and 58 respectively, these values indicate large differences among the literacy rate among districts. The average literacy rate for cluster 1 is 71.86 and for cluster 5 it is 47.09 percent, about 1 to 2 ratio. The MDG set for the literacy rate is 88 percent and none of the districts in Punjab has achieved this goal.

**Table 5: Cluster-wise Summary statistics for Child mortality (Number/Thousand)**

Infant Mortality Rate	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Minimum	40	53	54	72	75
Maximum	70	81	92	86	110
Mean	54.57	71.00	78.22	79.00	92.73
Median	52	73	82	79	88
S.D	10.64	10.20	11.52	9.90	14.47
C.V	19.50	14.36	14.73	12.53	15.61

Table 5 shows the cluster wise summary of child mortality. The minimum value of infant mortality rate in cluster 1 is 40 whereas maximum value is 70 which is 1:2. The minimum and maximum values in cluster 5 are 75 and 110. The values of means and medians are almost similar and monotonically increasing from cluster 1 to cluster 5. Although cluster 1 contains a district Rawalpindi which achieved the MDG (i.e. 40) but this cluster cannot be regarded as the developed regarding infant mortality rate as the value of CV is maximum in this cluster (i.e. 19.50).

The average rate of infant mortality is least in cluster 1. It is because the average literacy rate for this cluster was high and more educated people will tend to take more care of their children as compared to less educated people. Cluster 5 contains the districts with very high values of infant mortality rate.

**Table 6: Cluster-wise Summary statistics for Adult health**

Indicator	Statistic	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
<b>Care provided by Lady Health Worker (LHW)</b>	Minimum	44	18	57	65	31
	Maximum	82	42	83	77	73
	Mean	67.00	28.83	68.67	71.00	52.91
	Median	70	26.5	66	71	59
	S.D	12.75	9.72	8.25	8.49	14.31
	C.V	19.04	33.73	12.01	11.95	27.05
<b>Reported tuberculosis</b>	Minimum	0.1	0.3	0.1	0.6	0.3
	Maximum	0.3	0.5	0.4	0.7	0.5
	Mean	0.21	0.40	0.24	0.65	0.39
	Median	0.2	0.4	0.2	0.65	0.4
	S.D	0.07	0.06	0.11	0.07	0.08
	C.V	32.20	15.81	46.24	10.88	21.26

The minimum and maximum values for the care provided by LHW are again in 1 to 2 ratio in almost all the clusters as shown in table 6. The average value for the coverage of LHW for cluster 2 is the least. It is justified as this cluster contains major cities whereas the LHW program was launched by the government for providing the health facilities to the rural areas. The MDG for LHW coverage is 100 but still no district achieved this goal. Less education and non-coverage of lady health workers are the main reasons for high infant mortality rate in these areas.

Tuberculosis is one of the major health issues in Pakistan. About 1 in 333 (0.3 per cent) of the surveyed population reported a diagnosis of tuberculosis in the past year (MICS 2007-08). The MDG for the reported tuberculosis cases is 45 per one million population. But the current situation regarding the reported cases of tuberculosis is very alarming. Layyah (0.6 per cent) and Muzaffargarh (0.7 per cent) Districts have the largest population diagnosed with tuberculosis. In cluster 1 and 3 the value of CV is very high.

**Table 7: Cluster-wise Summary Statistics for Reproductive Health**

Indicator	Statistic	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Skilled attendant at delivery	Minimum	44	44	31	20	12
	Maximum	68	66	50	26	42
	Mean	58.00	53.83	38.33	23.00	28.82
	Median	59	54.5	36	23	29
	S.D	9.43	8.42	6.24	4.24	7.69
	C.V	16.27	15.65	16.29	18.45	26.69
Use of contraceptives (any method)	Minimum	29	33	20	23	13
	Maximum	50	45	41	27	38
	Mean	38.43	39.50	28.44	25.00	21.73
	Median	37	40	26	25	21
	S.D	6.27	4.76	7.20	2.83	6.69
	C.V	16.31	12.06	25.30	11.31	30.81

The summary statistics for the reproductive health are also very disappointing (table 7). Three-quarters of all maternal deaths occur during delivery and the immediate post-partum period. The single most critical intervention for safe motherhood is to ensure a competent health worker with midwifery skills is present at birth and transport is available to a referral facility in case of emergency. The average number of skilled attendants at delivery is 58 in cluster 1 and 23 in cluster 4. The minimum and maximum values in cluster 5 are 12 and 42 respectively (1:3.5). In Rawalpindi and Gujrat districts 68 percent of women are assisted during delivery by skilled personnel; medical doctors have the highest percentage of assistance in these districts. Women in Rajanpur district are the least likely to have deliveries assisted by skilled personnel (12 percent). About 38 percent of women aged 15-49 with a birth in the two years preceding the survey delivered in a health facility (institutional delivery), with a higher percentage in urban (57 per cent) than in rural areas (31 per cent). Institutional delivery increases markedly as mother's education and wealth index increases. This indicator is over 50 per cent in Gujranwala, Chakwal, Gujrat, Lahore, Faisalabad and Rawalpindi.

Appropriate family planning is important to the health of women and children by preventing early or late pregnancies, extending birth intervals and limiting the number of children. Differentials exist in the current use of contraception across the 35 districts. Women in Sialkot district have the highest contraceptive prevalence (50 percent) while women in Rajanpur district have the least (13 percent). Like other indicators, MDGs are still not achieved regarding reproductive health.

**Table 8: Cluster-wise Summary statistics for water and sanitation**

Indictor	Statistic	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
<b>Physical access to drinking water (within dwelling)</b>	Minimum	76	84	92	99	82
	Maximum	99	99	99	100	97
	Mean	88.00	93.33	97.33	99.50	89.36
	Median	87	96.5	98	99.5	91
	S.D	7.64	6.62	2.24	0.71	5.33
	C.V	8.68	7.10	2.30	0.71	5.97
<b>Use of sanitary means of excreta disposal</b>	Minimum	73	67	61	42	32
	Maximum	89	95	69	54	65
	Mean	79.71	82.00	65.89	48.00	53.45
	Median	80	83	66	48	55
	S.D	5.85	12.12	2.47	8.49	9.77
	C.V	7.34	14.78	3.75	17.68	18.28

Ninety-two per cent of the population has access to improved drinking water sources within dwelling and five percent within the distance of half an hour (hand/motorized pump 71 percent; piped water 20 per cent; others 9 per cent). Only 57 percent of household population disposes of waste water properly, including 96 percent in major cities, 88 percent in other urban areas but only 41 percent in rural areas. About 14 per cent of households dispose of solid waste properly, with over three-quarters using open fields.

The source of drinking water for the population does not vary greatly by area of residence and district. In rural areas, 97 percent use water from an improved source, mainly hand pump and motorized pump. Major cities have 95 percent usage: mainly piped water and motorized pump, while in other urban areas more than half use motorized pumps, 14 percent use hand pumps and 25 percent use piped water. In most districts, over 95 percent of the population has access to improved sources of drinking water. Two districts, Chakwal and D.G. Khan, with 89 per cent each, have less than 90 per cent.

### CONCLUSION AND RECOMMENDATIONS

Overall the northern areas and the central Punjab have better indicators as compared to the other districts. Cluster 1 and 2 can be regarded as the developed group of district compared to the others. This cluster contains districts having maximum literacy rate, births by skilled birth attendants and use of contraceptive. Infant mortality rate and number of persons suffering from tuberculosis with minimum values lie in this group. Cluster 5 has minimum literacy rate, maximum infant mortality rate, persons having tuberculosis, minimum births by skilled birth attendants, minimum use of contraceptive, and minimum sanitation facilities among all the districts of Punjab. It is the most deprived cluster the Punjab. As an ideal situation all the districts should form a single cluster depicting the efficient use of resources and a fair system of distribution of the facilities. But the real situation is very different. The policy makers should pay attention to these areas. There is a need to improve and purify the system for equalization of the resources.

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**GENDER DISCRIMINATION IN WORKFORCE  
& ITS IMPACT ON THE EMPLOYEES**

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**ABSTRACT**

Now a day the function of HRM has become very complex because of heterogeneous workforce. Heterogeneous workforce is the result of passage of federal legislation in USA prohibiting employment discrimination, based on such laws avenues began to open up especially for women and minorities. Managing diversity is required to close the unfair discrimination and thus enable employees to compete on equal basis, thus employment discrimination is at the heart of the HRM. This research paper explores the issue of gender discrimination in workforce and its impact on the satisfaction and motivation, commitment and enthusiasm and stress level of employees. Close ended questionnaire was administered from 526 males and females of lower, middle and higher category employees of public and private health and education departments of Hyderabad and Jamshoro districts. Likert scale was used to measure the tendencies of respondents regarding gender discrimination, satisfaction and motivation, commitment & enthusiasm and stress level. SPSS was used to conduct the Reliability tests of these four continuous scales (i.e. gender discrimination, satisfaction and motivation, commitment & enthusiasm and stress level), assess their normality tests and for data analyses. Gender discrimination in workforce was measured through independent samples-t test. Two variables were used for this test, one categorical and other continuous. Categorical variable used was 'Sex' (with male coded as 1 and female coded as 2) and continuous variable used was 'discrimination in workforce', which is the total score participants recorded on 8 item gender discrimination scale. Gender discrimination scores for males and females were compared. For public organizations there was a significant difference in scores for females (M=23.103, SD=4.706) and males (M=19.679, SD=4.415); P=0.000(two-tailed). Hence females were discriminated more than males in public organizations. For private organizations, the results showed that there was again a significant difference in scores for females (M=23.254, SD=5.185) and males (M=19.764, SD=4.050); P=0.000(two-tailed). Hence it was also clear that females were discriminated more than males in private organizations. Thus the findings show that females are discriminated more than males in private sector than in public sector. The impact of gender discrimination on satisfaction & motivation, commitment & enthusiasm and stress level was assessed through Pearson product moment correlation co-efficient. Two continuous variables were used for finding the impact of gender discrimination on satisfaction & motivation / commitment & enthusiasm / stress level, i.e. gender discrimination at workforce and satisfaction and motivation / commitment & enthusiasm / stress level. The results for the impact of gender discrimination on satisfaction & motivation show that  $r = -3.15$ ,  $n = 523$ ,  $p < 0.05$ , which meant that there was a moderate negative relation between these two

variables i.e. gender discrimination decreases satisfaction and motivation level of employees. The results also showed that gender discrimination also decreases the commitment and enthusiasm of employees ( $r = -0.319$ ,  $n = 521$ ,  $P < 0.05$ ). The results of impact of gender discrimination on stress level were:  $r = 0.240$ ,  $n = 502$ ,  $P < 0.05$ . These results prove that gender discrimination increases the stress level in the employees.

### **INTRODUCTION**

Decenzo, (1998) has described that HRM in any organization is concerned with the Staffing, Training, Developing, Motivating and Maintaining the employees. Staffing is concerned with strategic human resource planning, recruiting and selection. Fifty years ago, HRM was considerably simpler because work force was strikingly homogenous. Now-a-days work force has changed from homogeneous to heterogeneous type. Wayne (1995) has explained that Managing Diversity means establishing a heterogeneous work force to perform to its potentials in an equitable work environment, where no member or group of members has an advantage or a disadvantage. Managing diversity is very essential for any organization, especially in this era of globalization. Managing diversity is required to close the unfair discrimination and thus enable employees to compete on equal basis.

### **GENDER DISCRIMINATION**

Wayne (1995) says that no law has ever attempted to define precisely the term 'discrimination', in the context of workforce, it can be defined as the giving of an unfair advantage (or disadvantage) to the members of the particular group in comparison to the members of other group. Narrating the decisions of the courts, Ivancevich (2003) writes that in interpreting title VII of the 1964 Civil Rights Act and other laws, the United States' courts have held that both intentional (disparate treatment) and unintentional (disparate impact) acts of covered entities may constitute illegal employment discrimination.

### **STATEMENT OF THE PROBLEM**

Gender discrimination turns the employees emotionally brittle, simple peace loving employees transform into paranoid and suspicious, fearful and angry individuals. Elimination of Gender Discrimination is crucial for the satisfaction and motivation, commitment and enthusiasm and less stress of the employees.

### **OBJECTIVES OF THE STUDY**

1. To assess the gender discrimination in work force.
2. To study the impact of gender discrimination on women employees.
3. To propose practices to help reduce the sticky floor and glass ceiling effects.

### **Hypotheses**

- Gender Discrimination at work place prevails more in public sector than in private sector
- Gender Discrimination decreases job satisfaction in women workers.
- Gender Discrimination reduces commitment and enthusiasm in women workers.
- Gender Discrimination increases stress level in women workers.



### **SCOPE OF THE STUDY**

This research was conducted to assess gender discrimination in workforce in the Public and Private organizations of Hyderabad and Jamshoro districts. Health and Education departments were taken from each of the above sectors. This study has measured the effect of the gender discrimination on the job satisfaction and motivation, commitment and enthusiasm and stress level of the women workers.

### **RESEARCH METHODOLOGY**

Total sample size for this study is 526. A sample size of male and female employees for public education department for both districts is 73 and 80 and for private education department of both districts is 44 and 78, respectively; whereas, sample size of 80 male and 85 females was collected from public health department of both districts and 46 males and 40 females from private health departments of both districts.

Stratified method of probability sampling is used for collecting data. In this research each one of the education and health departments, both public and private, was divided into four strata i.e. education into primary schools, high schools, colleges and universities and health into paramedical, nurses, doctors(BPS 17) and Professors/Senior Doctors; and then random sample was drawn from each strata.

Standard instrument –Questionnaire- is used for measuring the variables. The aspects measured through questionnaire are: Gender Discrimination, Satisfaction and Motivation, Commitment and Enthusiasm, and Stress Level. Gender Discrimination in workforce is surveyed through the questions, based on the perceptions regarding gender discrimination in work force identified by the UNDP (1993, p.91). Satisfaction and Motivation is surveyed by the Motivation and Satisfaction scale ( $\alpha=0.81$ ) developed by Nick Foster (1999). Commitment and Enthusiasm at work is surveyed by using a similar set of questions as the ones used by the United States Merit Systems Protection Board (USMSPB) and reported in Naff (1994, p.512), latter on used by Habib Zafarullah (2000). Stress level of respondents is surveyed using GHQ-12 (General Health Questionnaire-12).

Five point Likert scale was used to ask the respondents how strongly they agree or disagree with a statement. Rating or Scale questions were used to collect opinion data from the respondents regarding the gender discrimination, satisfaction and motivation, commitment and enthusiasm and stress level.

Nominal, Ordinal and at some places Interval scales of measurements are used. However, ordinal scale of measurement is used mostly. In this research attitudes/tendencies of respondents regarding Gender Discrimination, Satisfaction and Motivation, Commitment and Enthusiasm and Stress Level were measured by means of questions, with alternative answers ranked in ascending or descending order.

### **RELIABILITY OF GENDER DISCRIMINATION SCALE**

Reliability of Gender Discrimination scale, having eight questions, is 0.704, which is more than the required one i.e., 0.70. Hence this scale is reliable. Reliability of Satisfaction & Motivation is 0.800. Reliability of Commitment & Enthusiasm is 0.709. Reliability of Stress Level Scale is 0.728.

### ANALYZING GENDER DISCRIMINATION IN PUBLIC ORGANIZATIONS

Gender Discrimination in workforce was assessed through Independent-samples t-test. Two variables are used for this test, one categorical and other continuous. For this research categorical variable used is Sex (with male coded as 1 and female coded as 2) and continuous variable used is ‘discrimination in work force’, which is the total score that participants recorded on 8 item gender discrimination scale.

**Table I: Group statistics for gender discrimination (GD) in work force**

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Discrimination in work force	Male	153	19.6797	4.41536	.35696
	Female	165	23.1030	4.70680	.36642

**Table II: Independent samples test for GD in workforce**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Discrimination in work force	0.624	.430	-6.676	316	.000	-3.42329	.51279	-4.43221	-2.41437
			-6.692	315.956	.000	-3.42329	.51155	-4.42977	-2.41681

**Interpretation:** In table I, SPSS gives the mean and standard deviation for males and females. N shows the number of males and females, here the number of males and females is 153 and 165 respectively.

In table II, the significant level for Levene’s test is .430, which is larger than the cut-off of .05. This means that the assumption of equal variance has not been violated, therefore we will use the t-value provided in the equal variance assumed line.

As the assumption of equal variance has not been violated, therefore we choose the value of Sig (2-tailed) as provided in the equal variance assumed line. As the value of Sig (2-tailed) is less than .05(.000), there is a significant difference in the mean scores on gender discrimination for males and females.

An independent-sample test was conducted to compare the Gender discrimination scores for Males and Females. There was significant difference in scores for males (M= 19.679, SD= 4.415) and females (M=23.103, SD= 4.706); P=.000 (two-tailed).

Hence females are discriminated more than males in work force.

### ANALYZING GENDER DISCRIMINATION IN PRIVATE ORGANIZATION

Gender Discrimination in workforce is assessed by independent-sample T-test. Two variables are used for this test, one categorical and other continuous. For this research categorical variable used is Sex (with male coded as 1 and female coded as 2) and continuous variable used is ‘discrimination in work force’, which is the total score that participants recorded on 8 item gender discrimination scale.

**Table III: Group statistics for GD in work force**

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Discrimination in work force	Male	89	19.7640	4.05088	.42939
	Female	118	23.2542	5.18411	.47724

**Table IV: Independent Samples Test for GD in Work Force**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Discrimination in work force Equal variances assumed	6.011	.015	-5.255	205	.000	-3.49019	.66421	-4.79975	-2.18064
Discrimination in work force Equal variances not assumed			-5.437	204.726	.000	-3.49019	.64197	-4.75592	-2.22446

**Interpretation:** In table III, SPSS gives the mean and standard deviation for males and females. N shows the number of males and females, here the number of males and females is 89 and 118, respectively.

In table IV, the significant level for Leven’s test is .015, which is smaller than the cut-off of .05. This means that the assumption of equal variance has been violated, therefore we will use the t-value provided in the equal variance not assumed line.

As the assumption of equal variance has been violated, therefore we will choose the value of Sig (2-tailed) as provided in the equal variance not assumed line. As the value of Sig (2-tailed) is less than .05(.000), there is a significant difference in the mean scores on gender discrimination for males and females.

An independent-sample test was conducted to compare the Gender discrimination scores for Males and Females. There was significant difference in scores for males

(M= 19.764, SD= 4.050) and females (M =23.254, SD= 5.184); P=.000 (two-tailed). Hence females are discriminated in work force.

### IMPACT OF GENDER DISCRIMINATION (GD) ON SATISFACTION & MOTIVATION (S&M)

Here we assess what is the relationship between the gender discrimination at work force and satisfaction and motivation. Two continuous variables are needed for this analysis, which are:

- Gender Discrimination at work force, and
- Satisfaction and Motivation

**Table V: Correlation between GD and S&M**

		GD	S&M
GD	Pearson Correlation	1	-.315**
	Sig. (2-tailed)		.000
	N	524	523
S&M	Pearson Correlation	-.315**	1
	Sig. (2-tailed)	.000	
	N	523	525

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Interpretation:** The relationship between perceived gender discrimination and Job satisfaction and motivation was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumption of normality. There was a moderate negative correlation between the two variables,  $r = -.315$ ,  $n = 523$ ,  $p < .05$ .

### IMPACT OF GENDER DISCRIMINATION ON COMMITMENT AND ENTHUSIASM (C&E)

Here we assess the relationship between the gender discrimination at work force and commitment and enthusiasm. Two continuous variables used here are:

- Gender Discrimination at work force, and
- Commitment and Enthusiasm

**Table VI: Correlation between GD and C&E**

		GDscrmnWF8	C&E
GD	Pearson Correlation	1	-.319**
	Sig. (2-tailed)		.000
	N	524	521
C&E	Pearson Correlation	-.319**	1
	Sig. (2-tailed)	.000	
	N	521	523

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Interpretation:** The relationship between perceived gender discrimination and Commitment & Enthusiasm was investigated using Pearson product-moment correlation

coefficient. Preliminary analyses were performed to ensure no violation of the assumption of normality. There was a medium negative correlation between the two variables,  $r = -.319$ ,  $n = 521$ ,  $p < .05$ .

### IMPACT OF GENDER DISCRIMINATION ON STRESS LEVEL (SL)

Here we assess the relation of gender discrimination at work force on stress level. Two continuous variables are needed for this, which are:

- Gender Discrimination at work force, and
- Stress Level

**Table VII: Correlation between GD and Stress Level**

		GD	SL
GD	Pearson Correlation	1	.240**
	Sig. (2-tailed)		.000
	N	524	502
SL	Pearson Correlation	.240**	1
	Sig. (2-tailed)	.000	
	N	502	503

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Interpretation:** The relationship between perceived gender discrimination and stress level was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumption of normality. There was a small positive correlation between the two variables,  $r = .240$ ,  $n = 502$ ,  $p < .05$ .

### RESULTS AND DISCUSSIONS

In hypothesis 1 we predicted that “females are more discriminated than males at work force in public organizations than in private organizations”. Gender discrimination at workforce was calculated through the T-Test. For public organizations, the results showed that there was significant difference for females (Mean = 23.103, SD = 4.706) and males (Mean = 19.679, SD = 4.415);  $p = 0.000$  (two-tailed). Hence it was clear that females were discriminated more than males at workforce in public organizations. For private organizations, the results showed that there was significant difference for females (Mean = 23.254, SD = 5.184) and males (Mean = 19.764, SD = 4.050);  $p = 0.000$  (two-tailed). Hence it was clear that females were also discriminated more than males at workforce in private organizations.

When we compare the results of public and private organizations, it was very clear that females were discriminated more than males at workplace in both organizations, but the score of discrimination was more in private sector (23.254) than in public sector (23.103). Hence we accept the null hypothesis and reject the alternative hypothesis:

- H<sub>0</sub>:** Females are not discriminated more than males at work place in public organizations than in private organizations.
- H<sub>A</sub>:** Females are discriminated more than males at work place in public organizations than in private organizations.

In hypothesis 2, it was predicted that gender discrimination decreases the satisfaction and motivation level of employees. This hypothesis was tested by correlation. The results of the correlation were: Pearson Correlation ( $r$ ) = -0.315,  $n= 523$ ,  $p < .05$ . The results showed that there was a negative relation between these two continuous variables, thus it confirmed our prediction that gender discrimination decreases satisfaction and motivation. On the basis of this analysis we reject the null hypothesis and accept alternative hypothesis:

- H<sub>0</sub>:** Gender Discrimination does not decrease Job satisfaction & motivation.  
**H<sub>A</sub>:** Gender Discrimination decreases Job satisfaction & motivation

In hypothesis 3, it was predicted that gender discrimination decreases the commitment and enthusiasm level of employees. This hypothesis was also tested by correlation. The results of the correlation were: Pearson Correlation ( $r$ ) = -0.319,  $n= 521$ ,  $p < .05$ . The results showed that there was a negative relation between these two continuous variables, thus it confirmed our prediction that gender discrimination decreases commitment and enthusiasm. On the basis of this analysis we reject the null hypothesis and accept alternative hypothesis:

- H<sub>0</sub>:** Gender Discrimination does not decrease commitment and enthusiasm.  
**H<sub>A</sub>:** Gender Discrimination decreases commitment and enthusiasm.

In hypothesis 4, it was predicted that gender discrimination increases the stress level of employees. This hypothesis was also tested by correlation. The results of the correlation were: Pearson Correlation ( $r$ ) = .240,  $n = 502$ ,  $p < .05$ . The results showed that there was a positive relation between these two continuous variables, thus it confirmed our prediction that gender discrimination increases stress level. On the basis of this analysis we reject the null hypothesis and accept alternative hypothesis:

- H<sub>0</sub>:** Gender Discrimination does not increase stress.  
**H<sub>A</sub>:** Gender Discrimination increases stress

### CONCLUSIONS

From the statistical analysis presented above and the subsequent intensive discussions, the study identifies the following as the most significant conclusions.

1. The statistical analysis has revealed that females were prone to gender discrimination behavior at the work place, both in public and private organizations. However, that biased behaviors was more in public organizations than in private organizations.
2. Analysis showed a negative relation between GD and S&M; which means that gender discrimination resulted in low job satisfaction and motivation.
3. Analysis also showed that gender discrimination was inversely proportional with commitment and enthusiasm, i.e., because of discrimination, women showed less commitment and enthusiasm towards their job.
4. A positive relation between gender discrimination and stress level was indicated through statistical techniques; which meant that higher the gender discrimination, higher will be the level of the stress.

## RECOMMENDATIONS

In the light of the results of the present study, the research suggests following recommendations for reducing gender discrimination against females and providing them equal chances at the work place.

1. The constitution of the Pakistan guarantees equal rights to all its citizens and so many laws guarantee equal chances of employment to both sexes; but neither government nor private organizations are acting upon those laws. Therefore a committee comprising of Judges; Experts of HRM; Representative of ministry of Women Development, Media, Non-Government Organizations(NGOs), Civil society and Human Rights Commission of Pakistan (HRCP), should be Constituted to inspect and investigate the matters of gender discrimination in work force.
2. Government through media must start a mass awareness campaign on gender discrimination in employment. Especially the female employees must be informed about their rights and privileges.
3. NGOs should also come forward and highlight the cases of gender discrimination and help and support the victimized female employees in getting justice.
4. Forms under the heading “gender discrimination at work force” should be introduced in each organization by the government and filling of which should be made mandatory for the employees of the organizations. Such forms assess the behavior of authorities, boss and colleagues at work place. These forms, to maintain secrecy, mention only the gender and not the name of the employee and should be filled in the presence of a neutral competent authority to extract the correct and accurate data.

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**DATA ANALYSIS BY DATA MINING ALGORITHMS  
A PRACTICAL APPROACH**

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**ABSTRACT**

Data analysis is a process in which raw data is prepared and structured so that valuable information can be extracted from it. The process of organizing and thinking about data is way to accepting what the data does and does not contain. There are a variety of ways in which public can approach data analysis, and it is notoriously easy to direct data during the analysis phase to push certain conclusions or agendas.

In this work, I use Data Mining algorithms for the data analysis process to prove experimentally and practically that how reliable, efficient and fast are these for the analysis of data? A solid mathematical threshold (0 to 1) is set to analyze the data. The obtained results will be tested by applying the approach to the databases and data warehouses of different sizes with different threshold values. The results produced will be of different magnitude from short to the largest sets of data items. By this, we may take the results produced for different purpose.

**KEY WORDS**

Data analysis, Association Algorithms, Stored data, Data Transformation

**1. INTRODUCTION**

**1.1 Data Analysis**

Analysis of data is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains [9]

**1.2 Data Mining**

Data Mining is the discovery of hidden information found in databases [13] [18]. Data mining functions include clustering, classification, prediction, and associations. One of the most important data mining applications is that of mining association rules. Association rules, first introduced in 1993 [16], are used to identify relationships among a set of items in databases. The AIS algorithm is the first published algorithm developed to generate all large itemsets in a transaction database [16]. This algorithm has targeted to discover qualitative rules. This technique is limited to only one item in the consequent. This algorithm makes multiple passes over the entire database.

The SETM algorithm is proposed in [12] and motivated by the desire to use SQL to calculate large itemsets [17]. In this algorithm each member of the set large itemsets,  $L_k$ , is in the form  $\langle \text{TID}, \text{itemset} \rangle$  where TID is the unique identifier of a transaction. Similarly, each member of the set of candidate itemsets,  $C_k$ , is in the form  $\langle \text{TID}, \text{itemset} \rangle$ . Similar to [16], the SETM algorithm makes multiple passes over the database.

The Apriori algorithm [15] is a great achievement in the history of mining association rules. It is by far the most well-known association rule algorithm. This technique uses the property that any subset of a large itemset must be a large itemset.

The Off-line Candidate Determination (OCD) technique is proposed in [8], and is based on the idea that small samples are usually quite good for finding large itemsets.

Sampling [7] reduces the number of database scans to one in the best case and two in the worst. A sample which can fit in the main memory is first drawn from the database. The set of large itemsets in the sample is then found from this sample by using a level-wise algorithm such as Apriori.

Each association rule mining algorithm assumes that the transactions are stored in some basic structure, usually a flat file or a TID list, whereas actual data stored in transaction databases is not in this form. All approaches are based on first finding the large itemsets. The Apriori algorithm appears to be the nucleus of all the association rule mining algorithms. In this work my focus is on association rule mining technique. I take two algorithms, first the well known Apriori and our own developed SI [11] algorithm.

## 2. ASSOCIATION RULE PROBLEM

A formal statement of the association rule problem is as follows:

**Definition:** [16] [4] Let  $I = \{i_1, i_2, \dots, i_m\}$  be a set of  $m$  distinct attributes. Let  $D$  be a database, where each record (tuple)  $T$  has a unique identifier, and contains a set of items such that  $T \subseteq I$ . An association rule is an implication of the form of  $X \Rightarrow Y$ , where  $X, Y \subseteq I$  are sets of items called itemsets, and  $X \cap Y = \emptyset$ . Here,  $X$  is called antecedent while  $Y$  is called consequent; the rule means  $X \Rightarrow Y$ . Association rules can be classified based on the type of vales, dimensions of data, and levels of abstractions involved in the rule. If a rule concerns associations between the presence or absence of items, it is called Boolean association rule. And the dataset consisting of attributes which can assume only binary (0-absent, 1-present) values is called Boolean database.

## 3. LOGICAL DATA ANALYSIS

The logical analysis of data was originally developed for the analysis of datasets whose attributes take only binary (0-1) values [2, 3, 6]. Since it turned out later that most of the real-life applications include attributes taking real values, a "binarization" method was proposed in [1]. The purpose of binarization is the transformation of a database of any type into a "Boolean database".

**Table 1: Original Database**

ID	Age		Marital Status		...
	20-29	30-39	Single	Married	
1	1	0	1	0	...
2	0	1	0	1	...

LAD is a methodology developed since the late eighties, aimed at discovering hidden structural information in Boolean databases. LAD was originally developed for analyzing binary data by using the theory of partially defined Boolean functions. An extension of LAD for the analysis of numerical data sets is achieved through the process of “binarization” consisting in the replacement of each numerical variable by binary “indicator” variables, each showing whether the value of the original variable is present or absent, or is above or below a certain level. LAD has been applied to numerous disciplines, e.g. economics and business, seismology, oil exploration, medicine etc. [14].

**3.1 Binarization**

The methodology of LAD is extended to the case of numerical data by a process called binarization, consisting in the transformation of numerical (real valued) data to binary (0, 1) ones. In this [5] transformation we map each observation  $u = (uA, uB, \dots)$  of the given numerical data set to a binary vector  $x(u) = (x1, x2, \dots) \in \{0, 1\}^n$  by defining e.g.  $x1 = 1$  iff  $uA \geq \alpha1$ ,  $x2 = 1$  iff  $uB \geq \alpha2$ , etc, and in such a way that if  $u$  and  $v$  represent, respectively, a positive and negative observation point, then  $x(u) \neq x(v)$ . The binary variables  $xi$ ,  $i = 1, 2, \dots, n$  associated to the real attributes are called indicator variables, and the real parameters  $\alpha_i$ ,  $i = 1, 2, \dots, n$  used in the above process are called cut points.

The basic idea of binarization is very simple. It consists in the introduction of several binary attributes associated to each of the numerical attributes; each of these binary attributes is supposed to take the value 1 (respectively, 0) if the numerical attribute to which it is associated takes values above (respectively, below) a certain threshold. Obviously the computational problem associated to binarization is to find a minimum number of such threshold values (cutpoints) which preserve the essential information contained in the dataset.

In order to illustrate the binarization of business datasets, let us consider the examples presented in Table 1. A very simple binarization procedure is used for each variable “age” and “marital status”. Quantitative attributes such as “age” is divided into different ranges like age: 20..29, 30..39, etc. The “marital status” variable is divided into binary values by converting its domain values into attributes.

**Table 2: Boolean Database**

ID	Age	M.Status	#cars
1	22	Single	0
2	37	Married	2

**3.2 Binary Variables**

A binary variable has only two states: 0 or 1, where 0 means that the variable is absent, and 1 means that it is present. If all binary variables are thought of as having the same weight, we have the 2-by-2 contingency table of table 3, where  $a$  is the number of variables that equal 1 for both items  $i$  and  $j$ ,  $b$  is the number of variables that equal 1 for

item  $i$  but that are 0 for item  $j$ ,  $c$  is the number of variables that equal 0 for item  $i$  but equal 1 for item  $j$ , and  $d$  is the number of variables that equal 0 for both item  $i$  and  $j$ . The total number of variables is  $z$ , where  $z = a + b + c + d$ .

**Table 3: A contingency table for binary variables**

		<i>Item j</i>		
		<b>1</b>	<b>0</b>	<b>Sum</b>
<i>Item i</i>	<b>1</b>	A	B	a + b
	<b>0</b>	C	D	c + d
<b>Sum</b>		A + c	b + d	Z

For noninvariant similarities, the most well-known coefficient is the Jaccard dissimilarity coefficient, where the number of negative matches  $d$  is considered unimportant and thus is ignored in the computation:

$$d(I, J) = \frac{b + c}{a + b + c}$$

The measurement value 1 suggests that the objects  $i$  and  $j$  are dissimilar and the measurement value 0 suggests that the objects are similar. This method is used in SI algorithm while the Apriori algorithm works using similarity measures.

### 1. EXPERIMENTAL RESULTS

I performed different experiments to check the results and efficiency of the technique. The data required in database should be in binary format. I download the dataset transa from the net [10].

The data was stored in a format:

0 1 0 0 1 0 0 1

I coded the algorithms in ORACLE 10g using laptop computer having 20GB hard drive and 1.6MH processor. I create a table in the database to store the data for the purpose of experiment. To load the data to the database oracle provide a facility by making a control file and then by using SQL loader. We first convert the data into a format that the item now is separated by commas instead of spaces. Now the data is loaded to the table with the help of SQL loader and look like

0,1,0,0,1,0,0,1

After loading the data into table the algorithms are implemented on the database having ten thousand records, initially.

**Common steps from the presented Algorithms**

**Input**

$\Phi$  User specified threshold between 0 and 1

T Binary transactional Database

**Output**

Frequent Itemsets

**SI Algorithm Results**

Salim Irshad

Dissimilarity	Threshold	Status
.71	.8	item1 and item2 are frequent
.38	.8	item1 and item3 are frequent
.33	.8	item1 and item4 are frequent
.73	.8	item1 and item5 are frequent
.64	.8	item2 and item3 are frequent
.71	.8	item2 and item4 are frequent
.79	.8	item2 and item5 are frequent
.5	.8	item3 and item4 are frequent
.75	.8	item1 and item2 and item3 are frequent
.53	.8	item1 and item3 and item4 are frequent

The largest frequent itemsets generated by the algorithm are

$$I_1, I_2, I_3 \text{ and } I_1, I_3, I_4$$

After giving the data to Apriori algorithm it also produce the same results. With the same largest frequent item sets contain,

**Apriori Algorithm Results**

Minimum Support	Support Count	Status
20	4838	1 is frequent
20	3868	2 is frequent
20	5332	3 is frequent
20	4848	4 is frequent
20	4344	5 is frequent
20	1938	1 and i2 is frequent
20	3878	1 and i3 is frequent
20	3878	1 and i4 is frequent
20	2423	2 and i3 is frequent
20	1938	2 and i4 is frequent
20	3393	3 and i4is frequent
20	2424	4 and i5 is frequent
20	1938	item1 ,item2 and item3 are frequent
20	3393	item1 ,item3 and item4 is frequent

$$I_1, I_2, I_3 \text{ and } I_1, I_3, I_4$$

After loading more data, the database becomes double. The total records in the database are 19350. Applying Apriori and SI algorithms on the updated database, the results produced are given.

The largest frequent itemset

$$I_1, I_2, I_3 \text{ and } I_1, I_3, I_4$$

We see that again the algorithms produce the same results.

After loading more data the total number of records becomes 38700. And again applying the algorithms on the database, the results produce are given

$I_1, I_2, I_3$  and  $I_1, I_3, I_4$

So this is again that the algorithms produce the same results.

After loading more data to the database the total records in the database are 77450. Again applying Apriori and SI algorithm on the database the results produced are given.

$I_1, I_2, I_3$  and  $I_1, I_3, I_4$

We see that again the algorithms produce the same results.

Now we have to load more data to the database the total number of records become 154000. And once again applying both the algorithm on the database the results produce are given.

$I_1, I_2, I_3$  and  $I_1, I_3, I_4$

We see that again the algorithm produces the same results.

Up to this we analyze the performance, efficiency and accuracy of the algorithms by changing size of the database.

After this we change the input threshold to analyze the performance, efficiency and accuracy at different threshold values. The input threshold changes from .80% to .70% (dissimilarity) for SI algorithm and from 20% to 30% (similarity) for Apriori algorithm. The database contains 154000 records and after applying both the algorithms the results produces are given below.

#### SI Algorithm Result

Dis	Threshold	Status
.38	.69	tem1 and item3 are frequent
.33	.69	tem1 and item4 are frequent
.64	.69	tem2 and item3 are frequent
.5	.69	tem3 and item4 are frequent
.53	.69	tem1 and item3 and item4 are frequent

#### Apriori Algorithm Result

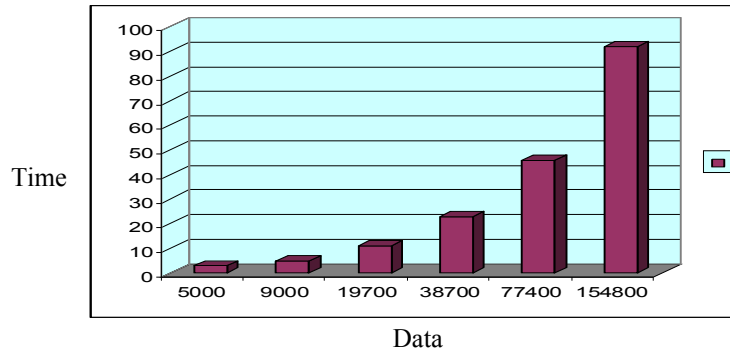
Minimum Support	Support Count	Status
80	19352	1 is frequent
80	15472	2 is frequent
80	21328	3 is frequent
80	19392	4 is frequent
80	17376	5 is frequent
80	15512	1 and i3 is frequent
80	15512	1 and i4 is frequent
80	13572	3 and i4is frequent
80	13572	item1 ,item3 and item4 is frequent

The largest frequent itemset produce is  $I_1, I_3, I_4$

Now this is clear that both algorithms produced the same results at different threshold. Up to this, we analyze that these techniques are very reliable.

## 5. GRAPHICAL ANALYSIS OF THE RESULTS

Graph for the results produced at different database size by algorithms.



## 6. CONCLUSION AND FUTURE WORK

In this research, I study that how data mining algorithms are used for the data analysis in each field. The output produced was based on solid reasons and values so it is reliable, efficient and accurate. Here we show the results by performing different experiments and prove that such algorithms are very consistent. In future we may perform experiments for other algorithms from different point of view on different datasets.

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**THE YOUTH AND ENTREPRENEURSHIP IN BAHAWALPUR, PAKISTAN**

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**ABSTRACT**

This research study is about the condition of entrepreneurship in Bahawalpur, a non-industrial and less developed city of southern Punjab. The research discloses the constraints and obstacles faced by the young entrepreneurs while starting a business in Bahawalpur. The condition of business and steps of the Govt. towards entrepreneurship have been also discussed here. The study also reveals the charms and attractions of the jobs for the youth, which shows the preference of job over entrepreneurship.

**KEY WORDS**

Entrepreneurship; obstacles and attractions.

**INTRODUCTION & BRIEF LITERATURE REVIEW**

**Entrepreneurship**, by the economist's point of view is a combination of innovation and risk taking. Those who know when and where to invest could also be good at managing the ventures they start (Paul A. Gompers Anna Kovner, 2008). Entrepreneurship is the act of developing a new venture outside an existing organization. Sixty years have been passed but unfortunately, Pakistan is still in the trap of poverty. Half of the population of Pakistan is unemployed and doing nothing, have been becoming the main source of poverty. Although the Govt. of Pakistan is taking more steps now a days in this regard for the betterment of its population, but still it is not enough as compared to the proportionate increase in the population.

There is a clear relationship between promotion of competition and economic development that arise from the impact of entrepreneurial firms (Mark A. Dutz, Janusz A. Ordoover, Robert D. Willig, 2000). The earliest identified entrepreneurial characteristic was risk taking. Risk includes not only financial considerations, but also career opportunities and family relations. Surveys of entrepreneurs suggest that obtaining adequate access to capital is one of the biggest hurdles to starting and growing a new business (William R. Kerr and Ramana Nanda 2008).

Innovation is the critical link between entrepreneurship and economic growth. Innovation boosts productivity, which leads to higher growth rates for our economy and a rising standard of living for citizens (Thomas M. Hoenig, 2005). The scope for team entrepreneurship is promoted by bounded structural uncertainty and common interest

arising from strong interdependence and that, for any given amount of structural uncertainty, the greater the degree of interdependence perceived, the more likely it is that agents will spontaneously form teams (Maria Minniti, Moren L. 2008). Those who know when and where to invest could also be good at managing the ventures they start (Paul A. Gompers Anna Kovner.2008).

Entrepreneurs who succeeded by investing in a good industry a year earlier are more successful than those who invested later (Paul A. Gompers Anna Kovner.2008).

#### STEPS TOWARDS ENTREPRENEURSHIP BY THE GOVT. OF PAKISTAN

Govt. has recently created SME Bank by merging the Small Business Finance Corporation (SBFC) and the Regional Development Finance Corporation (RDFC) and this bank started its operations in January 2002 as an independent company.

##### *Key features of SBFC:*

- Established in 1972 to support small and medium business.
- To support the self-employment schemes in which small entrepreneurs were provided credit to start a new business and funds for running business.
- Offered a loan with a range of Rs.50,000 to Rs.300,000.

Regional Development Finance Corporation (RDFC)

##### *Key Features of RDFC:*

- Established in 1985 to promote industrialization in less developed areas of Pakistan.
- Head Office: In Islamabad.
- 14 regional branches in Pakistan.
- Offered loan ranging from Rs. 25,000 to Rs.200,000 to women entrepreneurs.

#### UNDERSTANDING BUSINESS IN PAKISTAN

Nadeem-ul-Haque (2007) noticed from the group discussion with the businessmen of Lahore, Sargodha, Sialkot and Gujranwala regarding the state of entrepreneurship in Pakistan Following results were revealed.

- Innovation which is the key to entrepreneurship is nearly absent because most of the businessmen are involved in inherited business.
- Business is not dynamic, few businesses seem to grow to be large and multinational. Small businesses seldom seem to develop across cities.
- He further found lack of research skills, knowledge and lack of finance to start new business.

In Pakistan 40% of the business is in informal sector and still the small-scale enterprise and industry continues to face unfavorable policies. Historical growth rate of small business also points to the neglect of the sector (Nadeem-ul-Haque, 2007).

**SPECIFIC OBJECTIVES**

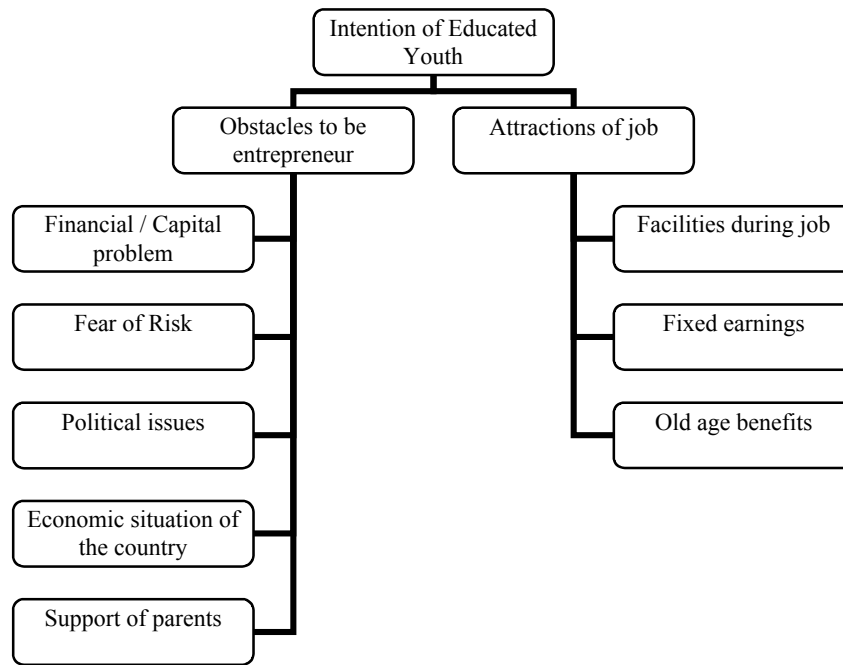
The research would help for achieving the following objectives:

- Finding the trend of young educated people towards entrepreneurship in Bahawalpur.
- Greater understanding of the problems faced by the youth while starting a business.
- Identifying the key factors which are causes or solutions of these problems.
- Identifying the attractions of doing job instead of running a business.
- Giving recommendations for the solution of the problems

**PILOT STUDY FOR CONCEPTUALIZATION**

To conceptualize the situation a pilot study was conducted and 20 students from business related programs of The Islamia University of Bahawalpur (IUB) were selected conveniently and detailed unstructured and structured interviews were conducted. The students were asked about their interests in starting business or doing job in future. They were also asked about the obstacles in starting a business and the facilities and charms in case of doing job. This pilot study helped a lot understand the indicators regarding entrepreneurship.

**CONCEPTUAL FRAMEWORK**



*Indicators of entrepreneurship:*

Upon interviewing the respondents, following suitable indicators of entrepreneurship were found:

- Financial / capital problem: To start a business, the main hurdle is the access to the capital. If someone has no problem to arrange the capital, it is rather easy for him/ her to become entrepreneur.
- Risk and uncertainty in business: There is a fear of risk in starting a new business as the business may flourish or fail. So there is hesitation to start a new business.
- Political issues: Political issues may affect the business, often the government is not democratic. Further more each government has its own intentions and policies about business. The policies may be easy or tough for the entrepreneurs.
- Economic situation of the country: The economic situation of the country is also a major factor, which can affect the business. Inflation and regular rise in prices of raw material and products discourage the entrepreneurs.
- Support of the parents: Financial and moral support of the parents to start a business is also a main factor for the young entrepreneurs. It becomes easy to become entrepreneur if the parents are supporting.

*Indicators(Attractions) of doing job:*

Upon interviewing the respondents, following suitable indicators of job were found:

- Facilities during job: Facilities like accommodation, medical, pick and drop facility and the educational facilities for the children can attract the educated youth towards job.
- Fix earning: Every month a fixed salary can attract the educated youth as there is a fear of risk in business, as it may flourish or fail.
- Old age benefits: Pension and other financial benefits after retirement have also a great charm for the educated youth.

Why we have focused on business program related students?

The enforcing argument is that they are well aware of the knowledge of business and know the obstacles regarding entrepreneurship.

## **FUNDAMENTALS OF RESEARCH DESIGN**

*Observation Unit*

A unit in which measurement is taken is known as observation unit. In this study every graduated and graduating student of business related program like M.COM, MBA, MBE, MCS, MSC (A/F) was considered as observation unit.

*Target Population*

Having time and budget constraints our target population in this study was comprised of the last two years Graduated and current graduating students of The Islamia University of Bahawalpur, as well as the graduates doing any job or in search of any job.

### COLLECTION OF DATA

This study was conducted in Bahawalpur city, data of passed out students in last two years from The Islamia University of Bahawalpur were collected as well as the data of graduating students with the four business related departments also obtained. A sample comprised of 240 subjects was selected randomly, selecting 120 graduates and 120 graduating students. Structured questionnaires were distributed to the subjects and 212 responded out of 240 thus having a response rate of 88% (212/240). 40 subjects, selecting 20 from each category were also interviewed successfully

**Sampling Frame**

<b>Sr. No.</b>	<b>Name of Category</b>	<b>Total students</b>	<b>Sampled Students</b>	<b>Graduated Students Responded</b>	<b>Graduating Students Responded</b>
1	M.Com	120	48	20	21
2	MSc. A/F	120	48	21	23
3	MBE &	120	48	19	20
4	MBA	120	48	23	22
5	MCS	120	48	22	21
Total		600	240	105	107

### QUESTIONNAIRE DESIGN

To gather information a questionnaire was designed in such a way that first of all the personal data i.e. name, address, contact no. and qualification of the respondent was asked. Then the questions about the entrepreneurship, its constraints like; to arrange capital, risk, uncertainty of the business political issues, economic condition of the country and the support of the parents while starting a business were asked. The benefits and attractions of the jobs were also asked.

### ANALYSIS, FINDINGS AND DISCUSSIONS

Upon making analysis (as given in annexure 1) it is clear that only 36% respondents are of the view to start their own business while 64% are not willing to start their business. Moreover, 56% of the respondents have capital problem to start business while 44% of the respondents don't have such problem and it is also clear that 84% of the respondents are of the view that doing business is risky while only 16% don't think so. Furthermore, 61% of the respondents were of the view that facilities like medical, house rent etc. are more attractive during job while 39% were against this idea. It is also noticed that 66% of the respondents were of the view that fix earning is more valuable than doing business while 36% were against this idea.

It is concluded that access to capital, risk in business, political and economic situation of the country are the factors which are important obstacles regarding entrepreneurship. Under these uncertain situations, youth is not willing to take risky step towards entrepreneurship. Moreover, the facilities during the job and risk free nature also attract the youth. Old age benefits and fixed earnings of the job are also attractions for the youth.

### SUGGESTIONS AND RECOMMENDATIONS

If there comes an improvement in the economic and political situations of the country, then there is a chance for the better of the youth and they may be attracted towards entrepreneurship.

This research is conducted in the un-industrial and less developed city of southern Punjab. The results may be different if the research is conducted in some developed and industrial city. There is still room to find other factors influencing the entrepreneurship.

Following steps should be taken to promote entrepreneurship:

- The policies should be made to promote business educated youth (male and female) towards entrepreneurship by making their access to the capital.
- The economic and political situations of the country should be improved.
- The parents should support their youth to be entrepreneur.

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## Annexure 1

## ANALYSIS AND DISCUSSION

**Intention to start own business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	38	35.8	35.8	35.8
	2	68	64.2	64.2	100.0
	Total	106	100.0	100.0	

The above table shows that only 36% respondents are of the view to start their own business while 64% are not willing to start their business.

**Preference of Doing Job instead of Running a business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	66	62.3	62.3	62.3
	2	40	37.7	37.7	100.0
	Total	106	100.0	100.0	

From above table, it is clear that 62% of the respondents prefer job rather than starting a business while 38% prefer business.

**Capital problems to start a business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	59	55.7	55.7	55.7
	2	47	44.3	44.3	100.0
	Total	106	100.0	100.0	

Nearly 56% of the respondents have capital problem to start business while 44% of the respondents don't have such problem.

**Opinion Regarding Risky Business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	89	84.0	84.0	84.0
	2	17	16.0	16.0	100.0
	Total	106	100.0	100.0	

From the above table it is clear that 84% of the respondents are of the view that doing business is risky while only 16% don't think so.

**Effect of Uncertain political Situations upon business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	104	98.1	98.1	98.1
	2	2	1.9	1.9	100.0
	Total	106	100.0	100.0	

From above table, it is clear that 98% of the respondents think that political issues affect the business while only 2% are against it.

**Favorable Economic Situation of the Country to Start Own Business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	96	90.6	90.6	90.6
	2	10	9.4	9.4	100.0
	Total	106	100.0	100.0	

It is clear that almost 91% of the respondents believe that the economic situation of the country affect the business while only 9% do not think so.

**Support of family members to start own business**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	71	67.0	67.0	67.0
	2	35	33.0	33.0	100.0
	Total	106	100.0	100.0	

From the above table it is clear that 67% of the respondents were of the view of they started business their family will support them while 33% negate the question.

**Attraction of facilities for doing job**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	65	61.3	61.3	61.3
	2	41	38.7	38.7	100.0
	Total	106	100.0	100.0	

The above table shows that nearly 61% of the respondents were of the view that facilities like medical, house rent etc. are more attractive during job while 39% were against this idea.

**Preference to Earn Fixed Salary/Earnings**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	70	66.0	66.0	66.0
	2	36	34.0	34.0	100.0
	Total	106	100.0	100.0	

From above table it is clear that 66% of the respondents were of the view that fix earning is more valuable than doing business while 36% were against this idea.

**Attraction of Old Age Benefits in jobs**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	59	55.7	55.7	55.7
	2	47	44.3	44.3	100.0
	Total	106	100.0	100.0	

From above table it is clear that nearly 56% of the respondents were of the view that there are more old age benefits in jobs than in doing business while 44% were against it.



**EXPORT DIVERSIFICATION & ECONOMIC GROWTH:  
EXPERIENCE OF PAKISTAN**

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**ABSTRACT**

Broad economic literature suggest exports diversification lead economic growth and development while a class of researchers advocate specialization in accordance with the economy comparative advantage more appropriate. Horizontal Diversification by means of reaching new markets through new products and Vertical Diversification shifting from traditional / primary commodities to value added products of same commodity group need technology, skilled human resource, infrastructure and sound geo-political environment. Pakistan's exports is assumes to be dominated by a few primary commodities such as Rice, Cotton, Leather. This paper evaluates Pakistan's experience of export diversification using various ratios and indices developed for measuring export concentrations and use econometric model to assess the relationship between export diversification and economic growth of Pakistan. We found that Pakistan export showing diversification from textile based commodities to food and mineral group.

**1. INTRODUCTION**

Over the last 50 years, the role of export diversification in growth in developing countries has received substantial attention in development literature. Several developing countries with rich natural resources in Asia, Africa and other regions rely greatly on exports of primary commodities for their foreign exchange earnings. For primary commodities, widespread price declines in world markets in recent years have forced the developing countries to take initiatives to increase export diversification in "commodity-dependent" as a source of improving their overall economic performance. Export diversification can contribute to reducing the instability of export earnings. Whether countries should follow diversification or specialization in export production has been a topic that has generated much discussion in the theoretical literature and in policy circles. One strand of the literature supports larger export diversity as good for economic growth and development, while another looks specialization, in line with a country's comparative advantage, as more appropriate. It is recurrently recommended that export diversification contributes to an acceleration of growth in developing countries. Horizontal export diversification into completely new export sectors may generate positive externalities on the rest of the economy. Vertical export diversification out of primary into manufactured exports is also associated with growth since primary export sectors prevalently do not exhibit strong spillovers. Hence, it is to be estimated that both horizontal and vertical export diversification are positively correlated with economic growth.

In many developing countries, export diversification of products and markets destination is observed as means to meet up the challenges of unemployment and lower growth. High performing Asian economies experienced a considerable increase in exports, and particularly exports of manufactures goods, as well as high growth rates of their GDP have encouraged many researchers to look export development and diversification as the new engine of growth. There is also an emergent consensus that patterns of economic development is linked with structural change in exports and increased export diversification. The patterns of trade have changed from primary exports to manufactured exports of labor intensive types in almost all regions of the world.

In view of the above, this paper is organized as follows section 2 of the paper will give review of the literature part. In section 3 the exports diversification, its significance and statistical tools to measure diversification have been discussed. In section 4 will describe empirical analysis of export performance in last two decades and last section will conclude on findings and recommendation for future.

## 2. LITERATURE REVIEW

Countries should move from primary exports to manufactured products besides other structural changes (see Lewis (1954), Chenery (1979) and Syrquin (1989)). This vertical export diversification could reduce declining terms of trade shocks for commodity dependent countries. Additionally, commodity products particularly with high elasticities are subject to very unstable market prices so that countries which are dependent on these commodities may experience from export volatility. Ghosh and Ostry (1994), Bleaney and Greenaway (2001) discussed that horizontal export diversification could therefore help to stabilize export earnings in the longer run. There could also be increasing returns to scale from new techniques of production related to export diversification that could lead to higher per capita income growth (see Amin Gutierrez de Pineres and Ferrantino (2000)).

The connection between export diversification and economic growth in Chile was studied by Amin Gutierrez de Pineres and Ferrantino (1997), and they concluded that Chile has gained significantly from its diversifying export. Lederman and Maloney (2002) in a dynamic cross-country panel model also find some evidence in support of diversification-led growth. Imbs and Wacziarg (2003) develop some theoretical opinions for countries' incentives to locally diversify and then specialize. Acemoglu and Zingales (1997) developed the portfolio argument whereby diversification is an endogenous process, and producers invest in a wide range risky sectors which leads to diversification.

Hausmann and Rodrik (2003), Hausmann, Hwang and Rodrik (2006) as well as Hausmann and Klinger (2006) have investigated the benefits of export diversification and exports in general for economic growth, both empirically as well as theoretically. They concluded that economic growth is not determined by proportional advantage but by countries' diversification of their investments into new activities. Hausmann and Rodrik (2003), suggested that the government should play an important role in industrial growth as well as structural transformation through promoting entrepreneurship.

In many developing countries, it is often the case that they have focused in exporting certain goods but not able to transfer those assets and skills to the production of more

refined commodities. Therefore, it might be another argument for export diversification since this might allow countries to attain skills and assets that could be relevant for goods in the nearby production space. Contrary, there might be knowledge spillovers or increasing returns to scale from export diversification (Amin Gutierrez de Pineres and Ferrantino (2000)). The role of innovation in export diversification is another aspect. Klinger and Lederman (2005) investigated the relationship between innovation and export diversification. They concluded that developing countries that are in the diversifying stage are mainly characterized by a higher frequency of inside-the-frontier discoveries. Hausmann and Klinger (2006) studied the benefits from diversification in terms of the spillovers in the economy as a result of having a more diversified production structure.

### 3. EXPORT DIVERSIFICATION

Export diversification is defined as the change in the composition of a country's existing export product mix or export destination (Ali, Alwang and Siegel, 1991), or as the spread of production over many sectors (Berthelemy and Chauvin, 2000). It is conceived as the progression from traditional to non-traditional exports in many developing countries, and thus as part of an export led growth strategy. Diversification can lower instability in export earnings, expand export revenues, upgrade value-added, and enhance growth through many channels through providing a broader base of exports. Thus, the least developed countries needs to diversify their variety of production of primary export commodities for reducing the excessive dependence on primary commodities for generating export earnings. Diversification can also aim at expanding opportunities for export and improvement of backward and forward linkages to domestic inputs and services.

#### 3.1 Dimensions of Export Diversification

Export dependency on primary products of a country can be decreased through diversification of the export portfolio. But, export diversification can occur in different forms and dimensions and hence its analysis can be carried out at different levels. Usually a country can accomplish export diversification by changing the share of commodities in the existing export mix, or by including new commodities in the export portfolio. In this context, there are two familiar types of export diversification known as horizontal and vertical.

Horizontal diversification takes place within the same sector (primary, secondary or tertiary), and requires adjustment in the country's export mix by adding new products on existing export baskets within the same sector, with the expectation to diminish adverse economic and political risks. However, vertical diversification entails contriving additional uses for existing and new innovative commodities by means of value-added endeavors such as processing and marketing. It is anticipated that vertical diversification can enlarge market opportunities for raw material and facilitate to enhance growth and stability because processed goods usually have greater price stability as compared to raw commodities. For economic development of a country, both horizontal and vertical diversification are equally important, however, requirements for two could vary significantly in terms of technological, managerial and marketing expertise. Sustainable long term export growth requires both horizontal (e.g. adding new products on existing

ones), and vertical (e.g. move from commodity to higher value added manufactures), diversification. This can be achieved either by adjusting shares of commodities in the existing export mix or by adding new products to the export mix.

### 3.2 Significance of Export Diversification

Since a long time, developing countries have been struggling with the challenge of expanding and diversifying their export baskets. There can be serious economic and political risks, when export is concentrated in a few major commodities and export diversification aspires at mitigating these risks. Economic risks (in the short term) includes volatility and instability in foreign exchange earnings, which have adverse macroeconomic effects and (in the long term), includes material and volatile declining terms of trade trends which exacerbate short run effects. Political risks include deteriorate governance and risk of civil war in fragile states (Collier, 2002). Another objective of diversification is to reduce dependence upon one or a limited number of geographical destinations for its exports. Since conventional exports face restricted demand due to their low income elasticity and declining terms of trade, and to lower variability of growth rates, therefore, diversifying away from conventional exports is believed to elevate growth rates.

### 3.3 How to measure Export Diversification?

Export diversification can be analyzed using several measures analogous to different definitions or concepts. In this paper, exports diversification will be carried out using the following measures:

- Commodity-specific cumulative export experience function (CSCEEF);
- Commodity specific traditionalist index (CSTI);
- Variance of the commodity specific traditionalist index;
- Concentration ratio (product or geographic concentration);
- Herfindahl-Hirschman index (HHI);
- Gini Coefficient.

#### 3.3.1 Commodity-specific cumulative export experience function (CSCEEF)

It is a more common measure of diversification and can be acquired by estimating a cumulative export experience function. Suppose that  $Y_{ik}$  represents the actual value of exports of the  $i$ th commodity in year  $k$ , the commodity specific cumulative export experience function (CSCEF) is defined as:

$$CSCEF_{ik} = \frac{\sum_{k=k_0}^{k_e} Y_{ik}}{\sum_{k=k_0}^{k_K} Y_{ik}}$$

where  $k_0, k_e$  and  $k_K$  indicate the initial, current and terminal periods of the sample respectively.

The variable  $CSCEF$  has properties similar to that of a cumulative distribution function in the sense that it may take a very small (or near zero) value in the initial period and consequently rise to 1 in the terminal period. A comparison of CSCEF across different commodities may also shed light on the diversification of the export industries. For example, the commodities for which plots of CSCEF are shifted further to the right

should not only be considered to be more non-traditional export commodities but they should also be expected to be more vertically diversified.

### 3.3.2 Commodity-specific traditionality index (CSTI)

CSTI involves computing the mean of the cumulative export experience index for each  $i$ th commodity for the entire sample period and is defined as:

$$CSTI_i = \frac{\sum_{k=k_0}^K CSCEF_{ik}}{k_K - k_0 + 1}$$

There would be a more traditional export commodity if CSTI has a higher value. By using both CSCEF and CSTI, it is likely to identify and estimate the degree and nature of diversification of a country's export portfolio of different varieties.

### 3.3.3 Variance of CSTI (VCSTI)

The variance of CSTI (VCSTI) can be used to test the robustness of the commodity-specific traditionality index and is defined as:

$$VCSTI_i = \frac{\sum_{k=k_0}^{K_e} \left( CSCEF_{ik} - \overline{CSCEF_i} \right)^2}{k_K - k_0 + 1}$$

where  $\overline{CSCEF_i}$  is the mean value of CSTI and a lower value of VCSTI would indicate that the composition of traditionality for a specific commodity has been stable over the sample period.

### 3.3.4 Concentration Ratio (CR)

The concentration ratio (CR) measures the export share of only the major export categories and using the measures of CR of export earnings, the degree of diversification can be estimated. There are many measures to estimate concentration ratios, including the Ogive index, the Entropy index, and the Gini-Hirschman index (see Bond and Milne (1987), Siegel (1990), Svedberg (1991)). It is calculated as follows:

$$CR(x) = \sum_i S_i; \quad i=1, 2, \dots, n$$

where  $x$  is less than the total number of export commodities  $n$ . CR confer equal weight to the  $x$  largest export categories but ignore the remaining categories in the export market. When the ratio value is close to unity, this means that the  $x$  categories included in the ratio make up the entire export bill and therefore concentration is high. There is no such rule for determination of the value of  $x$ , and the number of categories included in the Concentration Index is a rather arbitrary decision, however, in most applications CR(4), CR(8) or CR(12) are used. This is the main shortcoming of this ratio but it is still broadly used due to its limited data requirements and simplicity of calculation.

### 3.3.5 Herfindahl-Hirschman Index (HHI)

The Herfindahl-Hirschman Index (HHI) or Herfindahl index is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. It is calculated by taking the square of export shares of all export categories in the market:

$$HHI = \sum_i s_i^2; \quad i = 1, 2, \dots, n.$$

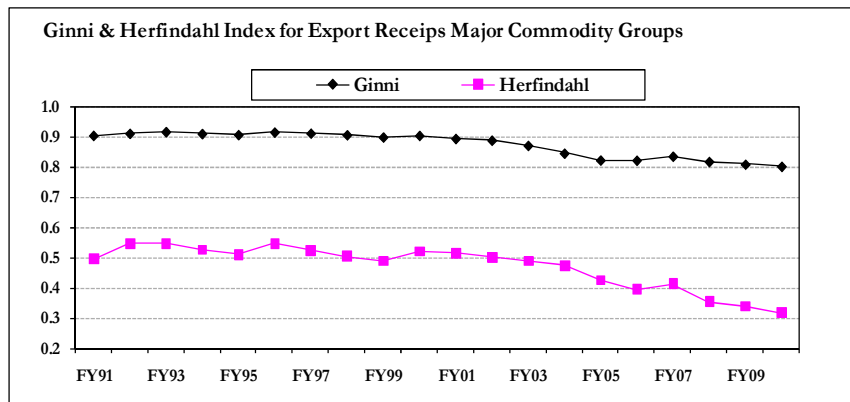
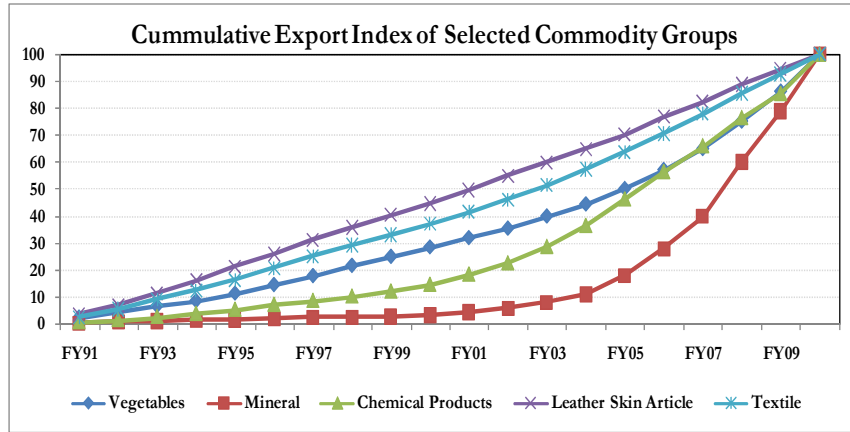
HHI provides greater weight to the bigger export categories and approaches a value of unity when the country exports only one commodity or service (high concentration). Generally, an increase in the Herfindahl index reflects a decrease in competition and an increase of market power, whereas decreases indicate the contrary. The main advantage of the Herfindahl index in relationship to such measures as the concentration ratio is that it provides additional weight to bigger firms.

### 3.3.6 Gini Co-efficient

It can range from 0 to 1 and is sometimes multiplied by 100 to range between 0 and 100. A low Gini coefficient reflects a more equal distribution, with 0 analogous to complete equality, while higher Gini coefficients indicate more unequal distribution, with 1 corresponding to complete inequality. Hence, if the Gini coefficient is being used to portray household income inequality, then no household can have a negative income. Whilst used as a measure of income inequality, the most unequal society will be one in which a single person receives 100% of the total income and the remaining people receive none (i.e.  $G = 1$ ); and the most equal society will be one in which every person receives the same percentage of the total income (i.e.  $G = 0$ ). Some find it more intuitive (and it is mathematically equivalent) to think of the Gini coefficient as half of the Relative mean difference.

## 4. EMPIRICAL ANALYSIS

We have analyzed the Pakistan's export receipts data for the period from 1991 to 2010. Our results are summarized in the following Table. From the results in the Table, we find that Pakistan traditional exports textile sector and raw lather skin loses its share in export basket, contrary minerals, vegetables and prepared food stuff raised their shares. Right Shifted CSCEF plots and low values of Commodity Specific traditionally index for Mineral, Vegetables and Chemical Group indicating an increasing trend of these commodities in Pakistan export basket. Further, primary or traditional commodities of leather and skin showing a decline in their shares with high CTSI and CSCEF plot tends towards right. Whereas for textile group, flat CSCEF plots suggest that there is overall no significant structural change. There is persistent decrease in overall share of export basket however total export value is uniformly increasing as textile sector is still leading contributor and employment generating sector. Declining Gianni Index and Herfindahl indices also advocates structural shift in the export basket and resistance on relying on export of few commodities.



Commodities	Millions US \$				%Share				CSTI	VCSTI
	FY 91-95	FY 96-00	FY 01-05	FY 02-10	FY 91-95	FY 96-00	FY 01-05	FY 02-10		
	656	834	870	1,440	2.0	2.0	1.6	1.6	0.44	0.08
Vegetables	2,243	3,352	4,233	9,744	6.9	8.2	7.7	11.2	0.36	0.08
Animal Vegetable Fats	4	3	201	561	0.0	0.0	0.4	0.6	0.20	0.10
Food Beverage Tobacco	718	817	820	1,773	2.2	2.0	1.5	2.0	0.41	0.08
Mineral	171	147	1,335	7,519	0.5	0.4	2.4	8.6	0.19	0.08
Chemical Products	163	273	932	1,584	0.5	0.7	1.7	1.8	0.30	0.10
Plastic & Article	23	55	624	1,526	0.1	0.1	1.1	1.7	0.22	0.09
Leather Skin Article	3,363	3,665	4,007	4,651	10.4	9.0	7.3	5.3	0.49	0.09
Wood	21	28	48	76	0.1	0.1	0.1	0.1	0.38	0.08
Pulp Wood	32	38	90	238	0.1	0.1	0.2	0.3	0.30	0.09
Textile	23,116	28,914	37,333	50,556	71.3	70.8	67.9	57.9	0.44	0.09
Footwear	133	150	328	535	0.4	0.4	0.6	0.6	0.37	0.10
Stones Plaster Cement	82	83	210	444	0.3	0.2	0.4	0.5	0.32	0.08
Perals Precious Metal	32	31	63	205	0.1	0.1	0.1	0.2	0.28	0.06
Base Metal	149	201	449	1,484	0.5	0.5	0.8	1.7	0.27	0.08
Machinery	90	138	513	1,113	0.3	0.3	0.9	1.3	0.28	0.10
Vehicles Transport	33	30	123	232	0.1	0.1	0.2	0.3	0.31	0.09
Apparatus	498	682	861	1,286	1.5	1.7	1.6	1.5	0.42	0.09
Arms Ammunition	0	0	90	123	0.0	0.0	0.2	0.1	0.20	0.11
Miscellaneous	828	1,288	1,719	2,258	2.6	3.2	3.1	2.6	0.42	0.10
Art Work NSEs	76	96	98	36	0.2	0.2	0.2	0.0	0.58	0.11
Total	32,432	40,827	54,948	87,384	100.0	100.0	100.0	100.0	0.42	0.09



## 5. CONCLUSION

In this paper, we have studied two main issues. Firstly, we have developed various measures of export diversification for Pakistan and using these measures in the subsequent regression analysis, we examined that diversification of exports have a role in determining export /growth performance. Pakistani exports are determined mostly in primary or semi-manufactured product categories. It is pertinent to note that identification of primary products with “traditional exports” and manufacturing with “non-traditional exports” is a mistake. Our analysis concludes that even within textile group, the importance in the early period was on low value-added and labor intensive products (e.g. raw cotton and cotton yarn). Conversely, recently, the importance has shifted to relatively higher value-added products.

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**COMPARATIVE STUDY OF GENDER DIFFERENCES IN DEGREE  
OF PERCEIVED OR AVAILABLE SOCIAL SUPPORT  
TO EARTHQUAKE SURVIVORS**

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**ABSTRACT**

A comparative study of perception of social support among male and female of earthquake survivors was conducted against the hypothesis; Men perceive high level of social support than female earthquake survivors. Purpose of study is to explore the differences in degree of perception of social support as well as on its sub component, like attachment, nurturance, social integration etc. Purposive sampling was done. Sample of Fifty (50) earthquake survivors, (equal distribution of male and female), of age ranging from 16-60, was selected from different hospitals e.g.; Military Hospital Rawalpindi, PIMS Hospital Islamabad, and NIRM Islamabad. Urdu version of Social Support Scale by Gull and Najam was administered. In results mean score of male on Actual social support was 17.6 and on Perceived social support was 68.92, while mean score of female on Actual social support was 15.5 and on perceived social support was 64 only. It is concluded that male earthquake survivors perceives high level of social support by 86.6 than 79.9 of female in general.

**INTRODUCTION**

Social support and relations with others have long been regarded as emotionally satisfying aspects of life. Social support means seeking help; it also refers to all human relations that have positive and lasting effect on individual's life. The people who provide this kind of help are usually called a person's social support network. (Nadcer, 1986. Wills, 1992). Parents, roommates, siblings, coworkers, may all be part of social support network. Social support system help the person to gain control of emotional and stressful situation. People with high level of social support when they confront with a stress, they may cope with it successfully (J.M. Siegel, 1993).

Social support is a multidimensional construct that has been conceptualized and measured in a variety of ways. Most measures of support fall into one of three categories:

- 1) Social network characteristics that assess the degree to which a person is socially integrated;
- 2) Received support measures that indicate what a person has actually received or reported to have received; and
- 3) Perceived support measures that capture an individual's beliefs about the

Availability of support (Sarason, B.R., Sarason, I.G., and Pierce, G.R. 1990). Measures of perceived support are the focus of this study.

Researches have suggested that social support may take any of several forms, House (1981), in a masterful integration of the many conceptualizations of social support, presents a multidimensional classification scheme for the Social support construct. House (1981) proposes that social support is an interpersonal transaction involving one or more of the following types of supportive behavior: emotional, instrumental, information, or appraisal.

Emotional support involves providing empathy, caring, love, and or trust to another. Instrumental support is provided when someone helps another do their work, takes care of them, or helps them pay their bills. Informational support provides a person with data that can be used to cope with personal and environmental problems. This is different from instrumental support because the information given is not in and of itself helpful, rather, it helps people to help themselves. Appraisal support provides the person with feedback or information that is relevant to self-evaluation-in a social comparison sense (Festinger, 1954; Jones & Gerard, 1967). Appraisal support includes helping an individual to understand better and what resources and coping strategies may be mastered to deal with it. Through such exchange of appraisal, individual facing the stressful event can determine how threatening the stressful event is likely to be. Tangible assistance involved the provision of material support, such as services, financial support, or goods.

House's (1981) definition of support provides clearer direction for measuring the social support construct. However, the four types of social support proposed by House should not be seen as independent entities (Leavy, 1983). For instance, it is difficult to imagine an emotionally supportive relationship in which there is no appraisal support (i.e., giving advice). Leavy (1983) notes that the classification scheme presented by House (1981) provides a good balance between comprehensiveness and specificity.

Supportive friends /family can provide emotional support by reassurance the individual. Warmth and nurturance provided by others can enable a person under stress to approach it with greater assurance. Family and friends can provide information by suggesting specific actions. So people under stress can try out his/her definition of the problems and potential solution and supportive people around, family can provide feedback during time of stress, people often suffer emotionally and may experience bouts of depression, sadness, anxiety and loss of self esteem.

- **Role of social support**

Social support appears to lower the likelihood of illness when it does occur (Kulich and Mahler, 1989). Role of social support has direct and buffering effect. Direct effect is that social support is generally beneficial during highly stressful time, Buffering effect is that Physical and Mental health benefits of social support are chiefly evident during the period of high stress.

Evidence suggests both direct and buffering effect of social support has existed (S. Cohen and Hoberman, 1983). Social support may even have direct physiological benefits with regard to buffering, (Baron and Russel, 1990). So people with good support system are more likely to comply with appropriate regimen that permits them to recover

from medical illness (Wallston,1983). It is concluded that people with good level of social support may be less likely to develop Psychological and Medical problems.

It may also perceived that perceived availability (that social support can be available at any time) of social support enables the people to appraise stressful event in a more benign way (Wethington and Kessler, 1986).

Generally when researcher has looked at social support in social term, direct effect of social support has been found. When social support has been assessed qualitatively, such as degree to which a person feels that there are others available to him if he needs it, than effect of social support has been found (S. Cohen and Wills, 1998).

### **RATIONALE OF STUDY**

Above mentioned effectiveness and importance of social support, also depends on degree of level of social support, so this research will determine the degree of available social support which in turn will give the idea of quality of work done with earthquake survivors.

Beside the degree, gender differences in perception of the available social support also play a significant role in appraisal of he event. As we belong to developing countries there are major gender differences, this study will also determine the differences in this regards.

### **OBJECTIVES**

1. To measure the degree of availability of social support among Earthquake survivors
2. To highlight the differences among men and women's perception about perceived/available social support among Earthquake survivors

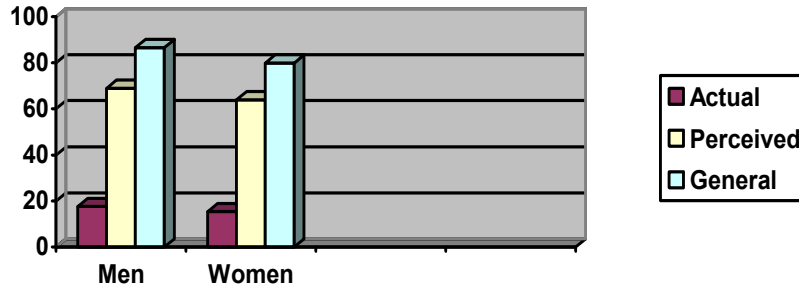
### **METHODOLOGY**

Social Support Scale (Urdu version) by Gul and Najam in 2001, consisting of two parts (Actual Social Support, and Perceived Social Support), was administered. Sample of Fifty (50) Earthquake survivors were classified equally in two halves of men and women was purposively selected from different Hospitals (Military Hospitals, PIMS, and NIRM). Their scores were tabulated manually, sum score of Actual Social support was converted into means by dividing it to its total no of sample, separately for men and women. After calculation of the scaled scores on each subscale of Perceived Social Support (part-2), these scores were further converted into means by the above mentioned strategy, separately for men and women. These results are comparatively presented below in table-1 and in table-2.

**RESULTS**

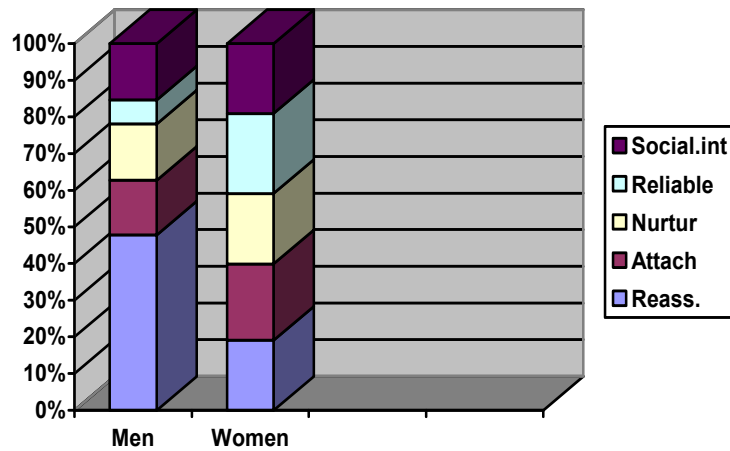
**Table-1: Differences of means on Actual, Perceived and General Perception of the Men and Women**

Perception	Men	Women
1. Actual	17.6	15.5
2. Perceived	68.92	64
3. General	86.6	79.9



**Table-2: Differences of means on different subscale of Perceived Social Support of the Men and Women**

Perceived Social Support	Men	Women
• Reassurance of worth	36.5	12.2
• Attachment	11.4	13.4
• Nurturance	11.73	12.3
• Reliable alliance	05	14
• Social integration	11.73	12.2



## DISCUSSION

This research explores gender differences in perceptions of social support among earthquake survivors. Differential socialization of men and women has been a well documented phenomenon (Deaux, 1984; Deaux & Lewis, 1984; Eagly, 1987; Maccoby, 1966; Maccoby & Jacklin, 1974; Spence & Helmreich, 1978; Vaux, 1988). Male socialization often deemphasizes the expression of feelings, focusing more closely on autonomy, self-reliance, and independence. Hence, the male socialization process itself may run counter to the formation of “effective” social support networks (Barbee et al., 1993; Greenglass, Pantony, & Burke, 1988). This more central role that men play in the society and may make social support more available to them. As it is very clear from the finding of this research where mean score of male on Actual social support was 17.6, while mean score of female on Actual social support was 15.5. It shows that men have high degree of availability of social support as compared to Women

Results of the research indicated that generally men has high level of actual and perceived social support but in reliable alliance of perceived support, female has high score as compared to male, might be because of female socialization emphasizes verbal expressiveness focusing on warmth and a search for intimacy. Women are more likely to acknowledge the need for help and assistance thereby explicitly fostering socially supportive relationships. Thus, establishing and maintaining socially supportive relationships may be much easier for women than for men. This difference in the exchange of socially supportive behaviors may be especially noticeable in the area. We find that, Women has high level of perceived social support as compare to men it is going to second the finding of research conducted by Von Dras et al. (1996) hypothesized and find that women have greater perceived social support than men. Antonucci, Toni (1985) speculates that women may have a higher sense support because they are generally embedded in more varied social networks than are men.

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**E-TENDER SYSTEM**

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**ABSTRACT**

An e-Tender System facilitates the complete tendering process from the advertising of requirements through to the placing of the contract. This includes the exchange of all relevant documents in the electronic format.

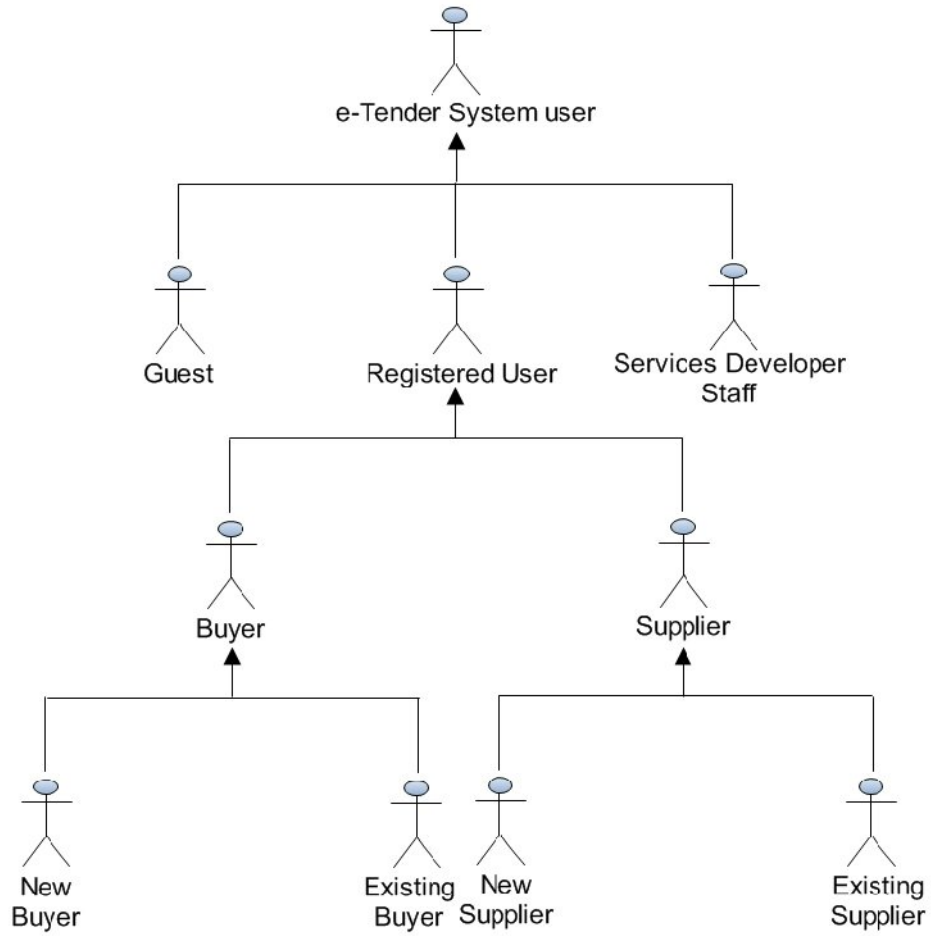
A simple e-tendering solution may be a space on a web server where electronic documents are posted with basic viewing rules. This type of Solution is unlikely to provide automated evolution tools; instead users are able to download tenders to spreadsheet and compare manually, but in an electronic format. Such solutions can offer valuable improvements to paper based tendering.

More sophisticated e-tendering systems may include more complex collaboration functionality, allowing numbers of users in different locations to view and edit electronic documents. They may also include e-mail trigger process control which alerts users for example of a colleague having made changes to a collaborative ITT (Invitation To Tender), or a supplier having posted a tender.

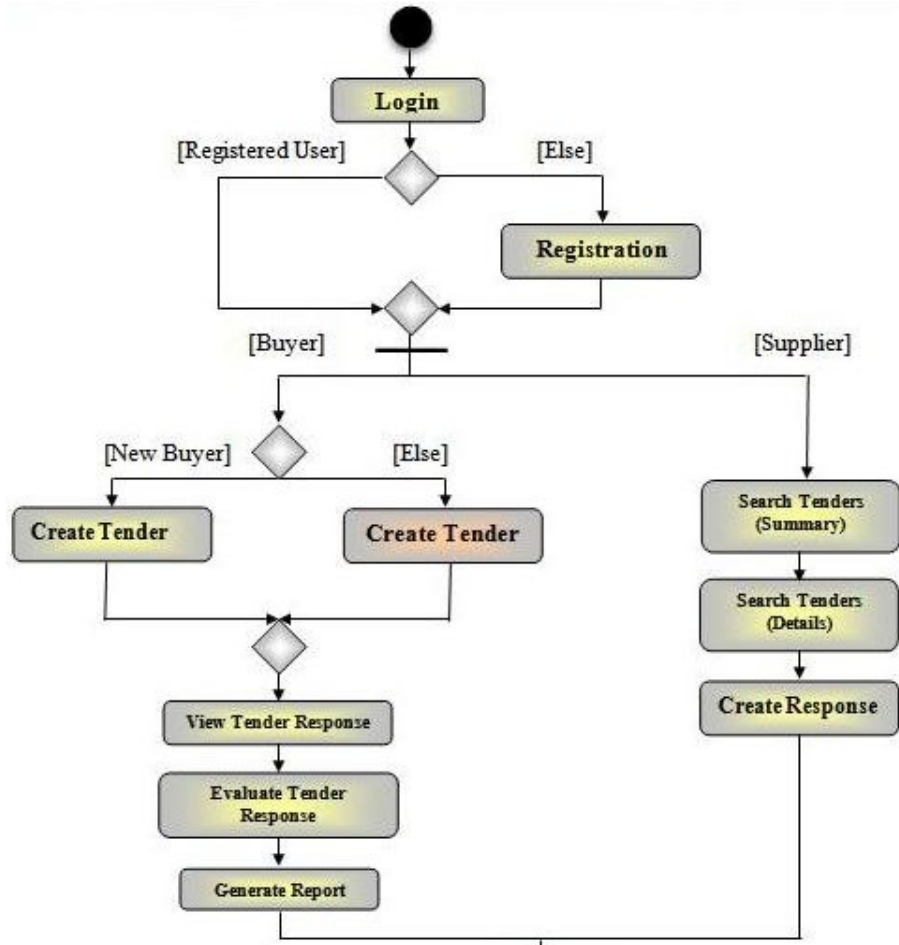
The most sophisticated systems may use evaluation functionality to streamline the tender process from start to finish, so that initial ITT documents are very specific and require responses from vendors to be in a particular format. These tools then enable evaluation on strict criteria which can be completely automated.

The manual process can be long and complex, often taking three months or longer, which is costly for both buyer and supplier organizations. E-Tendering replaces these manual paper based tender processes with electronically facilitated process based on best tendering practices to save time and money.

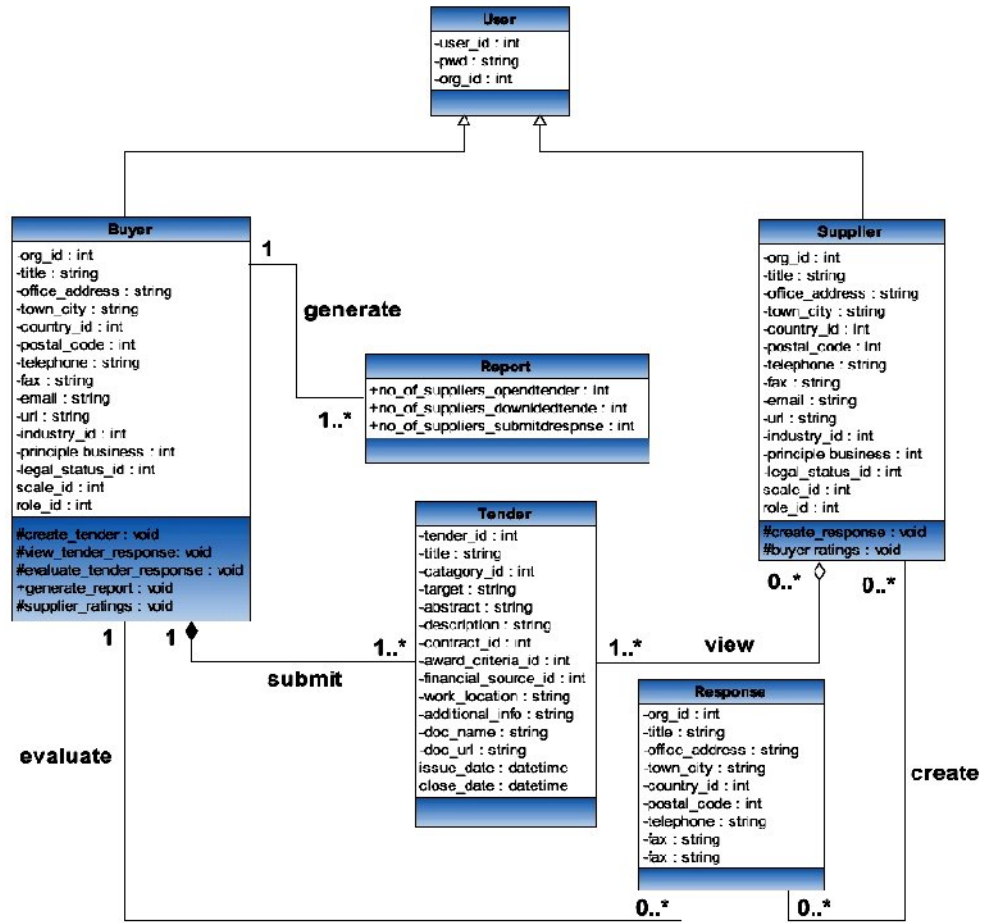
The aim is to reduce tender cycle-time, which results in fast and accurate pre-qualification and evolution enabling the automatic rejection of suppliers that fail to meet the tender specification.



Workflow behind the system & Application model with Parallel Processing



Static structure View



### **CONCLUSION**

The bottom line is that e-Tender System provides a more efficient way of contracting supplies and services by easing the traditional process of tender compilation and distribution.

The efficiency of any e-Tender System can be improved through complex collaborative functionality, allowing geographically different teams of an organization to collaborate for preparation of Tenders Even e-Tender System can become handier if it supports the financial transaction between different organizations.

However some more improvements can be made into a e-Tender System such. As use of virtual reality; to make use of 3D diagrams for product samples (for suppliers) and 3D diagrams for work location (for services).

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**ISLAMIC BANKING AND FINANCIAL SOUNDNESS:  
SOME EMPIRICAL EVIDENCE**

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**ABSTRACT**

This research investigates the Islamic banking and financial soundness some empirical evidence. Data were collected from various secondary sources. It was revealed that as the presence of Islamic banks grows in a country's financial system, there is no significant impact on the soundness of other banks. This suggests that Islamic and conventional banks can co-exist in the same system without substantial 'crowding out' effects through competition and deteriorating soundness. These findings are subject to several caveats relating to the cross-country data. Databases are often incomplete in coverage of Shariah-compliant and conventional banks. Moreover, we focused only on fully-fledged Islamic banks and did not cover Islamic branches operated by some conventional banks. Data limitations also prevented the study from fully taking into account all aspects of Islamic financial contracts, for example, by distinguishing between PLS and other investments. Nonetheless, the main results are encouragingly robust with respect to a range of sensitivity tests, such as using different measures of financial soundness and different estimation methods. Our findings provide some comfort regarding the financial soundness of small Islamic banks. At the same time, they underscore the importance for regulators of paying attention to the prudential risks of Islamic banks, in particular those that are large.

**KEY WORDS**

Islamic Banking; Financial Soundness; Empirical Evidence.

**INTRODUCTION**

There is a large body of descriptive literature about Islamic finance, but there has been relatively little empirical work on Islamic banking and financial stability, an area of increasing interest as Islamic banking grows. In recent IMF research, 'Islamic Banks and Financial Stability: An Empirical Analysis', we attempt to fill this gap in the literature, using data on 18 banking systems with a substantial presence of Shariah-compliant banks to provide a cross-country empirical analysis of the role of these banks in financial stability. An increasingly popular way of assessing banks' soundness is to analyze their so-called z-scores. The z-score combines a bank's capitalization, profitability, and a measure of risk faced by the bank into a single index. The interpretation of the z-score is straightforward: the lower the score, the more likely it is that a bank will run out of

capital. Defining large banks as those with total assets of more than \$1 billion and small banks as all others, the paper finds that:

- small Islamic banks tend to be financially stronger (that is, have higher z-scores) than small and large conventional banks;
- large conventional banks tend to be financially stronger than large Islamic banks;
- small Islamic banks tend to be financially stronger than large Islamic banks (see the bar chart).

A plausible explanation of the contrast between the high stability in small Islamic banks and the relatively lower stability in larger ones is that it is significantly more complex for Islamic banks to adjust their credit risk monitoring system as they become bigger. For example, the PLS modes used by Islamic banks are more diverse and more difficult to standardise than loans used by conventional banks. As a result, as the scale of the banking operation grows, monitoring of credit risk rapidly becomes much more complex. That results in a greater prominence of problems relating to adverse selection and moral hazard. Another explanation is that small banks concentrate on low risk investments and fee income, while large banks do more PLS business.

### **ISLAMIC BANKS GOING FORWARD: CHALLENGES**

The continuing rapid growth of demand for Islamic financial services is clearly good news for Islamic banks. At the same time, it also presents some challenges, as the banks need to invest in upgrading their credit risk management capabilities in line with the more complex and larger projects into which they are entering. Despite the rapid growth, business models and products of Islamic banks are still rather homogeneous, while Shariah compliance amplifies risks stemming from product configuration and process implementation. The success of Islamic banking in recent years has produced too many Islamic banks with the same business models. There is a lack of 'bread and butter' lending, and the current excess liquidity has led to too much complacency among Islamic banks. In addition, there is a large and diverse set of accounting standard differences across different jurisdictions. The development and setting of simple standard legal contracts is necessary in order to overcome the complexity and heterogeneity of current contracts. Furthermore, the deployment of IT systems that help monitor the fulfillment and visibility of processes on an end-to-end basis are crucial to facilitate the continuous monitoring of activities by Shariah scholars while eliminating the possibilities of non-compliance, which in some cases might render transactions invalid. Liquidity risk management of Islamic banks is an important challenge and is constrained due to limited availability of tradable Islamic money market instruments and weak systemic liquidity infrastructure. At the moment, there is no Shariah-compliant short-term Islamic money market (less than one week maturity) in local currency or in US dollars, and Islamic rupee markets have not yet developed. Islamic money markets with longer maturities, which are based on commodity Murabaha transactions (mark-up financing), sometimes suffer from unreliable brokers with low creditworthiness. Islamic banks also have a competitive disadvantage with conventional banks, as they deposit their overnight money with their domestic central bank interest free. The lack of liquidity and viable alternatives, combined with the competitive disadvantage, hamper the local Islamic banks and can even create a liquidity crisis.

### **ISLAMIC BANKS GOING FORWARD: SOLUTIONS AND OPPORTUNITIES**

Both risk managers and regulators are working to address the above challenges. To overcome the shortcomings of the Islamic money market, many investment banks are currently designing new complex products, compliant with Shariah law. It remains to be seen whether these new solutions will obtain widespread Shariah-compliant status in the Islamic finance community, and generate enough demand for a functional Islamic money market to develop. The rapid developments are likely to continue. Financial institutions in countries such as Bahrain, the UAE and Malaysia have been gearing up for more Shariah-compliant financial instruments and structured finance – on both the asset and liability sides. At the same time, the leading financial centers, such as London, New York and Singapore, are making significant progress in establishing the legal and prudential foundations to accommodate Islamic finance side-by-side with the conventional financial system. Many of the largest western banks, through their Islamic windows, have become active and sometimes leading players in financial innovation, through new Shariah-compliant financial instruments that attempt to alleviate many of the current constraints such as a weak systemic liquidity infra-structure. More conventional banks are expected to offer Islamic products, enticed by enormous profit opportunities and also ample liquidity, especially across the Middle East.

New product innovation is also driven by domestic banks' interest in risk diversification. With a large number of new Islamic banks across the Middle East and Asia especially, diversification of products enables banks to offer the right product mix to more sophisticated clients. A few banks are already active across different jurisdictions, and this trend is certainly going to continue in the near future, possibly with some consolidation. On the regulatory front, the Islamic Financial Services Board (IFSB), an international standard-setting organization based in Malaysia, has moved ahead with its efforts aimed at fostering of the soundness and stability of the Islamic financial services industry through more standardized regulation. Globally accepted prudential standards have been adopted by the IFSB that smoothly integrate Islamic finance with the conventional financial system. For instance, the adoption of the IFSB standards (somewhat akin to Basel II), which take into account the specificities of Islamic finance, ensures a level playing field between Islamic and conventional banks.

Many challenges still lie ahead, as is clear from the discussion above. However, the ongoing improvements in banks' risk management techniques and prudential frameworks for Shariah-compliant banking give reasonable hope that the Islamic financial industry's growth will contribute positively to broader financial and economic stability.

We begin with basic principles. The one is interest-based money lending while the other operates like a trading house. Where does this difference originate? Two core principles lie at the centre – elimination of Riba and gharar. Any Islamic transaction needs to assess these two things first and foremost. Bearing in mind the definition given in Hadith, as mentioned above, we can discuss the time value of money and the workings of present day Islamic banks. For this, we have to look at the differences between the ways in which modern capitalist theory (the basis of interest-based banking) views 'money' and 'commodity' and the principles defined by Islam.



According to capitalist theory, there is no difference between money and commodity in so far as commercial transactions are concerned. Accordingly, both are treated at par and can be sold at whatever price parties agree upon. With this theory, selling Rs100 for Rs110 or renting Rs100 for a monthly rental of Rs10 is the same as selling a bag of rice costing Rs100 for Rs110 or renting a fixed asset costing Rs100 for a monthly rental of Rs10.

Islamic principles differ from this concept because money and commodity have different characteristics. For instance, money has no intrinsic value but is rather a measure of value or a medium of exchange. It cannot fulfil human needs by itself, but needs to be converted into a commodity. On the other hand, a commodity can fulfil human needs directly. Furthermore, commodities can differ in quality while money has no differential quality, in the sense that a new note of Rs1000 is exactly equal in value and quality to an old note of Rs1000. Similarly, commodities are transacted or sold by pinpointing the item in question or at least by giving certain specifications. Money, however, cannot be pinpointed in a transaction of exchange. Even if it could be, it would be of no use to do this since the different denominations of money making up an equal amount have the same ultimate value.

With these differences in mind, to exchange Rs1000 for Rs1100 in a spot transaction would make no sense since the money in itself has no intrinsic utility or specified quality. So, the excess amount on either side is without consideration and hence not allowed under Shariah. The same would hold true if we were to exchange these Rs1000 for Rs1100, to be delivered after a period of one month, since the excess of Rs100 would be without consideration of either utility or quality but would only be related to time.

The false sense of immunity from losses that all these factors together provide, has introduced a fault line in the financial system. Banks have not, therefore, undertaken a careful evaluation of the loan applications. This has led to an unhealthy expansion in the overall volume of credit, to excessive leverage, and to an unsustainable rise in asset prices, living beyond means, and speculative investment. Unwinding later on gives rise to a steep decline in asset prices, and to financial fragility and debt crises, particularly if there is over-indulgence in short sales. Jean Claude Trichet, president of the European Central Bank, has rightly pointed out that 'a bubble is more likely to develop when investors can leverage their positions by investing borrowed funds'.

Islamic finance should, in its ideal form, help raise substantially the share of equity and PLS in businesses. Greater reliance on equity financing has supporters even in mainstream economics. Professor Kenneth Rogoff of Harvard University states that in an ideal world equity lending and direct investment would play a much bigger role. Greater reliance on equity does not necessarily mean that debt financing is ruled out. This is because all the financial needs of individuals, firms, or governments cannot be made amenable to equity and PLS. Debt is, therefore, indispensable, but should not be promoted for nonessential and wasteful consumption and unproductive speculation. For this purpose, the Islamic financial system does not allow the creation of debt through direct lending and borrowing. It rather requires the creation of debt through the sale or lease of real assets by means of its sales- and lease-based modes of financing (Murabaha, ijara, salam, istisna and sukuk). The purpose is to enable an individual or firm to buy now

the urgently needed real goods and services in conformity with his/her ability to make the payment later. It has, however, laid down a number of conditions, some of which are:

- The asset which is being sold or leased must be real, and not imaginary or notional.
- The seller or lesser must own and possess the goods being sold or leased.
- The transaction must be a genuine trade transaction with full intention of giving and taking delivery.
- The debt cannot be sold and thus the risk associated with it must be borne by the lender himself.

The first condition will help eliminate a large number of derivatives transactions which involve nothing more than gambling by third parties who aspire to claim compensation for losses which have been actually suffered only by the principal party and not by them. The second condition will help ensure that the seller (or lesser) also shares a part of the risk to be able to get a share in the return. Once the seller (financier) acquires ownership and possession of the goods for sale or lease, he/she bears the risk. This condition also puts a constraint on short sales, thereby removing the possibility of a steep decline in asset prices during a downturn. The Shari'ah has, however, made an exception to this rule in the case of salam and istisna where the goods are not already available in the market and need to be produced or manufactured before delivery. Financing extended through the Islamic modes can thus expand only in step with the rise of the real economy and thereby help curb excessive credit expansion. The third and the fourth conditions will not only motivate the creditor to be more cautious in evaluating the credit risk but also prevent an unnecessary explosion in the volume and value of transactions. This will prevent the debt from rising far above the size of the real economy and also release a substantial volume of financial resources for the real sector, thereby helping expand employment and self-employment opportunities and the production of need-fulfilling goods and services. The discipline that Islam wishes to introduce in the financial system may not, however, materialise unless governments reduce their borrowing from the central bank to a level that is in harmony with the goal of price and financial stability.

One may raise an objection here that all these conditions will perhaps end up shrinking the size of the economy by reducing the number and volume of transactions. This is not likely to happen because a number of the speculative and derivatives transactions are generally known to be zero-sum games and have rarely contributed positively to total real output. Hence a decline in them is also not likely to hurt the real economy. While a restriction on such transactions will cut the commissions earned by the speculators during an artificially generated boom, it will help them avert losses and bankruptcy that become unavoidable during the decline and lead to a financial crisis.

The injection of a greater discipline into the financial system may tend to deprive the sub prime borrowers from access to credit. Therefore, justice demands that some suitable innovation be introduced in the system to ensure that even small borrowers are also able to get adequate credit. Such borrowers are generally considered to be sub prime and their inability to get credit will deprive them from realising their dream of owning their own homes and establishing their own micro enterprises. There is no doubt that a number of countries have established special institutions to grant credit to the poor and lower middle

class entrepreneurs. Even though these have been extremely useful, there are two major problems that need to be resolved. One of these is the high cost of finance, ranging from 30 to 84 per cent in the interest-oriented microfinance system. This causes serious hardship to the borrowers in servicing their debt. No wonder the minister of finance for Bangladesh described micro credit interest rates in that country as extortionate in an address he delivered at a micro credit summit in Dhaka in 2004. It is, therefore, important that micro credit is provided to the very poor on a humane, interest-free basis (Qard Hasan). This may be possible if the microfinance system is integrated with zakat and waqf institutions. For those who can afford to bear the cost of microfinance, it would be better to popularise the Islamic modes of PLS and sales- and lease-based modes of finance, not only to avoid interest but also to prevent the misuse of credit for personal consumption.

Another problem faced by microfinance is that the resources at the disposal of microfinance institutions are inadequate. This problem may be difficult to solve unless the microfinance sector is scaled up by integrating it with the commercial banks. Commercial banks do not generally lend to small borrowers because of the higher risk and expense involved in such financing. It is, therefore, important to reduce their risk and expense. This may be done partly by a subsidy from zakat and waqf funds for those borrowers who are eligible for zakat. Thus we can see that the Islamic financial system is capable of minimising the severity and frequency of financial crises by getting rid of the major weaknesses of the conventional system. It introduces greater discipline into the financial system by requiring the financier to share in the risk. It links credit expansion to the growth of the real economy by allowing credit primarily for the purchase of real goods and services which the seller owns and possesses, and the buyer wishes to take delivery. It also requires the creditor to bear the risk of default by prohibiting the sale of debt, thereby ensuring that he evaluates the risk more carefully. In addition, Islamic finance can also reduce the problem of sub prime borrowers by providing credit to them at affordable terms. This will save the billions that are spent after the crisis to bail out the rich bankers. These do not, however, help the poor because their home may have already become subject to foreclosure and auctioned at a give-away price. The problem is that the Islamic finance is still in its infancy and shares a very small proportion of international finance. In addition, it does not genuinely reflect the ethos of Islamic teachings. The use of equity and PLS is still very small while that of debt-creating modes is preponderant. Moreover, even in the case of debt-creating modes, all the conditions laid down by the Shari'ah are not being faithfully observed by the use of legal stratagems (*hiyal*). This is partly due to a lack of proper understanding of the ultimate objectives of Islamic finance, the non-availability of trained personnel, and the absence of a number of shared or support institutions that are needed to minimise the risks associated with anonymity, moral hazard, principal/agent conflict of interest, and late settlement of financial obligations. The system is, thus, not fully prepared at present to play a significant role in ensuring the health and stability of the international financial system. It is, however, expected that the system will gradually gain momentum with the passage of time and complement the efforts now being made internationally for promoting the health and stability of the global financial system. Since the current architecture of the conventional financial system has existed for a long time, it may perhaps be too much to expect the international community to undertake a radical structural reform of the kind

that the Islamic financial system envisages. However, the adoption of some of the elements of the Islamic system, which are also a part of the western heritage, is indispensable for ensuring the health and stability of the global financial system. These are:

- The proportion of equity in total financing needs to be increased and that of debt reduced.
- Credit needs to be confined primarily to transactions that are related to the real sector so as to ensure that credit expansion moves more or less in step with the growth of the real economy and does not promote destabilizing speculation and gambling.
- Leverage needs to be controlled to ensure that credit does not exceed beyond the ability of the borrower to repay.
- If the debt instruments, and in particular CDOs, are to be sold, then there should be full transparency about their quality so that the purchaser knows exactly what he is getting into. It would also be desirable to have the right of recourse for the ultimate purchaser of the CDOs so as to ensure that the lender has incentive to underwrite the debt carefully.
- While there may be no harm in the use of CDSs to provide protection to the lender against default, it needs to be ensured that the swaps do not become instruments for wagering. Their protective role should be confined to the original lender only and should not cover the other purchasers of swaps who wish to wager on the debtor's default. For this purpose the derivatives market needs to be properly regulated to remove the element of gambling in it.
- All financial institutions, and not just the commercial banks, need to be properly regulated and supervised so that they remain healthy and do not become a source of systemic risk.
- Some arrangement needs to be made to make credit available to sub prime borrowers at affordable terms to enable them to buy a home and to establish their own micro enterprises. This will help save the financial system from crises resulting from widespread defaults by such borrowers

### CONCLUSION

Islamic financial services is clearly good news for Islamic banks. At the same time, it also presents some challenges, as the banks need to invest in upgrading their credit risk management capabilities in line with the more complex and larger projects into which they are entering. Despite the rapid growth, business models and products of Islamic banks are still rather homogeneous, while Shariah compliance amplifies risks stemming from product configuration and process implementation. The success of Islamic banking in recent years has produced too many Islamic banks with the same business models. There is a lack of 'bread and butter' lending, and the current excess liquidity has led to too much complacency among Islamic banks. In addition, there is a large and diverse set of accounting standard differences across different jurisdictions. Databases are often incomplete in coverage of Shariah-compliant and conventional banks. Moreover, we focused only on fully-fledged Islamic banks and did not cover Islamic branches operated by some conventional banks. Data limitations also prevented the study from fully taking into account all aspects of Islamic financial contracts, for example, by distinguishing

between PLS and other investments. Nonetheless, the main results are encouragingly robust with respect to a range of sensitivity tests, such as using different measures of financial soundness and different estimation methods.

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**CONTEMPORARY PRACTICES OF PERFORMANCE  
MANAGEMENT (PM) IN HRM**

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**ABSTRACT**

Performance Management is defined as both "the process through which companies ensure that employees are working towards organizational goals" and "a broad term that has come to stand for the set of practices through which work is defined and reviewed, capabilities are developed, and rewards are distributed in organizations." With this thought in mind, the category to be examined is the occasionally vehement opposition to the use and perpetuation of this type of management system. As one researcher stated, Performance Management "is one of the most widely researched management practices, and yet, it continues to be a major source of frustration for managers. Performance appraisal systems are the butt of many jokes and the source of considerable dissatisfaction. Companies with programs, manage the performance of their people outperform companies without such programs on a wide range of financial and productivity measures. Further, those companies whose performance has trailed in their industries show significant improvement in their business results after implementing a [PM] program. Performance appraisals can be a good way for organizations to boost employees' motivation and hone their competitive edge. This study focuses that what direction should an organizational decision-maker take? Should a Performance Management System be implemented? , If so, what should be included and excluded? Should the existing system be eliminated? A good way to determine what is occurring in the field is to get a feel for what course of action other organizational directors have opted for. This litmus test will be the main focus of this research.

**KEYWORDS**

Hiring Management Solutions; Pre-employment Assessment; Performance Management in HR.

**INTRODUCTION**

It is considered everywhere that performance management has been a major component of human resource solutions for many years. With rapid usage of modern technology, organizations all over the world are admiring change, ameliorating their human resource by putting robust talent management software solutions. Performance management software, especially module within a larger talent management software

suite, is an enabler - a catalyst propelling change. How performance management is adopted in different organizations?" And, more importantly, which of these human resource solutions are working? The following research review provides the ways, strengthening better practices being observed all over the world in organizations successfully revamping their performance management strategies. It is not strange that organizations with strong business performance are those which are having strong employee performance management programs. This report was recently issued by the 2007 State of Performance Study consulted conducted by World at Work and Sibson Consulting which surveyed more than 550 HR professionals. The study reported that Performance management methods for both the effective and less effective organizations are almost same. The major difference is the level of strong leadership support and making better to the process. The study explored that "The organizations performing at optimum level are because of having strong leadership support and that execute well in differentiating performance and giving performance messages."

### **SCOPE**

Latest research studies prove that the lots of organizations are adopting performance management systems / performance management software and majority of them are in the process of revamping their first generation systems. According to Development Dimensions International (DDI), performance management systems have been implemented in 91% of 3,600+ organizations observed. In this paper I will also try to discover current trends in performance management and its possible implementation in current situation and how companies all over the world are making changes. According to SHRM (the Society for Human Resource Management), "performance management is the organized method of monitoring results of work activities, collecting and evaluating performance to determine achievement of goals, and using performance information to make decisions, allocate resources and communicate whether objectives are met." It is likely the majority of employees equate "performance management" to their performance appraisal form and yearly discussion with their manager about "how they are doing in their job." But things are changing in this area of HR.

### **LITERATURE REVIEW**

There is a law in Physics which states that two bodies cannot occupy the same space at the same time. Therefore, neither the proponents, nor the detractors of this type of system can be ultimately or universally correct. With this in mind, the hypothesis of this study questions whether the positive attributes of Performance Management, as suggested by its advocates, are indeed correct, and conversely, if the objections of detractors are erroneous. In order to test this hypothesis properly, a thorough literature review was conducted on the subject of performance management in an effort to analyze both its pros and cons. The attributes, once culled from the literature, will be tested in the field for their veracity, and the results of the field tests will be analyzed, with the hypothesis either proven or refuted. The next significant categories in the literature were the concepts and functions that should be included in a Performance Management System. These functions are considered important features by their promoters. Conversely, Performance Management detractors point to their absence as reasons for dismissing the program. The

literature review clearly describes the importance of the investment in skills training for a successful Performance Management System. Therefore, the literature emphasized that a well-constructed Performance Management System can assist a firm in the defense of a legal action taken against the company by an employee or former employee for demotions, transfers, terminations, etc. Conversely, however, if the Performance Management system is poorly constructed, it may have the opposite effect. Before ending the literature review, it is important to understand that performance management systems have evolved over time into legally recognized entities. Furthermore, Performance Management Systems are considered "employment tests," and are subject to the Uniform Guidelines on Employment Selection of the Equal Employment Opportunity Commission. It is no surprise that companies with strong business performance are also companies with strong employee performance management programs. This finding was recently reported by the 2007 State of Performance Study conducted by World at Work and Sibson Consulting which surveyed more than 550 HR professionals. The Performance Management Software is a sophisticated and simple way for Managers and HR Professionals to keep current of ever evolving employee contributions and developmental needs. Research from the Institute for Corporate Productivity (i4cp, formerly the Human Resource Institute) indicates that there are several well-defined steps that can make performance management an effective process in any organization. Their study, finding the Keys to Performance Management: A Study of Current Trends and Future Possibilities surveyed more than 1,000 HR professionals representing various industries and company sizes. According to the research team, it is not necessary to have all nine key practices, however the more practices an organization implements, the more effective the program. Such top companies are using technology to drive these changes.

### **METHODOLOGY**

For this study I will use firsthand knowledge and include those organization having practices of performance appraisal in organization. The major force for designing, implementation, and maintenance of this type system is HR contributions. That's why; HR professionals are our target respondents. The data collection source for this research paper is articles, journals and recent publication on Performance Management. The cross sectional study method will be used for gathering the data for this study. The data collection instrument is questionnaire that will be used to obtain the data. This questionnaire was distributed directly and also sent, via email, to the target respondent. This type of survey is common, cost effective and fast to gather the desired data. This study discovers a synopsis of currently prevailing Practices of Performance Management in HR and also provides a portrait of organization that is depending on Performance Management to motivate employees for betterment of organizational operations and desired outcomes.

### **DATA ANALYSIS AND DISCUSSION**

#### **Key Ingredients for Successful Performance Management:-**

Following components were discovered while analyzing gathered data regarding performance appraisal management



The most important factor is commitment of leadership—top-down and bottom-up.

The next factor is strong relations between performance measures and program outcomes.

The third factor is transparent performance information system.

The fourth important factor is effective feedback mechanisms to discuss and address performance issues.

The last factor is useful performance measures.

These five factors are most important for any successful performance management system. But the challenges of effective performance management are constantly evolving. There is a fast appreciation among public managers that performance, accountability, and results cannot be obtained in isolation by a single program. As a result, next years will observe the “managing for results” approach to governing branch out into the use of networks and broader metrics.

### **Performance Management Current Trends:**

The connection Between Employee Performance Management and Organizational Performance is known as strategic HR.

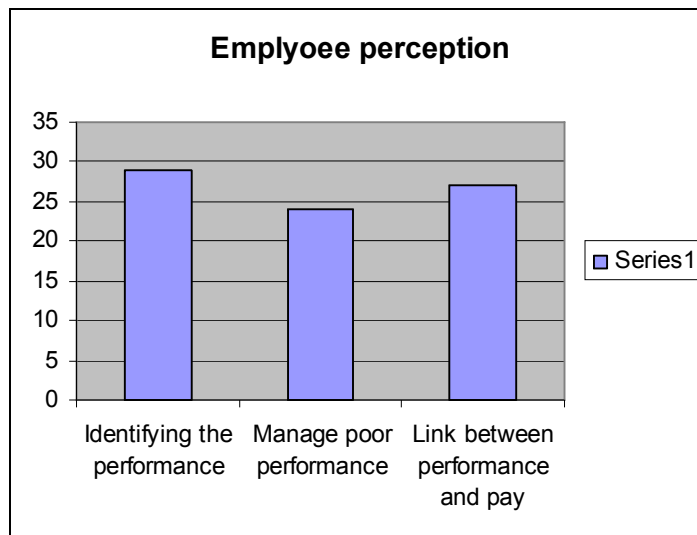
Organizations are rapidly concentrating on strategic HR, aligning human resources initiatives with the overall goals of the organization to ameliorate the overall success of organization. Aligning Employee Performance Management (EPM) with Corporate Performance Management (CPM) has the positive effects: 90% of organizations surveyed, observed better management of their workforce as key to obtaining competitive advantage (CA). (1) Organizations are trying to align their employee performance goals with corporate performance goals through technology solutions.

Employees Perceptions: A recent Watson Wyatt survey of 113 different Canadian organizations and 3,000 employees asked about. Following results found:

29% employees feel their companies do a good job of identifying and rewarding top performers

27% employees feel there is a clear link between performance and pay

24% employees feel their companies manage poor performers so their work improves



**Fig.1: Performance Management Employees Perception**

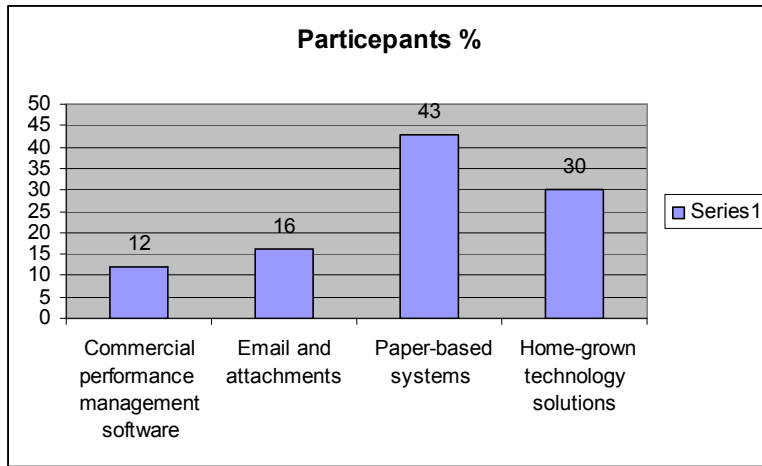
**Soft wares used for Performance Management purpose in current era.**

According to the survey 2006 finding the Keys to Performance Management: A Study of Current Trends and Future Possibilities, Human Resource Institute, the most common performance management solutions being used today are:

- 1) Paper-based systems (43%)
- 2) Home-grown technology solutions (30%)
- 3) Email and attachments (16%)
- 4) Commercial performance management software (12%)

**Table-1: Performance Management Solutions**

Performance Management Solutions	Percentage Participating
❖ Paper-based systems	43%
❖ Home-grown technology solutions	30%
❖ Email and attachments	16%
❖ Commercial performance management software	12%



**Fig.2: Performance Management Solutions**

What are some current trends regarding Workforce Performance Management?

Increased attention towards Workforce Performance Management

A survey of over 3,000 HR professionals held by The International Association for Human Resources Information Management (IHRIM) and asked respondents the following question: "How does Workforce Performance Management Initiatives Rank in Terms of Your Overall HRM Priorities?" Following responses were responded: 1) 54% of respondents felt Workforce Performance Management Initiatives were very important 2) 40% of respondents felt Workforce Performance Management Initiatives were somewhat important 3) Only 2% of respondents felt Workforce Performance Management Initiatives were not very important.

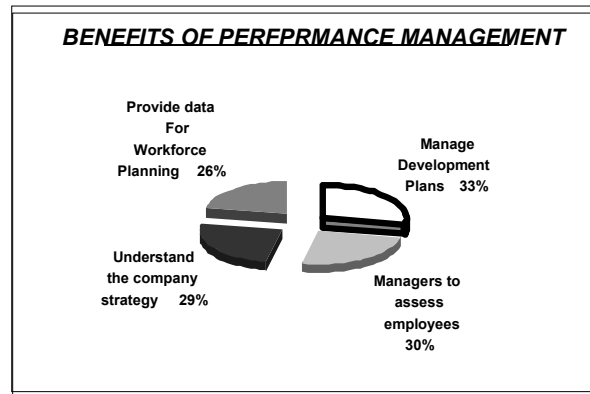
**Table-2: Workforce Performance Management Initiatives**

Initiatives of Workforce Management	Respondents %
Very Important	54%
Somewhat Important	40%
Not Important	2%

#### **DEMAND OF PERFORMANCE MANAGEMENT:-**

The existing demand for employee performance management is just a start. The concept of talent management as a strategic-business is an initiative, as HR explores better ways to link performance, learning and development. Another is the available solution is new software that align these processes and make them easier to manage. HR managers point to the following as among the top two benefits: Making it easy for employees to develop and manage their career and development plans 33%.

- 1) Developing it easier for managers to assess employees fairly 30%
- 2) Developing it easier for employees to understand the company strategy and their role in this strategy 29%
- 3) Improved data about people for workforce planning 26%



**Fig. 4: Performance Management Benefits**

### CONCLUSION

Research conducted by the Institute for Corporate Productivity (ICP) confirms that there are several well-defined steps that can make performance management an effective process in any organization. Their research findings the ways to Performance Management: A Study of Existing Trends and Future Possibilities surveyed more than 1,000 HR professionals belonged to various industries and company sizes. In nut shell, our research findings confirms that on the basis on performance management software organization may take better and result oriented decisions and management have great importance in Human Resource affairs to manage organizational goals better way. We understand from above research paper that implementation of Performance Management in HR is complementary to ameliorate management positive feedback because if it doesn't provide benefits to organization than it will never give any drawbacks.

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**FINANCIAL LIBERALIZATION AND DEMAND FOR MONEY:  
A CASE OF PAKISTAN**

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**ABSTRACT**

The formation of monetary policy by the experts requires the knowledge of demand for money in an economy. The financial liberalization is connected with demand for money along with other monetary aggregates. For the formation of efficient monetary policy it seemed necessary to find the link between financial liberalization and demand for money. The current study examined the association between the financial liberalization index and demand for money in the case of Pakistan by using JJ cointegration and auto regressive distributed lag (ARDL) to cointegration. The results confirmed the existence of long-run relationship among the variables and concluded that financial liberalization index along with gross domestic product and real deposit rate positively affect the demand for money in the long-run. While GDP and real deposit rate also positively affect the demand for money in the short run.

**KEY WORDS**

Demand for money; financial liberalization; real deposit rate; Pakistan; ARDL.

**1. INTRODUCTION**

The empirical literature on demand for money in Pakistan ignored financial liberalization as a determinant of demand for money. Majority of the studies like Abe et al. (1975), Mangla (1979), Burney and Akmal (1991), Khan (1994), Khan and Ali (1997) and Qayyum (2001) investigated demand for money by including the income, interest rate, inflation and exchange rate as explanatory variables. Rehman (2005) concluded that demand for money is positively associated with real output and exchange rate while negatively with inflation rate. Hsing (2007) used the linear, log linear, and Box-Cox transform models and found a positive relationship between demand for money and GDP, and negative link between demand for money and domestic as well as foreign interest rate. Qayyum (2005) using cointegration and error correction technique while Hsing (2007) by log linear transformation concluded the stability of demand for money in Pakistan.

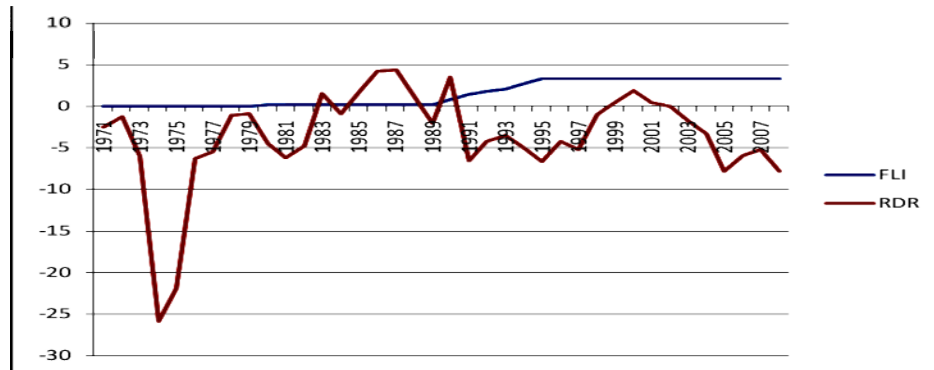
Hye, et al. (2009) used JJ cointegration and FMOLS methods to estimate the relationship between demand for money and economic activity, interest rate, inflation, exchange rate and stock prices. They found a positive association between demand for

money and stock prices but insignificant impact of exchange rate on demand for money. The study also found a positive relationship between demand for money and financial innovation in the long as well as short-run.

The current study is aimed to estimate the impact of financial liberalization on demand for money in Pakistan. It is distinguished from the previous studies particularly Hye (2009) by the following points. Hye (2009) used M2/M1 as a proxy of financial innovation to capture the impact of banking sector reforms on demand for money. We included composite financial liberalization index as a determinant of demand for money. From the methodological point of view, we employed JJ cointegration and autoregressive distributed lag (ARDL) approach to cointegration for long-run inference. The ARDL cointegration method has advantages over the other cointegration methods. Firstly, the ARDL model gives the robust long-run results when we work on the small sample size. Secondly, the ARDL approach is applicable whether the primary variables are entirely I(1) or I(0) or mutually integrated.

## 2. ESTIMATION METHODOLOGY

We tested the financial liberalization and demand for money hypothesis on annual time series data for the years 1997-2008. The broad money (M2), gross domestic product and real exchange rate (\$/Rs.) are taken from State Bank of Pakistan (various publications). Real deposit rate is calculated by deposit rate minus inflation and financial liberalization index is developed, although it has been also used by Hye and Wizarat (2010).



**Fig.1: Financial Liberalization Index (FLI) and Real Deposit Rate (RDR)**

The trend of FLI and RDR are shown in fig-1. It explains that government of Pakistan has taken most of financial liberalization measures during 1990-1996 and real deposit rate remained positive in 1983, 1985-1988, 1990 and 1999-2001. The following model is utilized to investigate the association between demand for money and financial liberalization.

$$\ln(M)_t = \psi_0 + \psi_1 \ln(GDP)_t + \psi_2 FLI + \psi_3 RDR_t + \psi_4 \ln(ER)_t + v_t \quad (1)$$

where

$M_t$  = Demand for money ( $M_2$ ),  $GDP_t$  = Gross Domestic Product,  $FLI_t$  = Financial Liberalization Index,  $RDR_t$  = Real deposit rate and  $ER_t$  = Exchange rate. The log lin model is used for empirical estimation in which the demand for money, gross domestic product and exchange rate in natural logarithm form and financial liberalization index and real interest rate without log are taken. For empirical analysis it is important to determine the order of integration so we have used Phillips Perron unit root test in order to determine the order of integration. For long-run relationship between demand for money and financial liberalization we employed JJ-cointegration and autoregressive distributed lag (ARDL) approach to cointegration.

The Johansen (1991, 1995) cointegration test is based on  $\lambda_{trace}$  and  $\lambda_{max}$  statistics. The 'Trace test' cointegration rank  $r$  is as follow:

$$\lambda_{trace} = -T \sum_{j=r+1}^n \ln(1 - \hat{\lambda}_j)$$

On the other hand the  $\lambda_{max}$  Max-Eigen cointegrating vectors against  $r+1$  is presented here as:

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_j)$$

Johansen (1995) also recognized  $\lambda_{trace}$  and  $\lambda_{max}$  critical values. We also employed the least cointegration technique autoregressive distributed lag (ARDL) that is proposed by Pesaran, et al. (2001). The vector error correction version of ARDL technique is as follows:

$$\begin{aligned} \Delta \ln(M)_t = & \phi_0 + \sum_{i=1}^K \phi_i \Delta \ln(M)_{t-i} + \sum_{i=0}^K \phi_i \Delta \ln(GDP)_{t-i} + \sum_{i=0}^K \phi_i \Delta \ln(FLI)_{t-i} \\ & + \sum_{i=0}^K \phi_i \Delta \ln(RDR)_{t-i} + \sum_{i=0}^K \phi_i \Delta \ln(ER)_{t-i} \\ & + \delta_1 \ln(M)_{t-1} + \delta_2 \ln(GDP)_{t-1} + \delta_3 \ln(FLI)_{t-1} \\ & + \delta_4 \ln(RDR)_{t-1} + \delta_5 \ln(ER)_{t-1} + \mu_t \end{aligned} \quad (2)$$

The null hypothesis for no-cointegration between the variables in equation (2) ( $H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = 0$ ) is test beside the alternative hypothesis ( $H_1 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 \neq 0$ ) by using the F-test of overall level of significance. The no-cointegration hypothesis is rejected if the estimated value of F-statistic is above the upper bound critical value and in contrast if the value of F-statistic falls below the lower bound than no cointegration hypothesis is accepted. An inconclusive inference can be draw if F-statistic falls inside the upper and lower bounds. We utilized critical values of upper and lower bound proposed by Narayan (2005) for small sample size.



### EMPIRICAL RESULTS

In the empirical analysis Phillip's Perron (PP) unit root test is applied to determine the rank of integration. The test gives the parsimonious results in the small sample size. The table-1 illustrates the PP unit root test results. The results indicate that all the variables, i.e. broad money (M), gross domestic product (GDP), financial liberalization index (FLI), real deposit rate (RDR) and exchange rate (ER) are integrated order one. It supports the implementation of JJ cointegration as all variables are integrated order one.

**Table-1: Phillip's Perron Unit Root Test**

Variable	I(0)	I(1)
Ln(M)	-0.81	-28.35***
LN(GDP)	-2.28	-6.21***
FLI	-1.73	-4.42***
RDR	-2.88	-5.75***
ER	-1.25	-7.22***

Note: 1% level of significance.

The results of JJ cointegration method are demonstrated in table-2. First starting with the Trace statistics, the null hypothesis of no-cointegration ( $r = 0$ ) in the demand for money function is rejected in favour of alternative hypothesis ( $r > 1$ ) because the  $\lambda_{trace}$  is 118.82 and it is above the 10% critical value of 72.77. In table-2 the other hypothesis of  $r < 1$ ,  $r < 2$ ,  $r < 3$  and  $r < 4$  is also rejected at 10% level of significance. Therefore we draw conclusion on the basis of  $\lambda_{trace}$  that there are five cointegrating vectors among the five variables which are indicated in demand for money function.

In Max-Eigen Statistic the null hypothesis of no cointegration ( $r = 0$ ) in favour of alternative hypothesis ( $r = 1$ ) is rejected at 10% level of significance because the  $\lambda_{max}$  is 33.47 and it is above the critical value of 32.16. In lower part of table-2 the other null hypothesis is rejected. Therefore we concluded stable long-run relationship among the variables.

**Table-2: Results of JJ cointegration**

<i>Hypothesized</i>	<i>Trace Statistic</i>	<i>10% Critical Value</i>	<i>Prob.**</i>
None *	118.82	72.77	0.00
At most 1 *	85.34	50.53	0.00
At most 2 *	56.24	32.27	0.00
At most 3 *	30.67	17.99	0.00
At most 4 *	11.61	7.56	0.01
<i>Hypothesized</i>	<i>Max-Eigen Statistic</i>	<i>10% Critical Value</i>	<i>Prob.**</i>
None *	33.47	32.16	0.07
At most 1 *	29.09	26.13	0.04
At most 2 *	25.57	20.06	0.01
At most 3 *	19.07	13.91	0.01
At most 4 *	11.61	7.56	0.02

We also estimated the long-run relationship by using cointegration approach of autoregressive distributed lag (ARDL) model. The calculated F-statistic is 4.57, that is greater than critical value of 5% level of significance which conforms the long-run relationship between the variables of demand function in the case of Pakistan. In the next step we estimated the long-run and short-run coefficients.

**Table-3: Long Run Coefficients**

<i>Variable</i>	Normalized cointegrating coefficients	ARDL coefficients
	<i>Coefficients [T-statistic]</i>	<i>Coefficients [T-statistic]</i>
<i>Ln (GDP)</i>	0.63 [3.45]	0.61 [3.41]
<i>RDR</i>	0.11 [6.32]	0.04 [3.09]
<i>FLI</i>	0.42 [1.75]	0.38 [1.85]
<i>Ln (ER)</i>	0.21 [0.28]	-0.12 [-0.17]
<i>Constant</i>	5.52 [4.32]	5.16 [5.31]

The long-run coefficients of normalized cointegrating vector (through JJ cointegration) and ARDL based coefficients are shown in table-3. Results indicate that GDP, FLI and RDR positively determine the demand for money.

**Table-4 Short Run Coefficients**

<i>Variable</i>	Dependent Variable: $\Delta(\ln(M))$
$\Delta(\ln(GDP))$	0.31 [2.16]
$\Delta(RDR)$	0.03 [2.61]
$\Delta(FLI)$	0.16 [0.83]
$\Delta(\ln ER)$	0.91 [1.43]
<i>Ecm(-1)</i>	-1.00
<i>Constant</i>	5.88 [5.85]
R-Squared	0.45
DW-statistic	1.97

The short-run coefficients are represented in table-4. Results indicate that the real deposit rate and gross domestic product positively influence the demand for money. The error correction terms represents the speed of adjustment from short-run disequilibrium to long-run equilibrium. It is negative and equal to one that shows 100% adjustment from short to long-run.

## CONCLUSION

The study employs the JJ cointegration and auto regressive distributed lag (ARDL) to cointegration in order to determine the long-run relationship. The both JJ cointegration and ARDL results confirm the existence of long-run relationship among the variables. The long run results indicate that gross domestic product, financial liberalization index and real deposit rate positively influence the long-run demand for money demand in Pakistan. But in the short-run only GDP and RDR positively determine the demand for money in the country.

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**CAUSES OF PRE-EXAMINATION DEPRESSION IN STUDENTS:  
A STATISTICAL STUDY**

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**ABSTRACT**

Depression has been observed to become a common problem among students, specifically when exams are ahead. In this paper we investigate the major factors which cause depression in college students. The study design used is an observational cross-sectional study. A semi-structured questionnaire consisting of 25 questions was administered on students belonging to three leading institutions of Lahore. Analysis of the collected data revealed that students who do not prepare regular lectures, prepare only in exams, having problems in understanding lectures, do not discuss problems with their teachers, having problem in memorizing and in reproducing work, have greater chances of suffering from depression. Female students attending and preparing regular lectures, discussing problems with their teachers and studying according to timetable have less chances of depression as compared with male students. Principal component factor analysis was used to determine the prominent factors, and, as such, eight factors were extracted from the 22 variables in the analysis.

**INTRODUCTION**

Life is full of good times and bad, happiness and sorrow. Everyone experiences some unhappiness, often as a result of a change, either in the form of a setback or a loss, or simply, as Freud said, "Everyday misery." But if you have been feeling "down" for more than a few weeks or having difficulty in daily life, you may be experiencing more than just the "blues." called depression. Depression affects genders of all ages from any background. People suffering from depression say that "it is a black curtain of despair coming down over their lives" (Khan, 2009). Depression can be categorized by its severity and it is divided into two classes; mild depression and severe depression.

**Definition of depression:**

Depression is characterized by feelings of sadness, shame, guilt, anxiety, helplessness, hopelessness, loss of energy, enthusiasm, poor self-image, changes in appetite and for some thoughts of suicide (Feldman & Feldman, 2010).

**Depression in Student Life:**

The best time of a person's life is college but besides this college is a stressful time also. Depression is common among students due to the unique amount of stressors in a

student's life. During college, students go through rapid life changes, new social experiences and increased responsibilities. These factors put college students at risk for depression. If this situation lasts for weeks, or interfere with academic or social functioning, it may be clinical depression. (National Institute of Mental Health, 2009). Everyone being a student feels anxious some of the time, especially when stressful things are happening, such as the pressure of study and exams. Both the exams and the fear of results is a stressful time. It is very common to feel depressed around exam time. Most of the students feel panic, might feel there is a huge amount of pressure to do well, or anxious to be not fit to make revision. These fears and concerns are completely natural. "An examination may be one thing students dread. Just by hearing the announcement about an upcoming test could make them cringe, particularly those who don't study enough" Smart. A recent survey by the Mental Health Foundation showed that 50% of university students showed signs of clinical anxiety and more than one in 10 suffered from clinical depression. (BBC news, 2001). According to a survey from the Anxiety Disorders Association of America (ADAA), universities and colleges also have seen an increase in students seeking services for anxiety disorders. The average age of onset for many mental health conditions is the typical college age range of 18 to 24 years old said Courtney Knowles. (Tartakovsky, 2010).

**Symptoms:**

Most common signs of depression include: difficulty in getting to sleep or waking up in the morning, constant fatigue, forgetfulness, headaches and pains for no apparent reason, poor appetite, loss of interest in activities, increased anxiety and dizziness (Rockler-Gladen, 2007).

**Why do college students get depressed?**

Student depression is mainly caused by examinations, final grades, term papers, excess homework, pressure from parents and relatives to do well and need to get high grades to get on track for the career you really want.

**LITERATURE REVIEW**

Alexander and Ronald (1987) examined depression, life stress, cognitive distortions, cognitive rigidity, problem-solving, loneliness, and family support in college freshmen (N=158) using self-report measures. Results suggested that depression has important interpersonal correlates.

Furr, *et al.* (2001) studied the rate of self-assessed depression and suicide among college students and examined contributing factors and help-seeking behavior. Results of the study indicated that 53% and 9% of the sample experienced depression and committing suicide respectively since beginning college. It was suggested for college mental health practitioners related to programming, prevention, and psycho education.

Abdulghani (2008) investigated prevalence of stress among undergraduates and to observe an association between stress and academic year, grades, regularity and physical problems. A sample of 600 registered students at King Saud University in years 1, 2, 3, 4 and 5 were enrolled in the study. There were 494 responses (83%). Results showed there was highly significant association between year of study and stress levels, ( $p < 0.0001$ ).

The association between academic grades of study subjects and their stress levels was not statistically significant, as distribution of prevalence of stress was not significantly different across each of the four academic grades ( $p=0.46$ ). The main source of stress found to be their studies (60.3%). A high level of psychosocial distress was found in students during the initial three years of their course.

### **RATIONALE OF THE STUDY**

In the hustle bustle of this life, students are unsatisfied with their personal life as well as their education. The problem of depression is very common issue in students, especially pre-exam stress. There are different reasons for being depressed and pre-examination depression is one of them. It starts prior to exams among both the average and outstanding students. Fear of exams is a natural phenomenon and, therefore, the purpose of this study is to identify the cause of pre-examination depression amongst both the male and female.

### **OBJECTIVES OF THE STUDY**

To investigate causes of pre-exam depression in students, to access causes of pre-exam stress comparing male and female, to find out which causes of pre-exam depression are associated to male and female students, to observe which gender is likely to suffer more or less pre-exam depression than the other and to find out prominent factors of pre-exam causes of depression.

### **RESEARCH METHODOLOGY**

The study design used in this research is an observational cross-sectional study. A semi-structured questionnaire was designed for survey, consisting of 25 questions. The study was conducted by taking response from three institutes of Lahore (University of the Punjab, FC College University and Kinnaird College). A simple random sampling technique was used and response was obtained from 150 randomly selected students. In order to carry out the data analysis, Statistical Package SPSS 15 was used and to make an analysis of the collected data, four techniques such as Univariate, Bivariate, Multivariate Analysis and Odds Ratio were used.

### **RESULTS**

In this section Univariate, Bivariate, Multivariate Analysis and Odds Ratio are discussed as under:-

Both **Univariate analysis** and **Bivariate analysis** were done and these comprised of the variables such as age(18-24), gender(62 male 41.33% and 88 female 58.67%), study year(1<sup>st</sup> year to 4<sup>th</sup> year), attend regular lectures, prepare regular lectures, prepare only when exams are ahead, discuss problems with their teachers, discuss problems with their fellow students, prepare for exams alone, problem in understanding lectures, problem in memorizing, problem in reproducing lectures, study according to timetable, good learning process, good concentration, study interest without understanding, disturbance in routine, panic in exams, worry, interest in other things during exams, feel miserable and sad, feel hopeless, good sleep, headaches and feel tiredness. In univariate

analysis counts and percentages of each variable were discussed where as in bivariate analysis the cross tabulation of each variable was tested with respect to gender. To check the association of variables **Fisher's exact test** was applied, each variable was tested with gender. Variables found to be associated with gender are; Attend regular lectures ( $p=0.010<0.05$ ), Prepare regular lectures(0.001), Problem in reproducing lectures(0.029), Study according to timetable(0.030), Panic in exams(0.018), Worry(0.025), Good sleep(0.051) and Feel tiredness(0.006). The **Odds ratio** was calculated to observe the impact of depression on female as compared to male students. To obtain this measure, the scale of key variables was changed to binary response. From the observed data, it can be said for the first variable that the students who attend regular lectures; female students have chances of depression almost 0.258 times less than those of male students and for the last variable (feel tiredness); female students have chances of depression almost 2.336 times more than those of male students. **Multivariate Analysis**; in this section factor analysis was applied to find the prominent factors which may cause pre-exam depression. Requirement of minimum sample size of 150 recommended by Tabachnick and Fidell (1996) was met and there were no missing values. Another requirement of the Factor analysis is that some of the correlations between the variables should be 0.30 or more. In this analysis more than 20 correlations were 0.30 or greater, so this requirement was also met. Bartlett's Test of Sphericity is used to test the null hypothesis that the correlation matrix is an identity matrix. This hypothesis ought to be rejected in order to attempt the Factor analysis. KMO is the measure of sampling adequacy it tests the amount of variance that could be explained by the factors within the data.

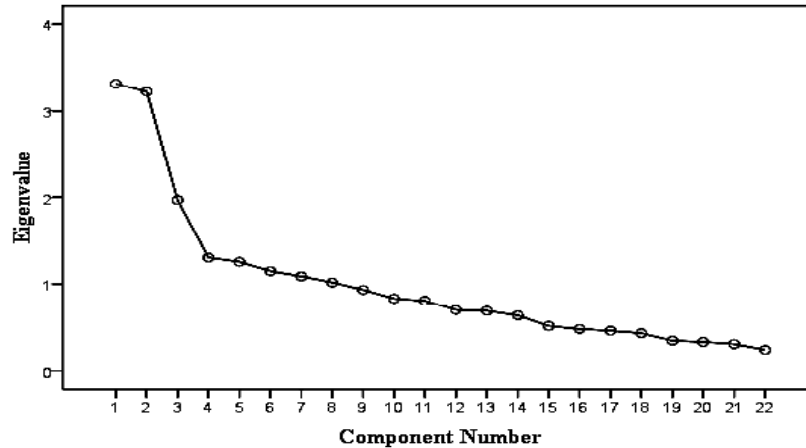
In this case KMO's MSA is 0.672, which is larger than the limit 0.50 said to be mediocre by Kaiser (1970). Bartlett's Test of Sphericity, the probability associated with Bartlett's Test of Sphericity ( $\chi^2$  (df = 231) = 807.362,  $p < 0.000$ ) is less than the level of significance (0.05) so sufficient number of correlations exist between the variables.

The communalities indicated that how much variance in each variable is explained by the analysis, for example (.595) 60% variation was explained by the first variable (attend regular lectures) similarly (.718) 72%, (.730) 73% of the variance was explained by the second (prepare regular lectures) and third (prepare only when exams are ahead) variables respectively and (.649) 65% variation was explained by the last variable (feel tiredness). The Initial Eigenvalues and Extraction Sums of Squared Loadings showed eight components have an eigen value greater than one. These 8 components explained 65.098% of the data variation. In Rotation Sums of Squared Loadings the % of variance, eigen values and cumulative % of variance explained by all the components were changed after varimax rotation.

The scree plot graphs the eigen values against the number of components. As it is clear graph also showed that first eight components have an eigen value greater than 1 so they were selected. Therefore from the rotated component matrix eight factors were obtained; Factor 1 comprises of 6 variables i.e. Problem in understanding lectures, Problem in reproducing lectures, Panic in exam, Worry, Feel miserable and sad, Feel hopeless. Factor 2 comprises of 3 variables i.e. Attend regular lectures, Prepare regular lectures, Prepare only when exams are ahead. Factor 3 comprises of 3 variables i.e. Feel miserable and sad, Headaches or other problems, Feel tiredness. Factor 4 comprises of 3 variables i.e. Problem in memorizing, Good learning process, Good concentration. Factor

5 comprises of 3 variables i.e. Discuss problems with teachers, Study according to timetable, Good sleep. Factor 6 comprises of 2 variables, i.e. Study interest without understanding, Disturbance in routine. Factor 7 comprises of only one variable, i.e. Discuss problems with fellow students. Factor 8 comprises of two variables, i.e. Prepare for exams alone, Interest in other things during exams. The component score covariance matrix showed that this is an identity matrix so the factors driven are orthogonal.

### Scree Plot



### DISCUSSION

Exam anxiety is the emotional reaction that some students face before exams. The fear is not irrational, but excessive fear interferes with performance. On the other hand, a minimal amount of stress is necessary to add spice to one's life. An element of stress is involved with growth and is essential for sound personal functioning. Many researchers suggest that a little worry is good for students because it keeps them task oriented; however excessive worry on the other hand can be very debilitating and interferes with the results if not managed appropriately.

It is usually said females suffer from higher stress than males during exams, in this study findings are opposite but study supports many of the findings of previous studies; study highlights the factors contributing to Exam Anxiety in three educational institutes of Lahore. In this study female students have less chances of depression as compared to male but in some cases females are found to be more depressed. From the total of 150 respondents 62(41.33%) were male and 88(58.67%) were female; revealed that students who do not prepare regular lectures, prepare only in exams, having problems in understanding lectures, do not discuss problems with their teachers, having problem in memorizing and in reproducing work have more chances of suffering depression. Female students have less chances of depression as compared to male, because they attend and prepare regular lectures, discuss problems with their teachers and study according to timetable but those female students have more chances of depression as compared to



male, who avoid discussion with fellow students and prepare for exams alone, feel panic in exams and get worried about results before exams. Moreover in bivariate analysis cross tabulations and association of key variables is tested with gender, to achieve this goal fisher's exact test is applied and the variables which are found to be associated include: Attend regular lectures, Prepare regular lectures, Problem in reproducing lectures, Study according to timetable, Panic in exams, Worry, Good sleep and Feel tiredness. The data was also analyzed by means of principal component factor analysis with varimax rotation method. Eight components were found to be extracted, the scree plot also indicated eight components having an eigen value of greater than 1. All 22 variables in the analysis formed 8 factors.

### CONCLUSION

The study highlights the factors contributing to exam anxiety in three educational institutes of Lahore i.e University of the Punjab, FC College University and Kinnaird College). The survey was conducted from 150 respondents (62 male 41.33% and 88 female 58.67%). Analysis of the collected data revealed that students who do not prepare regular lectures, prepare only in exams, having problems in understanding lectures, do not discuss problems with their teachers, having problem in memorizing and in reproducing work, have greater chances of suffering from depression. Female students attending and preparing regular lectures, discussing problems with their teachers and studying according to timetable have less chances of depression as compared with male students. Principal component factor analysis was used to determine the prominent factors, and, as such, eight factors were extracted from the 22 variables in the analysis.

### RECOMMENDATIONS

Some suggestions to overcome pre-exam depression/ stress are to concentrate more on reducing examination related stress, and in particular focus on the male students and to help students to make smooth transitions between different learning environments with changing learning demands and a growing burden. "Positive approach of mind; makes one win half of the battle in life; and rest half battle is won by dedicated hard work" (S Kalpna Sharma).

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## APPENDIX

## QUESTIONNAIRE

Age: \_\_\_\_\_

Gender: Male Female

Class: Degree \_\_\_\_\_ Year/Semester \_\_\_\_\_

	Most of the time	Often	Sometimes	Rarely	Almost Never
Do you attend regular lectures					
Do you prepare regular lectures					
Do you only prepare when exams are ahead					
Do you discuss problems with teachers					
Do you discuss problems with fellow students					
Do you like to prepare for exams alone					
Do you have problem understanding lectures					
Do you have problem memorizing					
Do you have problem in reproducing lectures					
Do you study according to a timetable					
Do you have a good learning process					
Do you get to concentrate well					
Do you have interest in study even if you don't understand					
Do you find it easy to do things as you use to					
Do you panic when exams are ahead					
Do you worry					
Do you still have interest in things you enjoy					
Do you feel miserable and sad					
Do you feel hopeless					
Do you get a good sleep					
Do you have headaches, stomach problems, muscle pain or any other problems					
Do you feel tiredness					

**HOUSEHOLD CHOICE OF PUBLIC VS PRIVATE SCHOOLING:  
A CASE STUDY OF BAHAWALPUR CITY**

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**ABSTRACT**

Government of Punjab is committed to attain the universalization of school education by providing free education and in a number of districts free books along with programs of food for education. The rapid increase in enrolment in private schools reflects the partial failure of these schemes and making the target of universalization of school education difficult. The paper examines the household choice of private versus public sector schools as an outcome of child, household and school characteristics by using logit model. Data has been collected from Bahawalpur city through stratified sampling of clusters and random sampling of households. A survey of 627 households having at least one school-going child made the data available. The study found that income of the household, education of the parents, English as medium of instruction in school and distance of public school from the household enhance the preference of private schools. To universalize the school education more public sector schools are required near to the households. The adaptation of English as medium of instruction may increase the school enrolment.

**KEYWORDS**

School Choice, Private Schools, Public sector schools, education, cost of schooling, Pakistan.

**JEL Classification:** I18, I20, I22.

**INTRODUCTION**

The Punjab Government is trying to get the target of universalization of school education. For the purpose a number of schemes are going on like the free education, stipends to the students and so on<sup>1</sup>. There is no more success to significantly enhance the enrolment in public sector schools. On the other hand the enrolment in private schools is tremendously increasing. If the enrolment in public schools remained low the target of universalization of school education becomes difficult.

The comparative quality of private and public sector schools is a puzzle. Some of the private schools are of good quality but majority of the private schools are not providing

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<sup>1</sup> Most recently the Punjab Government has transformed all the Urdu medium public sector schools into English medium.

good quality education (see, Moeen 1999; Alderman, et al. 2001; Andrabi, et al. 2002; Monazza 2006). Similarly public sector schools are producing bulk of the outcome but schools have many flaws (see, UNDP 2008; LEAPS 2009).

The question is if both type of schools have flaws, and education is free in public sector schools and Government of Punjab is trying to universalize the school education, then why parents are preferring (or not) the private schools. The factors causing their preference will be analyzed in this study and if private schools are preferred then the policy of free education needs some addition to attain universalization of school education.

## REVIEW OF LITERATURE

There is plethora of studies focusing on the decision of households for their children's schooling, but very few studies have attempted to probe the decision of the households for choice of public and private schools. Nasir (1999) has attempted to make a comparison of returns of private and public sector school attendees using Pakistan Integrated Household Survey (PIHS) 1995-96. The study concluded that private schools provide better education, higher learning skills and more cognitive skills. The study proposed to enhance the quality of public sector schools by revision of curriculum and acquiring good teaching staff.

The school quality, school cost and the public/private choice of low-income households in Quetta (Pakistan) have been probed by Alderman, et al. (2001). The study further concluded that lowering private school fees, distance and raising quality may enhance private school enrolment, partly by transfer from government schools and partly by new enrolments.

Andrabi, et al. (2001) using the census of private educational institutions and Population Census of Pakistan explained that private schools particularly at primary level has an important factor in elementary education of children. The determinants of pupil achievement in secondary schools in Pakistan are analyzed by Monazza (2003). The study demonstrated that home background, personal and school-related factors are significant determinants of pupil achievement. The pupil achievement differs by private and public sector schools. Majority of parameters of pupil achievement but not all favor private schools.

For rural areas of Uttar Pradesh and Bihar (India) the parents' preference of private schools, public schools and no-schooling option has been probed by Roy (2005). The study concluded that quality of public schools and cost of attendance has distinct effects on the choice of school.

The relative effectiveness of public and private schools and potential learning gap in students by school type has been explored by Monazza (2006) through a primary survey in Lahore. The study concluded that private schools are more effective than public sector schools in imparting mathematics and literacy skill.

### DATA AND MODEL SPECIFICATIONS

A random sampling survey of 627 households of twelve cluster of Bahawalpur city in 2008 made the data valid. Clusters were selected purposely so that households of all income groups would be part of survey. Only those households from the clusters were included who were sending at least one child to school.

Bahawalpur city may be a good case study as it has the private schools of national chains. The Gross Primary School Enrolment rate of Bahawalpur district is 75 percent. The public school attendance rate (5-17) is 69 percent and the access to school (less than 2 Kilometer) is 86 percent. These figures represent a good case study as the area under study.

The decision of private or public sector school is estimated by logit model.

$$\text{CHOICE} = f(\text{CGEN}, \text{CAGE}, \text{CAGESQ}, \text{CEDU}, \text{FEDU}, \text{MEDU}, \text{HHPCY}, \text{HHSIZ}, \text{NCHILD}, \text{DIST}, \text{COEDU}, \text{MEDI}, \text{FEE})$$

The definitions of dependent and explanatory variables are shown in table-1.

**Table-1: Definitions of Variables Used in Sequential Probit Estimation**

VARIABLES	DEFINITION
<b>Dependent Variables</b>	
CHOICE (Choice of parents)	• 1 if child goes to private school, 0 otherwise
<b>Explanatory Variables</b>	
<i>Child Characteristics</i>	
CGEN (Child's gender)	• 1 if child is male, 0 otherwise
CAGE (Child's age)	• Child's age in completed years
CAGESQ (Child's age squared)	• Child's age squared
CEDU (Child's education)	• Child's education in completed years
<i>Household Characteristics</i>	
FEDU (Father's education)	• Father's education in completed years of education
MEDU (Mother's education)	• Mother's completed years of education
HHPCY (Household's per capita income)	• Household per capita income per month in Rupees (00s)
HHSIZ (Household size)	• Number of household members
NCHILD	• Number of children (5-15 years) in the household
<i>School Characteristics</i>	
DIST (Distance of school)	• Distance of the relevant public sector school from the household (in KMs.)
COEDU (Co-education)	• 1 if co-education in school, 0 otherwise
MEDI (Medium of instruction)	• 1 if medium of instruction in school is English, 0 otherwise <sup>2</sup>
FEE (Fee of the School)	• Fee of the relevant school in Rupees (00s)

<sup>2</sup> Although most recently the public sector schools in Punjab have adopted the English as a medium of instructions.

## RESULTS AND DISCUSSION

The summary statistics and logit results have been given in table-2.

**Table-2: Logit Model Results of Choice of Public and Private Schools**

Variables	Mean	Standard Deviation	Probability Derivative	T-Values
Constant	-	-	1.0053	2.9629*
CGEN	0.6752	0.4831	0.0367	1.3845**
BORD	2.1012	1.2651	0.1421	0.1421
AGE	9.3087	2.8564	0.2884	0.7492
AGSQ	89.1247	49.6759	0.0734	0.9477
CEDU	5.1298	3.1302	-0.0985	-1.8265**
FEDU	10.1764	6.4821	0.0313	1.4712**
MEDU	8.8510	5.0931	0.1285	1.3552**
HHPCY	2934	6407.38	0.4076	2.7126*
HHSIZ	6.2716	1.6587	-0.0213	-0.3281
NCHILD	2.9228	1.1034	-0.0738	-1.6421**
DIST	3.9467	46.0759	0.4556	2.1036*
COEDU	13.2586	0.3281	0.8721	0.0839
MEDI	0.2351	0.4973	0.1869	2.8315*
FEE	2841	359.13	-0.1168	-1.5472*
Number of Observations	937			
R-Squared	0.6951			
Percent Correct Predictions	0.7793			
Log Likelihood	612.47			

\* Significant at 5 percent level and \*\* significant at 10 percent level.

The following features of the results are worth noting.

### **Gender of the Child:**

The choice of the household for private or public sector schooling may be affected by the gender of the child as it is concerned with investment on child. Our results revealed that boys are more likely to go to private schools as compared to the girls. (see, Monazza 2006). The explanation may be that private schools are costly as compared to public schools, so the parents' choice represents the gender discrimination in investment in schooling of the children.

### **Educational Level of Child:**

The years of education of child are also relevant to the choice of the private versus public sector schools by parents. One of the important factors is cost of schooling that increases by increase in educational level of the child. We have found that by increase in years of education of child the probability for the child to go to private schools declines. The possible factor may be the prevalence of primary schools in private sector and secondly the educational level of the child results into increase in school fees.

**Parents Education:**

The characteristics of the parents are critical in determining the child's school, i.e. private versus public sector. We have found that children from educated parents are more likely to go to private schools. It explains the positive perceptions of educated parents towards private schooling. It may also be inferred that educated parents give more weightage to the facilities of the private sector schooling, ignoring the flaws in this sector. The further explanation of the preference for private schools by educated parents may be that such parents may have higher income based on the level of human capital. The children of these parents go to the category of private schools producing quality education and charging higher fees. The schools may be the national chains and residential schools.

**Household Per-capita Income:**

The public sector schools are free, while the private sector is charging the fee in the range of three hundred to seven thousand. If quality of education is taken directly corresponding to the fee structure, the household per-capita income becomes significant for decision of the parents in choice of schools. We have found a positive association between the household per-capita income and choice of private schools. Alternatively the lower income households prefer public sector schools.

**Number of Children:**

The presence of school-age children in the household represents the intra-household resource competition. We have found that number of children (school-age group) in the household negatively impacts the choice of private schooling of children.

**Distance of Public Sector School from Household:**

It is found that more the distance of public sector school from the household, it is more likely for the child to go to private school. The availability of public sector schools is much important for enhancing the school enrolment. As we have found earlier that lower income group households send their children to public sector schools. It is proposed to Government of Punjab to make availability of public sector schools near to particularly poor community households. Aruntilake (2000) also pointed out for Sri-Lanka that free education for all has failed to raise the literacy rate to 100 percent. The availability and quality of public sector schools are necessarily required.

**Medium of Instruction:**

We have found a positive association between the choice of private school and medium of instruction as English. There is also evidence by Alderman, et al. (2001) that English language and mathematics in private schools give strong demand for private schools by parents. The Punjab Government's initiative of transforming Urdu medium public sector schools into English medium may result into increase in enrolment in public sector schools.

**School Fee:**

The educational cost is assumed to be the most important factor for not only the decision of schooling but also the choice of public vs. private schooling as well. We have used the fee of school as the proxy of school cost. Although the transport cost, the expenditure on educational material and uniform have significant share of the total cost of schooling. We have found inverse relation between the school fee and choice of private school.



## CONCLUSION

The question to be answered in this paper was that government of Punjab is trying to universalize the school education by providing free education in schools along with a number of schemes like free books, food for education and stipends to students in public sector schools. If the parents are preferring private sector schooling the policies will face failure. Our results show that educated parents prefer private schooling for their children. The distance of the public sector schools tends the parents to send their children to private schools. On the other hand higher fee keeps the children away from private schools. Moreover, higher per-capita income group of households send their children to private schools and vice versa. The public sector policy for universalization of school education is partial failure and need modification by inclusion of more public sector schools with improved quality of education. For the lower per-capita income group, the public sector schools are necessary to attain the target of universalization of school education.

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**BEHIND THE DATA: SECONDARY SCHOOL TEACHERS' PERCEPTION  
ABOUT TEACHING OF STATISTICS AT SCHOOL LEVEL**

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**ABSTRACT**

The aim of teaching mathematics at secondary school level is to prepare students for future life where they utilize it for their own benefits as well as for solving real life problems. Curriculum developers of mathematics try to include such topics in the curriculum of mathematics which are necessary and need of the time. Statistics is one of the major subjects under the umbrella of science and consider as science of decisions. Statistics does not stand out as a major topic but imbedded in secondary mathematics. The main purpose of teaching statistics at secondary level is to provide the students 'how know of statistics' so that they may use it for decision making in future. At secondary level statistics is not taught as a separate subject but kept in the textbook of mathematics as it is consider that statistics has a close relationship with mathematics. In secondary mathematics, there is continuity in mathematics, from simple to complex, whereas only basics of statistics are there in the book that is why students pay much attention to mathematics and statistics remain behind. Students consider statistics some arrangements of numbers and then find mean or mode and nothing more. Secondary students remain failing in understanding what is behind the data? In addition, teachers also think that mathematics is more important as compare to statistics. The aim of this study was to find the purpose of teaching statistics at secondary level and to find the perception of secondary school teachers about teaching of statistics at secondary level. The sample for the study was the secondary school teachers who were teaching mathematics to secondary classes. A questionnaire was developed on five point likert scale for knowing teachers' perception about teaching of statistics at secondary level.

**INTRODUCTION**

Secondary level is the most important fraction in students' life. At primary level, students learn basics of all subjects and at middle level, students learn advance forms of the previous learned concepts. In Pakistan's educational system, Students are promoted from primary to middle level with many deficiencies by considering that these deficiencies may be covered in middle classes, where these deficiencies remain in different forms, and again from middle level to secondary level, students are promoted with the same deficiencies. In school education, much importance is given to mathematics from very beginning. Mathematics is kept in the compulsory package of subjects in school and even students' level of intelligence is judged through mathematics. A student who performs better in mathematics is considered more intellectual and many

hopes are attached with such students. Mathematics competitions are held especially for sharpen students' cognitive powers, with the belief that mathematics is the subject which can help students in understanding the basics of other subjects. At primary level, students learn simple mathematical operations such as addition, subtraction, multiplication etc, and use of these operations in different situations. The aim of teaching these operations is that they may be able to utilize these operations for managing daily life. As these students enter into middle level (Grade 6), they met a new format of mathematics which is known as algebra. Algebra is also considered as the second shape of arithmetic. Students feel some confusion about algebra and with a majority of students this confusion remains even after completing school education. It is a fact that students rote algebraic formulas and put some values without real understanding and passed mathematics. Majority of the students left mathematics at college level because they have poor knowledge and for them mathematics is generated for some special peoples; it is not for every one to adopt. Students always combat with arithmetic and algebra and one important chapter named "Information Handling" can not get attraction of students. This chapter provides basic how know of data arrangement and presentation of data in a well managed way. In grade-8, for the first time, students come across with information handling. The purpose of teaching information handling to the students is to prepare them for representation data in pictorial form as well as making some decision from the given data. National Curriculum of Mathematic, Grades I-XII (2006, p. 68) explain the purpose of teaching Information Handling is to prepare the students for solving real life problems involving mean (Average), weighted mean, median and mode. In real situation, Teachers ignore graphs portion as they consider it less important, the reason behind this conception is that hardly one part is included in the final paper secondary school examination. The other topics of this chapter are arithmetic mean, mode, median and standard deviation, which are taught in cookbook fashion without any linkage to real life world. Some numbers are given in the question and are asked to find arithmetic mean, mode or median. Teachers laid out these questions step by step and students print these questions as it is in the final examination and get through the examination. Students remained fail in understanding the actual meaning of arithmetic mean, mode or median. In grade 9, almost all these topics appear once again in some advance form, and at this stage, students once again struggle hard for mathematics portion and prepare some questions from the chapter which deals with statistics for examination in the light of previous papers. Mainly, emphasis is on teaching of mathematics not statistics.

### LITERATURE

In recent years, statistics is becoming more significant in every sphere of human life. It is statistics which helps human beings in making decision on the basis of interpretation of data. Miller & Miller (n.d.) notes that:

Statistics longer consists merely of the collection of data and their presentation in charts and tables. It is now considered to encompass the science of basing inferences on observed data and the entire problem of making decisions in the face of uncertainty. (p. 1)

Statistics is a set of procedures for describing, synthesizing, analyzing and interpreting quantitative data (Gay, 2005). Burford (1970, p.3) describes that statistics is the science of logical induction and further stated that statistics is a field of applied mathematics. Brockett and Levine (1984, p.3) stated that statistics is a field of study with two basic objectives (a) to describe data and (b) to provide a valid method for making generalizations or inferences from a sample about an entire population.

At present, statistics is a part of almost all social sciences faculties as well as medical faculties. In 1940 and 1949, Harold Hotelling wrote two classical articles entitled "The Teaching of Statistics" and "The Place of Statistics in the University" respectively. In his articles, he raised some important questions about teaching of statistics in other disciplines and teaching of statistics by the department of mathematics. The questions raised by him were:

1. Should statistics be taught in the department of agriculture, anthropology, astronomy, biology, business, economics, education, engineering, medicine, physics, political science, psychology, or sociology, or in all these departments?
2. Should its teaching be entrusted to the department of mathematics, or to a separate department of statistics, and in either of these cases should other departments be prohibited from offering duplicating courses in statistics, as they are often inclined to do?
3. To what students, and at what stage of their advancement, should a course in statistics be administered?
4. Should there be mathematical or other prerequisites?
5. How much of an investment in a statistical laboratory is warranted?
6. Should courses be primarily theoretical and mathematical, or should they be made as practical as possible, equipping the student in the shortest possible time for a job as statistician, or for statistical work in the field with which a particular department is concerned?
7. What about degrees in statistics?
8. Eclipsing all these in importance, though it seems to have received too little of the attention of college and university administrative officers is the question, what sort of persons should be appointed to teach statistics?

For teaching of statistics, the answer of these questions was needed so that in the light of these answers, teaching of statistics may be made more effective. The answers of these questions will also suggest that at what stage and to what type of students, statistics may be offered. One important question is about whether statistics should be taught by mathematics teachers or some trained statistics teachers are required. Moore (1988) is of the view that statistics may be moved out of mathematics department, and in support of his view, he provided the following reasons:

1. Statistics does not originate within mathematics.
2. The aims and foundational controversies of statistics are unrelated to those of mathematics.

3. The standards of excellence in statistics differ from those of mathematics.
4. Statistics does not participate in the interrelationships among subfields that characterize contemporary mathematics.
5. The perception of statistics as mathematics is in part an illusion due to the isolation and narrow training of many theoretical statisticians.
6. The mathematical theory of statistics is of secondary importance in teaching.
7. Graduate training in mathematics is no more sufficient for teaching statistics than for teaching economics.
8. Satisfactory teaching of the science of data requires experience with data.
9. Introductory courses that contain mathematically false statements but require students to work with data are less damaging than courses consisting solely of correct proofs of true theorems.

Batanero (1999) states that it is preferable to integrate statistics activities to school mathematics as whenever possible, taking advantage of connections with arithmetic, geometry and student' day-to-day situations.

Carvalho (2001) stated that:

knowing how to think statistically allows each individual in their daily life to be able to understand the two types of messages usually present in the variety of information they have access to, not only the simple, direct ones but also the ones which involve complex inference processes. Based on this type of thought, many decisions are made

Asar (2002) notes that in Egyptian schools, statistics has become a major part of mathematics curriculum.

#### **TEACHING OF STATISTICS AT SECONDARY SCHOOLS IN PAKISTAN**

National Curriculum for Mathematics (2006, p.82) documented the following objectives for teaching statistics to Class-X students:

- i) Construct grouped frequency table
- ii) Construct Histogram with equal and unequal class intervals.
- iii) Construct a frequency polygon.
- iv) Construct a cumulative frequency table.
- v) Draw a cumulative frequency polygon.
- vi) Calculate arithmetic mean by definition and using deviations from assumed mean, median, mode etc.
- vii) Measure range, variance and standard deviation.

For teaching statistics, there are not special trained teachers; statistics is taught by the mathematics teachers. Unfortunately the teaching of statistics at school levels could not be effectively introduced as sufficient number of qualified statistics teachers are not available and mathematics teachers are made responsible for the teaching of statistics (Ahmad, 2001).

Teachers emphasizes mathematics portion as it covers the major part of the paper in the board examination. It is also a fact that there are some questions of statistics which appear in the examination frequently, and teachers in the light of their experience, select some topics and asked students to do these questions again and again, and it is also a fact that these questions appear in the examination.

## METHODOLOGY

### Population and Sample

The population for the study was the teachers who were teaching mathematics to secondary classes. Sample for the study was 100 male and female secondary teachers of mathematics from District Bahawal Nagar and District Rawal Pindi. At B.Sc level, two major groups formed with mathematics, one group chooses physics with double mathematics and other group chooses statistics with double mathematics. There is another group named as general group, in this group, opt statistics with other subjects other than mathematics. For the present study, only those teachers were selected who have chosen Statistics at B.Sc level.

### Tool used for the study

A questionnaire was developed on five point likert scale (Strongly Agree, Agree, Uncertain, Disagree and Strongly Disagree). A numerical value was assigned to each response as under:

Strongly Agree = 5, Agree =4, Uncertain = 3, Disagree = 2 , Strongly Disagree = 1

The questionnaire was divided into three sections:

- i) Teachers' Opinion about Statistics
- ii) Teachers' opinion about statistics in the secondary mathematics
- iii) Teaching Strategies and pedagogical knowledge for teaching Statistics Learnt in the teacher training program.

There were four items in part (i), (ii) and two items in part (iii) of the questionnaire. The questionnaire was sent to the sample teachers through post mail and were contacted through mobile for early response. There was a covering letter with each questionnaire, describing the objectives of the study.

### ANALYSIS OF DATA

Each statement of the questionnaire was tested by using chi-square technique.

		SA	A	UNC	DA	SDA	$\chi^2$
<b>Teachers' Opinion about Statistics</b>							
1	Statistics is as important field of mathematics.	40	38	20	1	1	72.3
2	Statistics is merely collection of data and their presentation in graphs.	18	24	32	20	6	9.0
3	Statistics provide logical fashion of interference from the situations of uncertainties.	17	10	27	33	13	18.8
4	Statistics helps in a scientific way for drawing conclusions from the data.	29	47	12	8	4	63.7
<b>Teachers' opinion about statistics in the secondary mathematics</b>							
5	Topics given in the secondary mathematics are related to the real life.	45	20	18	13	4	46.7
6	Statistics in secondary mathematics prepare students for higher level Statistics.	16	17	26	27	14	7.3
7	Students of secondary level are prepared for managing and interpreting the collected data.	29	18	37	9	7	33.2
8	After studying statistics at secondary level, students get enough knowledge needed for college statistics	18	13	19	26	24	5.3
<b>Teaching Strategies and pedagogical knowledge to teach Statistics</b>							
9	In teacher training programme, Pedagogical skills were taught for teaching Statistics.	25	32	19	13	11	15.0
10	In teacher training program, analysis of data and drawing conclusions from data were taught.	22	26	19	17	16	3.3

Degree of freedom = 4 Table value of  $\chi^2 = 9.488$

### DISCUSSION

The respondents of the present confirm that statistics is an important field of mathematics. At secondary level, statistics is taught in a traditional way by focusing the examination, but the respondents were of the view that Statistics is not merely the collection of data and their presentation in graphs, Respondents were of the opine that statistics is a science which provides logical ways for conclusions. When the respondents were asked about statistics in secondary mathematics, they show their disagreement towards the statement "Statistics in secondary mathematics prepare students for higher level Statistics", however, the respondents were agreed that the topics given in the secondary mathematics are related to the real life problems and students of secondary level are taught to manage data for useful purposes. The respondents think that the statistics in the secondary mathematics does not prepare students for college statistics. The respondents confirm that during teacher training programme they have learnt different teaching strategies for statistics and got pedagogical knowledge for teaching statistics.

### FINDINGS

1. Statistics is an important field of mathematics and not only the collection of data and its representation in the form of graphs.
2. Statistics provides logical way of thinking and helps in drawing conclusions in a scientific way.
3. Statistics in the secondary mathematics does not prepare students for higher level statistics, though topics are related to the real life problems.
4. Secondary students prepared for managing data, but this does not prepare students for college level statistics.
5. During teacher training programe, pedagogical skills for teaching statistics are provided, however, analysis of data and drawing conclusions are not taught.

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**UTILIZATION OF GENERALIZED DIFFERENTIAL EQUATION  
FOR THE DERIVATION OF A NEW SCUI DENSITY**

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**ABSTRACT**

Habibullah (2009) presents a pair of differential equations for generating SCUI distributions (i.e. those which are invariant under the reciprocal transformation). Habibullah et al. (2009) propose a much more generalized form of the differential equation for generating the class of SCUI distributions so that the differential equations of Habibullah (2009) become special cases of this one. In this paper, we utilize the generalized differential equation to derive a new SCUI density which seems to have the potential for modeling real data.

**1. INTRODUCTION**

Habibullah and Ahmad (2006) define Strict Closure Under Inversion as the case where the distribution of the reciprocal of a continuous random variable is identical to that of the original random variable. They (2006) adopt the abbreviation SCUI for distributions that are strictly closed under inversion.

Pearson (1895) seems to be the originator of the idea of utilization of differential equations in special problems of probability theory. Ever since, a number of authors have proposed differential equations including Dunning and Hansen (1977), Cobb (1980), Ahmad, M. (1985), and Chaudhry and Ahmad (1993). Habibullah (2009) presents a pair of differential equations for generating classes of SCUI distributions, and shows that a number of well-known distributions possessing the SCUI property are derivable from these differential equations. Habibullah et al. (2009) propose a much more generalized form of the differential equation for generating the class of SCUI distributions so that the above-mentioned two differential equations can be regarded as special cases of this one. In this paper, we utilize the generalized differential equation to derive a new SCUI density that seems to possess the potential for competing with the exponential distribution for modeling data having a reverse-J-shaped distribution.

**2. GENERALIZED DIFFERENTIAL EQUATION FOR  
GENERATING SCUI DISTRIBUTIONS**

Habibullah et al. (2009) propose that if  $g(y)$  is the *pdf* of the random variable  $Y$ ,  $-\infty < y < \infty$ , then the differential equation

$$\frac{d}{dy} [\ln g(y)] = \frac{\sum_{i=0}^n b_i [w(y)]^i}{\sum_{i=0}^n a_i [w(y)]^i}, \quad (2.1)$$

$n=0, 1, 2, \dots$ , yields an unlimited number of SCUI distributions  $f(x)$  of the random variable  $X = e^y$ ,  $0 < x < \infty$ , for each of the following two cases:

**Case I:**

$w(y)$  is an odd function of  $y$  i.e.  $w(y) = -w(-y)$ , and the following conditions hold:

a)  $a_i \neq 0$  and  $b_j \neq 0$  for some  $i, j, 0 \leq i, j \leq n$ , and

b)  $\sum_{i=0}^{2j} (-1)^i a_{2j-i} b_i = 0$ ,  $j = 0, 1, 2, \dots, m$ ,

$$\sum_{i=0}^{2j} (-1)^i a_{n-i} b_{n-2j+i} = 0, \quad j = 0, 1, 2, \dots, m \quad (2.2)$$

where  $m$  is  $\frac{n}{2}$  or  $\frac{n-1}{2}$  according as  $n$  is an even or odd non-negative integer,

**Case II:**

$w(y) = [w(-y)]^{-1}$ , and the following conditions hold:

a)  $a_i \neq 0$  and  $b_j \neq 0$  for some  $i, j, 0 \leq i, j \leq n$ ,

b)  $\sum_{i=0}^j (a_i b_{i+n-j} + a_{i+n-j} b_i) = 0$ ,  $j = 0, 1, 2, \dots, n-1$ ,

$$\sum_{i=0}^n a_i b_i = 0 \quad (2.3)$$

### 3. A NEW SCUI DENSITY

Letting  $w(y) = y \cos y$ ,  $n=1$  and  $a_1 = b_0 = 0$ , we have

$$\frac{d}{dy} [\ln g(y)] = \frac{b_1 [y \cos y]}{a_0} = my \cos y$$

implying that

$$g(y) = ke^{my \sin(y) + m \cos(y)}$$

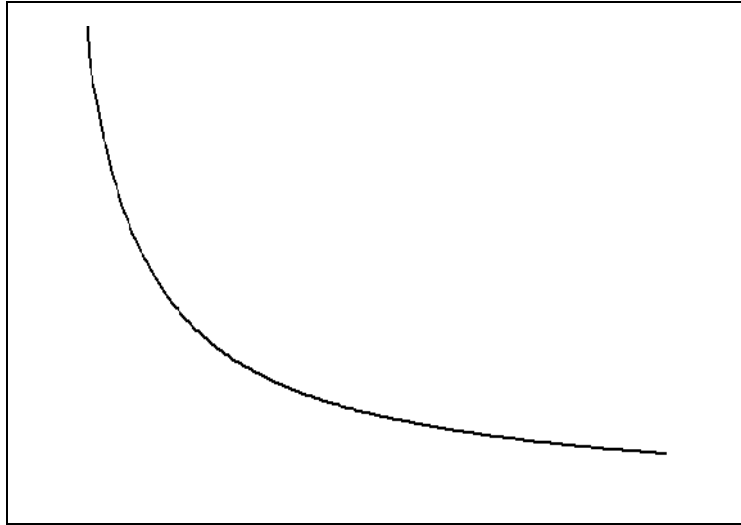
So that the density function of  $Y=\ln X$  is given by

$$f(x) = \frac{k}{x} e^{m \ln x \sin(\ln x) + m \cos(\ln x)} \quad (3.1)$$

where

$$k = \frac{1}{\int_{-a}^a e^{m y \sin(y) + m \cos(y)} dy}$$

The shape of the distribution is given in Figure 3.1.



**Fig. 3.1: Frequency Curve of Density (3.1)**

#### 4. CONCLUDING REMARKS

The shape of the density suggests that it possesses the potential for competing with the exponential distribution for modeling data which has a reverse-J-shaped distribution. Exploration of the properties of the newly derived density will be extremely helpful in discovering its true potential.

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**A COMPARATIVE STUDY OF MOBILINK POSTPAID PACKAGES  
& CUSTOMER BEHAVIOR TOWARDS VALUE ADDED SERVICE**

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**ABSTRACT**

The regulators, operators and the Government, in their own respective spheres, have been taking care of the mobile subscribers in Pakistan. The steps taken by these three include bringing value added services, increased accessibility, better quality, lower tariffs and better value for money. Since the market shares of all the operators have only marginal difference and the gap between the market leader (Mobilink) and the rest of the operators is narrowing rapidly, the companies are now getting into a price war whereby under-cutting each other for Voice and SMS services is resulting into higher financial burden on the companies. In this research we attempt to find which post paid package is preferred by users and what is the relationship among Mobilink post paid packages & customer behavior towards value added services so that the company is able to determine the best package plan and to offer the right product to the right customer. We have used secondary data that was obtained from Mobilink for research-purposes. Well-established statistical techniques such as cross tabulation, graphical representation, ordinal regression and logistic regression have been employed for analyzing the data. The software that has been used for data analysis is SPSS.

**INTRODUCTION**

Ayden et al. (1983) measure the effects of customer satisfaction and trust on customer loyalty, and the direct and indirect effect of “switching cost” on customer loyalty. Donner (2004) explores the widespread practice of ‘beeping’ between mobile phone users in Sub-Saharan Africa. The paper identifies the ‘rules of beeping’ and assesses the significance of the practice using socio-linguistic and socio-technical approaches to communication behavior. Gao et al. (2005) propose a peer-to-peer wireless payment system, known as P2P-Paid, to allow two mobile users to conduct wireless payment transactions over Bluetooth communications. The paper provides a system overview about system functional features, system architecture, and technologies used.

Pakistan's mobile cellular segment had been growing at a very fast pace; however, recently, the signs of slow down have indicated slow growth in subscriber base, penetration and revenues. The international research companies still consider Pakistan to be a lucrative market as there still remains a portion of unmet demand in certain areas. Sector has already shown signs of recovery.

Research sees huge potential for VAS solutions in the Pakistan market as operators desperately look for new revenue generators, and voice revenues consistently hit new lows.

In an effort to introduce more VAS and differentiate its services from that of its competitors, as well as increase ARPU rates, Mobilink launched personalized ring-tones under the Mobitones brand, as well as a voice SMS service under the name of Bolo SMS. These will allow the operator to increase the proportion of its non voice revenue stream. Mobilink also became the exclusive provider of BlackBerry services in Pakistan, giving it a distinct advantage in selling to the corporate market. The carrier has also launched a new mobile commerce solution Mobilink Genie, which allows subscribers to pay their bills and make other financial transactions. Recently, Mobilink signed a contract with Alcatel-Lucent to deploy a WiMAX network, allowing the use of mobile broadband services.

As for competitive environment in the sector, there is intense competition among all 5 operators. Since the market shares of all the operators have marginal difference and the gap between the market leader (Mobilink) and the rest of the operators is rapidly narrowing, the companies are now getting into a price war, whereby under-cutting each other for Voice and SMS services is resulting into higher financial burden on the companies. The operators have come to launch a range of value added services like Mobile banking, Mobile Internet, Music Library, Utility Bills Payment, Stock Market Updates, Voice Messaging, GPRS services, etc. that would help industry to improve ARPUs.

The regulators, operators and the Government, in their own respective spheres, have been taking care of the mobile subscribers in Pakistan. The steps taken by these three are bringing value added services, increased accessibility, better quality, lower tariffs and better value for money. PTA has estimated that cellular mobile subscribers would cross 102 million by 2011 in Pakistan. However, the PTA reported year 2008-09 did not come out to be an exciting one as the financial strength remained invariable with revenues growing only by 16% and investments dropped by 48%. The industry could not halt the falling ARPUs that are standing at US\$ 2.5, showing a drop of 20% from that of the last year. Although companies like Telenor and Ufone kept on investing more than their competitors, but to keep ARPUs constant is still a challenge for all the operators. Out of all the 5 mobile operators, only Ufone registered profit of Rs. 1.7 billion during 2008-09, and the rest of the companies recorded financial burden due to heavy running expenses including power expenses, rupee depreciations and employees' emoluments etc. For the first time ever, job cuts had also been announced by the operators.

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Pakistan would hopefully cross the number of 102 million subscribers by the next two year. However, in order to address low ARPUs, the need to boost data usage & VAS has increased. The operators are putting in their best efforts to introduce data service, but the low local content availability and high low-income prepaid base is not allowing them to grow on data services. Hopefully, once 3G licensing is completed, the subscribers would be in better position to use enhanced data service on better speed, and the business community will be benefited largely from it.

## RESEARCH OBJECTIVES

In this research we attempt to find which post paid package is preferred by users. As post paid business is going down due to low call rates & competitive free minutes in post paid tariff, Value Added Services are being offered to increase revenue. We explore what kind of VAS is preferred by each package plan user, so that the company is able to determine the best package plan and to offer the right product for the right customer.

## METHODOLOGY

We have used secondary data that was obtained from Mobilink for research-purposes. Well-established statistical techniques such as cross tabulation, graphical representation, ordinal regression and logistic regression have been employed for analyzing the data. The software that has been used for data analysis is SPSS.

## RESULTS

The analysis of the data yields the following results:

The highest users are belonging to package plan i-1500 having almost 37% of total postpaid users. Whereas the users of package plan i-400 are also very close to highest users having 30% of total postpaid users however the other part of our research shows that the low end users (i-400 & i-100) are mostly subscribed in Value added services and preferred to experience available VAS. So they may be our potential customers if we introduce more VAS.

We should introduce more Mobile Value Added Services; these services add value to the standard voice service and usually drive up the revenue per user. SMS, ring tones, picture/video messaging such as greetings, games and accessing Internet or other data services are common examples of value-added services for mobile operators.

All the mobile phone companies in Pakistan offer many value added services in various forms of messaging, information, ring tones, music and every imaginable entertainment one can think of. There are too many of these services around to link them here but if we visit the mobile company websites we will find these services clearly advertised.

Messaging and ring tones are the biggest revenue producers. Ring tones may evoke strong opinions from people for various (social and cultural) reasons but if you look beyond that ring tones market has done surprisingly well all over the world.

Service providers in the telecom industry know all too well that oftentimes the ability to compete hinges on successfully deploying what are known as “value-added services.” The trick is to figure out what type of value can be added that will be truly useful and enticing to customers.

The question then, remains: How can providers reach today’s consumers, and how can they continue doing so in the future? Or, to put it another way, how can a provider create more revenue and reduce customer churn?

Creating compelling, bundled service packages with standardized rates for different kinds of calls is a recipe for success.

The analysis of package plan shows the post paid users are those customers who consume more than min Rs, 1000 / Month as billing, as we come to know that 37.2% users have i - fifteen hundred package plan, the other major group is the users of i - four hundred which is 30.7%.

Following are the key point of our research and findings.

1. Low package plane user prefer to use VAS
2. Low & middle package users are more than 70% of total subscriber base (i-100, i-400, i-900)
3. Initially our target market must be low & middle end users for VAS
4. We should offer bundle VAS

### **CONCLUSIONS AND RECOMMENDATIONS**

Pakistan's mobile cellular segment had been growing at a very fast pace; however, recently, the signs of slow down have indicated slow growth in subscriber base, penetration and revenues. The international research companies still consider Pakistan to be a lucrative market as there still remains a portion of unmet demand in certain areas. Sector has already shown signs of recovery.

Pakistan would hopefully cross the number of 102 million subscribers by the next two year. However, in order to address low ARPUs, the need to boost data usage & VAS has increased. The operators are putting in their best efforts to introduce data service, but the low local content availability and high low-income prepaid base is not allowing them to grow on data services. Hopefully, once 3G licensing is completed, the subscribers would be in better position to use enhanced data service on better speed, and the business community will be benefited largely from it.

From the conclusions of the study it can be recommended that:

1. Initially our target market should be low & middle end users for VAS
2. We should offer bundle VAS
3. In order to address low ARPUs, the need to boost data usage & VAS
4. With the introduction of more non-voice services like mobile banking, mobile music and culture-based services like Quran recitation, the ARPU can be increased.
5. Rather than being a part of price war Mobilink should focus to offer more Value added services to increase its revenue

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## DIRECT AND INDIRECT SEASONAL ADJUSTMENT OF CPI OF PAKISTAN

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### ABSTRACT

Consumer Price Index is a tool through which the status of consumers can be gauge. Almost all economic and financial time series are influenced by the seasonal and calendar effects. Statisticians are involved to remove such effects from the time series for better understanding and planning. In this study the objective is to choice of Direct and Indirect seasonal adjustment techniques of aggregate<sup>1</sup> components time series of the Consumer Price Index of Pakistan. The X-12 ARIMA<sup>2</sup> method was applied for direct and indirect seasonal adjustment and we found that there is no high correlation between the components of time series and the indirect adjustment technique provides appropriate results than the direct adjustment.

### KEY WORDS

ARIMA<sup>3</sup> Modeling; X-12 ARIMA; Pre-adjustment; Seasonal Adjustment.

### 1. INTRODUCTION

An arrangement of the statistical data in accordance with time of occurrence is called a time series. Common examples on the time series are daily temperature measurements, monthly sale and yearly population figures. The aims of time series analysis are explanation of the chronological data and forecasting of future events. In the time series analysis, current data in a series may be compared with past data in the same series. It may be also compared with two or more series over time.

An observed time series is consisting on four components, i.e. seasonal component, trend component, cyclical variations and irregular variations. The trend and cycle components are customarily combined together into trend-cycle component due to the minimum number of cycles in our data. These components can be combined with multiplication or addition and provide multiplicative or additive model. Multiplicative model is often used in Real Macroeconomic time series. Relationship between the original series and its components can be modeled as;

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<sup>1</sup> The data series selected for this study is aggregated Consumer Price Index CPI, and it consists of 10 components groups

<sup>2</sup> Seasonal adjustment software was developed by the US Census Bureau as an extended and improved version of the X-11 ARIMA method.

- ▶ Multiplicative Model:  $( ) = \times \times$   
 ▶ Additive Model:  $( ) = + +$

Seasonal fluctuation is one of the most important components of the time series. Seasonality means particular periodic fluctuations, which are quite common in economic time series. These fluctuations in data make difficult to analyze whether changes in data for a given period reflect important increase or decrease in the level of data, or otherwise due to regularly occurring variations. If it exhibits in the time series data, it must be eliminated to obtain an exact picture of data. Seasonal adjustment is a procedure by which we remove seasonal movements from time series and a series from which these fluctuations have been eliminated is called seasonally adjusted series and it enables to compare between two months, or quarters for which seasonal agreement is different.

Mostly adjusted series use a multiplicative decomposition however a multiplicative model cannot be implemented, if there is zero or negative observation in the series. The seasonally adjusted series is the combination of the trend and irregular components, which is same as the original series once seasonal component is removed. Seasonally adjusted models for multiplication and addition are  $\times$  and  $+$  respectively. It is important to note that the adjusted series is very much essential for Policy maker, Government and financial institutions. The data is selected for this paper is aggregated Consumer Price Index (CPI) and its 10 components are *Food and Beverages, Apparel Textile and Footwear, House Rent, Fuel and Lighting, Household Furniture and Equipment, Transport and Communication, Recreation and Entertainment, Education, Cleaning Laundry and Personal Appearance and Medicare*.

## 2. METHODOLOGY FOR SEASONAL ADJUSTMENT

In present study, our objective is to choice of Direct and Indirect seasonal adjustment of aggregated consumer price index series of Pakistan comprises ten components groups, for which the following methodology is used.

### 2.1 ARIMA<sup>3</sup> Modeling

A stationary time series is one whose statistical properties<sup>4</sup> such as mean, variance, autocorrelation and etc are all constant over time. A stationary time series is one whose statistical properties such as mean, variance, autocorrelation and etc are all constant over time. Statistical forecasting methods are based on the assumption that the time series can be rendered approximately stationary, which consists of two parts, first is deterministic and other is disturbances. Deterministic part can be defined as the regressing the values from its own previous “p” values, is called Autoregressive model (AR) of order “p” may be written as;

$$= + + + \dots + + \quad (2.1.1)$$

<sup>3</sup> Autoregressive integrated moving average, popularly known as the Box-Jenkins Methodology is used for forecasting.

<sup>4</sup> Stationary processes is a normal; the weakly stationary stochastic process is also stationary for the normal stochastic process is fully specified by its two moments, the mean and variance.

Another component disturbance is also used in time series describe stationary series. The values of the time series depend upon the error terms, hence the model can be obtained by regressing the values from its past “ $q$ ” terms, is referred to the Moving Average model (MA) of order “ $q$ ” may be written as;

$$= + + + \dots + + \tag{2.1.2}$$

In practice a time series can be modeled with only modest number of terms “ $p$ ” or only modest number of terms “ $q$ ” in the form of either an AR or an AM or it may consist of both that can be known as ARMA model. This model is a tool for understanding and predicting the future values with the self deterministic as well as error terms, hence the classification of this model is Autoregressive of order “ $p$ ”, AR ( $p$ ) and Moving Average of order “ $q$ ”, MA ( $q$ ) and if we combine together then it is called ARMA ( $p,q$ ) may be written as;

$$= + + + \dots + + + \dots + \tag{2.1.3}$$

Practically, many economic time series are non-stationary, therefore we have to difference “ $d$ ” time to achieve stationary then the ARMA model is expressed as ARIMA ( $p,d,q$ ) where the symbol  $I$  denotes “integrated”. For instance ARIMA ( $p,1,q$ ) time series has to be differenced once ( $d=1$ )<sup>5</sup>, while if the given series is already stationary then the value of  $d$  is 0, means no difference taken in modeling, thus ARIMA ( $p,0,q$ ) is equals to ARMA ( $p,q$ ).

The Box-Jenkins methodology<sup>6</sup> is must used; either the available series is stationary or non-stationary. This methodology was proposed by G. E. P. Box and G. M. Jenkins to find the best fit of a time series in order to make forecasts. This method consists of four steps in the forecasting which are Model identification, Model selection, Diagnostic checks and forecasting.

**2.2 Pre-adjustment**

Variations in the number of working days and the weekday composition in each period as well as the timing of moving holidays can have significant impact on the series. These impacts must be adjusted before forecasting is called pre-adjustment.

The calendar effects component is that part of the seasonal components which represents calendar variations in a time series, such as trading days or working days, moving holidays and other calendar effect. For instance, Christmas and New Year are the most important holidays for western countries, while Ramadan, Eid-ul-Fitar, Eid-ul-Azha, Ashore and etc are the Islamic holidays. These are the example of moving holidays and adjustment of these fluctuations is performed by Reg-ARIMA modeling in X-12 ARIMA software, to obtain seasonally adjusted series. The differences between length of months (28, 29, 30 and 31) have also a significant impact on time series. Monthly time

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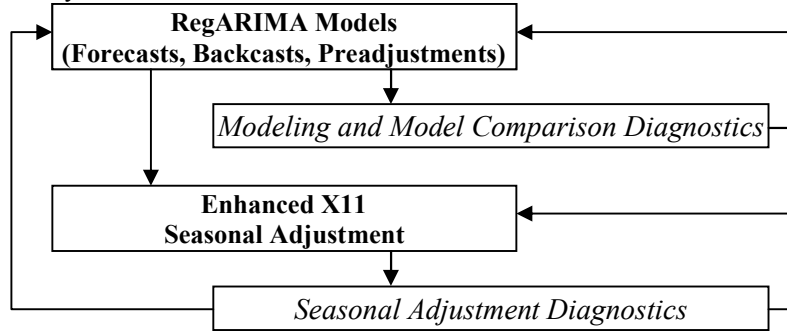
<sup>5</sup> For example, if  $d=1$ , then  $= -$  will become stationary similarly for  $d=2$   $= -$   $= -2$   $+$  .

<sup>6</sup> G. P. E. Box and G. M. Jenkins, *Time series analysis, Forecasting and control*, revised ed. Holden Day, San Francisco, 1978.

series that are based on daily flow of goods and services can be affected by each calendar, month, weekday or length of months, these affections can also be adjust by Reg-ARIMA modeling.

### 2.3 X-12 ARIMA

In earlier days, the X-11 software was used as a statistical method, developed by US Census Bureau for seasonal adjustment of time series. Later this, X-12 ARIMA was also developed by US Census Bureau as an extended and improved version of X-11 ARIMA. It is a most recently used software for seasonal adjustment, one of the important improvements is that the moving average technique is used with time series modeling. The X-12 ARIMA method is best described by the following flowchart as presented by David Findley and Deutsche.



**Fig 1: Flow Chart of the X-12 ARIMA**

The Figure 1 shows the steps for seasonal adjustments which are, first the series is modified by any user defined prior adjustment and then the program fits a Reg-ARIMA model to the series in order to detect and adjust for outliers and other distorting effects for improving forecast and seasonal adjustment. Moving average is also used to decompose a time series in three components Trend-Cycle, Seasonal and Irregular and X-11 method is used for seasonal adjustment. In the last step a wide range of diagnostic statistics are produced, describing the final seasonal adjustment.

### 2.4 Direct and Indirect Seasonal Adjustment

The seasonal adjustment can be classified as direct and indirect adjustment. When a time series is a sum of a set of different series in which each series is seasonally adjusted, then sum of set of such adjusted series to get a seasonally adjusted aggregate series, this kind of adjustment is called indirect adjustment. The alternative is the direct approach of adjustment is obtained by applying adjustment procedure on the aggregated data.

The criteria for the selection of direct and indirect approaches are given below:

1. The indirect adjustment should be selected, if the components of series comprise different stochastic properties.
2. The indirect adjustment is also applicable when data sources of the components are different.
3. If the high correlation exists among the components of series then direct approach is appropriate for adjustment.

In this paper both approaches have been applied on aggregated Consumer Price Index CPI series of Pakistan<sup>7</sup> comprise ten components groups for seasonal adjustment.

### 3. RESULTS AND DICUSSIONS

Analysis was carried out by using X-12 ARIMA seasonal adjustment program and multiplicative adjustment model was selected for all the series because the amplitude of the both seasonal and irregular variations increased as the level of trend increased. Direct and Indirect methods both were applied for seasonal adjustment and we observed that the indirect method gives the better results than direct method.

The Month to Month change series (MoM)<sup>8</sup> is a best method for comparison between direct and indirect adjustments. In present analysis, we observed that the variance and standard deviation of MoM change of indirect adjustment is less than the variance and standard deviation of MoM change of direct adjustment, while the mean of the both series is same. Following table shows the descriptive statistics of MoM change of both adjusted series.

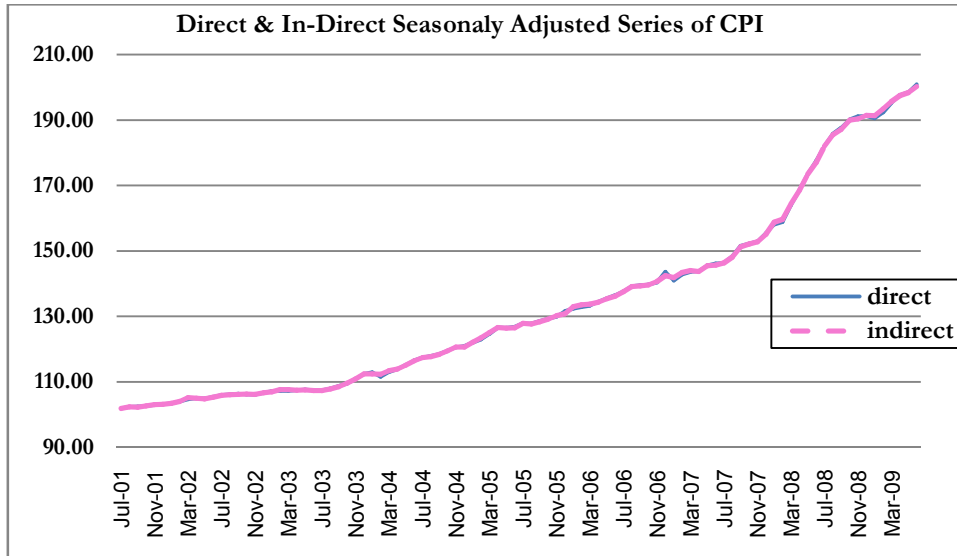
**Table 1: Descriptive Statistics of Month to Month Change**

<i>Statistics</i>	<i>Original</i>	<i>Direct</i>	<i>Indirect</i>
Minimum	-0.89	-1.81	-0.45
Maximum	3.34	3.18	2.95
<b>Mean</b>	0.71	<b>0.72</b>	<b>0.72</b>
<b>Std. Deviation</b>	<b>0.83</b>	<b>0.79</b>	<b>0.72</b>
<b>Variance</b>	<b>0.69</b>	<b>0.62</b>	<b>0.52</b>
Skewness	0.82	0.62	1.17
Kurtosis	1.15	2.12	1.55

The graphs for comparison between Direct and Indirect adjusted series and month to month change (MoM) series are given below:

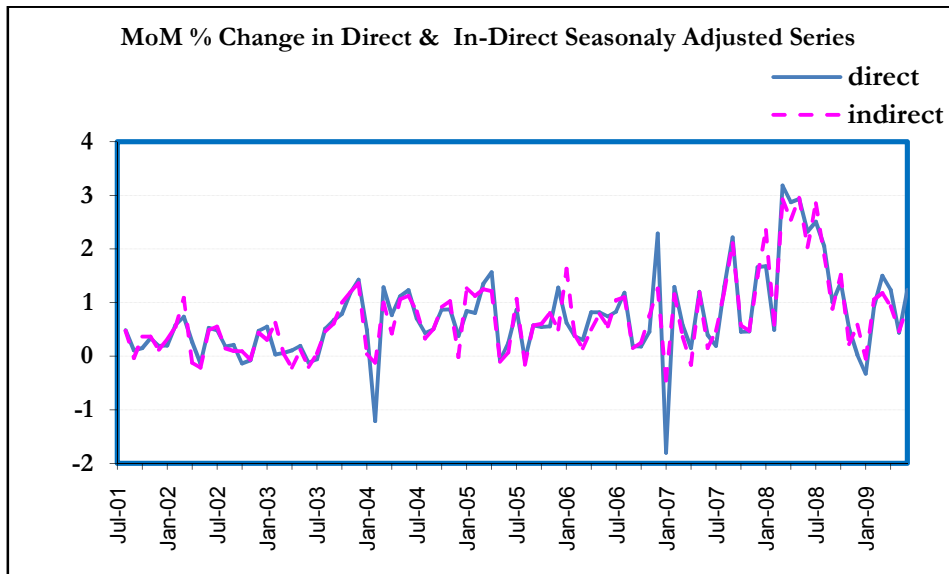
<sup>7</sup> Monthly price data compiled by Federal Bureau of Statistics was taken from July 2001 to June 2009, from the Statistical Bulletin of Statistics & DWH department, State Bank of Pakistan.

<sup>8</sup> Month to Month Change MoM =  $\frac{Y_t - Y_{t-1}}{Y_{t-1}}$ .



**Fig 2: Direct Versus Indirect Seasonally Adjusted Series of CPI**

In the above figure the dash line represents indirect adjustment and while smooth line is representing direct adjustment. Apparently, these two lines are coinciding however they have significant difference. The Month to Month change graph is an inevitable comparison between these adjustments.



Above graph provides the comprehending difference between two adjustments such as the dash line is flowing inside the smooth line and clearly shows the less variation in the indirect adjustment than the direct adjustment.

#### 4. CONCLUSION

As we discussed previously, in this paper two seasonal adjustment techniques have been applied, which are Direct and Indirect and we compared the performance of the both techniques and found that ten major components groups have different statistical properties and sources of components are also different. They have no high correlations among the components of series and each series has different behavior, therefore we conclude that the “indirect seasonal adjustment” gives better results than direct adjustment.

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## CHARACTERISTICS AND ISSUES OF AGING POPULATION: PAKISTAN

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### ABSTRACT

Aging of population may have its implications at individual, family, community and for economic activities. This paper explains characteristics and issues of aging population. Such factors are identified and categorized; the relevance of such factors with aging population is examined in a survey consisting of 341 observations. The findings demonstrate that marital status, living facilities, migration, education and employed workers are persistent characteristics of aging population. The study reflects affect of various factors on aging population and the finding may be of interest for the researcher and parishioners.

### INTRODUCTION

The segment of elderly population is increasing due to improved health facilities. This aging population brings an economic impact with increased costs pertaining social security and services delivered to the elderly people mostly in European countries (United States, 2005). One of the most critical demographic events in the world today is the population aging (Mohan, 2004), the process by which the share of older individuals in the total population starts becoming larger. With rapid decline in mortality and increase in longevity of age, Pakistan as well is likely to face such problems in the near future. Aging of the population has many important socio-economic and demographic implications, and presents challenges for economic activities. Yusuf and Pollard (1981) argue that the variation in age structure would pose little problem if the attitude and behavior of the population did not vary with age. In reality, the changing age structure of populations has significant social and economic implications at the individual, family, community and societal levels (United Nations, 2007).

Existing studies in population dynamics concern other factors rather than just age. Amongst the socio-economic-demographic variables are income, household, type of housing unit, tenure type, employment status, car ownership, geographical location, and number of children etc. Past research showed that some of these variables are correlated and care has to be taken in order to not confound various competing influences on environmental budgets (Lenzen, 2006). Living facilities, media of information, migration, education and employed workers are persistent correlates of aging population (Cheema and Aslam, 2009).

### OVERVIEW OF AGING POPULATION

United Nations (1992) has highlighted fertility, mortality, migration, size of household, marital status, educational status, work participation, income, living conditions, health status, savings, social support and relationships between generations as



the main population aging issues. The past research addressed various issues regarding the dynamics of the elderly population. For example, Menon and Frontline (2002) described that today's world is facing a challenge of rapidly aging population. The increase in life expectancy has added vastly to human happiness and human capabilities across all social groups and cultures. Their study indicated that the consequences of this demographic change in the context of sharpening global inequality are major challenges for the individual families, communities and governments in coming future. In Pakistan, Hashmi (2003) agreeably concludes that for the elderly population; their magnitude, trends, sex, education, employment, migration and headship are the important characteristics. Hafeez (2004) confirms that elderly in Pakistan are generally active and participate in routine activities of life including paid jobs and household activities. In the same light Gupta and Sankar (2003) showed that age, gender, education, social status and residence are important factors. Men in general were more educated than women as expected in patriarchal society of Pakistan. The studies also concluded the elderly in Pakistan were generally active and participated in routine activities of life including paid jobs and household activities.

In the context of rising median age, Weill (2006) asserts that aging is particularly high in developed countries with the median age expected to rise up to 45 by 2050. In the setting of Pakistan, a study by Nizam-ud-din (2006) showed that Pakistan's 60 years or older population had grown from 1.9 million in 1951 and to over 11 million by 2006. According to another study Gupta and Sankar (2003), around 44 percent of the elderly men and 24 percent of the elderly women were currently economically active, while the majorities were not economically active. Cheema and Aslam (2009) as well estimated that the problem faced by the elderly was the high levels of economic dependence on others, especially for women. The gender dimensions in ageing and its relative aspects also were very different because the life expectancy of females was higher than that of males.

Currently, Pakistan has more older men than older women (Clark et al. 2002), and research suggests that participation of rural older women has almost doubled from 9 percent in 1990-91 to 16 percent in 2003-04. Both the demographic changes and improvements in the level of educational attainment since 1990's had a positive impact on the participation of adult population in the labour market. The level of unemployment among aged people, 60 years and above has also been reported to be high Arif and Chaudhary (2008).

#### **METHODOLOGY & RESEARCH INSTRUMENT**

After reviewing different research methods, we found survey research to be more appropriate for our research study. For survey approach, determining sampling, developing questionnaires and interviews are the basic components (Fowler, 1993) as it is the widest spread quantitative research technique Corbetta (2003). As the population refers to individuals being researched, a major step in social research is to define population clearly that consequently may help in selection of a representative sample for inferring characteristics of the population (Labovitz and Hagedorn, 1981). The proposed sampling technique of the present study has in-built method for estimating sampling errors as standard error. However, estimates can be inflated through the application of ratio estimation method with the help of

two auxiliary variables, i.e. age and sex used as controlled variables, as to match with the actual population count emerging from quick count listing.

Nearly 5.5 percent sample, 3.8 percent from urban area and 1.7 percent from rural area, roughly proportionate to urban/rural population size was selected. A three-stage stratified systematic random sample with probability proportionate to block size in terms of number of households per block was drawn. There are 341 observations related to aging population (with age 60 or above), 194 in urban areas while 147 in rural areas of Islamabad Capital Territory, whereas 40 social, economic and demographic characteristics of aging population were picked up for the research purpose.

## DATA ANALYSIS & CONCLUSIONS

Until the year 1951, the sequence of high birth rates followed by high death rates kept the aging population (persons 60 year and older) at a low level in Pakistan. However, since 1951 Pakistan's population had 1.9 million persons 60 years and older. In recent years, a steady decline in the birth rate has accelerated this aging process. In Pakistan aging population increased to 6.44 million by 2008.

### AGING POPULATION IN 2008

#### 1 Size of Aging Population

At present a little over 3.4 percent of ICT is aging population; in absolute number 43436 aged persons are living here of whom 26343 are settled in urban area. Total population of Pakistan 165 million in 2008, and Islamabad population is 1.28 million (which shares 1.29 percent of the total population of Pakistan). Of the total elderly people of ICT 23708 are males and 19728 are females consisting sex ratio of 120 males per 100 females.

#### 2 Age Composition

Population age structure (Table 1 and Figure. 1) of the ICT shows extremely positive skewed distribution.

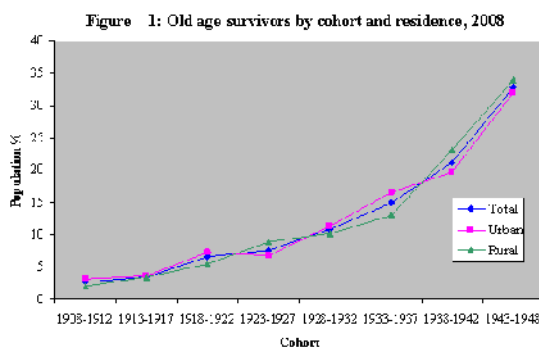
About 50 thousand persons (or 3.91 percent) are aged 60 and over. Among these over a half below is under age 70 and remaining 70 and over. It observed that mortality has decline to a reasonably low level because of some development programmes which include diagnostic facilities and increased awareness about health. The old age dependency ratio is around 4 percent indicating some burden on other family members.

Age	Total	Urban	Rural
60-64	32.8	32.0	34.0
65-69	21.1	19.6	23.1
70-74	15.0	16.5	12.9
75-79	10.9	11.3	10.2
80-84	7.6	6.7	8.8
85-89	6.5	7.2	5.4
90-94	3.5	3.6	3.4
95-99	2.6	3.1	2.0
Total	100 (3.91)	100 (3.08)	100 (2.52)

Area	Total	Urban	Rural
Old age dependency ratio	4.08	3.47	5.50

Dependency ratio is concerned with the personal support and social groups of older persons since these support systems have important implications for the social, psychological and economic well being of older persons.

Figure 1 shows fast change in age structure of elder over time, which indicates immediate review of strategy for old age social security.



### 3 Marital Status

Marital status is important aspect of demographic character, so, we can not ignore it for our present study. Among the older persons nearly 76 percent are still living as married couples. Of the remaining 24 percent whose majority is now widowed includes 43.8 percent females and 7.4 percent males. On loss of spouse males seem to get remarried. While female after death of their husband generally do not remarry and discharge her moral responsibility in upbringing her children.

Table 2: Marital status by residence, 2008

Variable	Both sexes			Male			Female		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Married	76.1	71.1	83.0	92.6	89.1	97.4	56.2	47.6	66.7
Others	23.9	28.9	17.0	7.4	10.9	2.6	43.8	52.4	33.3

### 4 Nationality

Nationality is important social aspect and here we consider it for aging study. Almost all the people living in Islamabad are Pakistanis, except very few (thirteen in one thousand) whose origin is neighboring country Afghanistan or India. Around 99 percent aged people are Pakistani.

Table 3: Nationality by residence, 2008

Nationality	Total	Urban	Rural
Pakistani	98.8	97.9	100
Afghani	1.2	2.1	0.0

### 5 Religion

Preponderance (nearly 97 percent) of people living in ICT is followers of Islam. Followers of Christianity are 3.1 percent and scheduled castes 0.1 percent. Christians and Quaidiani are usually found in the city. In our study around 97 percent aging population is Muslim while remaining 3 percent are Christian and Quaidiani. This indicates that majority of old age are Muslim in Pakistan.

Table 4: Religion by residence, 2008

Religion	Total	Urban	Rural
Muslim	97.4	96.4	98.6
Christian	2.1	2.6	1.4
Quaidiani/Ahmadi	0.5	1.0	0.0

## 6 Mother Tongue

Mother tongue is also an important indicator of social aspects. This indirectly tells us about the background of a person, here we take it to see the background of aging population. Statistics given in Table 5 indicates Punjabi is the most popular language among old age population as spoken by two-third (65 percent) of old age people living in ICT followed by national language Urdu representing one-fifths (21 percent). The third language being spoken in the area by old age is Pashto, 8 percent.

<b>Mother tongue</b>	<b>Total</b>	<b>Urban</b>	<b>Rural</b>
Urdu	21.1	33.5	4.8
Punjabi	65.4	53.1	81.6
Pashto	7.6	8.2	6.8
Hindko	4.4	4.1	4.8
Siraiki	0.9	1.0	0.7
Others	0.6	0.0	1.4
Total	100	100	100

## 7 Education

Education is very critical factor to judge many aspects like quality of life, employment, good passing time etc. Here we discuss some important issues of education as follows:

### a) Literacy

In survey we define the literacy as ability to read a book or journal or magazine and write a simple letter in any language. This implies that two conditions are essential for literacy i) reading ability and ii) writing ability. Without conforming to these two conditions simultaneously it is not possible to consider a person as literate.

The current literacy level for those aged 60 and above is 28.5 percent in ICT. Gender gap does exist in literacy ratio as male ratio is 39.6 percent while female ratio is 15.2 percent. When we look at the literacy rates by sex, we observe that the female rate is nearly half that of males. Urban area invariably has higher literacy ratio than rural for both male and female. For the present, however, any policy cannot direct towards the aged but may take note that two-thirds of the elderly females are not literate whereas two-thirds of men are literate. This gender misbalance must be creating economic hardship for older women especially who have lost their spouse and there is no family member to support them.

### b) Level of Education

Aged educated persons are more than double in number at all levels of education in urban than rural area of ICT yet those who left before completing primary level of education are greater in percentage in rural area. However rural area has far more percentage of aged educated persons up to middle and thereafter their percentage share drop considerably as compared to their urban counterparts.

As regards rural urban differences in the highest level passed, though urban rates are higher than the rural level, the difference is sharp. This is probably due to the fact that much attention was paid in the past to provide effective and well planned educational services to the urban area so, rural area also need such attention.

At present aged population's educational statistics from gender view point in percentage terms smaller share of male than female up to matriculation level and thereafter higher share of male and lower that of female. Hardly 4 percent of aged females have master's degree as highest degree. On the other hand 1.5 percent aged male person got PhD as highest degree.

**Table 6: Educational attainment by level of education passed and age, 2008**

Age	BPr.	Pr.	Mid.	Mat.	Int.	Deg.	M.Deg.	M.Phil.	Post Deg.	Oth.	Total
60-64	23.2	14.5	23.2	10.1	5.8	10.1	11.6	0.0	1.4	0.0	100
65-69	14.9	4.3	25.5	12.8	8.5	17.0	14.9	0.0	2.1	0.0	100
70-74	16.1	25.8	16.1	3.2	9.7	19.4	9.7	0.0	0.0	0.0	100
75-79	22.2	16.7	16.7	11.1	16.7	5.6	11.1	0.0	0.0	0.0	100
80-84	10.0	20.0	30.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0	100
85-89	0.0	40.0	10.0	20.0	10.0	10.0	10.0	0.0	0.0	0.0	100
90-94	75.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	100
95-99	25.0	25.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Total	19.2	15.5	20.7	11.4	7.8	13.0	11.4	0.0	1.0	0.0	100

Statistics given in Table 6 reveal that number of aged educated persons decreases with age. Over 70 years and older or those born before the inception of Pakistan in 1947, no one had PhD degree.

It is observed that the gap is wider between the two areas; obviously urban area has far more aged educated persons than rural area because of availability of resources, easy access and awareness of people. Aged educated males are much large in number than aged educated females in both urban and rural areas and at all ages. Men can easily support themselves in older ages provided jobs are available for them in the labour market and they are willing to work.

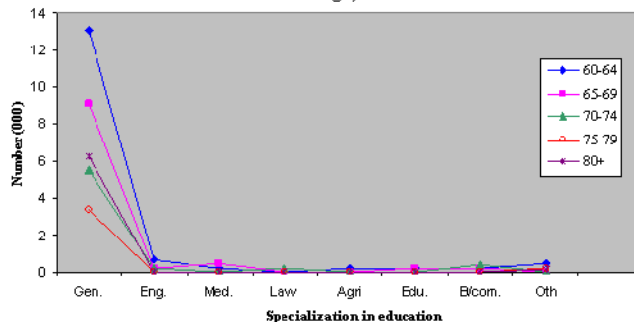
### c) Field of Specialization

All those aged persons who have general education and has no skill had low paid jobs, mostly engaged in services sector of economy as employees and had low contribution in country's economy or have less chance to get re-employment after getting retirement from their previous jobs.

Our aged person's educational attainment had nearly 90 percent based on general subjects and hardly 10 percent attained technical and professional. This situation is varying in urban and rural area and also by sex.

Regarding age pattern of aged educated persons by their field of specialization as envisaged from the Figure 2 it forms decreasing trend with professional degrees.

where \* stands for abbreviation Gen. for general education, Eng. Stands for Engineering, Med. for Medicine, Agri. for Agriculture, Edu. for Education, B.Com. for Business and commerce, and Oth. for Others

**Figure 2: Educational attainment by specialization in education\* and age, 2008**

It is very necessary to create awareness among persons towards importance of education. Because it is very important factor for employment, re-employment and in determining the quality of old age.

## 8 Migration

To see the duration of stay and reason to move of aged persons in our survey area it is observed that more than half of aged population move with their head of family and around 18 percent move because of new job. Around 2 percent move due to the health problem to Islamabad. Difference is almost the same in urban and rural areas with respect to the reasons of migration. However there is a lot of variation in levels for each reason. Gender differential indicate that females move because of head while males move for new jobs followed by head of family. The obvious reason of this gender differential is the strong hold of societal norms which inhibits them in educational attainment.

## 9 Economically Active Aging Population

To determine the quality of life and examining the implications of population aging we take this factor because in large measure provisions for income and health in old age are linked to employment. We take it as follows:

### a) Residential Composition

As discussed earlier the implications of population aging are important to assess trends in employment. At present the urban work participation rates are not very different from the rural rates. Nearly 80 percent of aging population is still employed while around 18 percent are job seekers. Aging population share of unpaid family helpers is very small yet in proportionate term share is higher in rural than in urban area.

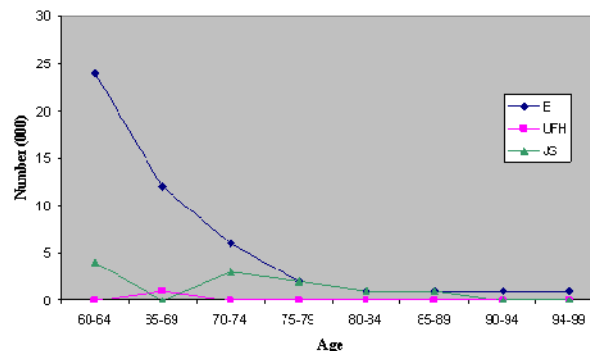
### b) Sex composition

When we see the share of males and females separately, it is noted that there is a considerable difference in female rates, as females in urban area may have less opportunities for work. It implies that females may not be suitable for urban occupations. It might be because of females who move to urban areas either belong to a better economic status or married with men in secure jobs and therefore tend to withdraw themselves from gainful employment.

### c) Age Composition

Results indicate that total 6065 aged persons are employed in which this share is greater at ages 60 to 70. After this employed ratio declined sharply, an indication of prevalence of high mortality or the age factor which affect the person's health and ability to work.

Figure 3: Economically active\* aging population, 2008



where \* stands for abbreviation E for employed, UFH for unpaid family helper, JS for job seeker

As appears from line graph drawn in Fig 3 the participation rate is very high at on age 60 to 74, starts fall rapidly with further advancing in age, and reaches to almost zero level after attaining age 85 years. This pattern is quite in line with those emerging from other national and international sources though level with ages varies from source to source.

#### d) Employment structure

Employment structure indicates the nature of employment of employed aging population.

**Table 7: Employed persons by employment status, sex and residence, 2008**

Residence	Employment status	Number			Percent		
		Both Sexes	Male	Female	Both Sexes	Male	Female
Total	Total	6149	5522	627	100	100	100
	Self employed	1769	1397	372	28.8	25.3	60.0
	Employer	116	116	0	1.9	2.1	0.0
	Employee (Govt.)	1630	1630	0	26.5	29.5	0.0
	Employee (Private)	2634	2379	255	42.8	43.1	40.0
Urban	Total	3474	3196	278	100	100	100
	Self employed	1071	932	139	30.8	29.2	50.0
	Employer	0	0	0	0.0	0.0	0.0
	Employee (Govt.)	932	932	0	26.9	29.2	0.0
	Employee (Private)	1471	1332	139	42.3	41.7	50.0
Rural	Total	2675	2326	349	100	100	100
	Self employed	698	465	233	26.1	20.0	66.7
	Employer	116	116	0	4.3	5.0	0.0
	Employee (Govt.)	698	698	0	26.1	30.0	0.0
	Employee (Private)	1163	1047	116	43.5	45.0	33.3

Table 7 provides the details of employment status with respect to sex and residence. Statistics indicate different patterns of employment status of males and females. For male, one half of them are working as private employee, nearly one third as government employee while every fourth is running his own business as self-employed. The same pattern is observed for females; however their proportionate share is a bit higher than males as private employees and the higher proportion of them working as private employee belong basically to urban area, 50 percent as against 41.7 percent male. In both areas and sex around 43 percent are private employee, follows by 29 percent self-employed; nearly 27 percent are government employee.

#### 10 Disability

Disability is an important economic indicator of our aging study. The disability of an old age person may appear as burden for the society as the disability of a person may impeach his effort to be done for any cause up to maximum level. In case the society ignores such people then it might lead to a miserable situation for a disable person. The disability may appear as one of the cause to move. In subsequent section we see it in respect of aging population.

### a) Disability Nature

Table 8 reports distribution of disabled aged population by difficulty of disability, sex of the disabled persons and the urban rural areas where they live. Result indicates three-fourth, of aged disable population have problem of seeing, might be because of partial or full blindness. Almost one-fourth disabled person is suffering from more than two causes. Nature of disability is almost the same for male and female as well as in both areas.

**Table 8: Distribution of disabled persons by disability, sex, and residence,2008**

Residence	Disability difficulty	Number			Percent		
		Both Sexes	Male	Female	Both Sexes	Male	Female
All area	Total	1542	914	628	100	100	100
	Seeing	1160	648	512	75.2	70.9	81.5
	Multiple	382	266	116	24.8	29.1	18.5
Urban	Total	1077	798	279	100	100	100
	Seeing	811	532	279	73.0	66.7	100
	Multiple	266	266	0	24.7	33.3	0.0
Rural	Total	465	116	349	100	100	100
	Seeing	349	116	233	75.0	100	66.7
	Multiple	116	0	116	25.0	0.0	33.3

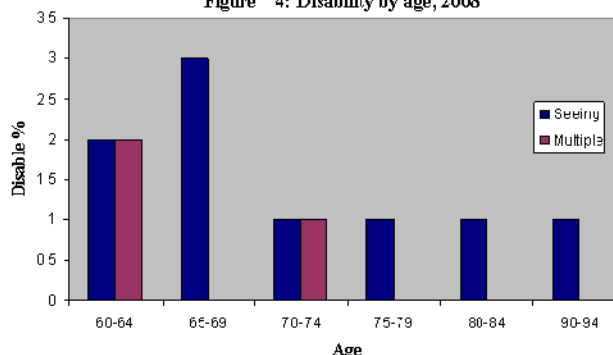
### b) Intensity of Disability

Intensity of disability indicates that over eleven-twelfths reported very severe problem, every one-twelfth reported as severe disability. The pattern is almost same among males and females in both urban and rural areas.

### c) Linkage with Age

Figure 4 shows the aging disabled population with age and difficulty. As we can see majority of disabled population has problem of seeing. One-half persons of age 60 to 64 suffering from difficulty in seeing and remaining has multiple difficulties. In age 75 and over all disabled aging population have the problem of seeing so; we can say this may because of age factor.

**Figure 4: Disability by age, 2008**



## 11 Housing Stock

Table 9 reveals the type of tenure of elderly in ICT. In urban area majority, more than three-fifths, of aging population is living in rented houses. Contrary to this in rural area majority, three-fifths of elderly people, is living in their owned houses.



**Table 9: Housing stock by tenure and residence, 2008**

Tenure	Number			Percent		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Owned	17383	6085	11298	40.0	23.1	66.1
Rented	22440	16833	5607	51.7	63.9	32.8
Rent-free	3613	3425	188	8.3	13.0	1.1
Total	43436	26343	17093	100	100	100

There also exist variations in rent-free housing units in urban and rural areas. In urban area it represents nearly 9 in hundred while in the rural area it is just one in hundred. This reflects that in urban ICT more than three-fifths of aged persons do not have their own houses. Even in rural area one-third elderly persons do not have their own houses. If some pattern is emerged from all over the country implies that there is a dire need to set up old people homes especially in big cities, to provide shelter and care for the homeless deserted and indigent aged persons.

### CONCLUSION

Our research explore various factors those have their impact on old age citizens. The degree of facilities old age citizens are availing and their importance. The findings demonstrate that living facilities, media of information, migration, education, disability and employed workers are persistent correlates of aging population. So, these factors do influence the aging population. The findings may be of interest for the researchers and practitioners who are working in the relevant area of research interest. It also provides guide line to explore other social factors and their implication towards the life of old age people in Pakistan.

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## REGRESSION ANALYSIS OF WHEAT MODEL

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### ABSTRACT

A classification is made of wheat plant trait towards grain yield contribution. Numerous prediction models, for predicting wheat grain yield on the basis of morphological characters, are developed. Variable selection procedures such as Best Subset Regression, Prediction Sum Of Square (PRESS), Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC) are used. In classification of genotypes, it is observed that all the plant traits such as: days to maturity, grain/spike and biological yield have a positive effect towards wheat yield, where as remaining wheat traits contribute negatively. It is found that wheat genotype having maximum days to maturity can be suitable for better yield. This may be concluded that subset regression method selected set of regressors, that are linearly independent with each other. Path analysis suggest that day to heading has maximum positive direct effect and 200 grain-weight has a maximum negative effect, on grain yield.

### KEYWORDS

Residual Analysis, Best Subset Regression, Prediction Sum of Square Statistic, Akaike Information and Schwartz Bayesian Criterion and Path Analysis

### INTRODUCTION

Wheat (*Triticum Aestivum* L.) belongs to family poaceae tribe Horde. It is the most important winter crop of Pakistan. Wheat is primarily used as a staple food providing more protein than any other cereal crop. Cheeroo-Nayamuth (1999) provides an overall view of agricultural models, their features, and the implication for the model development, testing and application. The researcher outlines the potential areas of model application and lists out the main issues to be considered when using models. By using Model-building capabilities it becomes possible to adopt a holistic and quantitative approach to problem solving within the agricultural field. His study provides the basic information on crop modeling and its adoption. Vishwakarma (2002) propose the models for biological yield and its qualitative characteristic in Wheat. Multiple regression analysis plays an important role for an improvement of wheat yield by some satisfactory models. His study select the four adequate models and he concludes that the most important factor affecting the biological yield is the spike weight per plant and this explains the variation towards wheat yield followed by 1000-kernal weight and spike lets per spike. In general he shows only four factors represent the wheat yield to a satisfactory

level. Yucel (2004) provides the phenotypic correlation coefficient between seed yield per plant and some yield components and identify the direct and indirect effect of 6 components on seed yield per plant in narbon bean lines. They determine the positive and statistically significant relationship between seed yield per plant and days to flowering number of pods per plant, number of seeds per plant, harvest index and 1000-seed weight; and negative and significant correlation between seed yield and plant height. They also show that the number of seeds per plant, 1000-seed weight, harvesting index, days of flowering and the number of pods affected seed yield per plant and conclude that these characters should be considered as significant selection criterion in narbon bean breeding for yield. Related work can also be seen from the paper of Freedman (1983), Correll et.al. (1994), Vargas et.al. (1998), Muhammad (2001), Yasunori and Fujikoshi (2002), Jamal and Rind (2005).

### METHODOLOGY & RESEARCH INSTRUMENT

In this study we used the wheat plant data. The reason of taking this wheat data is to provides the breeders different prediction models which can be helpful to predict the wheat grain yield with different fixed wheat plant traits. Wheat plant data obtained from Plant Genetic Resource Institute (PGRI) at National Agricultural Research Center (NARC) Islamabad and can be provided on request from the Author no. 1. This data set consists of 102 wheat genotypes and eleven different characters related to morphological characters.

Some basic regression assumptions such as: normality of residuals, linearity of the regression model, homoscedasticity or equal error variance, autocorrelation and multicollinearity must be verified to show how regression model can be used to handle the problem of statistical inference. With the help of residual analysis we can identify the outlying observations. There may be different possibilities of the outlying observations such as it may be outlying with respect to Y value, may be of X values or may be because of both X and Y values. Leverage value and Mahalanobis distance is appropriate device to test the multivariable outliers with respect to their X values for wheat plant model. Leverage of the  $i^{\text{th}}$  (X values) observations may defined as:  $h_{ii} = X_i'(X'X)^{-1}X_i$  and considered outlying observation (with respect to X values) If:  $h_{ii} > 2\bar{h}$ . Mahalanobis distance defined as:  $M.D = \sqrt{(X' - \bar{X})\Sigma^{-1}(X' - \bar{X})'}$  and considered outlying observation (with respect to X values) If:  $M.D > \chi^2_{(\alpha, p-1)}$ . Studentized deleted residual is the method of detection of outlying or extreme observation with respect to Y values and obtained as:  $d_i^* = d_i / S(d_i)$  and the decision criterion based on, consider outlying Y observation if:  $d_i^* > t_{(0.95, n-p-1)}$ . After identifying observations that are outlying with respect to X and Y values, the need is to ascertain whether or not they are influential. So we use DFFITS and Cooks measures for the identification of Influential observations. DFFITS computed as:  $(DFFITS)_i = (\hat{Y}_i - \hat{Y}_{i(i)}) / \sqrt{MSE_{(i)}h_{ii}}$ . As a rule of thumb we consider the observation influential if the  $|DFFITS| > 1$  (for small to medium data sets)

and  $|DFFITS| > 2\sqrt{P/n}$  (for large data sets). Cooks distance may defined as:

$D_i = (\hat{Y} - \hat{Y}_{(i)})' (\hat{Y} - \hat{Y}_{(i)}) / pMSE$  and if  $D_i > F(\alpha, p, n-p)$  then consider that observations as influential observations.

Prediction model selection procedures for our wheat plant data set can be identified through the study of Best Subset Regression Procedure, Prediction Sum of Square (PRESSp) Statistic, Akaik Information Criterion (AICp) and Sewart Bayesian Criterion (SBC) and their significance contribution have been identified with the help of regression analysis. Three criterions may be adopted for best k subsets as:  $R_p^2$  criterion,  $R_{adj}^2$  criterion and Mallows  $C_p$  criterion and computed as:  $R_p^2 = 1 - SSE_p / SST_o$ ,  $R_{adj}^2 = 1 - (n-1)MSE / SST_o$  and  $C_p = SSE_p / \{S^2 - (n-2p)\}$ . The PRESS selection procedure was proposed by Allen (1974) in the ‘‘Prediction Sum of Squares’’ as a Criterion for selecting predictor variables and defined as:  $PRESS_p = \sum [e_i / (1-h_{ii})]^2$  and the models which have the small  $PRESS_p$  values are considered good candidate models. In AIC and SBC we search for models that have small values of  $AIC_p$  or  $SBC_p$ . These criterions may be defined as:  $AIC_p = n \ln SSE_p - n \ln n + 2p$  and  $SBC_p = n \ln SSE_p - n \ln n + p(\ln n)$ .

After identifying the best prediction model by adopting the above criterions, the stability of different best regression models with respect to the future prediction can be tested by considering following points:

- Take some portion of the data set and fit model. For comparison purpose consider the remaining data set as future data.
- Present the prediction of complete data set with the help of prediction model, based on some portion of the data set.
- With the original response variable values, compare the fitted values of remaining data.

Stability can be check by adopting the graphical device. In this way we plot the original complete data set and predicted values by model based on some portion of data set.

To determine the pattern of causal interaction of wheat plant model path analysis can be used. It is an exploratory technique that can determine the consequences of particular models. Rodriguez et.al. (2001) argues that *path coefficient analyses have been used to evaluate selection criteria in several crops. This technique is useful in determining the direct influence of one variable on another, and also separates the correlation coefficient into its components of direct and indirect effects.* Path coefficient can be defined as the ratio of the standard deviation of the effect and may define as:

$$C = B^{-1} \times A$$

where

‘A’ represents the column vector of correlation between effect (Y) and each cause (X’s)

‘B’ represents the square matrix of pair wise correlation between causes (X’s) and

‘C’ represents the column vector of path coefficients.

If different causal effects (paths) are of opposite sign, then strong causal interconnection is consistent with overall correlations of small magnitude.

## RESULTS AND DISCUSSION

In wheat plant data, grain yield (Y) as response variable and remaining variables  $X_1, \dots, X_{10}$  used as predictor variables. Regression analysis is performed to estimate fitted values of wheat grain yield (Y), simple residuals ( $e_i$ ) and studentized residuals ( $r_i$ ).

The result of regression equation is:

$$Y = 599 + 0.348 X_1 + 0.56 X_2 - 0.295 X_3 - 4.17 X_4 - 2.08 X_5 \\ + 2.28 X_6 + 0.666 X_7 - 2.26 X_8 + 0.267 X_9 - 1.21 X_{10}$$

$$U_i \sim \text{NID}(0, \sigma^2 I)$$

In the equation: days to heading, days to maturity, 200-grain weight, grain/spike and biological yield have positive impact on the grain yield of wheat. Plant height, harvesting date, grain/spike and biological yield found significant at 10% level of probability. Value of adjusted  $R^2$  indicates that 78.1% of change in grain yield is due to these variables and remaining 21.9% is due to other traits either whose individual impact on yield is not significant or highly correlated with the variables already included in the equation.

For residual analysis, we form the matrix X by using the fix traits of wheat data and calculate the leverage value, Mahalanobis distance, Studentized deleted residuals, Cook’s distance and DFFITS values. According to the leverage value and Mahalanobis distance we conclude that the wheat genotypes 16017, 17174, 17177, 17200, 17201 and 17207 have the outlying fixed traits. As the Studentized deleted residuals criterion suggests the wheat genotypes 16021, 16880, 17050, 17051, 17236, 17139, 17144, 17145, 17146, 17151, 17156, 17192 and 17193” are as outlying w.r.t response variable Y. Here it is clear from the analysis that none of them is the influential observation according to Cooks distance criterion so we may conclude that their influence is not too strong to call from remedial measures.

We use the subset regression criteria (automatic selection criterion)  $\text{PRESS}_p$  statistic,  $\text{AIC}_p$  and  $\text{SBC}_p$  (basic criterion of model selection) for predicting wheat grain yield. In best subset regression adopted criteria for determining best  $k=5$  are: Maximum  $R^2_p$  criterion, Maximum  $R^2_{\text{adj}}$  criterion and Mallows’  $C_p$  criterion. It has been observed that the value of  $\max R^2_p$  vary from 54.4% to 80.2% for “best  $k=5$ ” subset regression with one to all ten predictors. This value of  $\max R^2_p$  can be considered as stable at 79.7% when 6 predictors are included in regression model. Hence, consideration of the subsets: days to maturity ( $X_2$ ), plant height ( $X_3$ ), harvesting date ( $X_4$ ), spike lets/spike ( $X_5$ ), grain/spike ( $X_7$ ) and biological yield ( $X_9$ ) with  $R^2_p = 79.7\%$  are reasonably good. Whereas the value of  $\max R^2_{\text{adj}}$  vary from 53.9% to 78.1% for best  $k=5$  subset regression with one to all ten

predictors. Max  $R^2_{adj}$  can be considered as stable at 78.4% when 6 predictors are included in the regression model. So, consideration of the subset predictors as days to maturity ( $X_2$ ), plant height ( $X_3$ ), harvesting date ( $X_4$ ), spike lets/spike ( $X_5$ ), grain/spike ( $X_7$ ) and biological yield ( $X_9$ ) with  $R^2_{adj} = 78.7\%$  are reasonably good for best prediction of wheat yield model. It is to be noted that the conclusion is same as  $R^2_p$  criterion. On the basis of  $C_p$  Criterion, we observe that the model with days to maturity ( $X_2$ ), plant height ( $X_3$ ), harvesting date ( $X_4$ ), spike lets/spike ( $X_5$ ), grain/spike ( $X_7$ ) and biological yield ( $X_9$ ) is considered to be best for predicting Grain Yield, and estimated results are as follows:

$$Y = 576 + 1.17 X_2 - 0.300 X_3 - 4.33 X_4 - 2.37 X_5 + 0.620 X_7 + 0.267 X_9$$

The above model provides the smallest  $C_p$  value with no indication of any bias in the regression model. Thus we conclude that the best prediction model using subset regression with Maximum  $R^2_p$  criterion, Maximum  $R^2_{adj}$  criterion and Mallows'  $C_p$  criterion is same, with  $R^2_p = 79.7\%$ ,  $R^2_{adj} = 78.4\%$  and  $C_p = 5.4$ .

To improve the model, an attempt has been made, we apply the  $PRESS_p$  statistic,  $AIC_p$  and  $SBC_p$  on the same set of predictors which selected by the subset regression procedure. Here the smallest  $PRESS_p = 47862.5$  with  $p = 6$  and  $AIC$  (8.995273) having minimum value when  $p=6$ . Here note that the  $SBC$  have minimum value (9.138247) when  $p=3$  but there is only small difference when  $p=6$  i.e. (9.175418). Hence this small difference can be negligible and one can choose the same model for prediction of grain yield of wheat model. All the criteria discussed above select the same prediction model of grain yield with predictors as days to maturity ( $X_2$ ), plant height ( $X_3$ ), harvesting date ( $X_4$ ), spike lets/spike ( $X_5$ ), grain/spike ( $X_7$ ) and biological yield ( $X_9$ ).

From the above prediction models, it is clear that plant height ( $X_3$ ), harvesting date ( $X_4$ ) and spike lets/spike ( $X_5$ ), the Wheat grain Yield on the average decrease. Hence we can conclude the physical characters like plant height ( $X_3$ ), harvesting date ( $X_4$ ) and spike lets/spike ( $X_5$ ) contributes negatively to Wheat grain yield. On the other hand, Wheat grain yield increases as the yield characters like days to maturity ( $X_2$ ), grain/spike ( $X_7$ ) and biological yield ( $X_9$ ) increases. The effect of days to maturity ( $X_2$ ) is positive and maximum i.e. 1.17 on Wheat grain yield. So our study recommends that any Wheat genotype/variety having maximum days to maturity ( $X_2$ ) can be suitable for better yield.

To test the stability of the selected regression models with respect to future prediction for predicting wheat yield, we divide the data set into two portions: one consisting of 90 observations and other with remaining 12 observations. The Appendix Table 1 reports Predicted wheat yield based on complete data set & first portion data model for subset regression prediction method and it is quite clear from the table that the predicted wheat yield by using subset regression with complete data model and first portion data model is much stable for future prediction. Here it is to be noted that this conclusion of appropriateness agrees with the previously conclusion made of subset regression model for the whole Wheat data set of 102 genotypes. Note that (in figure as given in Appendix) prediction is not seriously effected against any point since we have already declared in residual analysis that no observation from 91-102 is in the region of outlying observation with respect to the grain yield. So we conclude the fitted model can be considered as stable model.



Path analysis is performed on wheat data set with grain yield as response variable and direct and indirect effects are computed. From the results it is clear that the direct effect of days to heading on grain yield is positive and its value is 0.077094, the path coefficient value of days to headings is found to be the result of a strong indirect effect via harvesting date (-0.16484) follows by days to maturity (0.047158). The direct effect of days to maturity on grain yield is 0.060249, which is very small and positive, the path coefficient value of days to maturity is found to be the result of a strong indirect effect days to maturity via harvesting date (-0.27523) follows by days to heading (0.060343). The direct effect of plant height on grain yield is very small and positive and its value is 0.006378, the high path coefficient value of plant height is found to be the result of a strong indirect effect of plant height via biological yield (0.215513) follows by days to maturity (-0.13054). The direct effect of harvesting date on grain yield is positive and its value is 0.032545, the path coefficient value of harvesting date is found to be the result of a strong indirect effect via plant height (-0.39047) follows by grain per spike (0.05849). The direct effect of spike lets per spike on grain yield is 0.015302, which is small and positive, the path coefficient value of spike lets per spike is found to be the result of a strong indirect effect spike lets per spike via plant height (-0.10999) follows by harvesting date (-0.10786). The direct effect of 200 grain weight on grain yield is negative and its value is -0.02538, the path coefficient value of 200 grain weight is found to be the result of a strong indirect effect via biological yield (0.153258) follows by spike lets per spike (0.055985). The direct effect of grain per spike on grain yield is negative and low and its value is -0.00999, the path coefficient value of grain per spike is found to be the result of a strong indirect effect grain per spike via 200 grain weight (0.197286) follows by plant height (0.115755). The direct effect of grain per spike lets on grain yield is negative and its value is -0.02142, the path coefficient value of grain per spike lets is found to be the result of a strong indirect effect grain per spike lets via plant height (0.184552) follows by 200 grain weight (0.157945). The direct effect of biological yield on grain yield is negative and low and its value is -0.00165, the path coefficient value of biological yield is found to be the result of a strong indirect effect biological yield via plant height (-0.07206) follows by 200 grain weight (0.03116). The direct effect of spike length on grain yield is small and positive and its value is 0.001848, the path coefficient value of spike length is found to be the result of a strong indirect effect via grain per spike (0.180431) follows by plant height (-0.10561).

The use of the path analysis suggests that in this study, the wheat grain yield per plant characters, the direct and indirect effects of days to heading, days to maturity, plant height, harvesting date, spike lets per spike and spike length on wheat grain yield are positive, but the days to heading and days to maturity are of greater importance than the others. The consideration of these characters can contribute to the success in the wheat grain yield studies in the Arid Areas. On the other hand, 200 grain weight, grain per spike, grain per spikelets, and biological yield has negative effect on Wheat grain yield. It recommends that increase in 200- grain weight, wheat grain yield decreases.

### CONCLUSION

The recommendation made in this study will be helpful for wheat plant breeders for the selection of wheat plant traits that contributes more towards wheat grain yield and to

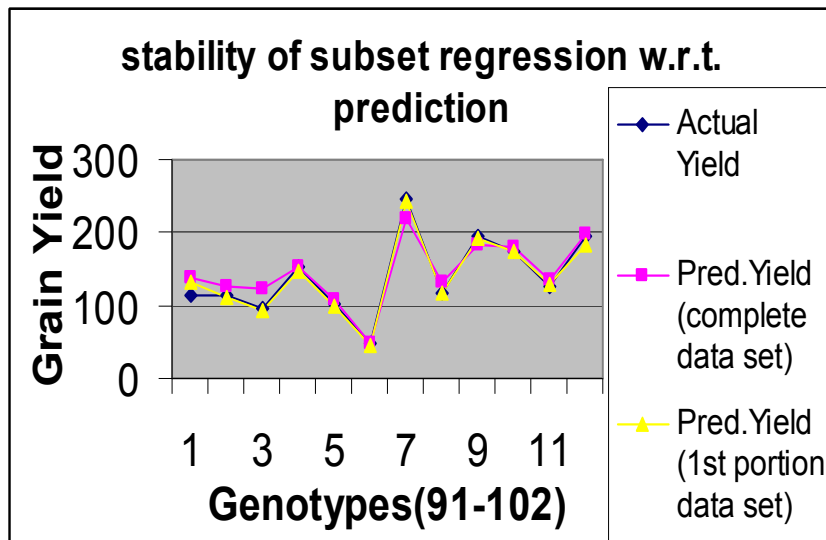
select best and stable (with respect to future prediction) prediction model for predicting wheat grain yield on the basis of different physical and yield related wheat plant traits. This research work will also facilitate the Wheat breeders to evaluate the environmental adoptability for wheat characteristic.

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**Table 1:**  
**Predicted Wheat Yield based on Complete Data Set and**  
**1<sup>st</sup> Portion Data Model for Subset Regression Prediction Method**

Obs #	Actual Yield	Pred. Yield (complete data set)	Pred. Yield (1 <sup>st</sup> portion data set)
91	115.33	137.483	132.096
92	113.63	125.496	111.758
93	97.28	121.601	93.109
94	152.50	151.943	146.775
95	101.50	107.106	99.440
96	47.24	49.333	44.545
97	244.81	217.745	241.704
98	117.01	131.548	118.052
99	193.93	181.770	191.685
100	175.41	180.374	173.151
101	125.61	135.037	129.323
102	195.35	196.770	197.961



**Fig.1: Plot of Stability of Subset Regression Model of Wheat Plant Model**

**FACTORS AFFECTING PREVALENCE OF DEPRESSION AMONG  
UNIVERSITY STUDENTS: A CROSS SECTIONAL STUDY**

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**ABSTRACT**

Depression is one of the major physical and mental health problems of today, which can affect the mental abilities of all age groups. Young adults at University level are also facing this problem because of the increasing Competition in Education Sector, which results in pessimistic attitude towards future and affects their output in form of bad results or low Grades in Studies. It may be due to a sense of Competition, Lack of Self Confidence, Financial Problems, Rules and Regulations or Lack of Facilities at University, Semester System, Health and Nutrition problems, Political Crisis, Course Load, University Life Style, Insecurity for jobs, Favorism, Lack of Assertiveness, role of media etc. The study was a cross-sectional descriptive and analytical survey carried out at Lahore College for Women University to identify those significant factors cause of depression among university students. A questionnaire had been designed to observe difference of rating the significant factors of causing depression among newly comer students and the senior students. The data had been collected from the B.S (Hons) Students of four years of all disciplines.

Factor analysis is considered to be appropriate method to analyze the data. The sample is taken of 367 students from the University. After applying the factor analysis on the data by using SPSS, among 5 suggested factors and by analyzing the components of these factors three major effective factors psychological, environmental and education system are found that provoke depression among BA/BS (Hons) of 1<sup>st</sup> & 2<sup>nd</sup> year students.

**KEYWORDS**

Depression; cross-sectional study; factors, descriptive-analytic; factor analysis.

**INTRODUCTION**

Depression is one of the Prevailing health problems of today. Over a lifetime a person may have a 20 percent, or one in five, chance of having an episode of depression. Depression is a psychological condition that changes how person think and feel, and also affects his social behavior and sense of physical well-being. It is also called clinical depression, major depression or major depression disorder. There are commonly ten types of depression disorders which are major depression, dysthymia, manic depressive illness, cyclothymia, post-partum depression, seasonal affective disorder (SAD), and

existential depression, mood disorders due to a medical condition, medication-induced depression, and substance-induced mood disorder.

Depression is a huge problem in the college student population nowadays. Some universities are seeing mental health care as less of a priority, greater fees and cuts to student grants and funding are piling on the pressure. University is an important place for social and emotional development; however, it can also be a source of negative life events. Depression is most common in the university population because university brings new stresses, including increased academic demands, challenges of living independently for the first time, uncertainty about career and future success, financial responsibilities, changes in social identity, and different types of peer pressure. A recent survey by the Mental Health Foundation showed that 50% of university students showed signs of clinical anxiety and more than one in 10 suffered from clinical depression.

There are many studies conducted on the topic of depression among the students of medical universities but not so much work has been done on depression among the students of other usual universities in Pakistan. However, people have limited knowledge of mental illnesses. There is limited information available on knowledge people have and attitudes they hold towards depression and other mental illnesses.

We conducted this cross-sectional study to find out the major causes/factors of depression among the students. The study had been carried out to Lahore College for Women University, to compare the results in terms of major factors behind depression among the new comer and senior students.

### REVIEW OF LITERATURE

Hysenbegasi et al. (2005) examined the impact of depression on the academic productivity of university students. It was observed that depression was associated with a 0.49 point, decrease in student GPA.

George et al. (2006) conducted a study to investigate the unique relationships. From the results, it was observed that depression and symptoms of depression were uniquely associated with specific family environments.

Mccarty et al. (2006) investigated the factors of high prevalence of depression among youth. As compared to girls, stressful life events were more strongly associated with symptoms of depression among boys.

Vazquez and Blanco (2006) examined Symptoms of depression and related factors among Spanish university students. Results indicated that 18% of students experienced the symptoms of hopelessness, 13.9% were exhausted, 13% were inadequate and 12.4% were having the disturbance of sleep.

Dixon et al. (2008) has investigated the study of depression and college stress among university Undergraduates. It was observed that women showing greater depression, college stress, self-esteem reported for 13.8% and 39.4% of the variance in stress and depression, respectively. The full model reported for 49.1% of the variance

## METHODS

**Objectives:** The objective of this study was to identify the significant factors that may be the main causes of depression among university students and also to observe that either there is a difference of rating the significant factors of causing depression among newly comer students and the senior students.

**Study design:** The study was a cross-sectional descriptive and analytical survey based on the random sample of 367 students, carried out at Lahore College for Women University to identify the significant factors behind depression among university students. Data from students had been collected by using the questionnaire which includes some general questions about stress level, and the source of stress causing depression among newly comer students and the senior students.

**Factor Analysis:** Factor analysis was applied to analyze the data. Factor analysis is a statistical approach that can be used to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). Data entry and analysis is carried out through SPSS (Statistical Package for Social Sciences)

## ANALYTICAL RESULTS

### ➤ B.A/B.S (Hons.) (I) & (II)

The following results are found for B.A/B.S (Hons.) of 1<sup>st</sup> & 2<sup>nd</sup> year level. It was observed that uncertainty about future is the most important variable that influences student's depression. It has the highest average of 3.10 of the variable uncertainty (Q29) while the minimum average is 1.66 of the variable family relationship (Q4).

**Total Varaince Explained:** The number of factors extracted can be determined so that the cumulative percentage of variance extracted by the factors reaches a satisfactory level. In the table 2, the five factors account for 26.39%, 14.37%, 13.96%, 10.38% and 10.32% of the total variance, respectively. Almost 75% of the total variance is attributed towards these 5 factors. The remaining 25 factors together account for 25% of the variance, approximately. Thus the model with five factors is considered to be adequate to represent the data.

To identify what these five factors represent, we checked that what variables are loaded on each of the five factors. The clustering of the variables in each factor and their wording offer the best clue as to the meaning of the factor.

It can be observed from the rotated component matrix (table 3) that nine variables loaded on factor 1. **Factor 1** includes the variables such as self confidence, competition, pressure and demands, rules and regulations, insecurity, favoritism, religion, negative outlook and perfectionism. An inspection of these variables in factor1 clearly shows that the majority of these variables reflect a psychological effect as a cause of depression among student.

**Factor 2** contains five variables such as university life style, dissatisfaction from teachers, lack of facilities, political crisis and media. So, this factor under these five variables shows the environmental cause of depression.

**Factor 3** also contains five variables such as inadequate curriculum, semester system, lack of assertiveness, uncertainty and academic demands which comes under the education system as a cause of depression.

➤ **B.A/B.S (Hons.) (III) & (IV)**

The following results are found for B.A/B.S (Hons.) of 3rd & 4th year.

The variable perfectionism is the most important variable that influences student's depression. It has the highest average of 3.60 of the variable perfectionism (Q25) while the minimum average is 1.63 of the variable family relationship (Q4).

**Total Variance Explained:** From the table 4, the five factors account for 22.31%, 16.88%, 12.79%, 10.41% and 8.81% of the total variance respectively. Approximately 71% of the total variance is attributed towards these 5 factors and the remaining 25 factors together account for 29% of the variance, approximately. So, the model is considered to be appropriate with 5 factors.

Table 5 of rotated component matrix shows that nine variables loaded on factor 1. **Factor 1** contains nine variables such as self confidence, competition, pressure and demands, rules and regulations, insecurity, favoritism, religion, negative outlook and perfectionism. An inspection of these variables in factor1 clearly shows that the majority of these variables reflect a psychological effect as a cause of depression among student.

Seven variables loaded on **factor 2** such as course load, health and nutrition, hormonal changes, self criticism, low self esteem, exams pressure and pessimistic attitude. So, factor 2 reflects physical cause of depression among students. **Factor 3** contains five variables such as university life style, dissatisfaction from teachers, lack of facilities, political crisis and media. So, this factor under these five variables shows the environmental cause of depression.

### CONCLUSION

From the results we can conclude that collectively, three major effective factors psychological, environmental and education system are found that provoke depression among BA/BS (Hons) of 1<sup>st</sup> & 2<sup>nd</sup> year students. Similarly for BA/BS (Hons) of 3<sup>rd</sup> & 4<sup>th</sup> level, Psychological, physical and environmental are found as main factors behind depression. So it is concluded that both the groups consider the psychological and environmental factors as a major cause in the prevalence of depression, whereas the new comers also take education system as a source of depression. Therefore by providing an easy atmosphere among family members and also in the university can be helpful to decrease depression. A variety of psychological factors appear to play a role in vulnerability to these severe forms of depression. Most likely, psychological factors are completely responsible for other forms of mild and moderate depression, especially reactive depression.

This study is done on small scale due to the lack of recourses and time constrain. This study is just based upon the data collected from Lahore College for Women University. But it should be done on a very large scale so that more precise results are obtained. Although the rate of depression is not so high in the universities of Pakistan but still it is not ignorable. So, there is a need of further study.

**Table 1: Sample Selection of both levels**

S. No.	Level/Class	Sample
1	B.A/B.S (I) & (II)	210
2	B.A/B.S (III) & (IV)	157
<b>Total</b>		<b>367</b>

**Table 2: Total Variance Explained for B.A/B.S (I) & (II)**

Component	Extraction Sum of Squared Loading		
	Total	% of variance	Cumulative %
1	7.916	26.387	26.387
2	4.311	14.369	40.756
3	4.189	13.962	54.718
4	3.113	10.376	65.094
5	3.095	10.318	75.412

**Table 3: Rotated Component Matrix for B.A/B.S (I) & (II)**

	Component				
	1	2	3	4	5
Self Confidence	<b>.888</b>	.011	.010	-.052	.097
Competition	<b>.894</b>	.021	.043	-.056	.053
Financial Problems	.129	.018	.017	-.025	<b>.903</b>
Family Relationship	.123	.022	.026	.027	<b>.939</b>
Pressure and Demands	<b>.889</b>	.058	.008	-.016	.129
University Life Style	.030	<b>.918</b>	.056	-.023	.044
Self Identity	.145	.020	.037	.004	<b>.901</b>
Peer Pressure	.111	.037	.019	-.011	<b>.908</b>
Dissatisfaction from Teachers	.071	<b>.915</b>	.010	-.002	.022
Rules and Regulations	<b>.916</b>	.032	.012	-.041	.041
Inadequate Curriculum	-.062	.083	<b>-.847</b>	-.017	-.041
Insecurity	<b>.892</b>	.077	.005	-.067	.091
Lack of Facilities	.072	<b>.931</b>	-.077	.020	.009
Semester System	-.014	.060	<b>-.864</b>	-.054	-.042
Favorism	<b>.912</b>	.061	.035	-.075	.082
Course Load	.092	-.095	-.001	<b>-.699</b>	.120
Religion	<b>.899</b>	.046	.031	-.063	.107
Health and Nutrition	.128	-.041	-.056	<b>-.763</b>	-.039
Hormonal Changes	.139	.087	-.013	<b>-.728</b>	.036
Political Crisis	.133	<b>.904</b>	-.021	.021	-.007
Media	.024	<b>.921</b>	-.034	.013	.034
Negative Outlook	<b>.895</b>	.059	-.015	-.106	.061
Self Criticism	.029	-.112	.068	<b>.715</b>	-.062
Low Self Esteem	.034	.083	.082	<b>.785</b>	.043
Perfectionism	<b>-.871</b>	-.062	.057	.037	-.039
Exams Pressure	-.046	-.017	.049	<b>.642</b>	.072
Pessimistic Attitude	-.036	.027	.065	<b>.705</b>	.038
Lack of Assertiveness	-.051	.052	<b>.873</b>	.077	-.013
Uncertainty	.028	.008	<b>.862</b>	.161	.011
Academic demand	-.001	.025	<b>.901</b>	.042	.018



**Table 4: Total Variance Explained for B.A/B.S (III) & (IV)**

Component	Extraction Sum of Squared Loading		
	Total	% of variance	Cumulative %
1	6.692	22.306	22.306
2	5.062	16.875	39.180
3	3.837	12.788	51.969
4	3.124	10.413	62.381
5	2.643	8.809	71.190

**Table5: Rotated Component Matrix for B.A/B.S (III) & (IV)**

	Component				
	1	2	3	4	5
Self Confidence	<b>.820</b>	.027	-.025	.000	.115
Competition	<b>.732</b>	.079	.036	.080	.099
Financial Problems	.156	.022	-.042	-.032	<b>.878</b>
Family Relationship	.086	.149	.019	.047	<b>.905</b>
Pressure and Demands	<b>.721</b>	.024	.056	.123	.087
University Life Style	.105	.108	<b>.879</b>	.017	.020
Self Identity	.084	.156	.143	-.017	<b>.845</b>
Peer Pressure	.185	-.002	.229	.019	<b>.827</b>
Dissatisfaction from Teachers	.084	.061	<b>.875</b>	.040	.072
Rules and Regulations	<b>.795</b>	.031	.052	-.061	-.035
Inadequate Curriculum	.026	.124	-.039	<b>-.868</b>	-.017
Insecurity	<b>.800</b>	.069	.056	.026	.091
Lack of Facilities	.059	.068	<b>.910</b>	-.006	.109
Semester System	-.023	.107	-.038	<b>-.878</b>	-.029
Favorism	<b>.832</b>	.031	.086	.045	.084
Course Load	.048	<b>.854</b>	.041	-.118	.075
Religion	<b>.807</b>	.019	.084	.038	.040
Health and Nutrition	.079	<b>.809</b>	.115	-.017	.082
Hormonal Changes	.094	<b>.818</b>	.091	-.151	.030
Political Crisis	.019	.087	<b>.900</b>	.055	.036
Media	.120	.029	<b>.886</b>	.026	.095
Negative Outlook	<b>.731</b>	-.056	.127	-.104	.036
Self Criticism	.044	<b>-.764</b>	-.026	.112	-.100
Low Self Esteem	-.064	<b>-.753</b>	-.026	-.012	.014
Perfectionism	<b>-.691</b>	-.076	.009	-.045	-.084
Exams Pressure	.033	<b>-.838</b>	-.008	.087	-.021
Pessimistic Attitude	-.075	<b>-.832</b>	-.074	.032	-.070
Lack of Assertiveness	.096	.024	.059	<b>.858</b>	-.065
Uncertainty	.068	-.168	.011	<b>.860</b>	-.023
Academic demand	.009	-.085	-.016	<b>.867</b>	.057

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**IMPACT OF ORGANIZATIONAL CITIZENSHIP BEHAVIOR AND  
WORKPLACE DEVIANT BEHAVIOR ON TEAM EFFECTIVENESS**

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**ABSTRACT**

The influences of organizational citizenship behavior (OCB) and workplace deviant behavior (WDB) on Team Effectiveness were investigated using data from public sector of Pakistan. Data included measures of WDB and OCB obtained from staff and ratings of performance provided by supervisors. It was found that WDB was negatively and relatively less significantly related with Team Effectiveness whereas, OCB contribute to the prediction of Team Effectiveness beyond the level that was achieved by WDB. However, the existence of OCB encourages and positively contributes the business performance. It showed that the presence of deviant employees among business units impinges upon the performance of the business unit as a whole, whereas OCBs had relatively little effect.

**KEYWORDS**

Organizational Citizenship behavior (OCB); Workplace Deviant Behavior (WDB); Team Effectiveness (TE).

**INTRODUCTION**

Employees are a company's livelihood. How they behave at workplace directly impact an organization's performance. An organization with employees engaged in exhibiting negative behaviors is completely vulnerable to both internal and external challenges because its employees are not going the extra mile to increase the efficacy of the business. Such organizations ultimately underperform.

A general view about public sector of any country is that it is less efficient as compared to private sector and especially developing countries are having this acute problem. There could be many reasons behind poor performance and inefficiency of public sector of these countries. But this study is an attempt to find the relationship among organizational citizenship behavior, workplace deviant behavior and team effectiveness that may be the cause of poor performance of public sector. Despite, the widespread interest in the topic of organizational citizenship behaviors (OCB) and workplace deviant behavior (WDB), little empirical research has tested that these forms of behavior improve or reprove the effectiveness of work groups or organizations. A nearly similar kind of research has been conducted by Dunlop and Lee (2004) highlighting the effects of organizational citizenship behavior and workplace deviant behavior on business unit performance.

In public sector, employees are more likely to exhibit deviant workplace behavior (WDB) whereas less likely to execute organizational citizenship behavior (OCB). The impact of workplace deviant behavior (WDB) is worst on organizational performance. The deviance behavior equates to less work being accomplished. Productivity does not disappear; it is usually transferred to aspects not related to the organization's work. Things like personal conversations, Internet surfing or taking longer lunches cost the organization time and money. Reduced productivity can be detrimental to an organization's performance and future success. No other factor influences the work performance as badly as workplace deviant behavior does.

To measure job performance, task performance is considered most important factor, often taken as a criteria for performance measurement, while the other aspects of measuring performance are ignored i.e. WDB and OCB. These two types of work behaviors that do not directly contribute to the technical core of the job figure in determining overall job performance at the individual level (Dunlop and lee, 2004). For example, in an organization where the whole business performance is reliant on employees and if they are engaged in negative behavior, the efficiency of the business will be affected badly. Therefore, WDB in any business have its negative effects resulting in drop in efficacy of business performance. On the other hand, organizational citizenship behavior (OCB) is expected to promote work performance. Employees with OCB are more likely to exhibit devoted performance because they are committed and loyal to their organization/workplace. The presence of OCB in employees or within the organization and within the teams is very supportive for creating suitable work environment. The point to investigate is to determine the extent to which both WDB and OCB have an influence on team effectiveness and the implications that these factors may have to social surroundings of business.

### LITERATURE REVIEW

Extensive research has been conducted on identifying key variables impinging upon organizational performance while no significant evidence is found in this regard with respect to Pakistani environment especially factors affecting performance of Public Sector of Pakistan. One of the most critical problems affecting the business performance is often related to some hidden factors (mostly voluntary and non-job specific behaviors) which are included in this research to identify and verify their impact on business in terms of team effectiveness. These factors are organization citizenship behavior and workplace deviant behavior.

#### *Team effectiveness:*

Team Effectiveness can be measured with respect to effectiveness of teams' performance. According to Somech et al., (2009) team effectiveness is defined here as the extent to which group members are motivated and committed to their joint work. Researchers have tried to identify the factors that influence the performance of the teams. A research suggests that teams may have different outcomes even within the same department, often due to factors that are not controllable by the management (Pagell and LePine, 2002). Integration and collaboration among individuals also matters in determining team effectiveness. According to Baiden and Price (2010) teams with different levels of integration had the same levels of teamwork effectiveness. At the same

time, integration is not the only necessity and condition for improved teamwork within a sector but it is also desirable. Conflicts among team members also affect the efficiency and effectiveness of teams. The methods of managing team members' conflicts can influence not only their sense of efficacy in resolving conflicts but their overall team performance (Alper et al, 2000).

*Organizational Citizenship Behavior (OCB):*

Organizational Citizenship Behavior (OCB) is the behavior that employees have the liberty to decide whether they will demonstrate or not, that goes beyond job requirements and that is excluded from the official reward range (Konovsky & Pugh, 1994). But the literature on OCB shows that most accepted definition of OCB was presented by Organ (1988). It showed the individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization (Organ, 1988).

For the success of businesses, organizations need those employees who support their coworkers, build a positive work environment, and care about their organization. These voluntary or discretionary behaviors that employees execute for organization are called organizational citizenship behaviors (OCBs) (Yoon and Suh, 2003). Examples of OCB include defending the organization when other employees criticize it and assisting coworkers with their duties etc. OCB promotes the ability of attracting and using the workforce of the organization, improves the quality of service; and act as a catalyst to increases the efficiency and the performance of the organization whereas it reduces the costs (Polat, 2009).

Many researchers have tried to determine antecedents of OCB. According to a recent research, controllability attributions for OCB-eliciting demands (coworker lack of performance, organizational constraints, or supervisor expectations) can lead to WDB. On the other hand, controllability and internal attribution for one's own WDB can lead to OCB (Spector and Fox, 2010). A research conducted by Dunlop and Lee (2004) has shown that workplace deviant behavior (WDB) was negatively and significantly linked with Team Effectiveness, however, OCB has positive impact on the organizational performance but is relatively less significant in contributing to the overall efficacy of business (Dunlop and Lee, 2004).

Moreover, Culture and an individual's generalized social beliefs can help to foresee the extent to which OCB is in-role or extra-role (Kwantes et al., 2008). Another study shows that the age, position and gender of workers are also significant antecedents of organizational citizenship behavior (Wanxian and Weiwu, 2007). According to Ackfeldt and Coote (2005) job attitudes are expected to be direct predictors of OCBs while leadership support, professional development, and empowerment are conceived as indirect predictors of OCBs but they directly predicts the job attitudes.

A previous study has shown that employees' job satisfaction and trust in management are significantly related to OCB and that their active involvements in OCB have a positive effect on organizational performance (Yoon and Suh, 2003). Moreover, those employees who have strong working relationship with their supervisors are likely to exhibit more voluntary helping behavior towards coworkers and vice versa (Kim et al., 2010). OCB along with organizational structure predicts the effectiveness of departments

or teams. Structure leads to OCB, which then direct toward department effectiveness. This indicates that OCB mediate the relationship between organizational structure and effectiveness i.e. when the influence of OCB on department effectiveness is incorporated, the relationship between structure and department effectiveness becomes non-significant (DeGroot and Brownlee, 2006).

Experts have consensus on three of the core facets of OCBs i.e. helping behavior, civic virtue and sportsmanship. Helping Behavior is about to help the fellow people in performing their work and overcoming problems within the organization while Civic Virtue expresses high level of interest in and high level loyalty to the organization. Sportsmanship pertains to avoid any actions which may lead to unfavorable tension at the workplace and maintaining synergistic atmosphere, these specific OCBs are used for explaining the theoretical relationship of OCBs with Team Effectiveness (Organ, 1988; 1990; Podsakoff et al., 2000). OCBs make organizational practices more effective by acting as a bridge between organizational routines and balancing teamwork.

***H2: “Organizational Citizenship Behavior (OCB) promotes and facilitates the business unit performance”***

*Workplace deviant behavior (WDB):*

Workplace deviance behavior is a voluntary behavior that violates significant organizational norms and in so doing threatens the well being of an organization, its members, or both (Robinson & Bennett, 1995). Kaplan described that employee deviance is voluntary in that employees either lack the motivation to conform to normative expectations of the social context or become motivated to violate those expectations (Kaplan, 1975)

In recent years there has been a lot of interest among researchers to investigate the workplace deviant behavior (WDB) in organizations, such as aggression, interpersonal conflict, sabotage, and theft etc. WDB can include active acts such as aggression, yelling at employees and theft or more passive acts, such as purposely failing to follow instructions or avoiding work/doing work incorrectly; and these behaviors are detrimental to the organization and its members by directly affecting its functioning or property, or by hurting employees in a way that will reduce their effectiveness (Fox et al., 2001). Based on a previous study, various job and workplace conditions (constrictions on performance, job stressors, inequality, or disobedience of psychological contract) will elicit emotional reactions. Negative emotions can cause WDB whereas positive emotions will increase the chances of OCB (Spector and Fox, 2002). Individuals make attributions about the reasons of the behaviors whenever they are engaged in WDB or OCB. Certain types of attributions will make the individual to follow either WDB with OCB or OCB with WDB (Spector and Fox, 2010). All negative behaviors including incivility, bullying and aggressive behaviors lead towards WDB and are damaging to the effectiveness of both individuals and organizations (Burnes and Pope, 2007).

Moderate task conflict (the perception of disagreements among group members about the content of their decisions) in groups paves the way for high team performance whereas a relationship conflict lowers the team performance (Peterson and Behfar, 2003). The study of Mullen and Nadler (2008) suggests that those outcomes that violates peoples' moral standard are likely to increase the deviant behavior.

According to a study, the introduction of internet in the organizations has opened the door to deviant workplace internet behavior or cyber loafing and hence influences the effectiveness of performance. This study reveals that interactional justice (a type of organizational justice that reflects how a person is treated by an authority) acts on the cyber loafing through some degree of fear or authority of the supervisor. (Manrique de Lara, 2006). Moreover, procedural justice (how fairly organizational procedures are designed) affects WDB through its influence on perceived normative conflict with the organization. This influence results in prompting workers to counter with organizational WDB (Manrique de Lara and Verano-Tacoronte, 2007). Study of Levine (2010) suggests that emotion, power and social influence are major determinants of relatively discretionary behaviors including both WDB and OCB. Emotion and social influence, when considered at individual and organizational levels, have a reciprocal causal relationship and jointly affect organizational behavior, including organizational citizenship and workplace deviant behavior (OCB and WDB).

Another study shows that emotional exhaustion and organizational deviance behaviors have negative influence on business such as low productivity, decreased job satisfaction, lower organizational commitment, and decreased performance. The effects of participative leadership and person–job fit on organizational deviance are mediated by both emotional exhaustion and job attitudes (Mulki et al., 2006). WDBs have significant negative impact on business performance and it does not only affect the social and psychological environments within the organization but also affects the task-related performance of the business unit (Dunlop and lee, 2004).

***H1: “Presence of Workplace Deviant Behavior (WDB) negatively affects the business unit performance”***

## METHODOLOGY

### **Participants/Subjects**

Organizations in commission in the twin cities (Rawalpindi & Islamabad) of Pakistan were treated as the population of this study. An effort was made to collect responses from the public sector only for that reason, Capital Development Authority, Federal Board of Intermediate & Secondary Education, Pakistan television, State Bank, NADRA, and Ministry of Working Labor etc were approached for data collection. Incumbents working at the top middle and lower level of management were targeted as they are in better position to impart about the Workplace deviant behavior (WDB), organizational citizenship behavior (OCB) and their effects on business unit performance.

### **Procedure**

It was also decided to collect at least 25 questionnaires from each of the organization for equal representation therefore, a total of 50 questionnaires were floated in each organization through self-administered approach. All participants were guaranteed through written information included with the questionnaires that responses would be used for research purposes only and were all anonymous and confidential. Data collected was subsequently analyzed through SPSS 15.0.

## Measures

### Workplace deviant behavior (WDB):

Aquino *et al.*, (1999) Workplace Deviant Behavior scale was used to measure WDB. The original scale included 15 items; however, in this study 9 items are used, as they were deemed more appropriate for the sample being studied. The questionnaire was based on a 5 point likert scale ranging from space 1. Strongly disagree to 5. Strongly agree. The questions were direct and positively stated e.g. my subordinates/colleagues intentionally arrive late for work, my subordinates/ colleagues take undeserved breaks to avoid work etc.

### Organizational citizenship Behavior (OCB):

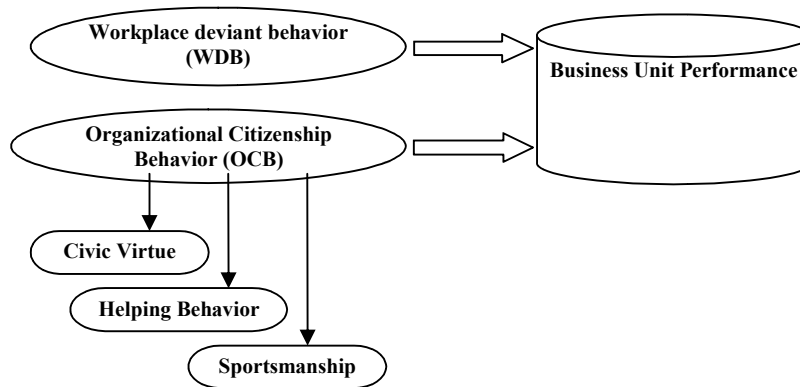
A scale adapted by McCook (2002) was used to measure Organizational Citizenship Behavior. This scale originally measures five dimensions of Organizational Citizenship Behavior, however, three core Organizational Citizenship Behavior dimensions i.e. Civic Virtue, Helping Behavior, Sportsmanship were investigated based on a five point likert scale ranging from 1. Strongly Disagree to 5. Strongly Agree. All the items for civic virtue, helping behavior and sportsman ship are included as in the original scale.

### Team Effectiveness

The Team Effectiveness was measured with 6 items out of 18 were taken from the study of Alper *et al.*, (2000) and the participants responded to each item on a five-point likert scale ranging from 1. Strongly Disagree to 5. Strongly Agree. All the sections contained brief background information about the purpose of the study and measures for confidentiality. Reliability values for Cronbach's Alpha Coefficient are given in the following table:

Reliability Statistics		
Constructs	Cronbach's Alpha	N of Items
Work Deviant Behavior	0.87	9
Organizational Leadership Behavior	0.81	10
Team Effectiveness	0.84	6

## THEORETICAL FRAMEWORK





## DATA ANALYSIS

Data analysis was done to determine how the units covered in the research respond to the items under investigation. Descriptive statistics, Pearson product moment correlation and multiple regression methods were utilized to analyze the collected data. Figures obtained from MS-Excel statistical part was interpreted to come at the conclusion and implication.

### Descriptive statistics:

Descriptive statistics were used to examine Mean, Mode, Median, Standard Deviation and other information. Since all the items were measured using five point likert scale starting from “strongly disagree” to “strongly agree”, therefore, mean values are greater than 3.00 for all three variables showing positive trend. Following table shows the data about central tendency and criterion variables.

### DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
Team Effectiveness	201	1.17	5.00	3.3265	.94960
Work Deviant Behavior	201	.89	4.67	3.2896	.77469
Organizational Citizenship Behavior	201	.00	4.70	3.2721	.64235
Valid N (listwise)	201				

Standard deviation varies from 0.64 to 0.95 for different variables which reflects the average distance from the mean. As standard deviation is less than 1 it shows that most of the observations assemble around the mean for all variables.

### CORRELATION ANALYSIS

Correlation Analysis was employed to know the relationship between variables and the extent of alliance between variables. Results of correlation analysis show that workplace deviant behavior is significantly correlated with team effectiveness (business unit performance). Correlation value of workplace deviant behavior (WDB) is -0.20 that means WDB is negatively and slightly less significantly associated with ‘team effectiveness’.

### CORRELATIONS

	Team Effectiveness	Work Deviant Behavior	Organizational Citizenship Behavior
Team Effectiveness	1	-.204(**)	.242(**)
Work Deviant Behavior	-.204(**)	1	.319(**)
Organizational Citizenship Behavior	.242(**)	.319(**)	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

Correlation value between organizational citizenship behavior (OCB) is 0.24 which means that OCB is positively associated with team effectiveness but is less significant.

The results of correlation analysis have supported the hypothesis H1 and H2 i.e. there is a positive relationship between OCB and team effectiveness whereas WDB affects the team effectiveness negatively.

### REGRESSION ANALYSIS

Regression Analysis was applied to know the interdependence of two variables. Results show that total 13.76% of the variation in team effectiveness (business unit performance) is explained by these two variables. The values of coefficient of determinations are found as -0.3831 and 0.5054 for WDB and OCB respectively showing their individual impact on team effectiveness.

#### MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.383(a)	.147	.138	.88161

a Predictors: (Constant), Organizational Citizenship Behavior, Work Deviant Behavior

#### Coefficients(a)

Model	Unstandardized Coefficients		Standardized Coefficients	t		Sig.
	B	Std. Error	Beta	B	Std. Error	
(Constant)	2.933	.367		7.999		.000
Work Deviant Behavior	-.384	.085	-.313	-4.517		.000
Organizational Citizenship Behavior	.506	.102	.342	4.941		.000

a Dependent Variable: Team Effectiveness

The value of *t-stat* for WDB is -4.51 and for OCB is 4.9327 which shows significant relatedness of the variables to the team effectiveness. Although both of these independent variables contribute less in team effectiveness but their impact is highly significant. Moreover, the *P-value* for both the independent variables is 0.00 showing that there are no chances of error.

In nutshell, regression analysis shows that 13.76% of team effectiveness depends upon the workplace deviant behavior and organizational citizenship behavior while the rest 86.24% dependence is unexplained or explained by other variables that are not taken in this research study. By analyzing the data regression equation is formed as  $Y = 2.9333 + (-0.3831X) + 0.5054X$  which can be used to predict criterion variable.

### DISCUSSIONS AND FINDINGS

This study discussed Team Effectiveness with reference to organizational behavior. To convert an organization as a high performing workplace, organizations should develop strong organizational citizenship behavior and try to eradicate workplace deviant behavior from employees. Relationship between independent variables and dependent

variables is found significant. The results of the investigation have supported the hypothesis i.e. H1 and H2. Presence of deviant behavior among employees will affect the business negatively whereas organizational citizenship behavior promotes and facilitates the business performance.

Descriptive results showed the positive trend of organizational citizenship behavior and negative trend of workplace deviant behavior with team effectiveness. It was found that OCB did not significantly contribute to the prediction of unit performance beyond the level that is achieved by WDB. In public sector performance of organizations increase as the employees show their gratitude, helping behavior toward their co workers; when employees expresses high level of interest and high level loyalty to the organization; and avoid any action which may lead to unfavorable tension at the workplace sportsmanship, this will lead to high team effectiveness. The productivity of business also increase when there is less deviance from work.

A positive relationship between organizational citizenship behavior and Team Effectiveness reveals that when employees show humble and polite attitude toward co workers and the supervisors and other employees are helping their colleagues then the business productivity enhances and it performs at its best possible level. The employees those attend functions and meetings regarding company image and those who does not found fault in organization are more committed and loyal to the business, their contribution lead to the higher business unit performance.

Although both the independent variables contribute little to the organizational performance but they have significant impact on it. It expresses that generally for each business and especially those that lie in public sector, if employees show less deviance form their responsibilities; and co workers including supervisor and colleagues are helping and committed to the organization then it all contribute in enhancing business performance.

According to correlation and regression analysis, WDB appeared to play a relatively less important role than OCB in determining supervisor ratings of business unit staff performance. Relatively less correlation is observed between workplace deviant behavior and Team Effectiveness suggesting that when employees are disloyal toward organizational goals and are committing deviance in performing their duties it leads to inefficient and ineffective business performance but to some extent only. Even small acts of deviant can affect the business performance negatively e.g. if employees intentionally arrive late for work or leave the work earlier without permission and spend the working hours engaged in unimportant activities, it will impinge upon the team performance which in turn deteriorate the business performance.

### **LIMITATIONS**

The limitations to this research paper are like;

- Firstly the sampling frame was limited to public sector of twin cities (Islamabad& Rawalpindi) therefore the result cannot be generalized to the entire public sector.
- Secondly convenience sampling method was used that's why equal representation of every organization was not possible.

- Third limitation is that only Questionnaire method was used to get results; if focus group Discussion, interviews and panel discussion was used the results may be more perfect and accurate.
- Another limitation is that the focus of the research is just on public sector, the results among private sector may totally differ because working conditions and environment in private sector is not similar to public sector.
- Although workplace behavior was implied to cause team performance in the present research, it is important to note that the link between workplace behavior and unit performance may well be recursive in that poor business unit performance acts as a precipitator of WDB
- Moreover the team effectiveness may depend upon other factors as well other than those variables incorporated in this research.
- Demographics study regarding OCB and WDB can be conducted because these behaviors may differ among males and females, old and young employees etc. moreover, culture also has important role in exhibiting OCB and WDB. These behaviors may differ from culture to culture or country to country.

### RECOMMENDATIONS

Workplace deviance is a phenomenon that occurs often in several organizations. The relationships that employees have with their organization are crucial as they can play an important role in the potential development of workplace deviance. Ultimately it is the managers and the organization to uphold the norms that the organization wishes to adhere to. It is the organization responsibility to create an ethical climate. Employees that perceive being treated respectfully and valued are those individuals that are less likely to resort to workplace deviance. Employees that perceive their organization or supervisor(s) as being much more caring or supportive have shown to have a reduction of such workplace deviant behaviors. Therefore, supervisors, managers and organization should be aware of and review their own behavior and interactions with employees so as to reduce workplace deviance and to improve the team effectiveness.

OCBs are thought to have an important impact on the effectiveness and efficiency of work teams and organizations, therefore contributing to the overall productivity of the organization. Three main dimensions of OCB are mentioned in this study (1) helping behavior (2) civic virtue and (3) sportsmanship. Existence of these three behaviors promotes organizational commitment of employees towards the organization hence resulting in increased overall performance. Managers and organizations should, therefore, ensure that employees are doing a better job, making an effort above and beyond formal requirements, and filling the gap between procedures and regulations in order to promote OCB among team members. Organizations that want to achieve success need employees who will do more than their usual job and duties and provide performance beyond expectations. In order to reach that goal organization must try to fulfill employees' job satisfaction, understand their needs and motivate them and create suitable working environment by reducing workplace deviance.

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## ROLE AND FUNCTIONS OF AGRICULTURAL CENSUS ORGANIZATION

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Agriculture is the second largest sector of Pakistan's economy. It is contributing more than 21 per cent to the GDP and absorbing 45 per cent of the total labour force of the country. Nearly, 62 per cent of the country's population is residing in rural areas which is directly or indirectly linked with agricultural pursuits. Agriculture sector provides food and fiber to the populace of country and also the raw material to the industrial sector. These facts reveal the undoubted significance of agriculture for Pakistan's economy and also of the data on agriculture required for its planning, allocation of resources and execution for agricultural and rural development. The important task of data generation for structural variables of agriculture had been entrusted to Agricultural Census Organization (ACO) since 1958. This Organization was established as a result of Agricultural Census Act 1958 under the Ministry of Agriculture to provide data on various important items related to agriculture for planning and other auxiliary purposes. Since then ACO had conducted Agricultural Censuses of 1960, 1972, 1980, 1990, 2000 and 2010. In 1978, this Organization was transferred to the Statistics Division as its attached department. Since then the scope of ACO had expanded and in addition to Agricultural Censuses, this Organization had also been conducting Livestock Censuses, Agricultural Machinery Censuses and Mouza Censuses throughout the country including Gilgit-Baltistan and Azad Jammu & Kashmir.

To conduct all the censuses besides its own staff, ACO borrows Provincial Government's field staff from Revenue, Agriculture, Livestock and Education departments. Before initiating the census work the officials borrowed from other departments are trained properly in concepts and census procedures by the staff of ACO. The district administration is also associated in the field operations. The Officer In-charge of the relevant department acts as District Census Officer during field operation of the concerned census at district level.

### FUNCTIONS & RESPONSIBILITIES

Agricultural Census Organization is responsible to conduct:

- a. Decennial Censuses of Agriculture.
- b. Decennial Censuses of Livestock.
- c. Decennial Censuses of Agricultural Machinery.
- d. Quinquennial Mouza (Village) Censuses.
- e. Other ad-hoc Censuses / Surveys in the field of Agriculture.

This Organization had already conducted five Agricultural Censuses each in 1960, 1972, 1980, 1990 and 2000 while the sixth Agricultural Census 2010 is in progress. It

conducted the first Livestock Census in 1976, the second in 1986, the third in 1996 and fourth one in 2006. Milk and Meat Production Surveys were also conducted along with each of the livestock censuses. However, Commercial Poultry Survey and Milk Processing Industry Survey had been conducted for the first time in 2006. ACO had also conducted Agricultural Machinery Censuses each in 1968, 1975, 1984, 1994 and 2004. Similarly, eight Mouza Censuses had been conducted each in 1971, 1979, 1983, 1988, 1993, 1998, 2003 and 2008.

Beside these regular censuses, the organization had also conducted adhoc surveys / studies, as and when needed. A summary of such special assignments completed so far is given as under:

- i) A Special Livestock Survey of migratory herds was conducted in 1986 in Balochistan and Khyber Pakhtunkhwa provinces;
- ii) A Rural Credit Survey was conducted on behalf of State Bank of Pakistan in 1973 and repeated in 1985 under the instructions of the Economic Coordination Committee (ECC) of the Cabinet, and;
- iii) Sindh Goth (Small rural residential establishments) Survey 2000.

### **BRIEF OF MAJOR CENSUSES**

#### **1. AGRICULTURAL CENSUS**

Decennial Agricultural Censuses are carried out to study structural changes in the Agriculture sector occurring due to overall socio-economic changes and adoption of modern agricultural practices including the use of agricultural machinery. The Agricultural Census fulfills the following main objectives:

- a. To develop basic information on the structure of agriculture in the country.
- b. To provide detailed information about the agricultural resources of the country and the state of their utilization.
- c. To find out the degree of acceptability of modern farming methods in the farming community.

Agricultural Census Reports furnish information on the agricultural resources and their distribution, and also on the arrangements made for their operationing. The reports also throw light on the performance of farming units under different conditions, facilities available to them and highlight the use of modern methods for agricultural production, cultivation practices and use of improved inputs.

The Census of Agriculture thus furnishes a comprehensive statistical description of the structure of agriculture in the country. Such that it facilitates a better understanding of the prevailing conditions and emerging trends for the future by providing data in terms of agricultural farm – the unit at which all decisions on the use of available resources are taken.

The scope of each of the censuses remained confined to the study of farm area, use of agricultural machinery, livestock and farm population. The non-farm area including the undistributed government lands, earmarked government forests, area under rivers, roads, colonies and built up urban areas was excluded from its purview. The number of items included in census questionnaire, however, had increased from one census to the other.



The questionnaire designed for the 2010 census includes the following items:

- a. Number, area and tenure of farms.
- b. Land utilization by size and tenure of farms.
- c. The land sold and purchased.
- d. Sources of irrigation.
- e. Number of fruit trees of bearing and non-bearing age found in compact and separate plantation and orchard area per farm.
- f. Number of non-fruit trees on the farm.
- g. Area under “*Kharif*” and “*Rabi*” crops with crop area irrigated in each case.
- h. Use of manures, fertilizers, insecticides and herbicides on important crops with quantity of fertilizers used.
- i. Use of agricultural machines, employment of casual and permanent labour at farm.
- j. Livestock population by sex and broad age groups.
- k. Agricultural credit by different institutions.
- l. Family members and type of their residential houses.
- m. Family members with education level, type of economic activity and number of persons employed for agricultural work.
- n. Different sources of income in addition to agriculture.

#### **Sample Design of Agricultural Census**

All the agricultural censuses conducted so far were based on sample primarily because of the financial and manpower constraints as well as the difficulties and problems likely to be faced to adequately train and supervise a large field staff dispersed all over the country. The size of the sample varied from area to area depending upon agricultural / geographic / settlement conditions. Before every Agricultural Census, the sample frame i.e. mouza list was updated through Mouza Census and list of urban blocks was obtained from Federal Bureau of Statistics. The three stage sample design had been used for agricultural census as:

- **First stage:** For selection of patwar circles.
- **Second stage:** Mouzas were selected in the second stage out of sampled patwars already selected in the first stage.
- **Third stage:** Households were selected in the third stage.

The probability proportional to size (PPS) sampling technique was used for first two stages taking Geometric Mean of households and cultivated area of the sampling unit as measure of size. Simple random sample of household clusters was selected in third stage for enumeration purpose. Urban blocks are selected through systematic random sampling with random start at district level.

Salient findings of Agricultural Census 2000 are given in the tables given below:

**Table 1: Number and Area of Farms**

(In Million)		
<b>Type of Farms</b>	<b>Number of Farms</b>	<b>Farm Area(Acres)</b>
Number of Farms	6.62	50.43
Owner Farms	5.13	36.97
Owner-cum-tenant Farms	0.56	07.32
Tenant Farms	0.93	06.14

**Table 2: Land Use and Cropping Intensities**

(Per Cent)		
<b>Farms</b>	<b>Land Use Intensity</b>	<b>Cropping Intensity</b>
All Farms	85	142
Owner Farms	83	140
Owner-cum-tenant Farms	89	146
Tenant Farms	92	147

where, Land Use Intensity = Cultivated Area x 100 / Total Culturable Area and  
Cropping Intensity = Total Cropped Area x 100 / Total Cultivated Area

## 2. LIVESTOCK CENSUS

Livestock plays an important role in the economy of Pakistan. Livestock rearing is a symbol of pride for landlords and is providing livelihood to the bulk of landless population particularly in rural areas. Livestock sector contributed approximately 53.2 per cent of the agriculture value added and 11.4 per cent to the national GDP during 2009-10. The population growth, increase in per capita income and export revenue is fueling the demand of livestock and livestock products. Therefore, an independent livestock census is being conducted regularly since 1976. Agricultural Census Organization had conducted four Livestock Censuses to meet out the following objectives:

- a) To provide current estimates of the commercially important livestock and domestic poultry birds by age, breed and sex distribution.
- b) To develop information based on livestock composition.
- c) To ascertain the number of livestock units reporting animals and poultry birds.

Following is the description of various sections of questionnaire used for 2006 Livestock Census:

- a) Number of cattle and buffaloes by breed, age and sex.
- b) Use of artificial insemination.
- c) Number of sheep and goats by breed, age and sex.
- d) Number of camels, horses, mules and asses by age and sex.
- e) Domestic poultry birds including hens, cocks, chickens, ducks, drakes and ducklings.
- f) Number of animals sold, slaughtered, died, purchased and born during the census year.
- g) Number of yak (for Northern Areas only).

### Sample Design for Livestock Census

Two stage sample design had been used for Livestock Censuses. First of all the mouza list (sample frame) was updated through Mouza Census. Then the mouzas were selected with PPS technique by taking households as measure of size. After selecting the mouzas the households were selected in the second stage for enumeration purpose using systematic sampling technique with random start. Urban blocks are also selected through systematic random sampling technique.

Salient findings of Livestock Census 2006 are as under:

**Table 3: Number of Animals**

Type of Animal	(In Million)
	Number
<b>Total Cattle</b>	<b>29.56</b>
Bullocks (3 years & above)	04.15
Cows (3 years & above)	15.16
In-milk Cows	8.72
Youngstock (Below 3 years)	10.25
Male Youngstock	05.37
Female Youngstock	04.88
<b>Total Buffaloes</b>	<b>27.33</b>
Male Buffaloes (3 years & above)	00.61
Female Buffaloes (3 years & above)	15.56
In-milk Buffaloes	10.22
Youngstock (Below 3 years)	11.16
Male Youngstock	04.70
Female Youngstock	06.46
<b>Total Sheep</b>	<b>26.49</b>
<b>Total Goats</b>	<b>53.79</b>

### 3. AGRICULTURAL MACHINERY CENSUS

Use of Agricultural Machinery had gained considerable importance in Pakistan. Government had continuously adopted measures to popularize the use of agricultural machinery for agricultural production. A few assembly plants had been set up in the country for tractors and a fairly large number of manufacturing units had engaged in the production of various kinds / types of farm implements and tubewells / lift pumps, etc. Agricultural Machinery Census fulfills the following objectives:

- a) To have a count of the tractors by type of model / horse power and that of tractor drawn as well as self propelled implements along with an estimate of bulldozers and combine harvesters.
- b) To have an inventory of tubewells and surface pumps by type of power source along with other related information.
- c) To reckon the type of households owning tractors and tubewells.
- d) To study the extent of use of those machines on owner farms and the practice of renting out tractor time and tubewell water.

All government and privately owned tractors used partially or wholly for agriculture purposes and tubewells / lift pumps used for irrigation purposes were included in the scope of the census. Further details about the scope may be visualized from the questionnaires adopted which pertained to the following items:

- a. Number of tractors and tubewells with their make, model and other specifications.
- b. Number of bulldozers and combine harvesters.
- c. Number of tractor-drawn and self propelled implements.
- d. Size of farm of the tractor / tubewell owners.
- e. Area added to farming after purchase of tractor / installation of tubewell.
- f. Changes in labour / work animals after purchase of tractor.
- g. Sources of financing tractor / tubewell.
- h. Area ploughed by owned tractor and irrigated by owned tubewell.
- i. Type of operations performed by tractor and area irrigated by tubewell during census year.
- j. Total hours put in for the owners and total hours sold to others.
- k. Difficulties in purchases / operations of tractor / tubewell.

#### **Sample Design for Agricultural Machinery Census**

All the tractors and tubewells were counted on 100 per cent basis. Subsequently, a single stage systematic random sampling technique was adopted for this census. Complete list / frame of all the tractors / tubewells was prepared at mouza level in each and every district throughout the country. Then every 10<sup>th</sup> tractor / tubewell was selected systematically with random start to get detailed information from their owners.

Salient findings of Agricultural Machinery Census 2004 are given below:

<b>Type of Machinery</b>	<b>Number</b>
<b>Private Tractors</b>	<b>400,446</b>
Massey Ferguson	171,943
Ford	24,968
Fiat	164,941
IMT	2,037
Belarus	31,768
Others	6,004
<b>Private Tubewells / Lift Pumps</b>	<b>922,207</b>
Electric	88,885
Diesel	833,322

#### **4. MOUZA (VILLAGE) CENSUS**

Quinquennial mouza censuses are conducted before each Agricultural Census and every Livestock Census to update the sample frame of mouzas. The main objectives of Mouza Census are as under:

- a) Verification of mouzas / dehs / villages list (used as sampling frame for the census) in respect of their number and grouping into patwar and kanungo circles.

- b) Collection of information on various socio-economic facilities locally available at mouza level and the distance of mouzas / dehs / villages from facilities not locally available.

Since a part of the requisite data is to be extracted from Land Revenue records, these censuses were previously extended to only those parts of the country which are known as settled areas for land revenue purpose. But, since 2003, the scope of Mouza Census had been expanded to the unsettled areas of the country as well. The data on socio-economic conditions are tabulated at tehsil, district, province and country levels. The socio-economic data about mouzas / dehs / villages (rural areas) provide very useful information about the status of rural development.

Salient findings of Mouza Census 2008 are as below:

**Table 5: Mouza Census 2008 at a Glance**

<b>Salient Features</b>	<b>Number</b>
Number of Districts	131
Number of Tehsils	388
Number of Total Mouzas	52376
Rural Mouzas	45906
Urban Mouzas	1099
Partly Urban Mouzas	1576
Forest Mouzas	439
Unpopulated Mouzas	3356
Rural Populated Mouzas	47482
Electrified Mouzas	38435
Non Electrified Mouzas	9047
<b>Bricked Streets</b>	
All	2440
Mostly	10138
Partly	11060
None	23844
<b>Sources of Irrigation</b>	
Canal	21660
River	1790
Tubewell / Well	24077
Arid (Barani)	12459
Flooding / Torrent	3154

Data are also available on gender wise credit facilities by type of institution, sources of employment by gender, different types of industries in mouzas, sources of drinking water, taste of drinking water, sewerage system, availability of fuel for domestic use, mass communication facilities, community reconciliation system and social organizations lying in mouzas. Facilities like education, veterinary treatment, health facilities, market / shops, bank, fuel for vehicles, CNG / LPG, metalled road, transport, police station, post office telecommunication facilities etc., if not existed in the mouza, are available in terms of distances from mouzas.

### **DISSEMINATION OF DATA**

This Organization is working for the last fifty years in the field of census / survey relating to agriculture in Pakistan. Therefore, an ocean of data had been generated which throw light on all the features of agricultural development occurred during the last sixty years. The publications of ACO for all the censuses have been published at provincial and country levels providing data tabulations at district level in provincial and at province as well as country levels in all Pakistan reports. The data are disseminated for data users on complimentary basis in the shape of hard as well as soft copies. In addition the data are also made available to the users through website [www.statpak.gov.pk](http://www.statpak.gov.pk)

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## RURAL BASED CRIME IN KATCHA AREA IN SINDH

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Etymologically the word rural means countryside or agriculture, while the word crime has detail meaning in a sense that “Activities that breaking the law”, According to the judicial dictionary 9<sup>th</sup> edition 1984 “crime is an act of commission or omission, for which punishment can be inflicted as the result of judicial proceedings taken in the name of state. Simply it may be defined as an act or omission by law”.

As far as Sindh is concerned so it is the land of marvelous history. Sindh is synonymous with a rich cultural fabric; woven by colourful threads of different religion, culture, language and ethnic background each blending to form a perfect amalgamation. It is the land of orient mystical yet vibrant; vivid yet full of life.

Sindh is basically the land of kings, invaders, landlords and rulers, so the element of feudalism is in its roots. That is why the bounded labour, suppressed people are found in Sindh. Albeit, the rural life is colourful and natural but present and traditional circumstances made it vulnerable. The most neglected areas are katcha areas of Sindh. There is no basic infrastructure or paucity of infrastructure.

The area on the left and right bank of river Indus is the Katcha area of Sindh. The laws are mentioned in the Forest Act 1954 that explains the boundary and geography of Katcha area. According to that Act the Land of Katcha area is prohibited for living purpose or for a settlement.

### **According to the savant R.M Malver and C.H Page,**

“A society refers to larger groupings of people who shares a common act of habits, ideas, attitudes and consider themselves a social unit.”

Aforementioned definition articulates that a person is a social unit and his life style is amalgam of his surrounding, which builds his character and an actor himself that made him either a human, sufi, leader, or robber dacoit, criminal and so on. Same as the crimes which are committed in Katcha area of Sindh are different than Urban or Rural crimes. Actually crimes vary from people to people, area to area; even the crimes differ from seasons to seasons. So the particular crimes of Katcha area are as under:

- *Burning of the standing crops.*
- *Theft*
- *Water theft*
- *Livestock theft*
- *Breach in embankment during flood seasons.*

In a nut- shell above mentioned crimes not only affect on human life of rural areas but on the economy of our country on the whole.

Briefly this research paper will open the vistas for further materialization of laws for future. It will also help to analyze, evaluate the real cause of crime in Katcha area of Sindh; ad provide statistical assistance to the organizations of investigation that will divert the expertise towards more creative and result oriented measures.

### **CRIME**

According to the judicial dictionary 9<sup>th</sup> edition 1984 “crime is an act of commission or omission, for which punishment can be inflicted as the result of judicial proceedings taken in the name of state. Simply it may be defined as an act or omission by law”.

Felony and misdemeanor committed in the urban areas of Sindh showing much fluctuated intensity in respect of transmitting the same in next generation. *Katcha* areas of Sindh became vulnerable since last five years for any crime, but statistics shows various scientific methodologies applied during these crimes. An astonishing factor is the increase in both the crimes year by year, resulted the disturbance of flora and fauna and low productivity in agriculture.

When, we consider about the crime, our inclination of mind immediately responding police. The question arises why our inclination goes towards the police or why this attitude of mind developed? Certainly, this attitude is not developed for a movement because it is a continuous process of thinking, imaging, commanding and responding. We have many analogies in this regard. As, soldier to gun, teacher to student, thief to prison, Imam to mosque etc. These analogies are not wrongly placed, but in research point of view it is not appropriate or necessary. Just imagine or consider about the analogy of teacher to research and Imam to scholar. Surely the test of analogy will be changed and our inclination or attitude of mind change towards positive-ness.

The purpose of above-mentioned words is why we are thinking only deductive way. Why we are not thinking in inductive way? We always consider that police is responsible of crime. We forget that in any society there is lot of factors and actors are responsible of crime then why only police is responsible. Why the parents, institutions, politicians, religious scholars, teachers, journalists, leaders, NGOs and state are responsible?

Albeit, there is lot of internal and external forces that lead man to commit a crime such as social, psychological and biological.

Responsible citizenship is one of the main purposes of education. While a vocational education prepares man by practicing skills in science and technology. Though



<b>Comparison between Crime Reports Of Years 2006-7 With 2007-08</b>					
<b>S#</b>	<b>Crime</b>	<b>2006-07</b>	<b>2008-09</b>	<b>Increased</b>	<b>Decreased</b>
1	Murder	20,082	24,036	3954	----
2	Rape	4300	5712	1412	----
3	Kidnapping	19,909	29,602	9693	----
4	Kidnapping for Ransom	569	1058	489	
5	Car Stolen	42,056	61,108	19052	-----
6	Cattle Theft	22,421	18,100	-----	4321
<b>Total</b>		<b>109337</b>	<b>139616</b>	<b>34600</b>	<b>4321</b>

The values in Sindh is related to Indus civilization and these values are love, peace and harmony, simplicity, mutual understanding, patience, hospitality, self-sufficiency, patriotism, hard working, promise abiding, sacrifice, generosity, truthfulness, goodness, guidance, sympathy, advice, freedom, democracy, equality, innovation, worth of time, mutual sharing in politics, economics and education, respect for all the religions along with the preach of humanism Islam and Sufism.

Sindh is a major province in Pakistan comprises of five divisions namely (1) Hyderabad division, (2) Mirpurkhas division, (3) Larkana division, (4) Sukkur division and, (5) Karachi division; Sindh has important historical values since the time immemorial, it was one of the famous points among 14<sup>th</sup>, that Sindh should be separated from Bombay in 1929.

The katcha Area is a right and left bank of Indus River, these areas are prohibited for living. After the nature, to distribute and work out things so that the common man lives life in a reasonably comfortable manner by getting his share in society. There are numerous crimes in Katcha area. The people are living forestland and rank and file in their business in daily routine work. That is why law and order situation always in hurly-burly condition. The property being of special nature and magnitude requires a special workable law to make the application feasible. Such special enactment are required to make clear to the public what act may done in the forests and to prohibit in set term such acts, which strictly speaking may be considered as damaged or theft.

There is also a need of a special forest law for the protection of forest production in transit, by common law no heed is paid to such product in transit. The product has to be kept to certain routes and examined at some points. Provisions are required for the registration of the property marks of the dealer s, contractors in order to prevent the pilferage of the timber in transit.

Cattle pound is an enclosure for detention or confinement of stray cattle. Under the Cattle to Tress Pass act, cattle pound may be established at such places as the District Magistrate thinks proper.

**Acts prohibited in each such forest.**

Any person who:

- a) Makes any fresh clearing prohibited by Section 5 or
- b) Set fire to a reserved forest or, in contravention of any rules made by the Provincial Government.

In Sindh including the parts of Thatta district the left bank provision of water area like Khairpur Gambho, fed by Rohri canal and in Command of Jamro and Mitharo water channels in Mirpurkhas district, fed by Nare canal. Timely availability of seed and fertilizer is essential besides credit facility.

The Sindh government instead of machines for dewatering should provide where there is need of water mobile sprinklers. Due to shortage of water many disputes occur. It is a common crime of rural area the people steal the water for cultivated their own land.

According to Sindh Abadgar Board four cycles of water were needed for wheat cultivation and one mobile sprinkler would provide 1000 liters per acre. The Sindh Agriculture Extension Research Department is especially focusing on cultivation of wheat, Sunflower, Fodder and Mize by sharing knowledge. The department and (SAB) manage these problems give some facilities and endeavor to give the equipments soon as possible.

According to (ARD) is working with local growers to get benefit of residual moisture in land. A RD specially focusing on cultivation of Wheat, Sunflower, fodder and Mize by sharing knowledge by growers. "Grower can get 80 mounds of yield per acre through TD-1 variety while they are currently having an average 35 mounds. It is time for transfer of technology and inputs to increase per acre yield."

The left bank area was hit by water shortage during Kharif season. Kharif season begins in March and April availability of water was delayed as late as July. Cotton, vegetables and Chili crops were lost due to water scarcity.

Ghotki district on the left bank of Indus and Guddu downstream were the worst affected where Cotton crop destroyed following heavy rains. Damage to Sugarcane was also reported besides colossal losses to paddy. Rainwater is still standing in fields. We have lost.

S. No.	CROPS	LOST %	REMARKS
01	Cotton	90	
02	Padday	80	
03	Sugarcane	30	

Rest of the crops is hit by water shortage

Most of the areas of lower Sindh; the Cotton was sown two months late due to water shortage. But now poorly cultivated crop has fallen victim to various viruses due to low

water availability and cloudy weather. "Cotton crop on thousands of acres has been hit by the reddening disease in the area and farmer who obtained seed and fertilizer on credit from local traders have suffered heavy financial losses."

### **FAMILY DISPUTE**

It is learnt that dozens of people have killed in feuds erupted between various clans in Sindh. Meanwhile dozens have also lost their lives and sustained injuries over petty issues. The graph of such crimes has been going upward day by day in rural areas. The tribal disputes have been taken place in upper Sindh areas likewise Jacobabad, Shikarpur, Larkana, Ghotki, and Sukkur etc. since many years. District Benazirabad, a peaceful area in the past, has also been gripped by the incident of murder and lawlessness due to a *bradari* dispute and personal scuffles for the past few months.

The prevailing situation increased sense of resentment and insecurity among general masses hampering social and business activities of the district. Dispute between Dhari-Dhari, Jatoi, Khossa, Dhari-Brohi, Bhangwar-Gidaro, Jamali, Pathan, Chandio, Jatt(Panjabi), Nari-Barohi has left deleterious affects on the peace of S. Benazirabad.

District S Benazirabad is an amalgamation of various political, religious and nationalist organizations. These organizations are active in various areas of district. There are apprehensive that they may incorporate themselves in any scuffle and exploit situation to portray the disputes as linguist riots.

Apart from various social and economic reasons, delayed dispersions of justice, deputation of officers of police and district administration on political basis, undue interference by the Senates, issuance of large number of arm licenses and permissions to new arms dealership are also the causes of recent tribal feuds. Besides, keeping the overall law and order situation of Sindh in view, ban may be imposed on issuing excessive arm licenses and granting permission for new arm dealership, meritorious deputation of honest police and other officers may be made in district, action be taken against corrupt officers.

Where society is divided on the basis of classes, those who belong to the privileged category develop their own culture that distinguishes them from the lower classes. However, to develop a distinguished culture the elite class needs the assistance of artisans who belong to the lower strait of society.

Agriculture revenue was the major source of income for the landlords. They paid full attention on the development of agriculture. Wells, lakes canals, water tanks and reservoirs were built to supply water for irrigation.

The ruler was the owner if entire land and peasant who worked hard to grow crop got only little amount as major part of the agriculture revenue was reserved for the state. The life in the rural areas were different from that of cities because there are no basic facilities

for the rank and file. The influential person in that area is *Munshi*. His duty is to collect the revenue on behalf of the feudal.

The second influent person is *Kamdar*, his duty is to enforce the *Hari* for work on in his own wish. It is the big crime the man found in illegal custody in the jail. Unlawfully detained hum in the personal lock-up.

It is heinous crime. The victim can submit corpus application under Section 491 of the Criminal Procedure Code in court. (Ref: Dawn 14-Oct- 2010).

### SUGGESTIONS

- As the situation is worst in Katcha area so, the true measures for the amelioration must be taken.
- Forest laws must be revised according to the need of the hour.
- Accusation in kattcha area must b removed from influential people.
- Afforest ration must be make possible both side of Indus river.
- As statistics is the main tool to remove complaxities so, the advanced way is to adopt to make the datas regarding crimes and measures must be taken according to it.

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**J CURVE PHENOMENON IN PAKISTAN:  
A Disaggregated Approach with Special Reference to  
United States of America**

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**ABSTRACT**

The objective of this study is to investigate the effects of devaluation on the trade balance of Pakistan with special reference to its trade share with United States of America being the largest trade partner of Pakistan. This study uses autoregressive distributed lag (ARDL) approach to co-integration and an error correction model (ECM) based on ARDL approach to investigate the effects of currency devaluation (ER), local real income (Y), and USA's real income (Y\*) on trade balance of Pakistan (X/M). The study uses the quarterly data on all the variables for the period 1980:Q1 to 2008: Q4. Results of ECM suggest the existence of significant positive effect of exchange rate on trade balance of Pakistan in the long-run and negative effect in the short-run. This exhibits the existence of J-curve in Pakistan. Impulse response of trade balance to exchange rate reinforces the idea of existence of J-curve. Nonetheless, existence of J-curve in Pakistan is not statistically favorable.

**INTRODUCTION**

Pakistan has depreciated its currency against its major trading partner over the last many years. Many economists insist that the depreciation of the currency is a good stimulant for the export growth.

**The J Curve**

Many economists believe that the devaluations in currency show positive and competitive advantage in foreign trade. Whenever there is depreciation, there is a time lag to improve the trade balance. During this Process the short run and long run effects of depreciation on the trade balance are quite different.

Economically, when we depreciate the currency, the trade balance deteriorates initially in the short run but improves in the long run. The time path through which the trade balance follows generates a J curve. Magee (1973) point out about this by considering adjustment lags. He explain this by implication of (a) currency-contract signed prior to devaluation, (b) Newer currency-contract signed after devaluation namely, the period of pass through (c) The sluggish quantity adjustments.

### **Currency-contract signed prior to devaluation**

Before signing a contract, economic authorities take in to account there expectation regarding the future devaluation or currency depreciation as well as appreciation and revaluation to avoid a capital loss or to make a capital gain. An exporter will give preference to currencies as payment that expected to be strengthened but importer prefers to make payment in currencies that will expect to be weakened.

### **Newer currency-contract signed after devaluation**

The increase in the domestic price index of imports, and decrease in the same for trading partners is due to the contracts signed after a devaluation .We know that the quantity always adjust in the long time period so for the short time period, a successful pass through represent a worsening of the trade balance. The sluggishness of quantities can result because of supply bottlenecks on either side.

### **The sluggish quantity adjustments**

The quantity adjustment period due to adjustment path is all depends upon the outcome of the pass through period. Since the short run demand curves tend to be inelastic, devaluation lead to deterioration in the dollar value of exports, and a uptrend in the dollar value of imports. In the long run, the Marshall – learner condition is fulfilled and trade balance improves.

In the efforts to estimate Magee's (1973) theoretical concept empirically, the article by Bahmani-Oskoe (1985) was the first to estimate a method of testing j-curve phenomenon. We can classified the studies in to two categories The first includes those that used aggregated trade data and tested the j-curve between one country and rest of the world countries with mixed results. The list includes, Bahmani-Oskoe (1985) for four developing countries, Felmingham (1988) for Australia, Rosenweig and Koch (1988) for the USA, Himarios (1989) for 27 countries, Bahmani-Oskoe and Malixi (1992) for 13 developing countries, Backus et al. (1994) for 11 developed countries, Bahmani-Oskoe and Alse (1994) for 22 developed and 19 developing countries, Demirden and Pastine (1995), Brada et al. (1997) for Turkey, and Gupta- Kapoor and Ramakrishnan (1999) for Japan.

Because of so called 'aggregation bias 'Problem attach with the research mentioned above, researched in the second group have estimated data at the bilateral level, that is between one country and her major trading partners. The bilateral technique was first introduced by Rose and Yellen (1989:67) who estimated the j – curve between the USA and her major trading partners.

### **Back ground setting**

The J curve Phenomenon explains that the prices of imports rise soon after the depreciation but quantities take time to adjust downward because current imports and exports are based on orders placed some time back (Yarbrough and Yarbrough 2002) on the other side, domestic extorts become, more attractive to foreign markets but quantities do not adjust quickly for the same reason. An increase in the value of import against a minor change in the value of exports results in a trade deficit in the short run . As time passes by importer have enough time to adjust their import quantities with respect to the

rise in prices while quantity demand for exports increases and this lead to an improvement in the trade balance. The long run positive impact in trade balance occurs when the Marshall - Lerner condition holds. In the long run the volume effect dominates the price effect of a real depreciation. The sum of exports and imports elasticities must be greater than unity for the improvement of trade balance.

According to them large countries are more beneficial than small countries as a result of devaluation. Small countries show a decline in national income as a result of devaluation.

The plan of this paper is as follows: First we explain introduction then second the literature review is given next Methodology is explained next reports the empirical results and finally presents the conclusions.

### **LITERATURE REVIEW**

Junz and Romberg (1973) argue that because in the short run production, consumption, inventory and transaction lags are involved, the export and import elasticity are expected to be small. This is true for agriculture because delivery lags and payments are normally made only after delivery. It is thus plausible to test the hypothesis that j-curve is good for agriculture.

Hagens and Stone (1982) calculate the effect on U.S trade balance of term of trade. Following the period 1947 to 1974 their studied show no improvement in the trade balance by deteriorating term of trade, It was a rechecking of Mcpheters and Strouge (1974) who deduced that there was a gap of about 2 years before the U.S trade balance could improve following changes in the prices giving evidence of J-curves.

Rose and Yellen (1989) used disaggregated, bilateral trade data and did not find support of J - Curve effect nor evidence of a long run relationship in the case of U.S data for period 1960-1985.

Wassink and Carbaugh (1989) proved evidence of a delayed J-curve by incomplete pass-through for USA. They analysis the effect of dollar-yen exchange rate on U.S trade for the year 1978-1988.

Koch and Rosensweig (1990) studied the relation between dollar and US trade. They apply time series specification tests and Granger test of causal priority to identify the J-curve phenomenon. Two out of four component show relationship that are weaker and much delayed than the normal J-curve.

The shortcoming of the above findings may have been the use of non-stationary data so the problem of Spurious regression. In an effort to solve this problem of spurious regression Bahmani-Oskooee and Pourheydarian, M. (1991) and Bahmani-Oskooee and OLS estimation may not be suitable for a flexible exchange rate regime because exchange rates affect other variables such as income which also affect the trade balance suggested by Demirden and Pastine (1995). They urge that since feedback effects cannot be captured in the OLS regressions so it is not possible to directly interpret the OLS coefficients on lagged exchange rates as the delayed effect of the exchange rate on the balance of trade. Since Turkey initiated a realistic and flexible exchange rate in January.

Demirden and Pastine (1995) findings were useful for the study so we consider them in our study. They use the Vector Auto Regressive approach that explicitly endogenizes the variables involved. Since this approach provides a highly flexible estimation environment that might be relevant in case we miss-specify the structural model, we adopt Juselius VAR model for the data. Demirden and Pastine (1995) further suggest impulse response analysis in determining the existence of the J-curve which aids detection of feedback effects in the sample data. However in their research they utilize orthogonal impulse responses that are not unique and change as the order of model variables change.

Khosrow Doroodian, Chulho Jung and Roy Boyd (1999) studied that U.S.A trade balance show deficit and increases in dollar was at its peak in half of 1980's. After peak its started to decline so deficit increases and in 1988 it appeared to be improve which is j-curve. Noland (1989) find j-curve for Japan while Rose and Yellen (1989) and Moffet (1989) reject the j-curve for USA. Bahmani Oskoe find j-curve effect for Greece, India, Korea, and Thailand with the exception carter and pick who examined agriculture sector only. All of these j-curve studies on aggregate data.

Bahmani-Oskoe and Brooks (1999), suggested a country's trade balance can be improved with one trading partner and at the same time deteriorating with another. This can also happen with real exchange rate. While Aggregate data on each of these variables could restrict the actual movements taking place at bilateral levels. Due to this reason current studies on the J-curve, employ bilateral trade data.

The technique was first introduced by Rose and Yellen (1989) who estimate the response of the bilateral trade between the USA and each of her large six trading partners. They estimate a log-linear variant equation;

From 1977Q1 to 1992Q1 by using quarterly bilateral trade data, they find evidence of the J-curves that have the same shape for both Canada and the US in the two sets of estimates. The US curve stays negative for one additional quarter in comparison with Canada and peaks one quarter later in the OLS version. They note that there are delays but 'both Canada and the US eventually should improve their net external positions with respect to exchange depreciation. With these positive results we find basis for the use of OLS with the Turkish data.

By applying the multivariate cointegration approach Shirvani and Wilbratte (1997) proposed by Johansen and Juselius (1990) to test for the bilateral J-curve phenomenon between the USA as the home country, and Canada, France, Germany, Italy, Japan and the UK as her trading partners. They find that with the exception of Italy, there is a statistically significant association (in the expected direction) between the real exchange rate and the trade balance in all cases. Moreover, the trade balance does not respond to the exchange rate in the very short run (1 to 6 months), though over the longer period (1 to 24 months), it does. This is suggestive of horizontally reversed L-curve effect.

Bahmani Oskoe (2001) use the technique of Engle-granger and Johanson Juselin cointegration for the middle eastern countries and find that there exists a favorable long run trade balance between these countries against a real depreciation except one country Morocco in which results are opposite than Upadhyaya and Dhakal.



Wilson (2001) observed the relationship between real trade balance and real exchange rate for disaggregated trade between Korea, Singapore and Malaysia with respect to the United States and Japan. He find no any j curve except for United States and Korea.

Akbostanci (2002) estimate j curve and find support for Turkey Trade balance and exchange rate in the long run. The relationship between trade balance and exchange rate is still not clear in the research for CEEC countries.

Hacker and Hateme (2002) estimated for the j-curve for the countries Czech Republic, Hungry and Poland With respect to the Germany as a disaggregated bilateral data. They found that there exists a long run positive relationship for these countries.

Rose and Yellen (1989) urge that the use of bilateral data is useful because you do not require a proxy for the world income violable as in aggregate analysis which reduces aggregation bias.

### Theoretical framework

Goldstein and Khan (1985) explained an imperfect substitute modal that trade balance contains only the components of exports and imports. The demand of imported goods is determined by the domestic income and prices of imports.

$$M_d = M_d (y, P_m, P_d) \quad (1)$$

where

$M_d$  = domestic demand for import  
 $Y$  = domestic income,  $P_m$  = domestic currency price  
 $P_d$  = general price level in domestic country.

In the same way, the supply for domestically produced goods to the world is show as

$$X_d = X_d (Y^*, P_x, E, P_f) \quad (2)$$

where

$X_d$  = quantity of export goods to the rest of world.  
 $Y^*$  = foreign income,  $P_x = P_x$  is the foreign currency price paid by domestic importers.  
 $P_f$  = is the general price level in the foreign currency.  
 $E$  = is the nominal exchange rate.

In order to effect the homogeneity assumption, right hand side of the equation (1) and (2) and divided by their respective prices and following equations are derived.

$$M_d = M_d (Y_r, R P_m) \quad (3)$$

Where  $Y_r$  is the real domestic income and  $R P_m$  is the reactive price of imports and

$$X_d = X_d (Y^*_r, R P_x) \quad (4)$$

where

$y_r$  = real foreign income and  
 $R P_x$  = is the relative price of exports.

When the foreign currency price of foreign exports  $p_x$  is adjusted for exchange rate, it is equivalent to the relative price of imports thus we come to the equation.

$$RP_m = P_m/P_d = EP^*_x/P_d = EP_f/P_d \cdot P^*_x/P_f = QP^*_x/r \quad (5)$$

where  $p_x$  is the real foreign currency price of exports and  $Q$  is the real exchange rate, In the above mathematical formulation, an increase in  $Q$  is associated with a depreciation of the domestic currency. Since domestic exports are foreign imports domestic import demand is equivalent to foreign export supply and domestic export supply is equivalent to foreign import demand.

$$M_d = X^*_s, X_d = M^*_s \quad (6)$$

where

$X^*_s$  and  $M^*_s$  are foreign export and import supply respectively.

We derive equation for trade balance in the long run.

$$TB = P^*_x X_d - Q M_d \quad (7)$$

Thus the trade Balance can be measured, by deducting imports from exports. A negative value shown deficit in trade Balance. Equation (7) can be expressed in reduced form equation in real values.

$$TB = TB(Y, Y^*, Q), \partial TB/\partial Y < 0, \partial TB/\partial Y^* > 0, \partial TB/\partial Q > 0. \quad (8)$$

The above equation is the traditional Keynesian function for trade balance.

### EMPIRICAL MODAL

Gupta Kapoor and Ramaknshan (1999) studied the J. curve using real variable by reduced form equation.

$$\ln(X/M) = B_0 + B_1 \ln Y + B_2 \ln Y^* + B_3 \ln RER + u \quad (9)$$

$\ln(X/M)$  is the natural log of trade ratio,  $\ln Y$  is the natural log of real domestic income,

$\ln Y^*$  is the natural log of foreign income,  $\ln RER$  is the natural log of real exchange rate.

$B_0, B_1, B_2,$  and  $B_3$  are the structural parameters to be estimated and  $u$  is a normal error term.

It is expected that foreign income and real exchange rate are positively related to the trade ratio but domestic income is negatively related.

The co integration tests are applied as outlined by Jon Hansen (1995). This type of methodology is advantageous because it permits for the analysis in case of multiple co integrating vectors. The resulting vector error correcting model is

$$\Delta Z_t = \sum_{i=1}^{n-1} \phi_j \Delta Z_{t-i} + \Gamma Z_{t-1} + v_t. \quad (10)$$

where  $Z_t$  is a vector of variables in equation (9),  $\phi_j$  is a matrix of coefficients for the growth rate of the variables,  $\Gamma = \alpha\beta'$  where  $\alpha$  is the matrix of the speed of the adjustment parameters and  $\beta'$  is the matrix of the co integrating vectors,  $i$  and  $n$  are lag order and maximum lag respectively,  $t$  is a time index and  $v_t$  is the vector of error term.

In estimating the error correction model, it is necessary to select the appropriate lag order that will affect the residuals white noise. The likelihood ratio, SBC and AIC information criteria are used to select the lag order. All variables are also tested for unit root using the Augmented Dickey-Fuller test. The choice of the ADF is the fact that the procedure automatically selects for the lag length to be included in the test. A variable with no unit root is stationary. According to Enders (2004), stationarity implies that a variable has a constant time invariant mean, variance and zero auto covariances. A non-stationary variable can be made stationary by either differencing or detrending. If a variable becomes stationary by differencing once, the variance is said to be integrated of the order one, denoted I(1). Consequently, if a variable is differenced twice in order to attain stationarity, such variable is integrated of the order two, denoted I(2). Unit root testing in macroeconomic data is much more important because it determines the appropriate model for estimating parameters.

Using the Johansen procedure (Johansen 1995), we test for the existence of long-run relationship between the trade ratio and the real effective exchange rate. The generalized impulse response function derived from the VECM is used to estimate the J-curve effect. According to Hsing (2003) the impulse response function shows the response of current and future trade ratio to one standard deviation change in the real exchange rate. The superiority of using the generalized impulse response functions is that the order in which the variables are arranged does not affect the outcome of the results. Variance decompositions analysis is used to estimate the forecast error of the trade ratio as attributable to its own innovation as well as innovations in other variables in the system. The main interest in using the variance decomposition analysis in this study is to estimate the contribution of the shocks in the real effective exchange rate to the forecast error of the trade ratio.

### **Data Description and Sources**

We will give a brief explanation of the data, the variables included, author's estimations, sources, limitations and problems encountered during data sourcing and their explanations and implication and finally the time series properties of the variables. For Pakistan the variables used in the empirical model are the trade ratio, real effective exchange rate, domestic income and the U.S income all in log form. However, we needed data on exports and imports to calculate the trade ratio so data on exports and imports variables were also collected, data on real exchange rate between Pakistan and USA, consumer price indices in Pakistan and USA are used to convert GDP for Pakistan from rupees to dollars. The data set for Pakistan covers the period from 1980:1 to 2005:4 in quarterly frequencies. To be consistent in the interpretation of the estimates, all the variables needed to be in the same currency except for the real effective exchange rate since it is an index. As such, we choose the US dollars as the units of measure of value.

For Pakistan, data were available in US dollars for all variables except for the domestic income. As a result, we had to convert the domestic income from rupees to dollars using purchasing power parity (PPP) method. The following equation explains how the Purchasing power parity methodology was applied

$$Y_S = Y \frac{CPI_{US}}{R CPI_R} E_{\$R} \quad (11)$$

where,  $Y_S$  is Pakistan GDP in United States dollars,  $Y_R$  is GDP for Pakistan in rupee  $CPI_{US}$  and  $CPI_{SA}$  are the United States and Pakistan consumer price index for all items in urban areas respectively,  $E_{\$R}$  is the exchange rate between the U.S and Pakistan. The CPI and exchange rates are based on 2000 constant values.

The series stretch from 1980:1 to 2005:4 in quarterly frequency. This study include the employment of quarterly data to increase the number of maximum possible observations, The real effective exchange rate for both Pakistan and united states are all based on consumer price index. There was no specific reason for choosing the CPI based RER other than convenience in the availability of the data. The main source of data used in this study is international financial statistics for DataStream Advance,

On average, Pakistan had been running a trade deficit. Only in 2002 it seems to be there is no deficit no surplus. There are some volatilities in Pakistan exchange rate implying there is a depreciation and appreciation. However the rupee is depreciating through time.

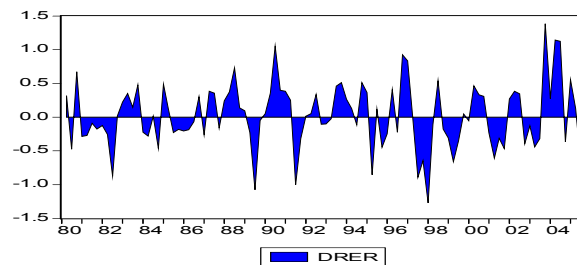


Fig. 1

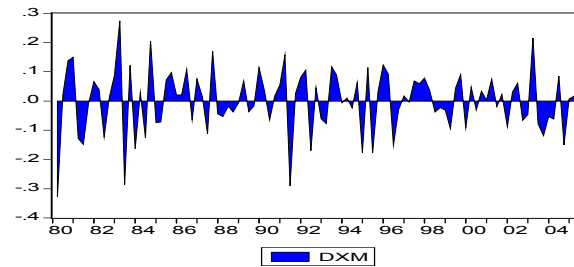


Fig. 2

Pakistan real effective exchange rate and trade ratio in first difference.

In the above figure all the series seems to be stationary. However, to prove it we perform unit root test .we will conduct both level and ist difference in unit root test in the next section.

### Properties of time series

For the test of variables the unit root test is conducted, the Augmented Dicky – Fuller test procedure is employed as explained by Enders (1995). Compare to the ordinary Dicky Fuller unit root test, the ADF test permit the inclusion of lagged dependent variable terms in order to correct for serially correlated residuals. Plots of domestic and foreign incomes for Pakistan model exhibit a presence of a trend in the series. As a result, the unit root test for these variables include a constant and time trend, equation 13 applies. Remaining variables from model do not have a time trend in the series so equation 12 is used to test the unit root in the series thus following equation is used.

$$\Delta z_t = a_0 + \gamma z_{t-1} + \sum \beta_i \Delta z_{t-i+1} + \varepsilon_t \quad (12)$$

where alpha ( $\alpha_0$ ) Gamma ( $\gamma$ ) and beta ( $\beta$ ) are parameter estimate and last ( $\varepsilon$ ) is error term.

The number of augmented lags is denoted by p. the null hypothesis of the ADF in this specification is that  $\gamma = 0$  (the data needs to be differentiated for its stationarity) and the alternative is that  $\gamma < 0$  (the data is not to need to be differentiated and it is stationary). For the equation that include a time trend (domestic and foreign income) the following specification is used.

$$\Delta z_t = a_0 + \gamma z_{t-1} + \alpha_2 t + \sum \beta_i \Delta z_{t-i+1} + \varepsilon_t \quad (13)$$

where  $t$  is a time trend and  $\alpha_2$  is a parameter estimate  $\gamma = 0$  (the data needs to be differentiated for its stationarity) and the alternative hypothesis is that  $\gamma < 0$  (the data is trend stationary and needs to be treated by means of using a time trend in the regression model instead of differencing the data) The results are provided in the tables below.

**Unit Root Test at 1<sup>st</sup> difference level**

Variables	T-calculated	T-tabulated	Region of rejection
Trade ratio =lnxm	-14.20097	-3.495677 *	Stationary. When $t_c < t_t$ , reject $H_0$ :non - stationry & accept $H_1$ : stationary
Real exchange rate = lnrr	-7.419497	-3.497727 *	Stationary. When $t_c < t_t$ , reject $H_0$ :non - stationry & accept $H_1$ : stationary
Domestic income = lnGp	-4.031005	-3.498439 *	Stationary. When $t_c < t_t$ , reject $H_0$ :non - stationry & accept $H_1$ : stationary
Foreign income = lnGu	-6.215470	-3.495677 *	Stationary. When $t_c < t_t$ , reject $H_0$ :non - stationry & accept $H_1$ : stationary

At 1% level.

All variables are found to be non-stationary at 1% significant level all the variables became stationary after first differencing at 1% significant level.

### EMPIRICAL ANALYSIS AND RESULTS

#### Co integrating Analysis

It is important to choose the lag length that will give white noise residuals before estimating the co integrating vectors. It is one of the important stage in this analysis. There always exists a trade off among using too many lags and too few lags. Too Few lags create the correlation of the residuals and too many lags leads to make the model less parsimonious and reduce the degree of freedom. The criteria of work information is to compromise between lag length and number of parameter by minimizing the linear combination of the residual sum of square and number of parameter (Johnson, 1995). We use the Akaike information criteria (AIC), Schwartz Bayesian criterion (SBC) and the likelihood ratio test to select the optimal lag length. All the AIC and SBC selected two lags as the optimal lag length for the modal in Pakistan. The AIC and LR test selected five lags while the SBC selected two lags. So that, the test results from two criterion were chosen. We applied Johnsen criterion for co integration of the variables in our modal. The method of Johnsen use the maximum eigenvalue statistics and also include the trace statistics to determine the rank of the cointegrating vectors. The results of this test are provided in the table below, with 95 % critical values. The test estimates are obtained from Enders (2004) reproduced from Osterwald – Lenum (1992). Both statistics reject the null hypothesis of  $r = 0$  against the alternative hypothesis of  $R \geq 1$  for Pakistan.

**Table Cointegrating Test Results for Pakistan**

Eigen values Pakistan		Null Hypothesis	Alternative Hypothesis	Test Values	5 % CV	Prob.
$\lambda$ trace tests						
$\lambda_1$	0.330884	$r^* = 0$	$r > 0$	71.89859	54.07904	0.0006
$\lambda_2$	0.198274	$r \leq 1$	$r > 1$	32.12066	35.19275	0.1034
$\lambda_3$	0.069482	$r \leq 2$	$r > 2$	10.24280	20.26184	0.6160
$\lambda_4$	0.030959	$r \leq 3$	$r > 3$	3.113373	9.164546	0.5597
$\lambda$ max tests.						
$\lambda_1$	0.330884	$r^* = 0$	$r = 1$	39.77793	28.58808	0.0013
$\lambda_2$	0.198274	$r = 1$	$r = 2$	21.87787	22.29962	0.0572
$\lambda_3$	0.069482	$r = 2$	$r = 3$	7.129423	15.89210	0.6537
$\lambda_4$	0.030959	$r = 3$	$r = 4$	3.113373	9.164546	0.5597

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

#### The long run Equilibrium Relationship

The existence of one cointegrating vectors implies that long run relationship is unique. The maximum eigenvalue statistics and economic reasoning make us choose the

first vectors in both models as the most likely long run relationship (Tarlock Singh, 2002). Hence the first vectors are the long run relationship for our model. The long run Model Indicate about the long run positive relationship between the trade ratio and exchange rate. This is consistent with the view that that depreciation improves the trade ratio in the long run.

The coefficients with the Domestic income and Foreign income also shows the consistent sign. In our results domestic income shows the negative sign but foreign income shows the positive sign. As Pakistan is a developing economy so whenever we earn more or our income goes up being a developing economy, we import more so our import increases and trade balance deteriorate. When income of foreign world up so our export incases and our trade balance improves.

#### Estimated Co integrating vector for Pakistan

Standardized $\beta$ eigenvectors				
<b>XM</b>	<b>RER</b>	<b>GU</b>	<b>GP</b>	<b>Constant</b>
1.000	-0.540888	-1.948279	1.005428	4.839166

In the above table it is shown clearly that long run model predicts the positive relationship between trade balance and real exchange rate as shown by results with long run elasticity of 0.54. This is consistent with theory that real depreciation improves the trade balance. Similarly Domestic and foreign income sign shows the negative and positive sign respectively.

The alpha coefficients indicate the adjustment parameters. The t- values point out that the trade ratio, real exchange rate, domestic and foreign income are the variables that adjust to deviation from the long run equilibrium. The estimated valued are small in size shows that they adjust to equilibrium slowly.

### DYNAMIC RELATIONSHIPS

#### Variance decompositions

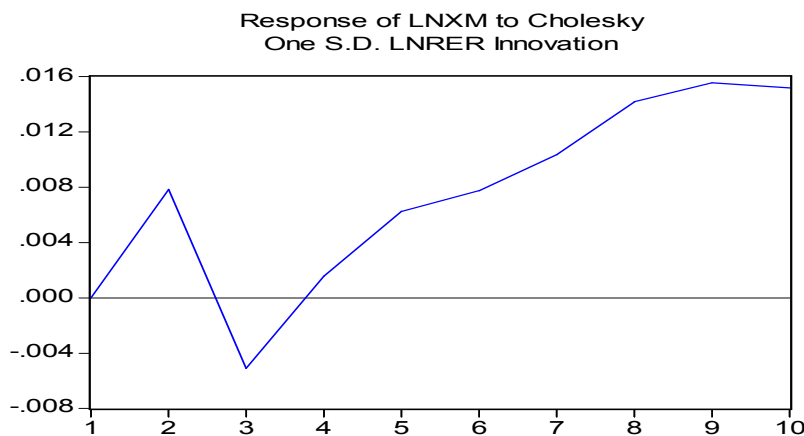
Table Variance Decomposition of the Trade balance for Pakistan

Period	<b>XM</b>	<b>RER</b>	<b>GP</b>	<b>GU</b>
1	100	0	0	0
2	99.3802	0.215946	0.003986	0.399867
3	97.78707	0.252005	1.492101	0.468823
4	96.12542	0.216863	3.168639	0.489083
5	95.07849	0.267476	4.218512	0.435523
6	94.37466	0.346649	4.832732	0.445954
7	93.90728	0.491721	5.196585	0.404409
8	93.34788	0.754609	5.406375	0.491133
9	92.99556	1.031718	5.499623	0.473101
10	92.79747	1.255556	5.504022	0.44295
11	92.60232	1.487952	5.47938	0.430351
12	92.32275	1.748173	5.447494	0.48158

The Results of the Variance Decomposition clearly explained that in Pakistan the the significance source of variation in the trade ratio forecast error is its own innovation and decline overtime with an average of 94.3267 % for the forecast horizon. The real effective exchange rate explain about an average of 0.672389% of the variation in the trade ratio. The domestic income and the foreign income explain about an average change of 3.8541% and 0.4135% respectively. In general the real exchange rate and foreign income have little effect but domestic income have the significant contribution as compare to other variable.

### GENERALIZED IMPULSE RESPONSE ANALYSIS

#### Trade Ratio



#### Real exchange Rate

**Fig. 3: The response of Pakistan Trade ratio to one standard deviation shock to RER.**

The above figure show that in the short run Pakistan trade ratio deteriorated by 0.055 % due to a one Percentage real depreciation in Pakistani rupees. The deterioration in the trade balance is due to the price effect which indicate the unit value of imports has increased resulting in the total value of imports as compare to the constant or insignificant change in the value of exports. About thirty quarters after the shocks the trade balance starts to improve. The improvement in the trade balance is because of volume effect.

### CONCLUSIONS

The long run equilibrium model of Pakistan shows that trade ratio is positively related to real exchange rate. The economic theory explains that devaluation in real exchange rate will lead to an long run improvement in the trade balance. It also explain that domestic and foreign income shows negative and positive relation with trade ratio. This study use the cointegration analysis and vector error correction model to find out the



j-curve effect on the trade balance of Pakistan. Results indicate there's evidence of cointegration amongst the four variables aggregated trade balance, real exchange rate and real domestic and foreign incomes, hence there's a long-run relationship amongst these variables. We found long run relation between real exchange rate and trade balance but even then did not find statistically significant j-curve.

The generalized impulse response results don't indicate any support for J-Curve hypothesis as well.

By applying Variance Decomposition technique we found that shocks in real exchange rate have insignificant attributes on the forecast error variance in the trade ratio.

We found j-curve in Pakistan but this does not provide enough information to devaluation policy in Pakistan.

One limitation of this study is the aggregative trade data. Recent studies on j curve have emphasized the use of bilateral data instead of using aggregated data due to "Aggregation Bias". The effective exchange rate do not provide much information about relative 'competitiveness' of trading countries. As we explain in chapter 2 that almost all the current researches are concerned on testing J-curve approach for large developing economies. The validity of any theory got more popularity, validity and wisdom if it is tested in countries of various sizes and structures.

It is possible for the country to devalue against one country and appreciate against others. In this the direction are not clear. So we should use bilateral trade data for future study.

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## HOSPITAL WASTE MANAGEMENT

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### ABSTRACT

In Pakistan there is unsatisfactory and non-scientific method for the disposal of hospital waste except in a few hospitals in Lahore, Karachi and Islamabad. The standard practice of hospital waste disposal is dumping it in the municipality containers.

Depending upon the factors associated with the poor handling of the hospital waste, a management system has been proposed which includes, hospital waste management plan, steps for the management of hospital waste, job descriptions of waste management team and proposed technical specification of incinerator.

### KEY WORDS

Hospital Waste Management; Segregation; Collection; Disposal; Risk Factors; Incinerator; Hepatitis B and C and Tertiary level.

### INTRODUCTION

The total waste generated by hospitals, healthcare establishments, and research facilities for diagnosis, treatment, or immunization of human beings or animals, and other associated research and services is known as health care waste. The major fraction (75-90%) of the waste generated by health-care facilities are, in general, non-risk waste and resembles residential and institutional waste. The remaining fraction (10-25%) is hazardous (risk) and may pose a variety of health risks.<sup>1</sup>

Various terms are being used more or less synonymously, with infectious waste; waste, bio-hazardous, biological, medical, hospital, medical hazardous, infective, microbiological, pathological and red bag waste. The waste which is capable of producing infectious diseases like Hepatitis B (HBV), Hepatitis C (HCV), human immunodeficiency virus (HIV) etc. in humans and other living beings is termed as infectious waste.<sup>2,3</sup>

Medical waste can be classified into human blood and blood products, cultures and stocks of infectious agents, pathological wastes, contaminated sharps, contaminated laboratory wastes, contaminated wastes from patient care, discarded biological, contaminated animal carcasses, body parts and beddings, contaminated equipment and miscellaneous infectious wastes.<sup>4,5</sup>

Transmission of diseases generally occurs through injuries from contaminated sharps. Infections of particular concern are Hepatitis B (HBV), Hepatitis C (HCV), and the human immunodeficiency virus (HIV). For HIV and HCV, the probability that a single needle stick will result in sero-conversion is 0.3-0.5 percent and 2-5 percent, respectively.<sup>6</sup> In the healthcare sector alone, the World Health Organization estimates that unsafe injections cause approximately 30,000 new HIV infections, 8 million HBV infections, and 1.2 million HCV infections worldwide every year.<sup>7,8</sup> Toxic risks may arise among others from reagents (particularly laboratory reagents), drugs, and mercury thermometers.<sup>9</sup>

In March 2009, 240 people in the Indian state of Gujarat contracted hepatitis B following medical care delivered with previously used syringes later discovered to have been acquired through the black market trade of unregulated health care waste.<sup>10</sup>

According to a study an average Pakistani uses five disposable syringes per year, making a demand of about 750 million syringes. It says Pakistan imports over 250 million syringes and 500 million syringes are produced locally in suspicious conditions. Most of these 500 million disposable syringes are often used in rural areas.<sup>11</sup>

In the present study an effort has been made to propose a system for the safe management of hospital waste which should be environment friendly.

### METHODOLOGY

A cross-sectional analytic study was conducted in Lahore, Gujranwala and Sheikhpura, which are considered to be the major districts of the province of Punjab to serve the basis of proposing the model. Closed ended questionnaire was used to collect data from all the selected institutions. The study instrument was pre-tested in a non selected hospital. Personal visits were made in the respective districts and direct personal interviews were held for standardizing and accuracy of the collected information. Approximately three hours were spent in each health care facility to get the relevant information on the questionnaire. The interviews were held with medical superintendents/administrators of the health care facilities (HCFs), in the presence of paramedical and sanitation staff. In addition to the interviews, the factors relating to the handling of waste were observed directly. Data were entered in the computer using SPSS version 16 after necessary data cleaning. The analysis was to develop the descriptive, analytical and inferential outcome. Since, it was mainly a descriptive study; no test of significance was applied. Out of the fifteen, nine private and three public hospitals were studied. Eleven HCFs included Fatima Memorial Hospital Lahore, Ali Hospital Lahore, three laboratories, three Dental Surgeries and three Pharmaceutical industries. Out of the three laboratories, two were pathology labs meant for human tests, whereas, one was for poultry diagnosis.

### RESULTS

The non-indoor health care facilities (HCFs) were all from Lahore in view of their hospital load. The health institutions included were mainly of private ownership (11/15), with three from the government sector and one as trust hospital. In terms of the levels of the care, eight were providing miscellaneous services like laboratory, dental services and

pharmaceuticals. The primary and tertiary care facilities were two each. There were three facilities of secondary level of care.

Five out of the HCFs had no guideline/internal rules for the management of health care waste. Plan including provision of training and guideline, 60% of the health care facilities had none and only 40% had gone through some training programs. (Table-1)

**Table-1:**  
**Existence of Infectious Control Team, Availability of Guideline and Plan**  
**n = 15**

<b>Presence</b>	<b>Infectious Control Team (%)</b>	<b>Availability of Guideline for HCW (%)</b>	<b>Existence of Plan including Training (%)</b>
No	60.0	33.3	60.0
Yes	40.0	66.7	40.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Seven of the institutions had no system for the segregation of waste while five were involved in segregating it by hazardous and general waste. Only three were performing segregation into general, soft infectious waste and hard infectious waste, none was performing the steps C-4 and C-5. (Table-2)

**Table-2:**  
**HCW Segregation**  
**n = 15**

<b>Category of Segregation</b>	<b>Frequency</b>	<b>Percent</b>
C-1	7	46.67
C-2	5	33.3
C-3	3	20.0
C-4	0	0
C-5	0	0
Total	15	100

C-1: No segregation. C-2: Segregation of hazardous and general waste, C-3: Segregation among general, soft infectious and hard infectious waste, C-4: Segregation among general, soft infectious, hard infectious and anatomical waste, C-5: Segregation among general, soft infectious, hard infectious, anatomical and radioactive waste.

### **MANAGEMENT SYSTEM**

Based upon the factors mentioned above, an evidence based hospital waste management plan has been suggested. The major components of this system are:-

#### **1. Hospital Waste Management Plan-outline**

Each health care facility should have its waste management plan. This plan should consist:

- 1.1 Policy and purpose of the waste management program
- 1.2 Scope of management plan
  - A. Waste types
  - B. Activities that generate infectious and medical wastes
- 1.3 Current management methods.
  - A. Identification
  - B. Segregation
  - C. Collection
  - D. Storage
  - E. Treatment
  - F. Transport
  - G. Disposal
- 1.4 Individual responsibilities and employee training
- 1.5 Waste minimization efforts
- 1.6 Occupational safety
- 1.7 Emergency response
- 1.8 Quality assurance.
- 1.9 Annual (or Biennial) Reports
  - A. Assessment of current management methods
  - B. Costs of waste management
  - C. Legal and other liabilities
  - D. Five-year planning
  - E. Operational needs

## **2. Hospital Waste Management Steps (ACRONYM SCTD-CYCLE)**

- Segregation of Waste
- Collection of Waste
- Transportation of Waste
- Disposal of Waste

### **2.1 Standard operating procedures (SOPs) for Segregation of waste**

Each health facility-hospital, Lab, dental clinic and pharmaceutical should follow the SOPs. The segregation should be from the point of generation. Soft infectious waste should be placed in yellow bag whereas hard infectious waste (sharps) in a sharp container. One trolley with yellow bag, one trolley with white bags and one sharp container is suitable for ten to twelve patient beds. The waste segregation and identification instructions should be placed at each collection point or department. Filling of yellow bags should be upto seventy-five percent. Yellow bags should never be closed by stapling. Each filled bag should be labeled with the point of generation (ward and hospital). Yellow bags containing highly infectious waste, after closing, should be placed in a second yellow bag as a safety measure. Waste should be collected daily from the wards or as frequently as required and transported to the central storage place.

### **2.2 Standard operating procedure for handling and storage of waste**

Each health care facility should have central storage facility. The storage place should be designed and marked as such; caution-hazardous waste storage area. Unauthorized persons keep out. No materials other than yellow bags are stored here. Storage place should be close to the treatment or secondary collection facilities. The storage area should be located away from the food storage preparation sites. Totally close and secured from unauthorized personnel access. Easy to clean and disinfect, good water supply, drainage and ventilation. No waste compactions. The cytotoxic, radioactive and specific hazardous waste should be separately from the non-risk and infections wastes.

### 2.3 Standard operating procedure for disposal of the waste

Dual chamber incinerator is proposed to destroy the Health Care Waste collected from different HCFs like-hospitals, pathology laboratory, dental clinics and pharmaceutical companies. In yellow bags all kind of soft infectious waste is collected, whereas, hard infectious waste is collected in sharp containers, which are specially designed for this purpose. Approximately five kilogram waste is collected in one yellow bag and five kilogram hard infectious waste (sharps) in one sharp container.

The temperature of primary chamber of the incinerator is maintained at 800 degree centigrade where as temperature of the secondary chamber is maintained at 1100 degree centigrade. The waste is destructed in batches. One batch which is of 50 kg approximately, consisting of ten yellow bags or ten sharp containers is fed in the primary chamber for fifteen minutes. All the waste is destroyed in this manner and converted into ash. If 100 kg waste is destroyed only seven to ten percent ash is produced. Emissions generated as a result of destruction of the waste are allowed to enter the secondary chamber of the incinerator which is already maintained at 1100 degree centigrade, decomposes the gases and maintained them at the national standards (CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>).

### 3. Waste Management Team Job Descriptions

The team of hospital waste management should be consisted of Medical Superintendent, Heads of Departments, Infection Control Officer, Chief Pharmacist, Radiology Officer, Nursing Superintendent, Head of Administration, Hospital Engineer and Waste Management Officer. The job description of the waste management team should be according to the specification lay down in the HWM environmental rules 2005.

### 4. Specification of Incinerator-Proposed

#### 4.1 Primary Chamber

- Volume (ft<sup>3</sup>): 120
- Temp: 800°C
- Burner Capacity BTU/Hr: 125,000
- Primary Air Fan Capacity (SCFM): 200

#### 4.2 Secondary Chamber

- Volume (ft.3): 235
- Temp: 1100°C
- Gas Retention Time (sec. @ 1832oF): 2.1
- Burner Capacity BTU/hr: 3,000,000
- Secondary Air Fan Capacity (SCFM): 1500

#### Burner Type

Eclipse ThermJet Series high-performance velocity natural gas with ultraviolet (U.V.) scanner flame detection and flame safeguard burner management control system.

### 5. Skill Development

In order to educate the hospital staff and general public regarding hospital waste management the posters in their regional language should be developed.

## 5.1 Safety Requirements

### 5.1.1 For Sanitation Staff

1. Special uniform according to duty
2. Trolleys with yellow bags for the collection of infectious waste
3. Sharp boxes for hard infectious waste
4. Special boxes for the collection of organs
5. Trolleys for the collection of general waste
6. Big trolleys for the transportation of waste up to storage place
7. Miscellaneous items like brush, face mask, cap, protective gloves and safety shoes

### 5.1.2 For paramedical staff

1. Special uniform according to duty
2. Face mask
3. Protective gloves
4. Special shoes
5. Hand washing material
6. Needle cutter

### 5.1.3 For Doctors

1. Long coat (overall)
2. Face mask
3. Special Shoes
4. Goggles
5. Hand washing material
6. Anything required for safety

## DISCUSSION

The inadequate waste management systems in the health care centres are posing a severe threat to public health as well as to the environment. This idea was also supported in the study done in Sylhet Bangladesh.<sup>12,13</sup>

The traditional casual attitude towards an organized, systematic approach for hospital waste management was found prevalent in the study, 60% of the health care facilities had no training program. Recent concern raised by various authorities against hazards to the hospital professionals and community at large has necessitated a serious insight toward hospital waste and its management. A study was done in the department of community medicine, Army Medical College Rawalpindi, Pakistan regarding the awareness of health hazards for sanitary workers. It was concluded that none of the sanitary workers ever received any training and they were unaware of the risks and hazards associated with handling of hospital wastes.<sup>14</sup> The study carried out by Sultana Habibullah and Salahuddin Afsar from Karachi showed that at health-care facilities none of the sanitary workers had good knowledge in healthcare waste disposal and 35 (71.4%) health facilities disposed the waste in public dustbins.<sup>1</sup>

A study was conducted in Thailand (2002). The average daily waste generated as general, medical and hazardous waste from all hospitals in Phitsanulok province was



found as 1.751,0.294 and 0.013 kg/bed respectively and at 0.323,0.041 and 0.002 kg/bed respectively from all clinics in Phitsanulok provinces.<sup>15</sup>

Same type of Hospital Waste Management system is also proposed by Badesha (1995).<sup>16</sup>

### CONCLUSION & RECOMMENDATION

- The traditional casual attitude towards an organized, systematic approach for hospital waste management was found prevalent.
- Segregation of waste at source.
- 60% of the health care facilities had no training program.
- None of the sanitary workers ever received any training and they were unaware of the risks and hazards associated with handling of hospital wastes.
- Four steps should be kept in mind, a) be aware of the public health risks from health-care waste, b) ensure that health-care waste are safely managed all along the waste stream, from the point of generation to its final disposal, c) choose disposal options carefully and d) think long term during the rehabilitation and reconstruction phase.
- Follow the hospital waste management plan.
- Implement the standing operating procedures.
- Start training programs at each level.
- Incinerator is preferring method for destruction of biomedical waste.

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**THE IMPACT OF EXPENDITURE COMPONENTS ON IMPORT  
DEMAND IN PAKISTAN: AN EMPIRICAL ANALYSIS**

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**ABSTRACT**

This study is aimed at in-depth empirical analysis of impact of final expenditure components on import demand in Pakistan. ARDL bound testing approach to cointegration is used to analyze the long run relationship of import demand, relative prices of imports and components of final expenditure like household consumption, investment, exports and government consumption expenditures. Empirical results show that there exists a long run relationship between import demand and the macro components of final expenditure and relative prices. Long run coefficients indicate that elasticity of import demand with respect to different macro components of final expenditure is different. The impact of the all expenditure components on import demand is positive and significant. The relative prices have negative but insignificant relationship with import demand in Pakistan. For the analysis of Short Run dynamics, Vector Error Correction Model (VECM) has been used. The results show that all expenditure components have positive and significant impact on import demand in Pakistan while the effect of relative prices is also statistically insignificant in short run.

**KEY WORDS**

Import Demand; Expenditure Components; Relative Prices

**JEL Classification:** F10, F14, F41

**1. INTRODUCTION**

International trade plays an important role in the development of an economy. To fulfill the growing needs of their respective economies, trade among the nations is almost unavoidable. Traditional theories of absolute advantage and comparative advantage treat the trade as a source of enhanced global economic activity which is mutually beneficial for all the nations. The empirical evidence shows that distribution of trade gains among different nations is uneven. Every nation wants to maximize its own gain irrespective of what happens to other nations. Formulation of economic policies to get maximum benefit out of trade creates controversy among the economists.

After emergence of World Trade Organization (WTO) trade liberalization is one of the major policy issues all over the world, particularly in WTO member countries. Liberalization of trade is not only advocated on the basis of economic growth but also on the basis of human welfare. It is argued that, based on comparative advantage, trade

enables countries to specialize in the production of goods and services, promotes competition and stimulates advancement in technology. As an outcome, wide variety of better quality products will be available to consumer at cheaper prices (Gupta and Choudhry, 1997 and World Bank, 2002).

Idea of specialization by Adam Smith gave birth to the debates about import substitution versus export led growth policies (Frankel and Romer, 1999). Imports and exports are two major components of the trade account of any country. Developing countries derive a substantial share of their national income from the export of primary goods. Developing countries are also seriously dependent on the import of diverse capital and consumer goods to fulfill the need of their industries and to satisfy the consumption needs of household. Most of the developing countries face problem of persistent trade deficit because value of their imports exceeds that of their exports. Thus multidimensional research is needed to study the trend of import and export of these countries. Similarly research based trade policies can help these countries to overcome the problem of persistent trade deficit (Salvatore, 1983).

Elasticities of export and import are needed to be estimated, particularly in the age of trade liberalization, in order to gauge the effect of income and price changes on trade balance (Brestler, 1996). Income elasticities of imports and exports are as important as their price elasticities, especially in a growing economy. If trade is initially balanced in a two-country model, prices are stagnant and income growth is the same in both countries, then the trade balance between them can still change over time if their respective income elasticities of demand for imports differ (Johnson, 1958). In such case, even relatively slow domestic income growth may be insufficient to alleviate payments imbalances for the country having relatively unfavorable income elasticities (Houthakker and Magee, 1969).

The estimated price and income elasticities of (imports) demand and (exports) supply have seemingly wide applications for macro-economic policy making. These applications include the international transmission of changes in prices and national expenditure and the impact of both exchange rate, monetary and fiscal policies on a country's trade balance. Welfare and employment implications of changes in own or partner-countries' trade restrictions and the severity of external balance constraints on domestic policy choices can also be explained by the trade elasticities (Goldstein and Khan, 1985).

The use of aggregate expenditure variable in the aggregate import demand function results in aggregation bias because different macro components of final expenditure have different import contents. Most of the earlier studies on expenditure components and import demand took into account only the effect of import contents of consumption, investment and exports but they did not differentiate between private and public consumption expenditure. Tang (2002a) and Funke and Nickel (2006) are among the few studies which considered the government consumption expenditure and household consumption expenditure separately in import demand equation. In case of Pakistan most of the studies on import demand used the conventional method which takes total expenditure (Gross Domestic Product (GDP)) as an explanatory variable. To the best of our knowledge there is no study that measures the effect of disaggregated expenditure components on import demand in Pakistan.

This study measures the responsiveness of import demand in Pakistan to the changes in relative prices of imports and disaggregated components of total expenditure (GDP) like household consumption, investment, exports and government consumption expenditures. The study will provide detailed information for macroeconomic policy decisions in Pakistan. This information will be useful for efficient utilization of both expenditure switching and expenditure dampening policies to overcome the problem of persistent trade deficit in the country. Exports and investment elasticities of import demand will also provide direction for future industrial policy.

## 2. LITERATURE REVIEW

Literature on import demand has various dimensions. First strand includes the studies which term import demand as a function of aggregate income and prices. In thesecond category those studies which disaggregate the total imports into different commodity groups and take import of each commodity group as a function of income and relative prices. In the third category we may include the studies which take aggregate import as a function of disaggregated strand components of total income or aggregate expenditure. In all these categories, both kinds of studies are included that take price determinant of import demand as relative prices or take domestic and import prices separately. Adler (1945) studied the import demand in United States (U.S.) from 1922 to 1937 through regression analysis. The author checked the impact of real income and relative prices on import demand. He found that the effect of relative prices on import demand was not significant but the national income is positively and significantly related to import demand. The effect of relative prices on duty free imports found to be negative and significant in second regression which used the duty free imports as a dependent variable. Similarly, Vegh (1941), Hinshaw (1945), Harberger (1953), Shabbir and Mahmood (1991), Afzal (2001), Rehman (2007) and Hye (2008) are among the earlier studies that checked the effect of aggregate national income and relative prices on import demand. Abbott and Seddighi (1996), Mohammed and Tang (2000), Mohammad et al. (2001), Min et al. (2002), Tang (2003) and Narayan and Narayan (2005) are among the studies who studied import demand function based on disaggregated expenditure components. But these studies do not consider government consumption separate from household consumption<sup>1</sup>.

## 3. THEORETICAL FRAMEWORK

Following the imperfect substitutes framework the model used for the present study is given below:

$$M_t = f(C_t, G_t, I_t, X_t, RP_t, t), t = 1, 2, 3, \dots, 37, \quad (1)$$

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<sup>1</sup> For detailed review of literature and discussion on Pakistan's economy refer Irfan, M. (2010). *The Impact of Expenditure Components on Import Demand in Pakistan: An Empirical Analysis*. An unpublished M.Phil dissertation submitted to National College of Business Administration and Economics, Lahore, Pakistan and Chani, M.I. and Chaudhary, A.R. (2010). *Import Demand Behaviour in Pakistan: An Empirical Analysis*. Saarbrücken, Germany: LAP Lambert Academic Publishing AG & Co. KG.

where  $M_t$  is Volume of imports in time  $t$ ,  $C_t$  is Household consumption expenditure in time  $t$ ,  $G_t$  is Government consumption expenditure in time  $t$ ,  $I_t$  is Total investment in time  $t$ ,  $X_t$  represents the Exports in time  $t$  and  $RP_t$  represents the Relative prices of import in time  $t$ .

The equation (1) can be written in the following form:

$$M_t = \alpha_0 C_t^{\beta_1} G_t^{\beta_2} I_t^{\beta_3} X_t^{\beta_4} RP_t^{\beta_5} e^{\beta_6 t} e^{\varepsilon_t}, \quad t=1,2,3,\dots,37, \quad (2)$$

where 'e' is base of natural logarithm and  $\varepsilon_t$  is the error term. Taking natural logarithm of equation (2), we can have the following estimation equation:

$$\begin{aligned} \ln M_t = \beta_0 + \beta_1 \ln C_t + \beta_2 \ln G_t + \beta_3 \ln I_t + \beta_4 \ln X_t \\ + \beta_5 \ln RP_t + \beta_6 t + \varepsilon_t, \quad t=1,2,3,\dots,37, \end{aligned} \quad (3)$$

where 'ln' represents the natural logarithm and  $\beta_0 = \ln \alpha_0$ .

### 3.1 Data Sources

This study uses the variables of household consumption expenditure, government consumption expenditure, total investment expenditure, expenditure on total exports of goods and services, imports of goods and services and relative prices of imports in Pakistan for empirical analysis from 1972 to 2008. Data for the variables of household consumption expenditure, government consumption expenditure, total investment expenditure, expenditure on total exports of goods and services and imports of goods and service is taken from World Development Indicators (WDI) online database by World Bank (2009). The relative price variable is the ratio of unit value index of imports to the GDP deflator and both variables are taken from International Financial Statistics (IFS) online database by International Monetary Fund (2009).

## 4. ESTIMATION RESULTS

We have used Ng and Perron (2001) unit root test to check the stationarity of time series data in logarithmic form. Schwarz Information Criterion has been used for maximum lag selection for applying Ng-Perron unit root test. According to these results variables of import of goods and services, household consumption expenditure, government consumption expenditure, total investment expenditure and relative prices of imports are not stationary at level. Only variable of exports of goods and services is stationary at 5 percent level of significance at level. This implies that null hypothesis of unit root at level cannot be rejected for all variables except import of goods and services variable. However all the variables are stationary at first difference. This shows that the null hypothesis of unit root for all variables is rejected when we use the first difference of the variables. Thus the variables have mix order of integration. Some of them are I(0) (integrated of order zero) and other I(1) (integrated of order one).

Keeping in view the number of observations, number of variables to be studied and lags requirement of the cointegration test maximum two lags are allowed to select the optimum lag length in Vector Auto-Regressive (VAR) process. Schwarz Information

Criterion (SIC) suggests that an optimal lag length of 1. Thus the lag length 1 has been used in our analysis.

The results of ARDL cointegration test, based on equation (3) are reported in Table 1. The wald (F) statistics is 7.35, which is greater than Narayan (2005) upper bound value of 6.26 at 1% significance level and also greater than Pesaran et al (2001) upper bound value of 7.30 at 5% significance level. Hence we can reject the null hypothesis of no cointegration and accept the alternative hypothesis which states that there is cointegrating relationship among the variables used in the study.

Thus the analysis of data confirms the presence of long run relationship among import demand, household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services and relative prices of imports in Pakistan.

**Table 1: Bound Testing Approach to Cointegration**  
**ARDL (1, 1, 0, 1, 1, 1)**

F-Statistic (Wald-Test) = 7.35				
Level of Significance	Pesaran et al. (2001)		Narayan (2005)	
	Lower Bound Value	Upper Bound Value	Lower Bound Value	Upper Bound Value
1%	8.74	9.63	4.53	6.26
5%	6.56	7.30	3.33	4.70
10%	5.59	6.26	2.83	4.04

As cointegration exists among the variables used in the study, therefore, the results presented for long run are reliable. These results represent long run elasticities of import demand with respect to expenditure components. The long run results are reported in table 2.

**Table 2: Long Run Relationships**

Dependent Variable: $\ln M_t$			
Variable	Coefficient	t-Statistic	p-Value
$\ln I_t$	0.5755	2.2149	0.0351
$\ln G_t$	0.2870	1.9212	0.0649
$\ln C_t$	2.3248	5.9103	0.0000
$\ln X_t$	0.2641	2.3614	0.0254
$\ln RP_t$	-0.1175	-0.9506	0.3499
Time	-0.1182	-4.9154	0.0000
Constant	-66.6962	-	-

The results reported in the table 2 show that all expenditure components (household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services) have statistically significant impact on import demand in Pakistan. But the impact of relative prices on import demand is negative and not significant in long run. While studying the import demand behaviour in Pakistan, Afzal

(2001) and Rehman (2007) also find the similar result about the effect of relative prices on import demand in Pakistan. The household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have positive impact on import demand. The results show that household consumption has the highest 2.3248 elasticity of import demand and it is followed by investment expenditure 0.5755, government consumption expenditure 0.2870 and exports of goods and services 0.2641. Relative prices have insignificant, negative and the lowest elasticity -0.1175 of import demand. The positive and significant import demand elasticities with respect to all components of final expenditure indicate that increase in economic growth will lead to higher import demand in Pakistan as indicated by Keynesian absorption theory.

The results show that long run coefficients of independent variables have theoretically correct signs. The difference in magnitude of the effects of different expenditure components on import demand further strengthen the significance of using different components of final expenditure separately in import demand equation. The inelastic and insignificant effect of relative prices on import demand reflects that import substitution policy adopted by government of Pakistan since 1950s has not been successful in achieving the target of producing sufficient import substitutes. The elasticity import demand with respect to relative prices reveals that a large proportion of Pakistan's imports are essential goods which have inelastic demand.

#### 4.1 Short Run Estimates

Once cointegration among the variables is proved, we can use VECM to study the short run dynamics. Table 3 shows the short run dynamics of the variables. According to the table household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have statistically significant effect on import demand in short run while the impact of relative price variable is statistically insignificant in short run.

**Table 3: Short Run Estimates**

<b>Dependent Variable = <math>\Delta \ln M_t</math></b>			
<b>Variable</b>	<b>Coefficient</b>	<b>t-Statistic</b>	<b>p-Value</b>
$\Delta \ln I_t$	0.7833	3.2616	0.0033
$\Delta \ln G_t$	0.2338	2.2002	0.0377
$\Delta \ln C_t$	2.1348	7.0784	0.0000
$\Delta \ln X_t$	0.2308	2.6515	0.0140
$\Delta \ln RP_t$	0.1170	0.9782	0.3378
$ECT_{t-1}$	-0.4915	-4.9540	0.0000
Time	0.0002	0.2113	0.8344
Constant	-0.1209	-	-
$R^2 = 0.7927$ $Adj-R^2 = 0.7064$ F-Statistic = 9.1789 Prob(F-statistic) = 0.0000 Durbin-Watson = 1.6529			



The error correction term is statistically significant and has a negative sign. It is further proof of long run relationship among the variables of our interest. The results, reported in table 3, show that coefficients of all expenditure components have theoretically expected signs and are statistically significant in short run. The coefficient of relative price variable has theoretically incorrect sign and is insignificant in short run. The household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have positive impact on import demand in short run as well. The results show that household consumption has the highest 2.1348 elasticity of import demand and it is followed by investment expenditure 0.7833, government consumption expenditure 0.2338 and exports of goods and services 0.2308. Relative prices have positive as well as insignificant elasticity 0.1170 of import demand.

## 5. CONCLUSION AND POLICY IMPLICATIONS

The results indicate that household consumption expenditure is the major determinant of import demand in Pakistan as it has the highest coefficient in our import demand equation. The investment expenditure has the second highest coefficient and is followed by government expenditure and exports. The highest elasticity of import demand with respect to household consumption expenditure is due to the reason that final consumer goods and raw materials used as inputs in the production of consumer goods have more than sixty percent share in total imports of Pakistan. Our results also confirm the reality that our imports are more consumption oriented and import growth of Pakistan is more sensitive to change in domestic consumption. Thus we suggest the following policy measures:

1. The exchange rate policies which directly affect the relative prices will have little impact on import demand in Pakistan. Thus devaluation of domestic currency is not a rational and suitable policy to overcome the problem of persistent trade deficit rather this policy can increase the severity of the problem by reducing the competitiveness of our exports. Devaluation of domestic currency may serve to raise the production costs because very large share of our imports consists of raw material and capital goods. It may also increase the import bill and can lead to balance of payment problems.
2. Import substitution policy should focus on the establishment of capital goods industries and the industries which can utilize the domestic resources rather than imported raw material.
3. Industrial policy should be formulated in a way which could increase the export of value added goods instead of exports of raw material or primary goods. For this purpose forward and backward linkages among the industries should be established.
4. The positive and significant import demand elasticities with respect to all components of final expenditure indicate that increase in economic growth will lead to higher import demand in Pakistan as indicated by Keynesian absorption theory. Thus monetary and fiscal policies should be designed in such a way that may be helpful in altering the existing composition of final expenditure for

reducing the trade deficit. This objective can be achieved by increasing the share of those components for which import demand elasticity is low and by reducing the share of those components for which import demand elasticity is high. For instance, monetary policy promoting saving and investment and fiscal policy providing incentives for domestic resource-based and export oriented industries will be useful. Export of finished goods instead of primary or semi-finished commodities should be promoted.

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**CO<sub>2</sub> EMISSION, POPULATION, AFFLUENCE AND ENERGY EFFICIENCY  
IN TOP 10 MOST POPULOUS COUNTRIES OF ASIA**

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**ABSTRACT**

This study examines the relationships between carbon dioxide emissions, population, affluence and energy efficiency for top 10 most populous countries of Asia by using Fisher-Johansen cointegration technique. The results of study provide strong evidence for fairly robust long run as well as short run relationships amongst carbon dioxide emissions, population, affluence and energy efficiency for the period 1980-2005. The results state that population and affluence have positive impact on carbon dioxide emissions and energy efficiency has negative impact on carbon dioxide emissions. Though study suggests that by enhancing the energy efficiency and controlling population could be helpful in controlling the pollutant emissions.

**JEL Classification:** Q53, Q56, Q43, P44

**KEY WORDS**

Co<sub>2</sub> Emissions, Population, Energy Efficiency, Affluence

**INTRODUCTION**

A country's population has a greater role in deteriorating the environment, especially in the emission of carbon dioxide (CO<sub>2</sub>) emissions gas, which contributes also in global warming. Population increases the demand for energy also increases in order to fulfill their needs. Population growth creates more density in countries, and cause congestion, depletes the natural environment and natural resources. Due to increase in population, pressure on the natural resources increases.

Global warming is an issue since 1970s and there is need to find the determinants of such phenomena. Scientists claimed that it is due to CO<sub>2</sub> emissions. There has been negotiation to reduce the CO<sub>2</sub> at the average of 5.2% annually between 38 developed countries from year 1990 to 2008-2012<sup>1</sup>. Conventional view for CO<sub>2</sub> emissions is due to the increasing consumption of energy. As the demand for consumption of energy depends on population density and growth rate of population, so CO<sub>2</sub> emissions is caused by population growth as well (O'Neill et al. 2001).

The relationship between environments and population growth can also be found in the Malthus's view, that earth has limited carrying capacity and slowly increasing supply

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<sup>1</sup> United Nations. 1997. *Conference of the Parties, Third Session*.

of food could not meet the demand for sharply increasing population (Malthus, 1798). So, he also gave suggestion about the preventive checks to control population and mentioned that if preventive checks would not operate then wars, famine and diseases would check the population growth.

Myers (1997) argued that consumption of natural, mineral and energy resources produced the wastes that environment could not able to absorb such wastes. Birdsall (1992) mentioned two factors which contributed to greenhouse gas emissions. First, increase in population would result in increase in demand for fuel for industry, power generation and transportation. Second, deforestation could reduce the carrying capacity to absorb the pollution. Engleman (1994) found that population and Co<sub>2</sub> emissions have been almost same growth rates since 1970 in the global scenario. Another cross sectional study conducted by Dietz and Rosa (1997), who used data for 111 countries found that 1 % increase in population contributed to 1.15 % to Co<sub>2</sub> emissions.

As per impact of affluence on Co<sub>2</sub> emissions is concerned, economic growth comes with industrialization, consumption of energy and along with there will be also pollution. Holtz and Selden (1995) and Grossman and Krueger (1995) found the positive relationship between pollution emissions and per capita income (affluence). On the other hand, Blok et al. (1993) found that energy efficiency could reduce the Co<sub>2</sub> emissions by using the better technology.

Present study wants to find the relationship between Co<sub>2</sub> emissions, population, energy efficiency and affluence in Pakistan, China, India, Indonesia, Russia, Bangladesh, Japan, Philippine, Vietnam and Turkey.

### MODEL

Some recent studies regressed Co<sub>2</sub> emissions on affluence (per capita GDP) and other regressors but did not use the population as a regressor (Grossman and Krueger, 1995; Holtz and Seldern, 1995; Seldern and Song, 1994; Shafik and Bandyopadhyay, 1992). At first, Dietz and Rosa (1997) regressed the population Co<sub>2</sub> emissions on along with affluence and energy efficiency for a panel data of 111 countries. To find the impact of population on carbon dioxide, study uses the same model Impact=Population\*Affluence\*Technology (IPAT) developed by Dietz and Rosa (1997).

Specific form of model for present is given below:

$$CO_{it} = \phi POP_{it}^{b_1} Y_{it}^{b_2} EF_{it}^{b_3} e_{it} \quad (1)$$

Here, CO is carbon dioxide emissions which is proxy for Impact, POP is Population, Y is per capita Gross domestic Product which is proxy for Affluence (economic activity per person), EF is energy efficiency which is proxy for Technology, i for countries, t for time series and e is error term. Study takes logarithm of both side of equation to make it linear:

$$LCO_{it} = a + b_1 LPOP_{it} + b_2 LY_{it} + b_3 LEF_{it} + u_{it} \quad (2)$$

Here, L is log operator, a = log  $\phi$  and u = log e.

Most of macroeconomic data is non-stationary over time, so at first study checks the level of integration between variables. To find the level of integration, study uses the Augmented Dickey Fuller-Fisher Unit Root Test developed by Maddala and Wu (1999) based on Fisher (1932). The test is non-parametric and based on Chi-square distribution with  $2N$  degree of freedom, where the  $N$  is the number of cross sections, which are 10 countries in our study. The test estimates the unit root of individual country statistic at its significant levels and combines afterward by using the additive property of Chi-squared variable for panel statistic.

$$\lambda = -2 \sum_{i=1}^N \log_e \pi_i \quad (3)$$

Here,  $\pi_i$  is p-value of test statistic for country  $i$ .

After testing the panel unit root, if there will be unit root problem and level of integration will be same then study will use Johansen Fisher panel cointegration test, which is a panel version of the individual Johansen (1988) cointegration test. This test uses the summation of p-values of individual Johannes trace statistics and maximum Eigen value. The aggregation procedure is as follows:

$$-2 \sum_{i=1}^N \log(\pi_i) \rightarrow \chi_{2N}^2 \quad (4)$$

Eigen value:  $N$  is the number of countries as 10 countries in the analysis. The value of chi-square is based on the MacKinnon et al. (2001) p-values for Johansen (1988) cointegration test. After testing the long run relationship, study will use the Vector Error Correction Model (VECM) to find the short run relationship in the model. The equation of VECM is as follow:

$$\begin{aligned} \Delta LCO_{it} = & \alpha_{1i} + \sum_{k=1}^p \beta_{11ik} \Delta LCO_{it-k} + \sum_{k=1}^p \beta_{12ik} \Delta LPOP_{it-k} + \sum_{k=1}^p \beta_{13ik} \Delta LEF_{it-k} \\ & + \sum_{k=1}^p \beta_{14ik} \Delta LY_{it-k} + \theta_{1i} ECT_{it-1} + \varepsilon_{1it} \end{aligned} \quad (5)$$

$$\begin{aligned} \Delta LPOP_{it} = & \alpha_{2i} + \sum_{k=1}^p \beta_{21ik} \Delta LCO_{it-k} + \sum_{k=1}^p \beta_{22ik} \Delta LPOP_{it-k} + \sum_{k=1}^p \beta_{23ik} \Delta LEF_{it-k} \\ & + \sum_{k=1}^p \beta_{24ik} \Delta LY_{it-k} + \theta_{2i} ECT_{it-1} + \varepsilon_{2it} \end{aligned} \quad (6)$$

$$\begin{aligned} \Delta LEF_{it} = & \alpha_{3i} + \sum_{k=1}^p \beta_{31ik} \Delta LCO_{it-k} + \sum_{k=1}^p \beta_{32ik} \Delta LPOP_{it-k} + \sum_{k=1}^p \beta_{33ik} \Delta LEF_{it-k} \\ & + \sum_{k=1}^p \beta_{34ik} \Delta LY_{it-k} + \theta_{3i} ECT_{it-1} + \varepsilon_{3it} \end{aligned} \quad (7)$$

$$\begin{aligned} \Delta LY_{it} = & \alpha_{4i} + \sum_{k=1}^p \beta_{41ik} \Delta LCO_{it-k} + \sum_{k=1}^p \beta_{42ik} \Delta LPOP_{it-k} + \sum_{k=1}^p \beta_{43ik} \Delta LEF_{it-k} \\ & + \sum_{k=1}^p \beta_{44ik} \Delta LY_{it-k} + \theta_{4i} ECT_{it-1} + \varepsilon_{4it} \end{aligned} \quad (8)$$

Here, L is log operator, CO is carbon dioxide emissions, POP is population, EF is energy efficiency, Y gross domestic product, ECT is error correction term,  $\Delta$  is difference operator, i is for cross sections for example 10 countries in our study, t is for time for example 1980 to 2005 in our study and p is for optimum lag length which is selected by Schwarz Information Criteria.

### EMPIRICAL RESULTS

Based on methodology mention above, study wants to find level of integration for variables. So, study uses panel unit root test based on Fisher Chi-squared values. Results are given below.

**Table 1: Panel Unit Root Test of Variables at Level**

Variables	Constant	Constant & Trend
LY	6.491	17.544
LPOP	16.354	13.975
LEF	21.183	18.655
LCO	17.086	27.604

Notes: \*\*\*, \*\* and \* indicate significance at 1%,5% and 10% level, respectively.

Table 1 shows the unit root test based on Fisher chi squared values in column 2 with constant and column 3 with constant and time trend. All variables are non-stationary at level.

**Table 2: Panel Unit Root Test of Variables at First Difference**

Variables	Constant	Constant & Trend
$\Delta$ LY	70.458***	86.401***
$\Delta$ LPOP	47.333***	41.584***
$\Delta$ LEF	213.1***	212.426***
$\Delta$ LCO	119.568***	104.313***

Notes: \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% level, respectively.

Table 2 shows the unit root test based on Fisher chi squared values in column 2 with constant and column 3 with constant and time trend. All variables are taken at first difference and are stationary at first difference at 1% level of significance, so it shows level of integration of all variables at first difference I(1). After testing the level of integration, study uses the Johansen Fisher Cointegration test developed by Maddala and Wu (1999). Results of cointegrating vectors are given below.

**Table 3: Johansen Fisher Cointegration Test**

	Trace Test	P-Value	Max-Eigen Test	P-Value
R = 0	224.2	0.000	135.9	0.000
R $\leq$ 1	123.3	0.000	84.75	0.000
R $\leq$ 2	63.37	0.000	61.19	0.000
R $\leq$ 3	30.16	0.067	30.16	0.067

Table 3 shows the results that there are three cointegrated vectors at 1% level of significance and four cointegrated vectors at 10% level of significance both with trace test and maximum Eigen value test. Results give strong evidence for long run relationship between variables. Long run estimates are given below.

**Table 4: Long Run Coefficients**

Variables	Coefficients	T-Statistic	P-Value
LEF	-1.005	-14.184	0.000
LPOP	1.269	38.0656	0.000
LY	0.942	35.175	0.000
C	-7.444	-24.086	0.010

Table 4 shows that all coefficients are significant at 1% level of significance. Energy efficiency shows negative relationship and about unitary elasticity with  $\text{CO}_2$  emissions. That means 1% increase in energy efficiency could help in 1% decrease in  $\text{CO}_2$  emissions. Population has positive and elastic relationship with  $\text{CO}_2$  emissions and 1% increase in population could increase 1.26%  $\text{CO}_2$  emissions. Per capita GDP has positive relationship with  $\text{CO}_2$  emissions and 1% increase in GDP comes with 0.94%  $\text{CO}_2$  emissions.

**Table 5: Vector Error Correction Estimates Based on Schwarz Information Criteria**

Variables	Coefficients	Standard Error	t-Statistic
C	0.021	0.00736	2.83383
D(LCO(-1))	0.001	0.07322	0.01918
D(LCO(-2))	-0.082	0.07508	-1.09657
D(LEF(-1))	-0.004	0.02659	-0.15234
D(LEF(-2))	-0.014	0.02525	-0.56021
D(LPOP(-1))	4.297	3.358	1.27955
D(LPOP(-2))	5.062	3.396	-1.49019
D(LY(-1))	0.269	0.147	1.82756
D(LY(-2))	0.180	0.148	1.21653
ECT(-1)	-0.21689	0.00613	-3.53864

Table 5 gives the results of vector error correction model for short run relationship. The coefficient of error correction term at its first lag is negative and significant which shows the convergence from short run to long run equilibrium and gives the evidence for short run relationship between the variables in the study and also gives speed of adjustment 22% in year.

### CONCLUSION

Study investigates the relationship between the  $\text{CO}_2$ , population, affluence and energy efficiency. Study uses the data of top 10 most populous countries of Asia during the period of 1980-2005 and applies Fisher Johansen cointegration technique to find the long run and short run relationship amongst variables. The study finds the short run and long run relationship amongst the variables. Results have shown that population growth is the major factor which increases the  $\text{CO}_2$  emissions. It is the finding of the study that:

- 1) 1% increases in population is associated with 1.26% increase in  $\text{CO}_2$  emissions.
- 2) 1% increases in GDP increases 0.94% increase in  $\text{CO}_2$  emissions, which gives the strong evidence that population has greater impact on  $\text{CO}_2$  emissions than affluence in developing countries.
- 3) Study shows that there exist a negative relationship between energy efficiency and  $\text{CO}_2$  emissions and 1% increase in energy efficiency could help in 1% decrease in  $\text{CO}_2$  emissions.



These results concludes that population is the major factor in enhancing CO<sub>2</sub> emissions and becoming the main cause of global warming.

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**A BRIEF ACCOUNT OF THE MAIN ACTIVITIES  
OF THE FEDERAL BUREAU OF STATISTICS**

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**ABSTRACT**

Federal Bureau of Statistics (FBS) is the premier statistical agency lying at the core of the mainstream statistical system comprising of FBS, Population Census Organization (PCO) and Agricultural Census Organization (ACO), controlled by Statistics Division. FBS is mandated to collect, compile and disseminate current statistics on a wide range of socio-economic variables. The functional profile of FBS encompasses a number of regular and adhoc activities. This paper gives an account of the main activities of FBS.

**INTRODUCTION**

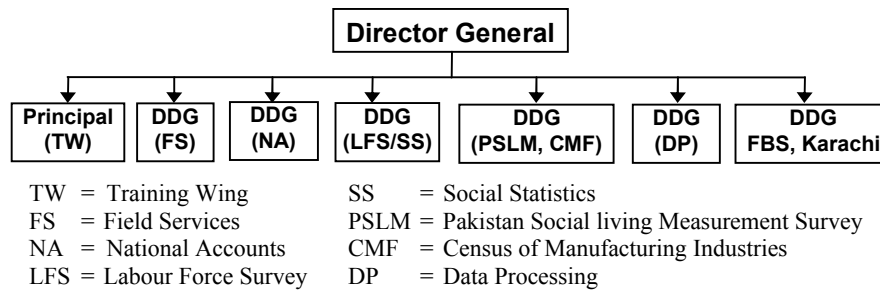
Federal Bureau of Statistics (FBS) is Pakistan's official statistical organization. It assists and encourages informed decision-making, research and discussion within governments and the community by providing a high quality, objective and responsive national statistical service. FBS compiles statistics from many sources and produces global updates in specialized fields of statistics.

2. The range of statistics collected, compiled and disseminated by FBS includes national accounts, prices, external trade, labour force, mining, industries, agriculture, electricity generation, household income & expenditure, environment, education, transport & communication, tourism, demography, banking, stock exchange, capital market and other socio-economic indicators with special emphasis on timeliness and quality of data.

3. FBS is headquartered in Islamabad with a chapter in Karachi. Its field services consist of 34 Regional/field offices, spread all over the country for conducting field enumeration. FBS also has its own Training Wing to meet the training needs of Statistics Division and its attached departments as well as other federal/provincial government departments. There are three Data Processing Centers of FBS located in Islamabad, Lahore and Karachi for processing the data inquests undertaken by Population Census Organization (PCO) and Agricultural Census Organization (ACO). Organizational Chart of FBS and an account of its important activities is given in the following paragraphs.

**ORGANIZATION**

FBS is headed by a Director General who is assisted by Deputy Director Generals (DDGs) to defray distinct sets of responsibilities. Training Wing is headed by Principal under the auspices of DG.



### FUNCTIONS IN BRIEF

As it has been alluded to in the introductory part, FBS is mandated to collect and compile statistical data relating to various socio-economic sectors, release/disseminate reports through electronic/printed means, meet the data requirement of federal ministries, provincial governments and other national and international organizations. FBS is preeminently consulted to provide advice in technical matters like sample selection & questionnaire designing by agencies/ departments for launching the requisite data inquests. Further, FBS performs pivotal role in evaluation and introduction of standard concepts, definitions and classifications pertaining to national statistical series and to determine the validity of statistical methods. FBS has also been providing on-job training to the working statisticians of various federal/ provincial departments. Some important quantification is given in the following paragraphs under the specific heads.

### NATIONAL ACCOUNTS

National account comprises collection of economic data to compile macro-economic estimates. In this connection, regular activities constitute; GDP/GNP (factor costs) by industrial origin (by "sector"), Expenditure on GNP (market prices) Estimates of GFCF (market prices) by industrial origin for private & public sector, and for general government and composition of general government consumption expenditure. Growth rate of national accounts estimates is determined with reference to some base year which of late, is changed on quinquennial basis. Similarly, some other periodic activities viz. compilation of input-output tables, institutional sectors accounts and national health accounts are also undertaken in order to understand the chemistry of the national economy. For the purpose of estimating the sectoral contribution, primary (agriculture) sector is divided in to crops, live stock, fishery and forestry. The secondary (industrial) sector comprises mining & quarrying, manufacturing which is further subdivided into large scale, small scale and slaughtering. The secondary sector also includes construction, electricity and gas & water supply.

The tertiary (services) sector encompasses transport, storage & communication wholesale & retail trade finance & insurance, ownership of dwellings public administration & defense and social community & personal services.

Aggregate demand viz. expenditure on GNP is also estimated in the form of private final consumption expenditure, government final consumption expenditure, gross fixed capital formation, changes in stocks, exports (minus imports) of goods and services and net factor income from rest of the world.

### **PAKISTAN SOCIAL AND LIVING STANDARDS MEASUREMENT SURVEY (PSLM)**

FBS conducts PSLM survey on annual basis to quantify a range of demographic, education, health, household assets & amenities, population welfare, water supply & sanitation, and income & expenditure variables. PSLM survey data is also used for poverty assessment and monitoring of MDGS.

The annual cycle of PSLM was launched on 15<sup>th</sup> July 2004 to continue till end June 2015, under a project initiative with total cost estimates of about 761 million rupees. Sample size of the survey comprises 17648 households.

The MDGs Indicators are produced through PSLM survey comprise net primary enrolment ratio (%), literacy rate (%), gender parity index (GPI) for primary, secondary and tertiary education, youth literacy GPI, proportion of fully immunized children 12-23 months, proportion of under 1 year children immunized against measles, proportion of children under five who suffered from diarrhea in the last 30 days and received ORS, lady Health workers' coverage of target population, proportion of births attended by skilled birth attendants, proportion of women 15-49 years who had given birth during last 3 years and made at least one antenatal care consultation, population having access to improved drinking water sources, population having access to sanitation.

### **QUANTUM INDEX OF LARGE SCALE MANUFACTURING INDUSTRIES (QIM)**

Growth and composition of large scale manufacturing (LSM) indicates transition of economy to higher reaches on the development trajectory.

FBS computes Quantum Index of Large Scale Manufacturing Industries to measure its growth rate on monthly basis. There are in total 100 items with a weight of about 75% which are used for computation of QIM. As for sources of requisite data (i) Production data of different manufacturing products is received from Oil Companies Advisory Committee (OCAC) supplies data for 11 petroleum items having a weight of 5.2%, (ii) Ministry of Industries and Production supply production data of 35 items having about 45% weight. Major items include sugar, cotton yarn and cloth, fertilizer, cement, steel, automobiles etc. (iii) Provincial Bureaus of Statistics supply production data of 54 items having weight of 25%.

The quantum index of large scale manufacturing industries is presently based on weights derived from census of manufacturing industries conducted for 2000-01. FBS is now working to rebase QIM as per weights derived from CMI 2005-06. Similarly, planning to conduct census of manufacturing industries for the base year 2010-11 is also underway presently.

### **LABOUR FORCE SURVEY (LFS)**

LFS is the prime regular activity of FBS. The Federal Bureau of Statistics has been conducting Labour Force Survey (LFS) since 1963 on annual basis. So far twenty Eight (28) surveys have been completed. The survey results have been quarterly representative for main aggregates since 2005-06. A "Panel on Labour Statistics" comprising of all

stakeholders reviews and approves the LFS questionnaire/methodology as per international standards. Presently LFS 2009-10 is under processing while LFS 2010-11 is in the field. Sample Size constitutes 40,000 households.

The survey provides a wealth of information on labour force characteristics and its micro data is widely supplied to government, national and international agencies, research organizations and other users at large. The main indicators comprise, labour force participation rates, unemployment rates, structure of employment, number of hours worked, employment by formal & informal sectors, occupational injuries/diseases, sex ratio, literacy rates and educational attainment.

### **SOCIAL STATISTICS**

The Social Statistics section of FBS is entrusted with the tasks of the compilation of social statistics series collected from secondary sources for the purpose of FBS publications with annual (sub-annual periodicity), supply of social statistics to national and international agencies and compilation of documents and compendia on social, gender and environment statistics.

### **SAMPLE DESIGN SECTION (SDS)**

Sample Design Section is the most conspicuous and sought after part of FBS. Almost all data inquests in the country are referred to the section for the preparation of sample design. The section is responsible to prepare, maintain and update sampling frames and design sample surveys.

### **AGRICULTURAL STATISTICS SECTION (ASS)**

As the title signifies, ASS collects agricultural crops data from provincial agricultural departments, prepares agricultural crops estimates at national and provincial level and supply crop estimates to MINFAL for final release. ASS data are also used as input in the calculus of national accounts estimates.

### **BUSINESS REGISTER (BR)**

A Business Register is a comprehensive database of all active businesses entities in the country. BR is imperative to establish frame for conducting census/surveys initiatives. The Development of Business Register started from January 2010. Initially it would be limited to large scale manufacturing industries. Gradually, it will be extended to other sectors of the economy. So far Software has been developed and 3808 establishments have been loaded. Expected size of BR would be about 16000 establishments. Main Sources of data are Federal Bureau of Statistics (FBS), Securities & Exchange Commission of Pakistan (SECP), Federal Board of Revenue (FBR), Karachi / Lahore / Islamabad Stock Exchanges, WAPDA, KESC, SNGPL, SSGC and Directorates of Provincial Labour & Industries Department.

### **ENERGY AND MINING STATISTICS SECTION (EMS)**

Energy and Mining Statistics Section is responsible to collect, compile and disseminate electricity generation and mining production data. The data sources include federal/provincial mining departments, WAPDA, KESC, NEPRA etc. ESS conducts Censuses of Mining and electricity generation. It also provides input for national accounts estimates of the relevant sectors.

### **PRICE STATISTICS SECTION (PSS)**

Price statistics includes collection of retail and whole sale prices and computation of price indices viz. Consumer Price Index (CPI) to measure inflation in the country (monthly basis), Wholesale Price Index (WPI) to know the general price level and direction of prices (monthly basis) and Sensitive Price Indicator (SPI) to assess price movements of essential consumer items in the short interval of time (weekly basis). Presently, price indices are based on 2000-2001. However, the process is underway to provide for rebasing these on 2005-06 – the national account base in making.

### **FOREIGN TRADE STATISTICS SECTION (FTS)**

Foreign Trade Statistics Section estimates the quantum and composition of foreign trade (imports) and exports. For collecting the requisite information, Federal Bureau of Statistics Karachi has made the electronic connectivity with the Custom House Karachi to download the Secondary data on import & export on monthly basis from their systems installed named as PRAL (Pakistan Revenue Automation Limited) and CARE (Custom Administration Reforms). As per known practices, imports are compiled on C.I.F basis (Cost, Insurance and Freight), exports are compiled on F.O.B. basis (Free on Board).

For the monthly summary totals and provisional advance release of data, F.B.S. gets total figures of Imports and exports from Federal Board of Revenue on monthly basis and issues the summary on External Trade comprising imports & exports and balance of trade on or before 10th of each month. After downloading the data from PRAL and CARE system at 8 digit level on harmonized coding system, monthly advance release on foreign trade statistics is issued on provisional data of major items of imports (43 items) and exports (46 items) on or before 20th of each month. The reports on country by commodity, commodity by country, by areas and countries/territories, by economic categories, by commodity group are also issued.

### **PAKISTAN DEMOGRAPHIC STATISTICS SECTION (PDS)**

Pakistan Demographic Survey is the one of the core regular activities of FBS. The survey is carried out to; estimate the current growth rate of population during the intercensal period, collect statistics of births and deaths in order to arrive at various measures of fertility and mortality for Pakistan and its four provinces with urban and rural and, gather statistics on other selected demographic characteristics of the population. Some important demographic indicators quantified by the survey are Crude Birth Rate (CBR), General Fertility Rate (GFR), Age Specific Fertility Rate (ASFR), Total Fertility Rate (TFR), Crude Death Rate (CDR), Infant Mortality Rate (IMR) and Life Table etc.

### **FBS PUBLICATIONS**

F.B.S. Karachi has in-house printing facility to print and disseminate the regular and adhoc publications. The lists of regular publications include i) Bulletin of Statistics (MBS), (ii) Pakistan Statistical Yearbook (SYB), (iii) Pakistan Statistical Pocket Book (SPB), (iv) Pakistan Labour Force Survey (LFS), (v) Foreign Trade Statistics (FTS) (Imports & Exports), (vi) Pakistan in Figures, (vii) Pakistan in Brief.

All of the regular publications except MBS are published with annual periodicity. Some of adhoc publications are (i) Social Indicators of Pakistan, (ii) Pakistan Demographic Survey (iii) Census of Manufacturing Industries, (v) Rent Survey of Dwellings, (vii) Census of Private Education Institutions in Pakistan, (viii) Census of Software Industry of Pakistan. Further, a News Letter and Review of Foreign Trade are also printed as well as upload on monthly basis.

### **DATA PROCESSING CENTRES (DPC)**

Data Processing (DP) is the defining activity of FBS. For this purpose three Centers are established in Islamabad, Lahore and Karachi. These centers carryout data processing of the data inquests undertaken by FBS, PCO and ACO. The list of the main data processing jobs of FBS include Foreign Trade Statistics, Price Statistics (SPI, CPI, WPI), Pakistan Demographic Survey, PSLM Survey, Labour Force Survey, Establishment Roll, Nominal Roll, Seniority Lists of Staff, etc. Website and Development of Price and Foreign Trade Databases.

Similarly, the main data processing jobs of ACO comprises Mouza / Village Census, Agriculture Census, Live Stock Census, Farm Machinery Census and Up-dating of Sampling Frame for Live-Stock Census.

The list of main data processing jobs performed on the behalf of PCO constitutes updating Mouza/Village file for Union Councils, Tabulation for National / province / districts & Union Councils level and Population & Housing Census.

### **TRAINING WING (TW)**

Training Wing plans, organizes and conducts training courses and holds workshops and seminars for statistical personnel of mainstream statistical organizations (FBS, ACO, PCO) as well as nominees from other agencies viz. institutions, research organizations etc. These courses are imparted by local and foreign resource persons.

### **CONCLUDING REMARKS**

Statistical activities of FBS take nigh all the stock of the socio-economic data requirement of the country. FBS has also been successful in keeping the statistical methodologies in line with international standards. Further, FBS can expand the canvass of quantification provided it is allowed to work with stipulated capacity of men & material which is circumscribed by overall budgetary and procedural constraints. While evaluating the work of FBS, it is worth keeping in mind that lack of documentation and unwillingness to share data, particularly by establishments, bear nexus with the lack of good governance – not with the capacity and performance of FBS.

## **POPULATION CENSUS ORGANIZATION (PCO)**

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Population Census Organization has been established in 1950 under the census act, 1949 as part of Ministry of Home Affairs (Interior) after 1972 Census, Census Organization was established on permanent footing an attached department of Ministry of Interior.

Department of Registration and Census Organization were merged of Registration Organization in 1973 were merged in 1976 to be called "Census & Registration Organization" In 1978, the Census Organization was made an attached department of Statistics Division

### **FUNCTIONS OF PCO**

The main function of Population Census Organization is planning and execution of decennial population & housing census, processing and dissemination of data in the form of census reports, analysis of census data and demographic research, intercensal sample studies / surveys in related areas, supply of census data to the data users and tabulation of data to meet specific demands of data users.

### **CENSUS HISTORY**

First regular census in areas now comprising Pakistan was held in 1881. Since then regular census have been conducted after ten years. After independence five censuses have been undertaken in Pakistan respectively in 1951, 1961, 1972, 1981 and 1998. Population Census is held under legal frame-work of Census Ordinance, 1959 authorizing Federal Govt. to decide census dates, formulate census questionnaires and to seek assistance from any quarter.

### **POPULATION CENSUS**

Population census is the total process of collecting, compiling, evaluating, analyzing and publishing/disseminating demographic, social and economic data pertaining to all persons living in a country or a well defined territory, at a specified time.

### **CHARACTERISTICS OF CENSUS**

Census is the largest statistical activity which covers entire territory and population living therein. Census is held at one point in time throughout the country giving a picture of the population and area at a certain time.



Census provides basic data (by age and sex) for smallest admin. units for planning at micro level. Censuses held at regular intervals provide comparable information to appraise the past, describe the present and estimate the future.

### **CONSTITUTIONAL COVER**

Population Census provides basis for political representation to the National Assembly under article 51 (3) of the constitution. Population base is used for distribution of funds to the federating units by the National Finance Commission formed under article 160 (2) of the constitution. It determines quota for recruitment to all civil posts in Federal Government.

### **LEGAL FRAME WORK**

The census ordinance of 1959 amended from time to time provides legal frame-work for census undertaking. The ordinance provide appropriate authority to federal government for fixing / declaring census dates, formulate census questionnaires to be notified in the official gazette, to maintain confidentiality of the individual information, to seek assistance from any quarter for census work and to penalize any wrong doers.

### **SCOPE OF CENSUS**

Entire Area of Pakistan including Tribal Areas (FATA & PATA), AJK & Gilgit Baltistan will be covered for both Population and Housing.

All persons living in above area will be enumerated. Afghan refugees and special population groups living in camps will be excluded. Foreign national living in Pakistan to be covered except diplomatic personnel and their families. Seasonal migrant to be covered at place of residence on census date.

### **DEVELOPMENT OF QUESTIONNAIRE**

Topics to be included in the questionnaire, their precise concepts and definition, language and order determine the scope and quality of census data. The choice of topics to be covered mainly depends upon national needs. Other considerations include:-

- i) Comparability and continuity of census information – traditional topics cannot be changed
- ii) Quality of data collected in previous census
- iii) Availability of qualified field staff and ability of respondents in answering complex questions
- iv) Availability of resources in term of money, men and material
- iv) International practice and UN / ESCAP recommendation

**TOPICS COVERED IN CENSUS****A) DEMOGRAPHIC & SOCIAL CHARACTERISTICS**

Age - Sex - Relationship to the head - Marital status  
Religion - Mother tongue (language) - Nationality

**B) EDUCATIONAL CHARACTERISTICS (for 5 years +)**

Literacy status - School attendance - Level of education completed - Field of education

**C) GEOGRAPHICAL/MIGRATION CHARACTERISTICS**

Usual residence - District of birth - Duration of continues residence in district - District of previous residence Reason of migration

**D) ECONOMIC CHARACTERISTICS (for 10 years +)**

Type of activity - Occupation, Industry - Employment status - Reason of un-employment

**E) FERTILITY MORTALITY (females 15-49 Years)**

No. of children ever born by sex  
No. of children still living by sex  
No. of children born during last 12 months by sex  
No. of children still living by sex

**F) MISCELLANEOUS**

Nature of disability if any  
Immunization of children under 10 years of age  
Holding of NI Card of persons 18 years plus

**G) HOUSING CHARACTERISTICS**

Information about living quarters such as number of, tenure status, period since constructed and construction material used in outer walls & roofs, Data on source of drinking water, source of lighting and cooking fuel used, Availability of proper kitchen, bathroom and latrine, Media of information such as use of T.V., Radio and Newspaper.

**CENSUS METHODOLOGY**

Methodology refers to methods employed for collecting data, different phases involved, use of sampling, etc.

**Enumeration Method:**

Canvasser method used in all previous censuses in which information was collected and recorded by enumerator through interaction with the head or responsible member of household.

**De-jure or De-facto Count:**

De-jure method used in previous censuses. Since 1981 census “**extended de- facto**” approach is used which provide both de-jure as well as de facto population count.

**Sampling:**

To collect additional information on complex/sensitive questions sampling is used.

**USE OF SAMPLING**

1. With the development of society needs of statistical data expand for additional questions, more tabulation of questions covered and early release of census data.
2. All such needs cannot be met through complete enumeration with limited resources.
3. Data on topics which are complex / sensitive and require intensive interviewing and processing efforts is collected on sample basis.
4. This procedure can optimize census output for a given cost and simplify and expedite census work.
5. This also results in improved quality of data through intensive training, appointment of better enumerators and effective supervision.
6. Sampling is also used in Census Evaluation Survey (CES).

**TABULATION PLAN**

Tabulation is the end product of the whole census exercise. It should be prepared to meet the national needs. Tabulation plan is the set of table formats as to appear in the published census reports. It should be developed soon after the content of questionnaire are finalized. Development of tabulation plan in advance help the data processing staff to complete all system analysis, programming and testing work in time. Tabulation plan should reflect requirement of data users. Consultation with data users is useful before tabulation plan is finalized. Publication time and cost and the data entry/processing method also determine the number and complexity of tabulation that could be produced.

**FIELD OPERATIONS**

Preparation of maps to avoid omission /duplication, Finalization of area lists, Delimitation of census areas to ensure complete coverage, Preparation of Field Operation plan, Logistic requirements, Hiring and training of field staff, Publicity campaign and Census enumeration.

**CENSUS MAPPING**

Maps are prepared for each census area to ensure complete coverage of area & population and avoid omission / duplication of area, Rural area maps prepared for the last census will be updated with the help of Revenue staff, Maps of large mauza/deh having population 5000+ updated while those of smaller areas will be updated before

delimitation, Updating of urban areas maps require more efforts due to structural changes in urban areas and insufficient details of boundaries on maps provided by the local councils.

### **FINALIZATION OF AREA LIST**

Accurate lists of rural and urban Admn. Units are required for tabulation and publication of census data, These lists are also necessary for a number of field activities like delimitation of census areas, appointment of field staff, working out logistic requirement etc, Lists of rural areas are finalized with the help of Revenue Department at district level, List of urban areas use to be finalized with the help of local government. However due to introduction of new local government ordinance the urban rural bifurcation has been discontinued.

### **DELIMITATION OF CENSUS AREAS**

To ensure complete coverage of area/population and for effective field supervision, the country is traditionally delimited on a four-tier system which include:

- Census District (Entire Tehsil, big urban localities and Cantt.)
- Census Charge (Qanungo/STC, Town/part of Town)
- Census Circle (Patwar Circle/TC, part of urban locality)
- Census Blocks (mauza/part of mauza, area of approx. 200 HH.)

The boundaries of census areas coincide with existing administrative set up of Districts, Tehsils/Talukas, Qanungo Halqas, Patwar Circles and Mauzas / Dehs in rural areas and Municipal/Town Committees and Cantonments in urban areas.

### **FIELD OPERATION PLAN**

A comprehensive plan for all field activities will be prepared for guidance of Census Officer/Supervisory staff highlighting the following:-

- i) The role/responsibilities of all the field staff i.e. DCOs, CDOs down to the level of Enumerator.
- ii) The Geographic/Cartographic activities such as up-dating of area list, updating of maps, delimitation of census area, etc.
- iii) Appointment of field staff i.e., CDOs, charge superintendents, circle supervisors & enumerators.
- iv) Arrangement for the training of field staff (supervisors and enumerators)
- v) Distribution of training / census field used material.
- vi) Census enumeration such as house listing, big count and sample count.
- vii) Retrieval of census material.

### **HIRING OF FIELD STAFF**

Census operation requires a large field force (about 160 thousands) as enumerators and supervisors, PCO depend on provincial government and district management for hiring of such a large field force, The primary and middle school teachers and other local government employees will be engaged as enumerators, Efforts will be made to obtain good quality enumerators, both male and female from Education, Health, Revenue and Local Government Departments.

### **TRAINING OF FIELD STAFF**

Training is an important aspect in the execution of census and collecting accurate data. Quality of census data depends on proper training of field staff, A core of master trainers (12 – 15 ) taken from senior officers of PCO will be prepared and trained, Master trainers will train about 650 trainers taken from BPS-17 officers of PCO, FBS and Education Department, These trainers will impart training to approx. 160 thousand enumerators and supervisors at district and tehsil level in about one month time, Manual of instructions will be prepared for enumerators and supervisors.

### **PUBLICITY**

Publicity plays an important role in projecting the importance of census. An effective plan need to be launched to educate the people for their greater participation and to motivate the field staff, A comprehensive plan will be implemented through Ministry of Information which will include interviews by Secretary / CCC, Messages of the President and Governors, Jingle on census, advertise-papers, etc, Sensitization workshops will be held at provincial capitals to brief the provincial functionaries and seek their cooperation, Similar orientation workshops will be held for the census district officers at regional level, Publicity material (posters, brief news, advertisements, etc.,) will be prepared and displayed throughout the enumeration period .

### **ENUMERATION ACTIVITIES**

House numbering / household listing to identify residential and non-residential units (commercial, educational, etc.) and to prepare inventory of households, Census enumeration through door to door visit and interaction of enumerator with the head or responsible member of household,/monitoring to ensure accuracy in recording of information. Each supervisor to fill certain number of forms of each block independently, Retrieval of filled-in documents according to delimitation of areas under security cover.

### **POST CENSUS ACTIVITIES**

- Editing and coding of census forms
- Transfer of data from source documents to computer (Data entry)
- Computer editing and imputation
- Data processing and tabulation

## **EDITING AND CODING OF FORMS**

In-spite of the best efforts through training and supervision some errors may creep in due to carelessness of either enumerator or respondent which demand editing, Manual editing - filled-in forms are checked for their completeness and editing of basic variables. Correction of errors is made only in clear-cut cases, Codes are assigned to open-ended questions on the long form like occupation, industry, district of birth and district of previous residence, in the office, Manual editing and coding of open-ended question is time consuming process and need to be shortened through computer editing, Computer editing is fast, uniform, more accurate and can apply more edit checks at a time.

## **DATA ENTRY**

Data entry is the process of transferring data from source document to computer for processing, Data entry of such a huge volume is a cumbersome and lengthy process. Intelligent character recognizer (ICR) technology is planned to be used in 2011 Census to ensure accuracy and timeliness. which has the capacity of scanning hand written alphanumeric characters, Use of ICR helps in reduction of data entry/processing time and release of reports by one third, Printing of ICR forms strictly according to machine specifications is a pre-requisite for success of this technology. Unfortunately such printing facilities are limited in Pakistan.

## **DATA PROCESSING AND TABULATION**

Data processing activities include computer editing, imputation of missing or inconsistent values, tabulation, etc, Computer editing of data in 1998 was done using CONCOR, a package developed by US Bureau of Census, Hot Deck method was used for imputation of missing and inconsistent values, Processing and tabulation of data was carried out by FBS on mini-computer VAX-6310, In the next census PCO plan to carry out most of the data processing activities (editing/coding, data entry, coverage checking and computer editing) in PCO. Processing and tabulation will be done by FBS.

## **PUBLICATION OF CENSUS RESULTS**

- Provisional Results within 2-3 months
- Advance tabulation on important characteristics
- Regular reports at District, Provincial and National level
- Supplementary reports to meet specific requirements
- Subject wise reports on important characteristics
- Special reports on big cities and selected areas.
- Census Atlas giving visual presentation of census data

**REGULAR CENSUS REPORTS-1998 CENSUS**

➤ National and Provincial Census Report	05
➤ District Census Reports	106
➤ Reports of FATA and Agencies	08
➤ Reports of Azad Kashmir and Districts (restricted for official use)	08
➤ Reports of Northern Areas and Districts (restricted for official use)	06
<b>Total</b>	<b>133</b>

These reports consist of five parts:

- i) General Description of the Area
- ii) Broad Analysis of Population Data
- iii) Broad Analysis of Housing Data
- iv) Statistical Tables
- v) Additional information in the form of Annexure

**DISSEMINATION OF CENSUS DATA**

- Census reports are supplied to data users on complementary basis.
- Data on important variables placed on the web-site of PCO i.e., [www.census.gov.pk](http://www.census.gov.pk) which is updated from time to time.
- Detailed data on population and housing census - 1998 available on CD and supplied on payment.
- Supply of data to National and International Agencies and general data users is a continuous activity.

## WATER CRISIS IN PAKISTAN

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In 1947, 5000 cu/m of water was available. Because of uncontrolled population growth. Water resources in Pakistan have been under severe stress for a long time. The downturn countries and the country is now on the brink of water scarcity. At the time of independence 5000 m<sup>3</sup> of water was available for each Pakistani in 1951, which has now reduced to 1000 m<sup>3</sup>. The availability could drop to 700 m<sup>3</sup> by 2025. Surface water and ground water are two main sources of water. Groundwater table is decline in various residential areas varies from 4-7 feet. Southern Punjab is facing serious threat due to Arsenic Contamination above 10ppb of WHO Guidelines. Under groundwater is rapidly declining up to 700 to 800 feet, which might cause a flow of brackish water of surrounding districts of Lahore.

The sea has intruded almost 40km in Badin district of Sindh only 30% groundwater is used because of the sea, surface water is common, but its quality is not up to WHO Guidelines values. Most of the treatment plants are not working properly. There are 29 lakes spread all over Pakistan, majority of these lakes are in Sindh but, they are contaminated. Many people dead after drinking the water of the Manchar lakes. River Kabul is the largest river of N.W.F.P. If India succeeds in building a dam on Kabul River upstream, NWFP will face serious water problem.

The best way to solve the problem of water scarcity is to apply technology of Desalination which includes Reverse Osmosis, Distillation and Electro-dialysis. Such plants can be installed at Karachi, Gwader and other cities which are near the sea.

### KEYWORDS

Mangrove Forest; agrarian economy; metering system.

### 1. INTRODUCTION

Almost 97.5 per cent of all water on earth is salt water, leaving only 2.5 per cent as fresh water. Nearly 70 per cent of that fresh water is frozen in the icecaps of Antarctica and Greenland; most of the remainder is present as soil moisture, or lies in deep underground aquifers as groundwater; not accessible to human use. Less than one per cent of the world's fresh water is accessible for direct human use. As given in table 1, Fresh water on our earth planet ready to use is 0.2971 km<sup>3</sup> thousand out of 1,403,477 km<sup>3</sup> thousand.

The freshwater resources, unevenly distributed across the globe, are depleting due to increasing population pressures, mismanagement, development of water-intensive industries and above all diversions for irrigated farming.

Pakistan faces the most serious water shortage in south asia. It will require 335 billion cubic meters of water per annum by 2025, with no more than 236 billion cubic meters available.



Today water has become a scarce commodity and an acute water shortage is being felt by developing as well as developed countries. The situation has been aggravated to a considerable extent by erratic weather patterns brought about by global warming.

#### **WATER ON EARTH PLANET:**

**Table 1: Earth Planet Water Compartment**

<b>Compartments</b>	<b>Volume Thousands of km<sup>3</sup></b>	<b>% of total water</b>	<b>Average Residence Time</b>
Total	1,403,477	100	2800 years
Oceans	1,370,000	97.6	3000 Years to 30,000 years
Ice and Snow	29,000	2.07	1 to 16,000 years
Groundwater down to 1 km	4,000	0.28	From days to thousands years
Lakes and Reservoirs	125	0.009	1 to 100 years
Atmosphere	113	0.008	8 to 10 days
Saline Lakes	104	0.007	10 to 1000 years
Soil and Moisture	65	0.005	2 weeks to a year
Biological Moisture in Plants and Animals	65	0.005	1 week
Swamps & Marshes	3.6	0.003	From months to years
River and Streams	1.7	0.0001	10 to 30 days

Source: US Geological survey, Washington D.C. [1].

According to the International Water Management Institute, [2] by 2025 one-third of the world's population will lack access to water. Developing countries will be more likely to face the worst water crisis because of lack of financial resources for water management.

## **2. INDIA AND PAKISTAN ON WATER ISSUE**

### **Wullar Barrage (The Tulbal Navigation Lock)**

In 1985, India started construction of a barrage some 439 feet long and with a lock at the mouth of Wullar Lake, the largest fresh water Lake in Indian. The stated purpose of the barrage was to make possible navigation in 22km stretch between the towns of Sopore and Baramula, during the lean winter season by regulating the flow of River Jhelum.

### **Kishanganga Project**

Outrageously the Kishanganga Project the Indians hawk on the premise that it will ostensibly bring water from River Kishanganga to Wullar Lake, where a hydroelectric power station is proposed.

The project envisages construction of a channel and a tunnel for this purpose. Simultaneously to build a dam, near the place where River Kishanganga crosses the Line of Control to enter Pakistan-administered Kashmir, where it is known as Neelum.

Here Pakistan plans to construct 969 MW-capacity Neelum-Jhelum Power Plant with Chinese assistance. The Pakistani project is going to be completed in 2017, due to delay in construction work. Pakistan is genuinely concerned and fears that the Kishanganga

Project would lead to a shortfall of water flow into Neelum, reducing its power generation by an estimated 9%.

India intends to complete the Kishanganga Project by 2016 to avail the opportunity of diverting Kishanganga's water to Wullar Lake before Pakistan is able to invoke the provision of prior appropriation.

### 3. RIVERS OF PAKISTAN

The catchments area of Indus contains seven of the World's highest ranking peaks and seven of the largest in the world glaciers.

Hydrologically, Pakistan has three main drainage basins namely Indus basin, Kharan closed basin and Makran coastal basin. Out of them Indus occupies 70% of the region while each of remaining two has 15 % of the area.

River Indus is the longest River and the third largest river, in terms of annual flow, in the Asian sub-continent originating in the Tibetan plateau in the vicinity of Lakes Mansarover, then runs a course through Ladakh Jammu & Kashmir and northern areas, flowing through the north in the southern direction along the entire length of the country, to merge into the Arabian sea near Karachi. The total length of the river is 3,180 km. the river has a total drainage area exceeding 1,65,000 km<sup>3</sup>. The province wise rivers of Pakistan are given in table 3, traversing about 310 km in Northwestern direction. Major Rivers of Pakistan are given in table 2.

**Table 2: Major Rivers of Pakistan**

<b>Punjab</b>	<b>Sindh</b>	<b>Khyber P.</b>	<b>Balochistan</b>	<b>AJK</b>
Chennab River	Maleer River	Kabul River	Dasht River	Kunhar River
Ravi River	Layari River	Kumar River	Hub River	Neelum River
Ghaggar Hakre River	Gujjar River	Khurram River	Kandhar River	Suru River
Sutlej River		Hunza River	Zhob River	
Sohan River		Gilgit River		
Jhelum River		Haro River		
Soan River		Gomal River		
		Swat River		

(Source: 3) River Ravi and Satluj Rivers are Indian Rivers according to Indus Water Treaty.

There are large rivers in Punjab. Sohan River is the only river which flow in Islamabad, Federal Capital. The greatest river is mighty Indus which supplies water to practically all of Pakistan. The maximum Rivers are in Khyber Pakhtoonkhwa province totaling about 15 rivers. River Kabul is the largest river in Khyber Pakhtoonkhwa. In Balochistan, there are six Rivers and in Azad Jammu & Kashmir, three rivers include Kunar River, Neelum River and Suru Rivers. Most of these rivers are not perennial, also they require treatment. Most of these Rivers are stream like and flow during rainy season. Traversing about 310km in Northwestern direction. It is joined by Shyok near Skardu at an elevation of 2740 meters. Flowing in the same direction for another 62-km distance before it turns round Nanga Parbat it is joined by the river Gilgit at a 1525-m elevation. [4]

#### 4. QUALITY AND RESOURCES OF PUNJAB RIVERS

The situation of water scarcity is going to deepen, as under ground water table is at sharp decline day-by-day.

##### PUNJAB

As per study conducted by the city district Government Lahore, the water table of Punjab is fastly going down due to excessive abstraction. According to Daily News dated 28.04.2010, the water level in the city (Lahore) is on the down hill at the rate of 5 to 10 meters annually. Actually measurement, the range is from 4 to 7 feet annually (NCBA&E). the major reasons behind this alarming decrease in water were its relentless usage, increasing population, over construction, over consumption and lack of rains.

Sources in WASA said all the 22 sub-division of WASA were facing the problem and the number of water shortage complains had increased to over 150 per day.

Sr. #	Name of residential Area	Decrease in Water Table
1	Ichhra	7 Feet
2	Kot Lakhpat	7 Feet
3	Township	5 Feet /Year
4	Gulberg 5	6 Feet /Year
5	Gulberg 12	6 Feet /Year
6	Gulberg Industrial Area	5 Feet /Year
7	Model Town Green Town	4 Feet /Year
8	Garden Town	4 Feet /Year
9	Samanabad	4 Feet /Year
10	Mozang	4 Feet /Year
11	Allama Iqbal Town	4 Feet /Year
12	Shimla Hill	4 Feet /Year
13	Misri Shah	4 Feet /Year

Source: (WASA) [5]

Well-placed sources in Wasa said that according to a State Bank report [4], per capita water availability was declining due to sharp decrease in the underground water table. The problem is worsening due to the combined impact of rising population, growing number of tube wells, lack of metering system, misuse of water on domestic and commercial basis, falling water flows and lowering trend to build underground water tanks in the buildings for water storage.

##### WATER QUALITY OF SOUTHERN PUNJAB:

Southern Punjab is facing a serious threat of water pollution. It has been learnt through the result of a field verification research jointly conducted by the team of Japanese researchers from Tokyo Institute of Technology and National Institute of Advanced Industrial Science and Technology (AIST) that the water level 10ppb above WHO Guidelines result are shown in table 4.

Sr. #	City	Value Range
1	Ahmedpur East	10 – 70ppb
2	Bahawalpur	10 – 70ppb
3	Liaqatpur	10 – 90ppb
4	Multan	10 – 100ppb
5	Muzaffargarh	10 – 150ppb
6	R. Y. Khan	10 – 90ppb
7	Yazman	10 – 130ppb

Source: (6)

Due to high arsenic level found, there is an increase in cancer, still births, post-neonatal mortality and other diseases, and the geological phenomenon is believed to be the main reason of the presence of the area. Increasing number of patients in Shaukat Khanum Memorial Hospital and research center shows an alarming situation. The issue needs the urgent attention of the government agencies responsibilities for planning and provision of basic infrastructure and services including water and sanitation. According to the official statistics of SKMH by the year 2008 a total of 76,250 patients were registered, 197,730 patients were given chemotherapy treatment, 33,789 patients were surgically operated, 717,562 got imaging studies, 12,777,05 pathology test were conducted.

## 5. FLUORIDES

Water of certain area of Punjab is also contaminated with Fluorides. Contamination of fluorides was high lighted in the year 2000, when it was investigated that children near the villages of Lahore were suffering from bone deforming disease, it was due to the presence of high fluorides ( $>1.5$  mg/l). The WHO Guideline for fluoride is 1.5 mg/l, it is temperature depended. If in the drinking water it is less than 1.5mg/l dental caries (tooth decay) takes place, if the value is greater than 1.5mg/l, dental fluorosis may occur, intake of 20 – 40 mg of  $F^-$  per day over long periods results in crippling skeletal fluorosis. District wise fluoride range in the water of western Punjab is given in the table.

**Table 5: District wise Fluoride Range in the Waters of Punjab**

District	No. of Sample Examined	Range of Fluorides mg/l
Attock	5	0.18 – 0.65
Rawalpindi	9	0.16 – 0.38
Jhelum	7	0.10 – 0.75
Mianwali	12	0.30 – 1.50
Sargodha	20	0.18 – 2.80
Gujrat	5	0.46 – 0.60
Sialkot	8	0.23 – 0.54
Gujranwala	16	0.22 – 1.90
Jhang	12	0.23 – 1.60
Sheikhupura	13	0.27 – 5.80
Faisalabad	10	1.00 – 1.90
Lahore	28	0.15 – 23.60
Kasur	12	0.37 – 6.40
Vihari	6	0.22 – 1.50
Sahiwal	12	0.24 – 2.40
Bahawalnagar	6	0.24 – 2.50
Bahawalnagar	6	0.29 – 0.98
Dera Ghazi Khan	4	0.19 – 0.80
Multan	8	0.16 – 0.65
Muzaffargarh	7	0.15 – 0.58
Rahim Yar Khan	6	0.50 – 2.80

Source (Khurshed A., 2007) (7)

It can be seen from the table that, highest values are obtain from Sheikhpura, Kasur and from Southern Punjab. The reason for high fluoride was invested by the author that there exist a range of fluorine containing minerals that runs obliquely across the Punjab which comes from ferozepure (India) through Kasur, Saangla hills, Chiniote Hundawala, Sargodha, Shahpur and in the east Mianwali which may be responsible for high fluoride concentration.

## 6. NITRATE

The nitrate contents of major cities and towns of Southern Punjab is discussed below. In Bahawalpur groundwater is the major drinking water source; sweet water in Bahawalpur is only 50 percent. Hand pumps are in common use. Three tube-wells located adjacent to the Hakra Canal supply drinking water. Rahim Yar Khan obtains its water supply from a groundwater and surface water from Adam Sohaba distributaries. In Sadiqabad groundwater is the major source of drinking water.

**Table No. 6: Nitrate level in the drinking water sources of southern Punjab**

S#	CITY	Source	No. of sources sampled	No. of times		Min-Max.	AV	Value exceeding Guideline Values
				Sources	Sampled			
1	Bahawalpur	HP	22	4		0.44 – 42.2	6.27	3
		SW	1	5		2.2 – 3.8	2.9	Nil
		T/W	2	5		0.71 – 1.6	1.17	Nil
2	Bahawal-Nagar	HP	1	5		1.95 – 2.1	2.55	Nil
		SW	21	5		0.43 – 22.2	8.52	6
		Well	2	6		4.87 – 9.4	3.95	Nil
		T/W	2	4		1.13 – 1.95	1.41	Nil
3	Rahim Yar Khan	HP	1	4		0.35 – 0.72	0.61	Nil
		SW	28	5		8.11 – 27.7	0.68	Nil
		T/W	1	5		6.61 – 09	0.85	Nil
4	Sadiqabad	HP	2	4		0.31 – 5.1	2.34	Nil
		SW	35	4		0.041 – 447	42	3
		T/W	4	5		0.17 – 1.57	0.84	Nil

SW=Surface Water, HP=Hand pump, T/W=Tube-well, Well deep well. (8)

## WATER RESOURCES OF SINDH

Sindh province has about 13 million acres of irrigated lands in its three barrage command areas, built between 1932 and 1962. Sukker barrage was the major irrigation achievement with a command area of 8.5 million acres. The water storage or extreme scarcity was found to be the main cause for out – migration from most of the villages. The total cultivated area of the Sindh Province as reported by the Govt. of Pakistan during 1997 – 1998 is 5.68 million hectares. This area includes fallow and sown area. Out of this total area, 2.56 million hectares is classified as irrigated area. The irrigated area constitutes 45.07% of the total area. Since the groundwater in most of the Sindh areas is

brackish and unsuitable for irrigation purpose, over 95% of the irrigated areas rely on surface water resources.

#### **Water Resources of Balochistan:**

Beside Indus Basin, there are Makran and Kharan basins in Balochistan. This province is biggest in size and smallest in population. Balochistan has limited water resources. Its share of water from Indus River is about 4.78Bm<sup>3</sup>, at present about 2.25Bm<sup>3</sup> of Indus water being utilize in Guddu and Sukker Barrages through the pat feeder, Desert and Kirthar canal system. In addition to the Indus water, approximately thirteen small river basins, which are mostly depend on hill torrents and small streams (nullah), are flowing only after intense rainstorms. Estimated annual flows from these rivers amount to about 3.5 Bm<sup>3</sup>. Water resources are extremely limited and scarce in Balochistan as compared to others parts of the country. There is dearth of water for irrigation, drinking and domestic purposes.

Main dependence of people has always been on nature and indigenous sources such as springs, streams and karez a permanent source of water for drinking and irrigation purposes in highland of the province. This source of water has been the mainstay of economic activity in rural area. Among all the resources, Karez have proved themselves most persistent and sufficient enough to most of the water requirement upon certain climate and ecological factors. Most of the karez that were alive few decades ago, have been abandoned resulting in radical changes such as shift of occupation, migration and strong inclination towards other sources of irrigation like excavation of tube-wells etc. Gradual decline of karez water has made people conscious of the future prospects of water.

In Balochistan the drought from 2000 onwards not only affected the whole agricultural system but also the water table become low and karez almost totally dried up. In highland, water resources and water conservation are practised in several forms. A variety of institutes have research interest in the field with the objectives like: (a) enhancing information exchange (b) identifying high priority area of research (c) Cataloguing future development requirements, and (d) developing and conserving the policies and strategies of scarce water resources. Irrigated crops are the main enterprise and about 54 per cent farmers relied on only irrigated crop. The main source of water for agriculture and orchards development in Balochistan is rainfall and ground water. Due to water imbalance between recharge and discharge of the aquifer of the sub-basin, a major problem has been arise, which demands immediate steps be taken to introduce remedial measures for an optimal solution. A combination of construction of water storage structure, introduction of watershed techniques and restriction in the further drilling of tube-wells is needed. It consists of all surface water flow. It takes two farms; overland flow may be in the form of film sheet of rill of water. The over land flow either percolate in the soil or evaporates or drains in to streams.

### **7. CLIMATE CHANGE POSES A MAJOR THREAT TO WATER SCARCITY**

Climate change is emerging as a major driver of disasters, with frequent and intense floods and storms, increasing forced displacement as an extremely likely consequence.

Heightened drought risk, desertification, sea level rise, and changes in the availability of water and fertile land, reduced access to basic resources, will also fuel longer-term migration and forced displacement. [9]

Climate change, therefore, has the potential to displace millions of people in coming decades. In coming decades, climate change will motivate or force millions of people to leave their homes in search of viable livelihoods and safety.

A recent report on ‘Climate change and migration issues in Pakistan’ [10] has described Pakistan as the 12th most vulnerable country of the world whose environmental degradation would cost five per cent of the GDP every year.

Water supply, which is already a serious concern throughout the country, will decline dramatically and it will affect food security thresholds.

Climate change is an economic, developmental and environmental problem. Given the enormity of the impact, adaptation and mitigation measures are critically important.

## **8. MANAGING WATER SCARCITY PROBLEMS**

Pakistan is already in a state of water crisis—particularly in southern Punjab, Sindh and its capital Karachi. It is high time that the people are made fully aware of the grave implications of the water disaster, likely to occur in a decade or two.

To control water scarcity, a comprehensive law be enacted within six months to “Save the Indus”. Such a law should substantively cover environmental protection of its overall ecology, protection of all rivers and their banks, their catchments areas, deltas, protection against discharge of pollutants and industrial waters in the river, speedy enforcement procedure and severe punishment involving both imprisonment and fine. Pakistan would be in the category of a modern country if we establish exclusive environmental courts in all key districts situated in the banks of the Indus, its tributaries and major canals have been greatly enhanced. Sources informed that as many as 8,00,000 tube wells are installed in different parts of the province. It is abstracting 40 to 42 MAF water annually causing rapid decline of water table in the province. There are more than 400 tube wells in the city pumping out thousand of Gallon water daily. The installation of tube wells in the Punjab province without any planning is the major reasons behind the fall of underground water level table. The installation of new tube wells could be an acute dearth of potable water by 2020.

To increase the water resources of the country, lakes and springs should be properly managed. Pakistan has small and medium sized lakes, located throughout the country. If these lakes are properly managed, it is protected from industrial effluents being discharged into it and antipogenic activities, the water of these lakes can be used for domestic purposes and after treatment for drinking water. Kinger Lake is taken to Karachi in a water treatment plants situated at COD Hills, the water is being used for drinking for a portion of Karachi.

## 9. WATER RESOURCES DEVELOPMENT

### Rain Water Harvesting

The scattered nature of rural settlement often precludes the possibility of conventional water supply schemes. There is therefore the need to devise a suitable means of meeting the water requirements of people in rural areas. Whatever method is to be adopted must necessarily be simple, low cost and effective. The collection and storage of rain water for domestic use adequately meets these requirements. The requirements structures are low cost and can be built by locally available manpower. Locally available material is largely utilized and post construction running cost is negligible. Also rainwater quality is generally within the recommended limits for drinking water.

### Desalination for Coastal Areas

Desalination is now an acceptable technique supplying high quality water to arid areas. In arid, semiarid, remote and rural or coastal communities, desalination of brackish or seawater may provide a source of clean drinking water otherwise unavailable.

### Desalination technology includes

- Reverse Osmosis
- Distillation
- Electro-dialysis

Generally distillation and reverse osmosis are used for sea water desalination, while reverse osmosis and electro dialyses are used for brackish water desalination. However, the selection and use of these processes can be site specific; they must be selected very carefully.

In 1950 distillation was the only viable means of desalination either brackish or sea water. In the early 1950's the desalting of brackish water by electro dialyses offered potential costs significantly below those of current distillation methods and a number of units were operated in the middle east.

## CONCLUSION

From the foregone studies, the following conclusion is drawn Pakistan is already in a state of Water Crisis. Particularly are Southern Punjab, Sindh and its capital Karachi. It is high time that the people are made fully aware of the grave implication of the water disaster, likely to occur in a decade or two.

- At the time of independence 5000cu/m was available because of uncontrolled population growth. Water resources in Pakistan have been under serve stress for a long time. The downturn continues and the country is now on the brink of water scarcity. Availability at present stand at a mere 1100m per capita, less than 1000m is considered to be the water scarcity mark. The availability could drop to 700m<sup>3</sup> by 2025.
- Underground water table is declining sharply is Punjab. In Lahore the decline of various residential areas varies from 4 feet to 7 feet.
- Several cities of Southern Punjab are facing severe threat due to arsenic contamination.



- Climate change is another factor for water scarcity. Although Pakistan contributes least to global warming.
- If India succeeded in building dams on Kabul River upstream, there will be 50 percent reduction in agriculture production in Sindh, the water bodies are drying.
- The sea has introduced almost 40 km in Badin district in Sindh.
- The best way to solve the problems of water scarcity for the area which have easy access to sea, include using desalination plants, such plants can be installed at Karachi, Gwader and other cities which are near to sea.
- For tapping more fresh water resources in river and delta, ram water harvesting and desalination techniques can be applied.

#### RECOMMENDATION

- It is recommended that the complete scenario can be estimated only if analysis is performed for at least three years and for all reasons and is compared with drought period.
- The deltaic shore line and creek network should be regularly mapped using satellite imagery to assess the magnitude of any coastal change.
- It is recommended that the monitoring programmes are developed and implemented to form a strong data base in water quality at all critical location of the Indus basin.

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### Toxic Elements in Drinking Water of Southern Punjab-Pakistan

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#### ABSTRACT

Water samples from different cities of Punjab were analyzed to check its quality for drinking purpose. Test results indicate that the value of various toxic elements is increasing the permissible limits. Arsenic was found much higher than the WHO guide lines values in the cities of Southern Punjab. The value of arsenic in ground water ranged from 0.02-5.0 mg/l. high value of Arsenic was investigated in village Pel of Mian Wali district.

High concentration of N was found in all the samples. In sadiqabad maximum value were obtained from Basti Mian Sahib and area surrounded the National Highway. The value ranged from 14.9-44.9 mg/l while in case of Bhawalpur the values varied from 8.2-40.3 mg/l and in Bhawalnagar the value ranged from 10.1-41.2 mg/l.

Low concentration of fluoride can cause dental caries of tooth decay in children especially. If its concentration is greater than 1.5 mg/l. they can cause dental fluorosis, an increase in concentration can effect of whole body. Out of total number of samples analyzed for fluoride, 43.5% had fluoride < 0.5 mg/l, which required fluoridation, 26.4% were in the desirable range, whereas, 29.7% had fluoride in excess which need defluoridation.

Due to the aging of distribution system there is no city in Pakistan which water is safe for drinking purpose. Water born diseases are common in Southern Punjab due to the presence of E-coli and Total Coliform.

#### INTRODUCTION

Drinking water may contain many toxic elements which can enter naturally into water or due to some human activity. Arsenic, fluoride, nitrates, E.Coli and T.Coliform are among important toxic elements. Arsenic present naturally on earth in soil and minerals, it enter into water stream through water run-off into wells, lakes, rivers and underground water and enter into the air through dust and wind blows or it may dissolve in rain and snow. Arsenic can also enter through industrial discharge, in the production of metals (like gold mining), in the burning of fossil fuel (like coal), in the use of pesticides, insecticides, herbicides, burning of waste and volcanic eruption. In Pakistan arsenic is present at shallow depth. If the concentration of arsenic is greater than 50ppb it can decrease the production of red and white blood cells, can cause vomiting, nausea, diarrhea, skin change. Can cause the cancer of bladder, lungs, skin, kidney, nasal passages, liver and prostate.

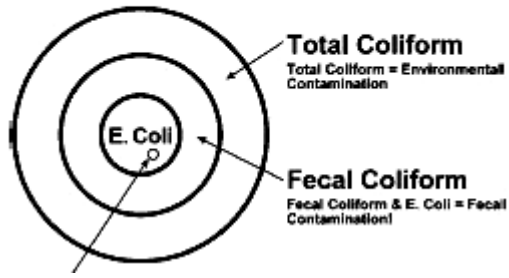
Nitrates are present naturally in soil it is very essential for the growth of plants for high production. Nitrates form naturally in environment in nitrogen cycle. Nitrate is an essential nutrient material for the plants it also provide artificially to increase the fertility of land in

the form of fertilizers. Soil nitrogen is also provided by legumes, these are plants which contain bacteria on their roots capable of fixing atmospheric nitrogen. Legumes may add significant amount of nitrogen. Nitrogen is an active integral in the environment and can leach into the ground water easily. When its concentration in water exceed than 10 mg/l, it can cause methemoglobinemia or blue baby-disease especially in infants. Prolong intake of nitrate can cause gastric problems due to the formation of nitosamines.

Fluoride is very harmful toxic element. It reacts readily to the body of any age group especially developing children. If its concentration is greater than 1.5 mg/l, it can cause dental fluorosis. Fluoride can cause a crippling bone disease called skeletal fluorosis. It can interfere with DNA synthesis.

Total coliform is a group of different type of bacteria. It presents in the soil or vegetation and enter into the water from environment. Fecal coliform is one of its types. *Escherichia coli* is a sub group fecal coliform found in drinking water when it get contaminated with sewage. It lives in the intestine of human and animals. It can produce such toxin which can cause diarrhea.

### TOTAL COLIFORM, FECAL COLIFORM AND E. COLI



#### Sampling

Well cleaned polythene bottles of 500 ml capacity were used to collect samples of fluoride, Nitrates and Arsenic.

For Bacteriological test (*T. Coliform* and *Escherichia Coli*) 100 ml well cleaned and pre-sterilized glass bottles were used. No preservation was added, as the samples were immediately brought to the laboratory for analysis. For nitrates samples, ice boxes were used in the transportation process. Grad sampling procedures were adopted for all investigation.

Sample points are selected in such a way as to represent the whole urban area. The water source include, surface water, tube wells, hand pumps, and shallow wells are most common. Because of long distance, an ice box was used for the preservation of samples during transport.

### MATERIAL AND MATHOD

#### Study Area

The study area relates to the four major cities of the southern Punjab i.e. Bahawalpur, Bahawalnagar, Rahim Yar Khan and Sadiqabad. The area extend over 45000 Km<sup>2</sup> with a population of 5.053 million [4]. The area is characterized by extreme climate and low rain fall as shown in Table 1.

**Table 1: Environmental Data for the main cities of southern Punjab\*\***

City	Longitude and Latitude	Population (Million)	Rainfall (Monsoon) (mm)	Access to Public Water Supply	Sweet Water Zone	Number of Samples Taken
Bahawalpur	71.6°E,29.4°N	1.164	2.6-28.0	75	50	25
Bahawalnagar	73.2°E,30°N	1.171	3.6-24.3	70	50	26
Rahim Yar Khan	70.2°E,28.5°N	1.596	5.3-22.7	60	70	30
Sadiqabad	70.1°E,28.2°N	1.122	5.0-21.3	60	70	41

\*\*Source: J.Sc. & Tech. [8]

## RESULT AND DISCUSSION

### Nitrates:

#### Bahawalpur:

Groundwater is the major drinking water source in the city. Sweet water is only 50%, the rest is brackish water. Hand-pumps are in common use, the average depth varies from 9-12 m [9]. Only 75% has access to public water supply system. Tube wells are present at Model Town and Satellite Town only. Surface water is also being used as public water supply source in some part of the city. For estimating nitrates, samples were collected from 22 hand pumps. The nitrates values ranged from 0.44-42.2 mg/l with an average value of 6.27 mg/l (Table 2). Higher values were recorded for hand pumps located near Victoria Hospital, Bahawalnagar Road and Multan Road near Sbzi Mandi. Nitrates values for these areas ranged from 17.1-19.8 mg/l, 38.4-40.1 and 16.3 mg/l respectively.

Out of the total sample examined, 12% of the samples showed higher nitrate level. Those areas which showed higher nitrate level were further investigated

#### Bahawalnagar:

Bahawalnagar is also located in brackish water zone, sweet water is only 50%. Three tube wells located adjacent to the Hakra canal a depth of 120 feet supply drinking water to 70% population of the city. Rest of the population obtain their water supplies from Hand-pumps installed in the zone recharged by the seepage of canal water. The balance being provided by the surface water.

Result of the investigation for Bahawalnagar are also shown in Table 2. Two major tube wells sampled four times. The nitrate-N value for these tube wells ranged from 1.3-1.95 mg/l. twenty one hand pumps were sampled five times with values ranging from 0.43-22.2 mg/l. two dug wells were also investigated, their nitrates-N value ranged from 4.87-9.4mg/l.

**Table 2: Nitrate Levels in the Drinking Water Source of Southern Punjab**

City	Source #	No. of Sources Sampled	No. of times sample taken from each source	NO <sub>3</sub> -N mg/l		Value Exceeding Guidelines Limits
				Min-max	Av.	
Bahawalpur	HP	22	4	0.44-42.2	6.27	3*
	SW	1	5	2.2-3.8	2.9	Nil
	T/W	2	5	0.71-1.6	1.17	Nil
Bahawalnagar	SW	1	5	1.95-2.1	2.55	Nil
	HP	21	5	0.43-22.2	8.52	6 <sup>L</sup>
	Wells	2	6	4.87-9.4	6.95	Nil
	T/W	2	4	1.3-1.95	1.41	Nil
Rahim Yar Khan	SW	1	4	0.35-0.27	0.61	Nil
	HP	28	5	0.11-27.7	0.68	Nil
	T/W	1	5	0.61-0.9	0.85	Nil
Sadiqabad	SW	2	4	0.31-5.1	2.34	Nil
	HP	35	4	0.041-44.7	4.2	3 <sup>d</sup>
	T/W	4	5	0.17-1.51	0.85	Nil

\* Victoria Hospital (Gate), Bhawalnagar road, Multan road (near Sbzi Mandi)

L Muhajir Colony, Officers Colony, Munirabad, Khadimabad, Madina Colony and Model Town.

D Basti Mian Sahib, National Highway (Near Bashir Engineering Works) and Tippu Sultan Colony.

# HP=Hand Pump, SW=Surface Water, T/W=tube Wells

**Table 3: Nitrates Level Higher than WHO Guidelines in the Drinking Water Sources of the Southern Punjab**

Location Source		N Samples taken	Range	NO <sub>3</sub> mg/l as N mean
<b>Bahawalpur</b>				
Victoria Hospital	HP	7	17.1-19.8	18.4
Bahawalnagar Road	HP	5	22.4-42.7	40.1
Multan Road	HP	5	14.7-17.9	16.3
<b>Bahawalnagar</b>				
Muhajir Colony	HP	4	21.1-23.4	22.2
Officers Colony	HP	5	10.1-11.3	10.6
Munirabad	HP	4	18.8-21.1	20.0
Khadimabad	HP	5	37.8-41.2	39.3
Madina colony	HP	4	15.3-17.8	16.7
Model town	HP	6	17.4-19.2	18.0
<b>Sadiqabad</b>				
Basti Mian Sahib	HP	6	41.2-44.7	43.0
National Highway	HP	7	14.9-17.3	16.0
Tippu Sultan Colony	HP	5	12.7-14.4	13.8
* Handpump				

**Rahim Yar Khan:**

The city obtains its water supply from ground water and surface water from Adam Sohaba distributry. Seventy percent of the ground water is sweet, the rest is brakish. Hand pumps are mainly being used with depth ranging from 30-50 feet.

One tube well was sampled five times its nitrate content ranged from 0.61 to 0.9 mg/l. 28 Hand pumps were sampled five times for their nitrate value ranged from 0.11 to 27.7 mg/l. All the nitrate values were within the WHO guideline limits.

#### **Sadiqabad:**

Ground water is the major source of drinking water. Municipal committee is responsible to supply water from 10 tube wells installed at Chak No. 9 and No. 11. four tube wells were investigated. Their nitrate values were within limits and varied from 0.17 to 1.51 mg/l. thirty five hand pumps were sampled their values ranged from 0.041 to 44.7 ml/l. hand pump from three areas showed higher values. These areas include Basti Mian Sahib, National High Way and Tipu Sultan Colony.

#### **Fluoride:**

It was investigated that there exist a salt range (fluoride) that runs obliquity across the Punjab. It reaches to the eastern part of Mian wali which may be responsible for high fluoride concentration in Ground Water.

For Fluoride climate conditions, volume of water consumed, and intake from other sources should be considered when setting an optimum fluoride value for Punjab.

As the Punjab Province is situated mainly in the Indus Plain, air temperature in the summer are high. They contribute to a high annual average of maximum daily air temperature ranging from 31.7 to 37.8 °C

For selection of fluorides, Ion Selection Electrode Method was used. Both the electrodes were from orion, before the field work the calibration curves were checked. Fluoride removal was done by the flocculation method commonly known as Jar test. The technique involves the addition of precipitation/ flocculation. Sedimentation and possibly filtration at a desired time interval. The stirring time was 20 min. at a speed of 25 rpm and setting time 50-60 min.

**Table 5: Statistical Summary of Fluoride Concentration in Drinking Water**

District	Sample Exam No.	Mean	Minimum	Medium	Maximum	S.D
Bahawalpur	6.0	0.63	0.29	0.78	0.98	50.0
Bahawalnagar	6.0	1.67	0.24	0.23	2.50	9.0
Dera G Khan	4.0	0.56	0.19	0.69	0.80	10.0
Mianwali	12	1.00	0.30	1.04	1.50	18.0
Multan	8.0	0.39	0.16	0.44	0.65	32.0
Muzaffargarh	7.0	0.32	0.15	0.39	0.58	17.0
R.Y Khan	6.0	2.00	0.50	0.79	2.00	7.0

#### **Arsenic:**

The revised edition of WHO drinking water guidelines (12) the value of arsenic is 0.01 mg/l. arsenic is poison. Long term exposure to arsenic via drinking water causes skin cancer, lungs, urinary bladder and kidney as well as other skin changes such as pigmentation. Arsenic occurs in Pakistan as geological deposits at a shallower depth. Where there are deposits tube water is found.

The following districts of Punjab contain arsenic:

- Rahim Yar Khan
- Mianwali
- Bahawalpur
- Bahawalnagar

Maximum value of 5.0 mg/l was recorded from sample taken of open Dug Well at village pell (Mianwali). Practically most of the water in district Mianwali are contaminated with arsenic. People of village Pel have become health conscious and have abandoned the use of this well. The village hand pumps and tube wells water also contain high arsenic value.

**Table 4: Arsenic in the Ground Water of Punjab**

Village Town Cities	*Sample Source	No. of times sample collected	Arsenic mg/l		Recommendation
			GAAS	Kit	
<b>Bahawalpur</b>					
Victoria Hospital	T/W	2	0.02	12.0	Some traces of Arsenic were found in the ground water of Victoria Hospital
Muhagir Colony	T/W	5	0.02	12.0	
Madina Colony	T/W	6	0.01	11.0	
T.Sultan Colony	T/W	5	0.00	10.0	
Sabzi Mandi	HP	2	0.00	10.0	
<b>Bahawalnagar</b>					
Officers Colony	T/W	5	0.03	13.0	Traces of arsenic was recorded in all the samples obtain from Bhawalnagar
Munirabad	T/W	6	0.02	12.0	
Model Town	T/W	6	0.02	12.0	
<b>Rahim Yar Khan</b>					
Basti Yar Muhammad	Free from Arsenic	25	0.4	400.0	In Basti Yar Muhammad high arsenic was present in 11 out of 41 house hold
<b>Mianwali</b>					
Main Bazar	T/W	4	2.00	200	In village Pel most of the sample obtain from deep well contain high arsenic compound
Khwajabad	HP	10	3.00	300	
Pell (Village)	D/W	12	5.00	500	
*HP=Hand Pump, SW=Surface Water, T/W=tube Wells D/W= Deep Well					

**Table 5: Arsenic Value greater than WHO guidelines**

Village Town Cities	Sample Sources	Arsenic mg/l		No. of Times Sample Collected
		GAAS	Kit	
Bahawalpur	HP	0.01-0.2	0.01-0.2	2-6
Bahawalnagar	T/W	0.02-0.03	0.02-0.03	5-6
R.Y Khan	HP	0.00-0.4	0.00-0.4	5-8
Mian Wali	T/W & HP & D/W	2.0-5.0	2.0-5.0	4-12

**Bacterial Quality:**

The risk due to the toxic chemicals in drinking water differs from that caused by microbial contaminations. There are few constituent of water that leads to acute health problems except through massive accidental contamination of a supply.

**Table 6: Bacterial Quality of Ground Water**

Circle/ Zone	Address	Faecal Coliform (E.Coli)
Bahawalpur Circle (Bahawalpur Zone)	Desret Branch at Kudwala Rest House	> 180 MPN
	Minchin Branch near Gulmarg Rest House	> 180 MPN
Rahim Yar Khan Circle (Bahawalpur Zone)	Abbasia Canal at Chann Goth Railway Station	> 180 MPN
	Abe-Hayat Dy. At Bagobahar Rest House	> 180 MPN
	Walhar Branch Dy. At Walhar Rest House	> 180 MPN
Bahawal Nagar Circle (Bahawalpur Zone)	Sadqia Canal at Jalwala Rest House	> 180 MPN
	Malik Branch Chandna Rest House	> 180 MPN
	Hakra Branch at Mianwala Toba	> 180 MPN
	Fordwah Canal at Mehmood pur Bahawal Nagar	> 180 MPN
	Hakra Branch at Kamrani Rest House	> 180 MPN
HC Circle (Multan Zone)	TS Link Canal near Shorkot Cantt.	> 180 MPN
CRBC (D.G Khan Zone)	CRBC near Taunsa Town	> 180 MPN
Rajanpur Circle (D.G Khan Zone)	Dajal Canal Near Dajal Town	> 180 MPN
	Qadara Canal at Hassanwala Rest House	> 180 MPN

**RECOMMENDATIONS AND CONCLUSION**

From the foreign investigations, the following conclusion may be drawn

- Leachate from agriculture field. Garbage dumps, intensive agriculture production and shallow water table contribute nitrate in ground water of Southern Punjab.
- In Bahawalpur, nitrates in drinking water sources ranged from 0.44 to 42.2 mg/l as N.
- In Bahawalnagar, nitrate in drinking water ranged from 0.43 to 22.2 mg/l.
- Methaemoglobinemia disease has also been observed for the area where nitrates were higher.
- In total 30 samples were examined from the various drinking water sources from the city of Rahim Yar Khan. All the values were well within the WHO guidelines.
- For the city of Sadiqabad, nitrate value ranged from 0.041 to 44.7 mg/l N.
- Incidence of methaemogolobenemia disease was also observed in Basti Mian Sahib.
- The Salt range in Punjab is responsible for high fluoride concentration in some drinking waters.
- Cases of mottled enamel were noted in Mianwali
- Experiments on the removal of excessive fluoride showed that flocculation with Alum was effective in Jar tests, but the efficiency depends on the alkalinity of the water, Low alkalinity is essential to achieve desirable results.



- Alternative of Fluoridation includes; Addition of Fluoride I tooth Paste, mouth wash and chew gum, Bottled water and Fluoride containing tablets.
- In Pakistan arsenic is present in ground water in mineral as arsenopyrite, it is some time attach to rich sulphide oar as impurity
- Arsenic was investigated in the ground water of the following districts: Bhawalpur, Bahawalnagar, Rahim Yar Khan and Mianwali.
- Maximum Arsenic was identified from village Pel district Mianwali.
- Provision of surface water treatment plants and waste water treatment plants coupled with good hygiene can reduce the mortality and morbidity rates.
- Drinking water should be free from Escherichia coli, so as to avoid water born diseases. In every city there should be a provision of waste water treatment plant for safe disposal of sewage.
- All the industrial waste should be treated within the industry according to the National Environmental Quality Standard before disposal. Even the Ground water which is usually free of pollution should be chlorinated before supplying water to public.

### RECOMMENDATION

One exciting possibility with genetic engineering is the development of plants other than the legumes which fix their own nitrogen.

Nitrogen depletion and increase of crop yield in agriculture soil can be achieved by rotating crops from year to year.

More detail study is required for the presence of arsenic in ground water.

There is a need of the replacement of old pipes of drinking water to avoid the microbial contamination.

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## **SUPER FLOODS: 2010 IN SINDH-PAKISTAN**

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### **ABSTRACT**

This study, due to time and finance constraints, leaves behind all the other natural disasters like: avalanches, earthquakes, lahars, volcanoes eruptions, limnic eruptions, tsunami, blizzards, cyclonic storms, droughts, hailstorms, heat waves, tornadoes, fire, epidemic, famine, Gamma rays bursts, impact events, solar flares, supernovae and hyper-novae, windstorms, tidal waves, land slides, hurricane, etc, and precisely discusses the natural and man-made causes of the floods in Pakistan. This study also discusses the geological and political causes that devastated nearly one-half and disrupted whole Sindh during Super flood: 2010. The methodology applied to collect data was the personal interviews from the local inhabitants, especially the flood victims, living nearby Tori Bund, the priori knowledge of the author as well as secondary data that was collected through browsing internet. The condition of flood victim camps was personally visited at random by selecting one camp from each district of Sindh, as well as help was sought from the friends and the print and electronic media personnel. This paper, due to non-availability of authenticated secondary data at Pakistan level, reproduces merely the figures quoted by the United Nations. Salient features of disaster management policy in Pakistan and the Measures to alleviate flood hazards in the future are discussed too. Conclusions and Suggestions are given at the end of paper.

### **KEY WORDS**

Super Floods, Causes (Natural, Geological & Political), Structural & Non-Structural measures.

### **INTRODUCTION**

Pakistan is a country that lies in South Asia, between latitudes 24 and 37 degrees north and longitudes 62 and 75 degrees east, covering a total land area of 796,095 sq km. It has 1046 Kilometer (650 miles) coastline along the Arabia Sea in the south and is bordered by Afghanistan and Iran in the west, India in the East and China in the far northeast. The topography varies from coastal beaches, sandy deserts, plateaus, plains, high mountains to snow-covered peaks. The country is geographically divided into three areas: the northern highlands, the Indus river plains and the Balochistan plateau. Low rainfall and extreme variations in temperature characterize the climate in Pakistan. 59.3 per cent of the total land area is classified as rangelands, which receives less than 200 mm annual rainfall (1). The southern slopes of the Himalayas and the sub mountainous tract receive higher rainfall from 760 to 1270 mm. Pakistan is the sixth most populous country as well, second largest Muslim population in the world (2). Like other South Asian countries, Pakistan continues to suffer from a plethora of natural and human

induced hazards like, floods, earthquakes, landslides, cyclones, and drought. To human induced disasters such as fires, civil unrest and terrorism, refugees and internally displaced people, health epidemics, transport accidents, industrial accidents and war that threaten to affect the lives and livelihood of its citizens. The human impact of natural disasters in Pakistan can be judged by the fact that 6,037 people were killed and 8,989,631 affected in the period between 1993-2002 (World Disasters Report 2003, Geneva, International Federation of Red Cross and Red Crescent Societies).

This is the Law of Creation, Sustenance and Dissolution that whatever has been created is sustained and eventually destroyed. Thus, whenever something is created in this world, after a period of being sustained or sometimes even within no time, it will be destroyed. Only the Creator i.e. God remains steady and unchanging (3)\*. Man affects Nature to the extent of 90% in three ways. (a) At physical level (30%), this happens by excessive cutting of trees, oil leakages, construction of buildings, roads, parking and emissions from factories, etc (b) At a psychological level (30%) by getting more selfish and cares less about the planet and his fellow men; he indiscriminately abuses the resources of the Earth. The collective psychological temperament of Man is closely related to the spiritual level at which Man affects Nature. (c) At a Spiritual level (40%) by digging deeper and finding that he is heavily influenced by his spiritual maturity. A reduction in the collective spiritual consciousness of Man, results in selfishness and unrighteousness. When there is lack of spiritual practice that is known as spiritual pollution.

The term disaster owes its origin to the French word “Disaster” which is a combination of two words ‘dis’ meaning bad and ‘aster’ meaning star. Thus the term refers to ‘Bad or Evil Star’.(4) The United Nations defined Disasters, as “A serious disruption of the functioning of a community or a society causing widespread human, material, economic and environmental losses which exceed the ability of the affected community / society to cope using its own resources” (UNDP). A disaster is a result from the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential chances of risk. Disaster is a sudden adverse or unfortunate extreme event which causes great damage to human beings as well as plants and animals. Disasters occur rapidly, instantaneously and indiscriminately. These extreme events either natural or man induced exceed the tolerable magnitude within or beyond certain time limits, make adjustment difficult, result in catastrophic losses of property and income and life is paralyzed. These events which occur aggravate natural environmental processes to cause disasters to human society such as sudden tectonic movements leading to Earthquake and volcanic eruptions, continued dry conditions leading to prolonged droughts, floods, atmospheric disturbances, collision of celestial bodies, etc. (5). Disasters have always co-existed with civilizations. With technological advancement, development initiatives resulted in the creation of a lot of infrastructure and permanent assets. Gradually material development detached man from nature on one hand, and increased vulnerability of the human population, on the other. The progressive increase in loss of life, property and deleterious effect on environment due to disasters moved the international community to look at disaster management in a new perspective, which transcends international barriers, anticipates possible threats and enables tackling of disasters from the pre-stage. The last decade (1990-1999) was observed by the International Community as the ‘International Decade for Natural Disaster Reduction’, a decade dedicated to promoting solutions to reduce risks from the natural hazards. The international dimension of disasters was realized and a protocol sought to be established so

that when it comes to suffering of humanity, help from the International community flow in right earnest (6). Natural disasters have a number of root causes, but today with global warming, the change in the environment triggered by increasing differences in heat and cold. The major natural disasters that occur periodically in this region are largely due to climatic and seismic factors.

Floods are probably the strongest and most dangerous form of the natural disaster on Earth. Most natural hazards cannot be prevented but by understanding how and where they occur, what causes them and what circumstances increase their ferocity, we can develop effective strategies to mitigate the damage they cause. Flooding although, it usually carries a negative connotation and disastrous effects, is quite a natural process and is simply the response of a natural system (a river system) to the presence of too much water during an interval of time. Floods are pretty easy to understand. One who understands “hydrologic Cycle”, can easily understand, when system backs-up there is a flood. Rivers and streams are governed by a simple equation;  $Q=AxV$ , where Q is discharge (amount of water), A is area of the river channel and V is velocity. When excess discharge is present in a river or stream, at first the water moves more quickly (V increases) and perhaps some erosion of the channel takes place (i.e. A increases). If discharge (Q) increases too rapidly, however, water must move out of the river, stream or channel (the confining area (A) and out onto the surrounding area, known as floodplain. The floodplain is the area that floods first (7). It indicates that flood is an imbalance.

This paper therefore discusses; (i) the natural causes and the human role that devastated one-half and disrupted whole Sindh during Super flood: 2010 (ii) History of flood in Pakistan (iii) History of floods in Sindh-Pakistan (iv) Causes of super flood in Sindh-Pakistan: 2010 (v) Losses in Pakistan during super flood-2010 (vi) Salient features of disaster management policy in Pakistan (vii) Measures to alleviate flood hazards and (ix) Conclusions and suggestions

### **Natural & Man-made Causes of Floods**

From the geological perspective, floods are a natural consequence of stream flow in a continually changing environment. Floods have been occurring throughout Earth-history and are expected so long as the water cycle continues to run. Streams receive their most of water input from precipitation and the amount of precipitation falling in any given drainage basin varies from day to day, year to year and century to century. Globally, there are number of factors that can contribute to this imbalance, both natural and man-made. Some obvious causes of floods are: (a) Heavy and intense rainfall (b) Run-off from a deep snow cover (c) Over-saturated soil, when the ground cannot hold any more water (d) Frozen soil (e) High river or reservoir levels caused by unusually large amounts of rains (f) Ice jams in rivers (g) Diversion of heavy rainfalls or floods of the neighboring countries to Pakistan (h) Poor maintenance of river bunds and banks of water canals by the Irrigation Department (i) Urbanization, that changes the surface due to the construction of the buildings, parking lots and roads and replace grass and dirt with concrete.

### **History of Floods in Pakistan**

For millennia, human populations have chosen to live near bodies of water. There are three main reasons for this practice (i) the soil near the waters is very fertile and can be used for growing crops, (ii) the bodies of water themselves are sources of drinking and

irrigation water and (iii) water courses support transportation and facilitate industry, commerce and trade. Many of the Asia's developing countries, including Pakistan, is situated in the world's hazard belts and is subject to floods, droughts, cyclones, earthquakes, windstorms, tidal waves and landslides, volcanic eruptions, hurricane etc (8).

In Pakistan flood events of 1950 and 1992 caused many deaths and huge losses to the national economy (Table-1).

**Table-1: Major Flood Events in Pakistan**

<b>Year</b>	<b>Lives Lost</b>	<b>Villages Affected</b>
1950	2910	10000
1955	679	6945
1956	160	11609
1973	474	9719
1975	126	8628
1976	425	9150
1978	393	9199
1988	508	1000
1992	1008	13208
1995	591	6852
1998	47	161
2001	201	0.4 million*
2003	230	1.266 million*
2010	NA**	NA**

\*Number of persons affected    \*\* Not Authenticated

Source: A Review of Disaster Management Policies and Systems in Pakistan <google.com>

In Pakistan, the monsoon season normally occurs between the months of June and September. The Thar Desert and adjoining areas of the northern and central Indian subcontinent (Pakistan, India and Bangladesh) heats up considerably during the hot summers. This heat causes an area of low pressure to develop over this region of the Indian subcontinent. As the low develops, moist winds from the Indian Ocean rush into the region and are then drawn towards the Himalayan Mountains, where they act like a wall to block winds from passing into Central Asia. This pattern forces air to rise and allows storm clouds to develop and cross parts of Pakistan and India. Throughout the months of June, July, August and September, this pattern repeats itself. Following figures (Table-2) provided by the Pakistan Meteorological Department (PMD) shows high percentage of average rainfall that occurred between July and August 2010.

These figures could be challenged in one way, as the rainfall of July & August 2010 (PMD) takes nearly one month's time to reach plains of Sindh from its Origin, but found 9 lac cusecs feet of flood water knocking the doors of Sindh province at Guddu Barrage in the mid of July 2010. It is also noticeable that between March and June 2010, SINDH celebrated "SINDHU-DAYS" and was under high protest against IRSA and was challenging Punjab, for NOT RELEASING their water-share, blaming it for FILLING WATER DAMS and running (C-J LINK CANAL etc), which is only meant for flood waters. This causes irreparable losses to Sindh province economically, as its Kharif sowing season in April was elapsed, on the one way. It is also a fact that in end June 2010, Tarbela and Mangla Dams were touching to their peak level and there was low or

no water storage provision in both of these dams. In addition, it is worth to consider that during the month of May 2010 and June 2010, there was no such forecasting from PMD, regarding heavy rainfalls that had to be occurred in Khyber Pakhtoonkhuwa and in other provinces of Pakistan.

Keeping in view the above findings, if such huge flood water as claimed, was only the rainfall in Khyber Pakhtoonkhuwa province, one can easily assume that in the end of June 2010, when Sindh was crying for water and was nearly turned drought, there was zero water-absorption power in the dams and rivers of Punjab province. Therefore, this rainfall-water from Khyber Pakhtoonkhuwa was given easy go to Sindh and this affected, the few patches of south Punjab lying in the surrounding of rivers, due to over topping of water. As the land level in Punjab is nearly 6-8 feet higher than the upper water level of rivers and thus the flash flood water easily comes back to rivers. But here in Sindh, this flood water devastated 17 districts of the province, where land level is 0-6 feet higher than the upper water level of river, as well as affected a lower part of the Baluchistan province adjacent Sindh province.

<b>Table-2: Comparison of Rainfall Totals: 2010 vs Mean Average</b>			
<b>Province/Region</b>	<b>Total Rainfall* (millimeters)</b>	<b>Normal Avg. (millimeters)</b>	<b>% Avg.</b>
<b>Punjab Province</b>			
Faisalabad	468	201.7	232%
<b>Gilgit Baltistan / Azad Kashmir</b>			
Bunji	130	40.3	323%
Chilas	96	31.0	310%
Gilgit	112	33.2	337%
Gupis	108	37.8	286%
Skardu	57	25.4	224%
<b>Khyber Pakhtunkhwa Province</b>			
Cherat	618	189.8	326%
Chitral	96	12.1	793%
D.I.Khan	523	122.2	428%
Drosh	154	42.1	366%
Parachinar	505	196.8	257%
Peshawar	535	118.7	451%
Saidu Sharif	757	278.5	272%
<b>Sindh Province</b>			
Jacobabad	182	78.2	233%
Karachi Airport	258	126.2	204%
Padidan	164	81.0	202%
<b>Balochistan Province</b>			
Sibbi	149	74.4	200%
Zhob	234	110.8	211%
* Total rainfall data is from selected locations between July 1, 2010 and August 30, 2010 Source: Pakistan Meteorological Department			

### **History of Floods in Sindh-Pakistan**

Historically, Sindh province has two sources of flood. The Reverine flood is more predictable and allows ample time to react, whereas, the Torrential flood floods leave almost no time to respond. Torrential floods have lesser frequency and duration but very high intensity therefore impact is also severe. The early prediction gives emergency officials time to evacuate residents in the danger areas. The Doppler radars (an advanced technology) can track rainfall street by street and could provide more accurate flash flood warning across the country. This new radar system would allow meteorologists to provide warnings before a flash flood occurs (9). The modern weather forecast systems based on satellite information sources has made it possible to develop a fairly reliable flood warning system. It will definitely cost much less than what the government normally spends on repair of damaged infrastructure and relief and rehabilitation of

devastated communities. Environmental, economic and social cost of losses will further justify this much deserving investment. This can be gauged from the fact that after 1995 flood damages, strengthening of Gaaj Diversion Bund at Gaaj Nai and F P Bund cost about 700 million rupees to public exchequer. Effective flood warning system will also help timely evacuation of vulnerable areas identified through careful mapping of flood prone communities. Infrastructure development in the flood plains is not being designed with prior understanding of natural flood routes. Irrigation experts believe that the road network in the area has also obstructed the free flow of flood. Some local roads and Ratodero-Khuzdar Motorway are aligned against the flood flows and have inadequate cross drainage provision, causing bouncing of flood water. There is no mechanism whereby National Highway Authority or Provincial Highway Department seeks Irrigation Department's advice on the road alignment in the Kachhi flood plain. This lack of institutional networking is likely to cause more damage in future. Time again has proved that tempering nature beyond a limit, invites terrible consequences. WAPDA's experiment of converting fresh water MNVD into a saline water channel of RBOD resulted in disaster to Manchar Lake. Now WAPDA is undertaking several drainage schemes in upper reaches through RBOD-III which will canalize effluent from Balochistan's irrigated areas and drain it to the main RBOD drain. A complex drainage network for Usta-Mohammad areas is under construction and existing EBOD is being connected to Hairdin drain and Chukhi through new drains under RBOD-III which will be ultimately connected with main RBOD network. There are strong political elements behind these decisions and WAPDA does not bother to involve Irrigation Department at local level to assess the potential threats which may stem through this made drive of drainage projects. According to officials of the Irrigation Department such coordination is virtually nonexistent and if any consultation takes place it is restricted to higher offices which have little understanding of ground realities. Since WAPDA executes federal government's politically motivated projects, it hardly gives any ear to the local irrigation departments, civil society groups and communities. Failure of LBOD should have been enough lessons to learn from but it does not seem happening. Local Irrigation experts also believe that the designed capacity of RBOD-III is also insufficient to carry normal flows of the local drains let alone heavy storm water. In recent flood Miro Khan and ShahdadKot drains experienced backflow since MNV was facing high flood. This could have inundated ShahdadKot and Miro Khan towns. Therefore this drainage network is posing a permanent threat to local areas. Likewise if Indus River receives heavy flood (above 700,000 cusecs), chances are high that it may choke RBOD-II at Bago-Toro hills near Sehwan, which flows very close to Indus River. Drainage system in the area is being developed as stand alone engineering infrastructure rather than as part of a management package. Heavy rainfalls in Balochistan and Pakhtun-Khuwa provinces in the monsoon season always remained responsible for the floods, not only in the Balochistan and Pakhtoon-Khuwa, but also in Sindh province. Western boundary of Sindh is connected with Balochistan through Khirthar hills. A series of ferocious torrents including Mula, Boolan, Khanji, Mazarani, Dillan, Buri, Salari, Shole, Gaaj, Angai, Naing and Bandani bring gushing waters from high altitudes of Khirthar to Kachhi plains of Sindh (10). This flood requires entirely different management systems, institutional capacities and infrastructure. High floods of 1942, 1944, 1948, 1950, 1955, 1956, 1973, 1975, 1976, 1978, 1988, 1992 1995, 1998, 2001, and 2003 have sent several reminders of this fact. Among them floods of 1976 and 1995 were huge in magnitude and caused greater

devastation to the flood protection infrastructure and local communities and inundated vast areas of ShahdadKot / Kamber and in the districts of Dadu. Similarly, this year water from Pakhtoon-Khuwa and Punjab together, also rushed into Sindh that ruined hundreds of villages of Sukkur, Shikarpur, Kashmore, Kandhkot, Jacobabad, Larkana, Hyderabad and Thatta districts. Hundreds of them lost their lives and marooned their houses, land and other property in deep waters. Knowing the climatic and topographic features of the area and the history of high floods, infrastructure building in the area required a more cautious approach but the policy wizards (both engineering and political) hardly give a thought to disaster, before it really occurred and took its toll. These and many other such facts reveal that the flood disasters were not merely an act of unkind nature but it was actually a resultant of bad planning, poor coordination, unfair and selfish political decisions and a complete institutional mess.

### **Causes of Super Flood in Sindh-Pakistan: 2010**

#### **A. Geological**

Almost everyday, newspapers, radio and television channels carry reports on flood striking several parts of the Sindh province. River Indus is at the height of 700 feet (above sea level) at Kalabagh, which is 950 miles away from Sea, enters plains of Punjab and Sindh. While passing through Punjab, the land-level seems much higher than Indus water, therefore, if somewhere water topped over banks came back to river. Whereas in Sindh, at Guddu Barrage, it is nearly 250 feet higher and at Sukkur Barrage it is 200 feet higher than sea level and the distance between Guddu Barrage and Sukkur Barrage is nearly 80 miles, whereas, the slope is only 50 feet. The distance between Sukkur and Sehwan is about 120 miles, whereas the river Indus is 111 feet higher than sea level at Sehwan and thus the slope is only 89 feet. Similarly, Kotri Barrage is 70 feet higher than the sea level and the distance between Sehwan and Kotri is about 60 miles and the slope comes nearly 41 feet. From Kotri to Garho the total distance is 100 miles and Garho is 11 feet higher than sea level and the slope to river comes about 59 feet. It is clear that in the distance of nearly 370 miles from Guddu to Garho, the slope to river Indus water is only 250 feet it means after every mile slope seems around 8 inches. Because the level of land in Sindh is nearly 0-6 feet higher than the River Indus and the slope of river is also insignificant (8 inches), therefore, the Indus water, before bunds went all the time out of banks, but after bunds, when it is compelled to stream through bunds, the river stream pressurizes the bunds and when any bund breaches, it is difficult to bring back flood water to the main stream. (Daily Kawish, Sunday, August 5, 2010). Also it is note-worthy that due to insignificant slope of River Indus in Sindh province (8 inches/per mile) with flash flood water (having low speed) feels difficult to fight against Sea for the penetration. Therefore, this high stay of flood water could bring more hazards for a long time.

#### **B. Political**

Sindh province has three barrages for smooth distribution of water to millions of agricultural land (i) Sukkur Barrage (Inaugurated in January 1932, with 18 lacs cusecs feet water discharge capacity, for irrigating 10 million acres with seven canals) (ii) Kotri Barrage (Inaugurated in March 1955 with 4 canals) (iii) Guddu Barrage (Inaugurated in 1962 with a discharge capacity of 12 million cusecs feet water with 4 canals and irrigates 29 million acres of agricultural land. Guddu Barrage has a flood height up to 26 feet from



the bed of river). In the mid of July 2010, when there arose flood water pressure at Guddu Barrage and the level of flood water reached to 20 feet from the bed of river (nearly 9 Lacs cusecs feet), there arose hue and cry in the province and also there was apprehension that flood water, that is still to reach from Khyber Pakhunkhuwa province through Punjab rivers, will overtop the Guddu Barrage and obviously will devastate the Ghotki and Sukkur districts, where billion of rupees are invested in national installations like, Fauji Fertilizer, Fauji Foundation Power Plant, Mari Gas Field, Tallow Gas, Liberty Power Plant, Engro Power Plant, Engro Fertilizer, PanoAkil Cantt , Railway track and Road line between Sindh and Punjab and Personal properties like, Agricultural Lands and Sugar Mills of the local Politicians etc. To save these national installations as well as the personal properties of local politicians, the way out searched by our Policy makers in hurry (with shortsighted Vision) was rather to had a cut to TORI Bund on the right bank of Indus river, in order to save the left bank of River Indus (where lies the national installations and the personal properties, as well as, they saved their constituencies to be remembered as their Heroes, for the coming election). However, the 1976 flood, as well as the Manual of Sukkur Barrage tells us vividly that whenever, there is a high flood in Sindh, a cut be given near the AliWahan, Taluka Rohri, so that flood water passes through the old Nara Canal to Thar (desert) with comparatively low damages to public and personal property. But here again the EGO OF THE POLITICIAN, TO SAVE THEIR PERSONAL PROPERTIES ON PRIORITY, AND LESS THINKING ABOUT THE SUBJECT (as usual, due to their self-centered vision as well as their selfishness) that came in the way. Resultantly, the flood waters of Tori Bund devastated nearly 17 districts of Sindh, especially falling on the right bank of river Indus.

#### **Losses in Pakistan during Super Flood-2010**

According to Impact report, the substantial damage from the floods was prevalent in nearly every section of Pakistan. The most significant home damage was reported in Khyber Pakhtunkhwa, Punjab, Sindh and Balochistan provinces along the Swat and Indus rivers and their respective valleys. A reported 10,860 separate villages were completely inundated by floodwaters after points along the Swat and Indus rivers swelled to more than 10 to 20 times their normal heights. During monsoon season, the rivers sometimes reach one kilometer (0.62 miles) in width, though several spots along the Indus River were measured at 32 kilometers (20 miles) – or 35 times wider than normal. Throughout flooded areas of Pakistan, water heights of over 5.5 meters (18 feet) forced residents to escape to their roofs in hopes to be rescued. According to Pakistans' National Disaster Management Authority (NDMA), at least 1.24 million homes were damaged or destroyed. International aid groups have noted that that number may continue to rise as further assessments are made. At least six million people were listed as homeless, with 17.6 million being affected. Statistics from the United Nations noted that the floods had also destroyed over 5,674 schools and 200 hospitals and health facilities. Topography and location of population played a major role in the high number of damaged domiciles and structures. Much of Pakistan is embedded within a mountainous terrain, and as the torrential rains fell, significant amounts of water ran downhill and tore through populated hillsides before reaching rivers and tributaries. Initial property damage estimates from the government were listed at PKR87 billion (USD1 billion), with that figure expected to rise. (Flooding in Punjab Province, Source: United Nations).

The widespread scope of the flooding also caused tremendous damage to the transportation infrastructure. In Khyber Pakhtunkhwa, the provincial information-minister reported that the transportation infrastructure was already severely impacted by ongoing civil unrest, and that the floods had only worsened the situation. Thousands of roads were either submerged or had been washed away, which made ground travel to many affected towns and villages throughout the country virtually impossible. Hundreds of bridges were destroyed, including one along the Karakoram Highway that connects Pakistan with China. At one point during the event in the town of Sukkur in Sindh Province, hundreds of meters (yards) of water were prevalent on both sides of the Indus National Highway. The electrical and telecommunications infrastructures of Pakistan was also severely affected by the floods, damaging well over 10,000 transmission lines, transformers, base station controllers, base transceiver stations, feeders and power stations. According to the Pakistan Electric Power Company (PEPCO), millions of residents lost electricity and millions more had lost access to clean drinking water. The Pakistani government estimated total sustained infrastructure damage losses (including roads, bridges, electricity and telecommunications) at over PKR869 billion (USD10 billion). (Impact Forecasting | Pakistan Flood Event Recap Report).

According to Pakistani government officials, the floods caused catastrophic damage to the agricultural infrastructure. Published reports from the Food and Agriculture Organization (FAO) of the United Nations indicated that floodwaters submerged approximately 6.9 million hectares (17 million acres) of cropland across Pakistans' most fertile grounds in Punjab, Khyber Pakhtunkhwa and Sindh provinces. This equates to nearly 16 percent of all cultivable land in Pakistan. Some of the countrys' primary crops include cotton, sugarcane, rice, pulses, tobacco, fruits, vegetables and animal fodder, as farming is the country's most important source of food and also a primary economic mainstay. According to Pakistans' Ministry of Food, Agriculture and Livestock as of late August, economic losses due to crop damage included PKR52 billion (USD600 million) to over 80,000 hectares (198,000 acres) of sugarcane, PKR21.3 billion (USD247 million) of rice, PKR22.4 billion (USD259 million) of maize, PKR17.3 billion (USD200 million) of wheat stock after damaging over 667,000 tonnes and PKR45 billion (USD518 million) to fruits, fodder and vegetables. Farmers noted that seed for next years' crop season was washed away and that many in the farming community could lose up to two years worth of income. In addition, the FAO believes that if September wheat planting is missed due to water-logging, the impact could last for up to two years. Those areas that grow rice and maize are not expected to be able to harvest their first crop until autumn of next year. Millions of hectares (acres) of cropland were submerged by the floods (Source: United Nations).

The textile industry was particularly affected, as over two million bales of cotton (20 percent of the crop) were washed away over 280,000 hectares (691,000 acres) as of August 30th. The economic damages from the lost cotton was estimated at PKR80 billion (USD925 million). Pakistans' textile industry accounts for 60 percent of the country's exports. Based on official statistics, 23 percent of Pakistans' economy is dependent on agriculture and at least 44 percent of the work force is employed in agriculture-related work. A drop in the agricultural production was expected to have a fairly negative impact on the projected 2010 GDP growth. While it is too early to assess the total loss in the agricultural sector (arising from damages to standing crop, grain and seed stockpiles,

livestock, poultry, fruits, agricultural infrastructure, etc.), an estimate from the Ministry of Food, Agriculture and Livestock noted that floods may have damaged crops valued at up to PKR433 billion (USD 5 billion). (11)

According to Government of Sindh sources, due to Super flood in Sindh, up to August 31, 2010, the total death occurred were 151, total number of villages affected was 5620, total persons affected were 4746482, total area affected was 3299475 acres, agricultural land that came under water was 1816871 acres, total number of houses demolished or affected was 402348, the number of injured people was 845 and the number animals died were 211902. These losses will increase further till flood water penetrates to Arabia Sea and till post-flood measures are taken promptly. This process will continue till physical losses are covered. However, the losses in the shape of deaths, to the supporting male members of families and their children are everlasting, and will be remembered for ever as History of Sindh.

### **Salient Features of Disaster Management Policy in Pakistan**

Disaster management policy in Pakistan exhibits following features: (a) Disaster management in Pakistan basically revolves around flood disasters with a primary focus on rescue and relief. After each disaster episode the government incurs considerable expenditure directed at rescue, relief and rehabilitation. (b) Applied disaster management policy sometimes carries strategic biases that are aimed at protecting locations and infrastructure of greater economic, political and strategic significance at the cost of areas and communities with lesser influence and importance. (c) Within disaster management bodies in Pakistan, there is a dearth of knowledge and information about hazard identification, risk assessment & management, and linkages between livelihoods and disaster preparedness. Disaster management policy responses are not generally influenced by methods and tools for cost-effective and sustainable interventions. (d) There are no long-term, inclusive and coherent institutional arrangements to address disaster issues with a long-term vision. For instance, the Emergency Relief Cell is mandated to deal only with post-disaster scenarios. (e) Disasters are viewed in isolation from the processes of mainstream development and poverty alleviation planning. Some of the large-scale development projects are bringing new forms of disaster and adding to the vulnerability of at-risk communities. The Left Bank Outfall Drainage (LBOD) project and link canals are significant examples in Pakistan. (f) Disaster Management, development planning and environmental management institutions operate in isolation and integrated planning between these sectors is almost lacking. (g) Absence of a central authority for integrated disaster management and lack of coordination within and between disaster related organizations is responsible for effective and efficient disaster management in the country. (h) State-level disaster preparedness and mitigation measures are heavily tilted towards structural aspects and undermine non-structural elements such as the knowledge and capacities of local people, and the related livelihood protection issues. (i) Disaster and relief departments and organizations largely remain under-resourced, untrained, and not given required importance within administrative hierarchy. A dedicated fund for disaster management at the federal level has never been a part of the overall development planning. The officials of two important organizations engaged in disaster management e.g. Emergency Relief Cell and Federal Flood Commission are not provided with adequate training. A great deal of uncertainty prevails among government employees about their stay in any disaster related organization / department, which contributes

towards working with less interest and efficiency. (j) Given the frequent incidence of floods during monsoon season the government has taken adequate measures for flood control and management down to district level. (12) The Pakistan Army plays a significant role in flood management by providing search and rescue services and emergency relief in affected areas. Flood Commission commences flood fighting plans every year in April and monitors the discharge of water at strategically important barrages and dams, and maintains a regular interaction with all provincial governments in pre, during and post flood situations. The district, provincial and federal governments prepare flood fighting plans annually and ensure timely dissemination of early warning through indigenous and modern modes of communication.

#### **Measures to Alleviate Flood Hazards**

Since floods are almost a routine annual feature in the monsoon season in the areas, lying along the rivers and their basins, the government must have a two-pronged flood management strategy: Structural and Non-Structural measures.

#### **Structural measures include:**

- a. Construction of embankments
- b. Construction of spurs / battery of spurs
- c. Construction of dikes / gabion walls / flood walls
- d. Construction of dispersion / diversion structures
- e. Channelization of flood waters
- f. Construction of delay action dams
- g. Construction of bypass structures

#### **Non-structural measures include:**

Improved flood forecasting system through;

- a. Effective data collection and dissemination system
- b. Real time rain fall and river flow data collection
- c. Weather radar prediction
- d. Modern system of transmission of flood forecasts

#### **Improved early flood warning system:**

- a. Based on effective flood forecasts, early flood warning is issued
- b. Reliable interaction between all related flood control and relief agencies
- c. Timely warning and evacuation arrangements by provincial relief departments and district administrations

### **CONCLUSIONS & SUGGESTIONS**

Super Flood: 2010 in Sindh province was not merely a calamity from the nature but also was a great curse from the selfish beneficiaries too (due to their self-centered vision and poor technical know-how). Their selfishness, egoism and vicious motives, devastated the whole Sindh. Also, it would not be out of way to consider, regarding Glacier melting (using of HARR technology) and Pouring in waters of Bulgier Dam and Kabul river etc as claimed in the print media, could be the other reasons to understand, the presence of such high flood water in the mid of July 2010.

It is therefore, suggested that a high profile enquiry through Supreme Court of Pakistan be conducted that where such flood water (9 lacs cusecs feet) came from that knocked the doors of the Sindh (Guddu Barrage) in the mid of July 2010, because no heavy rainfall was forecasted up to end June 2010. Why TORI Bund was given a Cut in hurry (as admitted by the Sindh Irrigation Minister in a Press Conference at Sukkur) and the factors that motivated them. Even, if no cut was given to Tori Bund (as amendment made by the Chief Engineer, Guddu Barrage & Sindh Irrigation Minister, later on), how the Tori bund breached, when the discharge capacity of Guddu Barrage is about 12 lacs cusecs feet of flood water and the total flood water was not more than 10.5 lac cusecs feet on August 7, 2010 (the day of cut to Tori Bund) or this happened due to gross negligence of the Irrigation Department? Also it is to be taken under consideration that how much payments were made by the Irrigation Department for repairing and curing the Tori Bund in FY-2009-10). Who will be held responsible for such high number of Deaths, Diseases, Disturbance and Devastating private property and pushing the Sindh province about 10 years back, economically? What charges are to be leveled against the culprits / defaulters, regarding killing thousands of persons and children? Only blacklisting the politicians and suspending the negligence doers would not suffice. These are criminals, who have played with the lives of Pakistanis (especially Sindhis) they must be punished rigorously. Also, if any foreign country's conspiracy is proved, that must be paid in the same coins, through International Court of Justice.

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**BIODIVERSITY OF EARTHWORMS SPECIES  
RELATIVE TO DIFFERENT FLORA**

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**ABSTRACT**

To study the effect of different flora on earthworms diversity, the specimens were collected from Guava, Mango, Citrus, Date palm and Mulberry field. Total 480 sampling sites, 30 sampling sites a week (6 for each fruit tree) were selected randomly by replacement sampling method. The specimens were preserved by following method suggested by Stephenson (1923) Mango field harbored the maximum number (14) of species (*Pheretima posthuma*, *Pheretima taprobanae*, *Pheretima minima*, *Pheretima lignicola*, *Pheretima anomala*, *Pheretima californica*, *Pheretima carinensis*, *Pheretima differenges*, *Pheretima suctoria*, *Pheretima bourna*, *Pheretima hawayana*, *Eutyphous ineammodus*, *Apporectodea longa*, *Apporectodea caliginosa*) where as Mulberry field harbored minimum number of earthworms species (6) (*Pheretima posthuma*, *Pheretima minima*, *Pheretima lignicola*, *Pheretima morrisi*, *Pheretima suctoria*, *Pheretima birmanica*, *Pheretima differenges*, *Pheretima californica* and *M.mouritici*) during the study period. Ranking of earthworm communities inhabiting different fruit tree fields was found to be Mango (14), Guava (11), Date palm (10) Citrus (10), and Mulberry (6) regarding their species complexity.

**Key words:** Earthworm, species, diversity, and flora.

**INTRODUCTION**

Earthworms are very important soil creatures as they make up a large portion of the total biomass of invertebrates of the soil. Earthworms though well studied organisms all over the world are badly neglected in Pakistan. Even the work on their taxonomy is far beyond completion. The work available on the systematics of earthworms is that by (Stephenson, 1923), who provided massive taxonomic information on oligochaeta in his book, "Fauna of British India". According to current estimation the number of existing species is far from complete. The most recent account of earthworm diversity comprises 3627 earthworm species described worldwide, with an average annual addition of 68 species (Reynolds, 1994). More than 3000 species of earthworms are known. In one hectare of soil, rich in organic matter and good moisture content, one can expect a population of 50, 000 to 4, 00, 000 earthworms and which are able to produce 25 to 30 tones of castings. Earthworms are hermaphrodites and they can double their population in one month in

ideal conditions of temperature, moisture, and food (organic matter). (Harender and Bhardwaj, 2001).

Earthworms play a versatile role in soil biology and fertility. As natural bioreactor they convert organic waste into organic manure. They are useful in land reclamation, soil improvement and organic waste management. (Harender and Bhardwaj, 2001)

Earthworm casts are sources of nutrients for plants. They increase the amount of nitrogen mineralized from organic matter in soil. (Syers *et al.*, 1979, Ruz Jerez *et al.*, 1988). Nitrogen-fixing bacteria are found in the gut of earthworms and in earthworm casts, they increase nitrogenase activity, meaning greater rates of N-fixation, are found in casts when compared with soil (Simek and Pizl, 1989). Beside above mention role some earthworm species have nutritional importance. The West-African night crawler and the brandling worm also known as the English red worm, have been used in North America as food for bait since the 1940's and as a dietary supplement for ornamental fish and other difficult-to-raise fish species. (William *et al.* 2006)

Earthworms provide a major potential source of alternative food for polyphagous predators, such as carabid beetles, that are natural enemies of slugs, aphids and other agricultural pests. (Symondson, 2000). Earthworms secrete enzymes, proteases, lipases, amylases, cellulases and chitinases which bring about rapid biochemical conversion of the cellulosic and the proteinaceous materials in the variety of organic wastes which originate from homes, gardens, dairies and farms. (Rajiv *et al.* 2004)

The present study was aimed at knowing diversity of earthworms in the fields of Guava, Mango, Citrus, Date palm and Mulberry field at Post Graduate Agriculture Research Station (PARS) Jhang Road Faisalabad. The present study is actually an attempt to study some aspects of biodiversity of earthworms fauna with respect to specified flora.

## MATERIALS AND METHODS

### Site of Study

The specimens were collected from the fields of Mango, citrus, date palm, Guava and Mulberry by the digging method (Lewis *et al.*, 1979) and identified in the research lab of Department of Zoology G.C. University, Faisalabad.

### Collection

A total 480 sampling sites were selected for study by the replacement sampling method every week. A hole of one square feet was dug with the help of spade and scraper in each selected site and earthworms were collected.

### Preservation

The collected specimens were preserved by the following method suggested by (Stephenson, 1923). The earthworms were washed with tap water, kept in 10% ethyl alcohol for ten minutes for dehydration, hardened by keeping in 10% formalin for about 24 hours and finally preserved in 5% formalin.

After identification the specimens were kept in separate jars with the inscribed species name and were kept in museum of Department of Zoology, G.C. University, Faisalabad.

## RESULTS AND DISCUSSION

Earthworm communities nearly always include species that pursue different ecological strategies and a familiarity with these strategies is essential to an understanding of the structure of earthworms communities.

493 earthworms were collected and identified. Twenty species were present in the study area. Out of these twenty species *P. posthuma* was the dominant (n=164). *A. caliginosa* and *M. mouritici* were the rare ones. *P. posthuma* (n=78) and *P. lignicola* (n=74) were in second and third in ranking order respectively. (table-1) This finding was in line with the work of Rafiq (2000) who demonstrated that in Faisalabad region the soil was mostly sandy loam harboring *pheretima posthuma* and its congeners in most of cultivated crops. These findings were also in line with Mannan *et al.* (1994) who studied the effect of different environmental factors and vegetation on abundance, morphometry and distribution of *pheretima posthuma*. He investigated that the season, soil type, moisture contents, day time temperature and vegetation significantly affected population density of the worm.

*P. posthuma*, *P. minima* and *P. lignicola* were the inhabitants of all the five habitats i.e. Guava, Mango, Citrus, Date palm and Mulberry fields. *A. caliginosa*, *E. ineammodus* showed exclusive inhabitation in mango field while *P. osmastonina*, *P. houlleti*, *P. heterochaeta* were restricted to citrus field and *M. mouritici* was present only in Guava field. *P. posthuma* was most common species in all the five fields except citrus where *P. osmastonina* was the most common and *P. posthuma* was second in ranking in citrus field. Didden (2001) also studied the different farm sites, comprising grassland and two types of horticultural farms (growing vegetables or flower bulbs). He reported that the abundance, biomass and species richness were significantly higher in grassland soils than in horticultural soils, and within the horticultural farms significantly higher in vegetable than in flower-bulb farms.

*A. longa* was confined in mango, citrus and date palm while *P. californica*, *P. carinensis* and *P. anomala* were present in mango, guava and date palm. *P. diffrenses* was inhabitant of mango, citrus, guava while *P. suctoria* was restricted to mango, guava and mulberry.

*P. bourni* was limited to mango and date palm while *P. hawayana* to mango and citrus. *P. morrisoni* harbored guava and mulberry while *P. birmanica* citrus, guava and mulberry.

Bano reported the 11 and 8 species from Bamboo and poplar trees respectively and Khanum (1999) explored 7 species from wheat field. In the present study the diversity is calculated by using Simpson Diversity index which showed that the highest earthworm diversity was found in date palm field (D=0.26), higher in mango (D=0.25), high in citrus and mulberry (D=0.221) and the lowest in guava (D=0.127). (table-2).



**Table I:**  
**Earthworms diversity and their relative abundance in different habitates**

<b>name of Earthworms species</b>	<b>Mango field</b>	<b>citrus field</b>	<b>Guava field</b>	<b>Mulberry field</b>	<b>Date Palm field</b>	<b>Total</b>
<i>P. posthuma</i>	42	66	23	10	23	164
<i>P. taprobanae</i>	2	-	-	-	2	4
<i>P. minima</i>	2	3	3	2	2	12
<i>P. lignicola</i>	8	36	22	2	4	74
<i>A. longa</i>	2	3	-	-	2	7
<i>P. anomala</i>	8	-	3	-	2	13
<i>P. californica</i>	3	-	4	-	2	9
<i>A. caliginosa</i>	2	-	-	-	-	2
<i>P. carinensis</i>	5	-	6	-	3	14
<i>P. diffrenes</i>	4	3	6	-	2	15
<i>P. suctoria</i>	4	-	6	3	-	13
<i>P. bourna</i>	2	-	-	-	4	6
<i>E. ineammodus</i>	3	-	-	-	-	3
<i>P. hawayana</i>	1	18	-	-	-	19
<i>P. morrisi</i>		-	4	2	-	6
<i>P. birmanica</i>		9	22	5	-	36
<i>M. mouritici</i>		-	2	-	-	2
<i>P. osmastonia</i>		78	-	-	-	78
<i>P. houletti</i>		9	-	-	-	9
<i>P. heterochaeta</i>		9	-	-	-	9
	88	234	101	24	46	493

**Table II:**  
**Simpson Diversity indices of earthworms species in five different habitats**

<b>Field</b>	<b>No of species</b>	<b>D-values</b>
Mango	14	0.25
Citrus	10	0.221
Guava	11	0.127
Mulberry	6	0.221
Date palm	10	0.26

$$\text{Simpson's Diversity Index} = D = \sum n(n-1) / N(N-1)$$

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## EFFECT OF DIFFERENT TECHNIQUES ON THE CHEMICAL BEHAVIOR OF MSW COMPOST

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### ABSTRACT

Chemical changes related to food waste compost are strongly affected by different composting techniques. For evaluation of compost maturity two locally fabricated composters were examined at seven days interval up to 91 days by loading food waste along with bulking agent. Gradual changes in chemical characteristics related to stability and maturity of compost were studied and compared. Increase in ammonia nitrogen level due to rise in temperature was maximum in aerobic process than others. Optimal level in stability and maturity parameters like C/N, was attained earlier in aerobic process as compared to facultative processes due to continuous aeration. The aerobic process provided good quality of compost and result from this study will assist in method optimization and quality of the compost product.

### INTRODUCTION

Composting is a process involving a complex ecosystem with many interacting factors. There have been several studies of the nature of the physicochemical and biochemical changes that occur during the composting process. The process can be greatly affected by succession of the microbial community, which is also influenced, by physicochemical factor. Characterization of the relationship between the physicochemical properties is important for a clear understanding of composting process [1] Many studies have mentioned the differences in quality of end product of different common feedstock. Differences in results of some physical and chemical parameters have been observed in different methods of composting [2], [3], [4], [5]. Composting methods differ in duration of decomposition and potency of stability and maturity. Mechanical composting physically breaks up organic matter yielding a texturally and chemically homogenous end product in less time where as in other composting, at least 60-90 days are required to stabilized organic waste. [6]. Static passively aerated composting is another method, which is less laborious than mechanical method and requires less time as compared to windrow process. Various techniques have been developed for forced aeration system to control odour and minimum processing time [7], [8].

The stability of compost is the degree to which the organic fraction is stabilized during the decomposition process. Compost is considered unstable if it contains a high fraction of biodegradable matter and underpin microbial activity. Stability is an important

aspect of composting in relation to its field application, potential of odour generation and pathogen regrowth [9], [10].

Maturity indices of food waste compost are still not developed. A number of criteria and parameters have been proposed for testing compost stability and maturity. But no single method has been universally applied to all compost due to the variation in field stock composition and composting process [11]. For stability, chemical methods are widely used including measurement of C/N ratio, CEC, and degree of organic matter humification.

C/ N ratio has been used as an index of compost maturity [12]. Reference [13] has compared initial to final C/ N ratio to relate them to maturity. Reference [14] have reported (30:1) C/N ratio for raw material and 13:1 for mature compost. Reference [15] recorded the decrease of total carbon including hemicelluloses, cellulose and increase in total nitrogen, crude ash and lignin during maturation of city refuse compost.

Nitrification is the oxidation of ammonia  $\text{NH}_4^+$  to  $\text{NO}_3^-$  by microorganisms. Reference [16] reported the total amount of soluble nitrogen decrease during composting and it represents mineralization. During maturation the ammonium nitrogen level continues to decrease while the nitrate levels increases. The increased ratio of  $\text{NH}_4^+$  ,N- $\text{NO}_3^-$  ratio is an indicator of compost maturity [17]. Cation exchange capacity describes the quantity of negative charges in the matrix to hold cations. CEC is one of the factor used in describing the properties of soil and its importance in determining the compost maturity. CEC is reported to increase during composting [18]. Highly significant correlation was noted between CEC and C: N ratio of city refuses compost. CEC greater than or approximately 60 is considered to be sufficiently matured for the application to crop land [19].

The aim of this study was to evaluate the C/N and Ammonia Nitrogen changes in food waste compost stability by using different techniques.

#### METHADODOLOGY

Food waste collected from Sunday bazaar Lahore, Pakistan was hauled to the composting site at PCSIR Laborites Complex Lahore. Cow dung manure was obtained from animal farm and bulking agent, saw dust and wood shaving (0.5-2.5 cm long) was taken from the PCSIR work shop. The process of composting was studied by using two different types of locally fabricated composters. The composters were loaded with food waste, bulking agent, which were homogenized by cutting the material to approximately 4-8 cm in length and loaded for 91 days. The chemical analysis of loaded sample was also analyzed. The technologies used in the study were as fellows.

**Table 1:**  
**Chemical properties of food wastes used for composting**

<b>Parameters</b>	<b>Concentration</b>
pH	7.53
C:N	35.74
Potassium (%)	0.2
Phosphate (%)	0.12
Moisture (%)	78 -84

### **AEROBIC COMPOSTER**

In order to study the compost stability on laboratory scale, a composter of 20 L capacity was used. The main unit of the composter i.e. the drum is of 610 mm in length and 480 mm diameter, made of a 3 mm thick stainless steel sheet. The inner side of the drum is covered by anti corrosive coating. The drum is mounted and fixed on iron metal stand. In order to provide appropriate mixing of waste, steel angles were welded horizontally inside the drum. To regulate the temperature a hot water jacket covered drum. In addition to that two holes of 400 mm and 203 mm on upper and lower portion of the drum were made, respectively. The mixed organic waste with cow dung was loaded into the composter by means of plastic containers and filled up to 75% of the total volume. Rotation was provided on continuous basis to ensure proper mixing and aeration by electrical gearbox of variable rpm. Temperature was monitored regularly from thermocouple attached to the composter.

### **FACULTATIVE COMPOSTER**

The facultative type composter was similar in dimensions as of aerobic but fixed on iron stand in vertical position. The only difference was that holes were present on the upper lid of the composter. The loading of the waste was also on the same pattern as in aerobic type composter but no mixing was done during the process. Temperature of the waste was also monitored.

### **ANALYTICAL METHODS**

Samples from each composter were collected after every seven days interval up to 91 days, and recorded the changes in different parameters. The dried compost sample (75° C) was ground to pass through 2mm sieve.

Measurements of Nitrogen and Carbon in compost were carried out on the dried sample. The C/ N ratio was calculated as the quotient of C over N. Carbon was also calculated by loss of weight by ignition at 550<sup>0</sup>C and Nitrogen by Kjeldhal method. The ammonium nitrogen was determined by using the Standard methods of water and wastewater [20]. Potassium concentration was determined by using flame photometer (Jenway) and it was calculated. [21].

### **RESULTS AND DISCUSSION**

The comparisons of the results for compost analyzed after every seven-day was carried out for a period of 91 days. The variations in the parameters during different times of study was documented for two composters (aerobic, facultative). Table 2, 3, presents the C/N ratio and Concentration of Ammonia Nitrogen of waste matter composted in different composters at different time intervals respectively.

The Changes in the C/N ratio reflect organic matter decomposition and stabilization during composting process because microorganisms used carbon as source of energy and N for building cell structure. As shown in table -2 with an increase in the composting time there was a decrease in C/N ratio for two processes. In the initial stage of

composting intense mineralization process take place, which were manifested by considerable decrease and increase in total organic carbon and nitrogen respectively in all treatments as result the C/N ratio decrease consistently across all methods as composting progress.

Ammonia nitrogen concentration was also an indicator of compost maturity. Its concentration was highest during the first 28 days in aerobic composting reflecting the more organic matter decomposition as compared to facultative composting. Mostly ammonia nitrogen present during aerobic composting was derived from rapidly decomposition of waste. When ammonia concentration decreases and nitrate appears in composting material, it is considered ready to be used as compost. [22].

Nitrate –N concentration rises gradually during composting and is a limited factor in assessing compost maturity [23]. Reference [24] also reported that the greatest decrease of ammonia nitrogen occurred after thermophilic stage leading to an increase of nitrate concentration through nitrification. In aerobic process the percentage conversion of ammonia to nitrate was highest than others due to continuous aeration of waste.

### CONCLUSION

From the above comparison, it was concluded that compost prepared in aerobic type composter showed the high level of nutrients and reached an acceptable degree of maturity more early as compared to facultative, compost. However the compost prepared by different methods yield chemically different product, by utilization of various production methods may help to optimize composting strategies to conserve the nutrients, provide appropriate and cost effective compost product for plant application.

**Table: 2**  
**Chemical changes in C/N ratio during composting**

No of days	Aerobic	Facultative
7	26.2	30.2
28	18.09	26.9
49	15.31	25.2
70	14.04	23.9
91	13.86	23.1

**Table 3:**  
**Chemical changes in ammonia nitrogen (mg/kg) during composting**

No of days	Aerobic	Facultative
7	45.3	12.31
28	62.7	15.21
49	35.1	23.75
70	23.9	24.35
91	17.25	19.1

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**ENVIRONMENTAL ASSESSMENT A TOOL FOR SUSTAINABLE  
DEVELOPMENT: A CASE STUDY OF NAI GAJ DAM PROJECT**

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**INTRODUCTION**

Water and Power Development Authority (WAPDA) has prepared a twenty-five (25) year development plan captioned as “Water Resources and Hydro Power Development - Vision 2025 Program”. Amongst other Projects, Nai Gaj Dam has been planned to be constructed under this program i.e. during the period 2006 to 2011. Main objective of its construction is to store a large amount of flood water for irrigation and to generate power. Nai Gaj Dam Project is proposed to be located over Nai Gaj River, Taluka Johi, District Dadu in the province of Sindh. It will be situated 65 km north of Dadu city. Its catchment area is 7019 km<sup>2</sup>, which lies in Kirthar Range and 85% of the area falls in Balochistan, while only 15% areas falls in Sindh.

The subject Project falls under the Schedule II of category E, of Environmental Protection Agency (EPA), Regulations, 2000, which are related to water management, dams, irrigation and flood protection with criteria that dams and reservoir with storage volume of 50 million m<sup>3</sup> and above or surface area of 8 km<sup>2</sup> and above or irrigation and drainage Projects serving 15,000 hectares and above will require an EIA. Therefore, Nai Gaj Dam Project requires an EIA for the subsequent issuance of No Objection Certificate (NOC).

**ENVIRONMENTAL LAWS, REGULATIONS AND GUIDELINES**

The Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992).

The Government of Pakistan promulgated “Pakistan Environmental Protection Act (PEPA)” in 1997. PEPA, 1997 is a fairly comprehensive legislation and provides protection, conservation, rehabilitation and improvement of the environment. It contains concrete action plans and programs for the prevention of pollution and promotes sustainable development.

Other laws, acts, ordinances and guidelines applicable are Land Acquisition Act, 1894, EPA Regulations, 2000, Lower Riparian Water Rights, National Environmental Quality Standards (NEQS), 2000, Sindh Forest Act, 1927, Sindh Wildlife Protection Ordinance, 1972, Sindh Fisheries Ordinance, 1980, The Canal and Drainage Act, 1873, Provincial Wildlife (Protection, Preservation, Conservation and Management) Acts, Ordinances and Rules (Act, 1972), Antiquities Act, 1975, Regulation of Mines and Oil Fields and Mineral Development Act, 1948, Explosives Act, 1884, World Bank Environmental Assessment Guidelines, World Health Organization (WHO) Guidelines

for Drinking Water Quality etc. Since Pakistan is a member of a number of international organizations, it has to follow the international protocols and obligations related to the environmental perspective.

### PROJECT DESCRIPTION

The Project will consist of the following major components:

Main Dam, Spillway, Intake Structure, Power House, Irrigation system and Gravity Water Main Pipeline to Manchar Lake. Design details are given below:

1	General	
	Location	65 km NW of Dadu
	River	Nai Gaj
	Purpose	Irrigation, Power and Flood Control
2	Reservoir	
	Catchment Area	7,019 Sq. km (2,710 Sq. miles)
	Design Flood	21,103 Cumecs (745,360 Cusecs) to cater for PMF
	Reservoir Area	2,023 Ha (5,000 Acres) at MCL: 177.50 m
3	Dam	
	Type	Central Core Earthfill Dam
	Height of Dam	59.0 m
5	Power Facility	
	Installed Capacity	4.2 MW (17.67 Gwh Energy)
6	Regulated Release for Lower Riparians	2.82 Cumecs (110 Cusecs)
7	Assured Releases to Manchar Lake	1.41 Cumecs (50 Cusecs)
9	Irrigation System	
	Gross Command Area	22,962 Hectare (56,739 Acres)
9a	With Surface Irrigation	
	Cultural Command Area	<ul style="list-style-type: none"> <li>▪ 15,216 Hectares (37,600 Acres) at initial year with 0.25 MAF Runoff</li> <li>▪ 11,655 Hectare (28,800 Acres) at initial year with 0.20 MAF Runoff</li> <li>▪ 8,579 Hectare (21,200 Acres) at 40 years with 0.20 MAF Runoff</li> </ul>
	Cropping Intensity	107.5%

\* Source: Revised PC-1 Proforma of Nai Gaj Dam Project, November, 2009

### PROJECT ALTERNATIVES

The no Project option means that no storage reservoir will be built on Nai Gaj and the command area will not have regulated supply of irrigation. This is not a feasible option as storage of flood water is the only option to increase the assured availability of water for irrigation purpose in the Study Area. Apart from the availability of water for irrigation, Nai Gaj Dam will also protect the lower riparians from flash floods.

Various technological options are available apart from the construction of Dam for the storage of water to be used for irrigation purposes which were considered during the Study. Various locations were considered for the Dam axis. Five options namely axis A, B, C, D & E for the selection of Dam axis were studied for the Project in which axis E was finally selected as the most suitable site.

Various design options such as different dam types and designs of various dam components were also considered in the Project. Similarly, four options for the irrigation methods in the proposed command area were also considered for the most economical and environmental friendly option. Options considered for irrigation system are surface water irrigation, sprinkler irrigation and drip irrigation. Another option considered is the irrigation system with the combination of all the above mentioned irrigation methods. In case surface irrigation is used the CCA will be 28,800 acres while for drip irrigation method the CCA will increase to 32,400 acres. The above parameters are based on the conservative water availability of 200,000 AF but if we consider the water availability of 250,000 AF, the corresponding command area with surface irrigation would be 37,600 acres.

The adopted option for Nai Gaj Dam Project apart from the irrigation releases for the command area includes 110 cusecs periodic releases for the lower riparians and 50 cusecs assured supply through a gravity pipeline to Manchar Lake.

This will ensure that the lower riparians of Nai Gaj Dam including Manchar Lake are provided assured water supply from Nai Gaj Dam in order to compensate for the shortfall of fresh water supply due to the construction of Nai Gaj Dam. It was decided that the water rights of Manchar Lake and the lower riparians should be given precedence over the newly developed command area of the Project.

#### **BASELINE CONDITIONS**

The purpose of the Baseline Study is to document the existing conditions of the resources likely to be affected e.g. existing infrastructure such as roads, houses, shops, mosques, cultivated land, trees, jeepable tracks and the social conditions of the inhabitants. A consultant's team of experts was constituted to establish the baseline conditions of the Project Area. The team was composed of Environmental Engineers, Socio-economists, Ecologists and Resettlement Experts. Based on the impact zones for the various predicted impacts, Study Area was developed and demarcated. For the collection of baseline information checklists, proformas, Satellite Imagery, Topographical maps, GT sheets were used. For the collection of socio-economic data, various proformas and questionnaires were developed. Scoping sessions were held with all the major Project stakeholders for disclosure of information and to clear queries and misconceptions regarding the proposed intervention. Government offices were also contacted and visited for the verification of baseline data collected during the field visit and to obtain published documents related to the Study Area. Similarly Non-Governmental Organizations (NGOs) were contacted to review their programs/developments Projects in the Study Area. In addition, efforts were made to collect information regarding the future development plans in the Study Area.

Points for environmental monitoring and sampling were selected and finalized for the monitoring of ambient air, noise and sampling for water (surface and groundwater). Monitoring and sampling contract was awarded to Pakistan Space and Upper Atmosphere Research Commission (SUPARCO). Ambient air and noise levels were recorded at site while samples of water and wastewater were taken to the laboratory at Karachi.

All the verified data was digitized and analyzed using state of the art software for engineering and statistics such as Microsoft Office (Word, Excel and Access), Statistical Package for Social Sciences (SPSS), Auto Computer Aided Design (CAD), Coral Draw 12 etc. Following is the description of the baseline conditions of the Study Area.

### **Physical Environment**

The reservoir area comprises alluvium deposits, which consist of rounded to sub-rounded gravels, cobbles boulders, sand and silt. There were 09 settlements in the reservoir area. Command area is the area which will be irrigated by the canals originating from the reservoir of Nai Gaj Dam. In the command area, soil is derived from Kirthar range and laid down by the Nai Gaj River and by some other hill torrents. The coarser materials like sand and gravels settled down at the foot of the hills while the finer sediments were washed away to the plains. The surface relief is uneven to nearly level with slope from north west to south east. The soils are recent to sub recent in age.

Lower riparian area refers to the reach of Nai Gaj from the dam axis upto Manchar Lake. It is the ancient bed of the Shol Nai. Lower riparian area also includes Manchar Lake and the villages located around the periphery of the lake.

The salient feature of the climate is the large difference in temperature between the southern and northern areas. The other peculiar feature of the climate is sub-zero temperature in Gorakh Hill Range during winter, where the mercury column remains below 20°C even in June and July. The maximum mean monthly temperature in the Project Area occurs in June, which is 44°C while the minimum mean monthly temperature occurs in January which is 5°C.

A number of hill torrents emanate from the Kirthar range in the western Sindh. Among these the Nai Gaj, with a catchment covering nearly 7019 km<sup>2</sup> is the largest. A physical feature of this plain is the Western Nara Valley, a natural valley, which runs through it from above Sukkur to Manchar Lake in the south. In order to extend the Sukkur Barrage command to the west of this valley, it was necessary to control the floods from the hills located at the north and west of the plain. To this end, a flood-protection (FP) bund was constructed, which was aligned to cross the ground contours at such an angle that there was sufficient slope to induce water to flow southwards around the bund, to Manchar Lake.

There is no industry of any type in the catchment and reservoir areas, thus air is fresh. However, a few cottage industry units are present in the command and lower riparian areas. These industrial units may not significantly produce any effect on the ambient air quality as well as noise pollution.

Different types of water resources are available in the Study Area. For instance, Manchar Lake is the largest fresh water lake of Asia and also a big surface water

resource. The lake is flanked by the Kirthar Range in the west, Lakki hills in the south and the River Indus on its east. Its surface area is 85,000 acres and the capacity is 0.85 MAF at the maximum level of 36.6 m (+120 ft). Manchar Lake is about 5.2 m (17 ft) lower than the Indus river bed and the surface area of the lake can extend to over 500 km<sup>2</sup> after the monsoons and reduce to less than 15 km<sup>2</sup> in the winter in the driest periods.

Second water resource is Hamal Lake, which is located in Larkana District. Its surface area is 26,000 acres and capacity is 0.08MAF at the maximum level of 40.84 m (+134 ft). A regulator has been provided so that water from the lake could be passed on to Main Nara Valley Drain (MNVD), which is a link between Hamal Lake and Manchar Lake. Its flow is regulated at Hamal and Manchar Lakes depending on the capacity-inflow-outflow relationship.

### **Ecology**

Major land use of the area is agriculture. Apart from agriculture, rest of the land is either barren or partly fertile due to the scarcity of water.

Vegetation in the Study Area is classified as Scrub Dry Tropical Thorn Forest Type. It has a capacity to survive and grow in the areas where over 45°C temperature is often recorded and the precipitation is as low as 24 mm a year. Fauna of Kirthar Range mountains includes mammals, reptiles and birds.

Flora and fauna situation in the reservoir, command and lower riparian areas is by and large identical. There exist 17 bird species, 3 main species of fish and many floral species, which shows rich biodiversity. Three mammals and two birds are reported to be critically endangered but none of the floral species is at risk.

Aquatic life of the area is principally fish, which is found in the nine large water collections or Kumbhs. These water bodies vary in size from ¼th of an acre to one acre. There are a number of part time fishermen who camp along the Nai Gaj and catch fish with the help of nets. Aquatic flora is *Tamarix dioica* (locally called lai) and is abundant along the banks of Manchar Lake especially near the fish market site. Manchar Lake provides an excellent habitat for a large number of water fowls including resident and migratory birds. Some of the duck species threatened globally spend the winter in these areas.

### **Socio-economic**

To document the socio-economic conditions of the population settled in the villages of the Study Area, socio-economic survey of the selected households was to be carried out. Reservoir area of the Project is spread over 5,099 acres and 9 villages fall in it with a population of around 591 persons. Due to the non-availability of basic facilities such as health, education and roads, socio-economic conditions of the local community are also not good. Literacy rate is almost nil, living conditions are also not good. The people are living in huts or Katcha houses and their main source of income is agricultural land and livestock.

The command area of the proposed dam starts near Gaj Bungalow towards the Kakar road and covers both sides of the road. In the command area, about 27,000 population is residing and the proposed dam will irrigate approximately 28,800 thousand acres of land

in the command area. Socio-economic condition of the local community is poor. Health centers and school buildings are available but without staff. Their major source of income of the people is agriculture land and labor. But due to the lack of water, they can cultivate only a few acres of land. Their irrigation system is based only on Nai Gaj water.

Lower riparian area of the proposed Nai Gaj Dam Project starts just downstream of the proposed dam near Gaj Bungalow and extends upto Manchar Lake covering the area along the right side of the Flood Protection (FP) bund. Population of the lower riparian area is about 43,098. Main sources of income are agriculture, labor and a few people are working in government or private sector. Main languages spoken in the lower riparian area are Saraiki, Sindhi and Urdu. Education and health facilities in the lower riparian area are relatively better than the reservoir and command areas.

### **Stakeholder Consultation**

Stakeholders especially the local population involvement is an important feature of the environmental assessment and can lead to better and more acceptable decision-making regarding Project design and implementation. Public consultation conducted for the Project has indicated that overall the public is in favor of construction of this dam. Residents of the command area are very much in favor of Nai Gaj Dam as they are the major beneficiaries of the Project. Residents of the reservoir area showed their concerns regarding the compensation of their land and land based assets. Lower riparians were worried about their water rights, however, they were satisfied when they were assured a provision of 110 cusecs periodic releases even during the drought period. Riparians residing around the periphery of Manchar Lake along with fishermen of the lake showed their concerns regarding the ever degrading water quality of the lake. They welcomed the Project when it was revealed that a provision of 50 cusecs continuous water supply through a pipeline has been made even during the low flow seasons.

## **IMPACT ASSESSMENT AND EVALUATION**

### **Positive Impacts**

Based on the findings of desk studies, processed satellite imageries, previous IEE studies, screening checklists, all the significant and non-significant positive impacts of the Project on physical, ecological and socio-economic environment show the following picture:

- The implementation of the Project will ensure the regular supply of 0.106 MAF of irrigation water yearly to an area of about 28,800 acres.
- Figures reveal that at its full operation, the Project will generate an amount of Rs.2559.82 Million annually as net economic benefits from the crops.
- Along with the irrigation benefits, Nai Gaj Dam will also provide hydel power.
- Thus the saving of differential investment cost of thermal plant, Rs.139.042 million, fuel and operation costs Rs. 59.971 million would be the benefits attributable to the Project .
- Total benefits from fisheries, thus, work out to be Rs. 42.89 million per annum.
- The proposed Project will mitigate flooding in the period June – October and thus reduce/control damages being caused to the crops and infrastructure in the command and lower riparian areas.

- Due to the implementation of the dam, further reduction in the storage volume of Manchar Lake caused by sedimentation, will be halted.
- During the construction of the dam, as an option, the private investor may by mutual agreement, acquire the entire command area from the locals / landowners on lease. This will create economic benefit for the locals / landowners. After the construction of the irrigation network, the investor would employ the locals over the leased land for cultivation either on salary or on contract basis. In this way, the locals will be benefited by the lease amount on annual basis and through the salary / contract price for performing crop cultivation tasks.
- Due to the flood protection, historical graveyard of Allah Yar Talpur located in the lower riparian area adjacent to Sajan Di Pai village will be protected from further damage.
- Project will have positive impacts on the lower riparian and command areas due to the development of quarry sites. In this regard, construction of new roads to the quarry sites will also benefit the local population and result in improved communication apart from more job opportunities.

### **Adverse Impacts**

Potential adverse impacts are also classified based on the anticipated stages of the Project i.e. Pre-construction, Construction and Operational stage. Following are the major adverse impacts of the Project.

- There are about 9 villages in the reservoir area, which will be submerged due to the impounding. The major impact due to the implementation of the proposed Project will be the loss of land and the land based assets in the reservoir area. These include land such as agricultural, rangeland and barren, private properties like residential houses, shops, trees, private infrastructure like sheds for livestock (animal penning area), open surface wells, irrigation water courses etc. Land to be lost in the reservoir area is classified into four categories i.e. Agricultural Land, Range Land, Barren Land, and River Bed.
- Based on the ecological surveys and processed satellite imageries, total number of large, medium and small trees to be lost in the reservoir area is 826, 2,263 and 5,683 respectively.
- A graveyard located within Yara Thuk village comprising about 100 graves will be submerged, due to the impounding of the reservoir.
- Development of the construction camps in the Project area will generate a requirement of 30,000 lit. Water/day for approximately 2000 workers. As the area is already deficient in potable water resources, the workers water demand will put a lot of pressure on the existing quantity and may affect adversely the water availability for the nearby settlements. Further, 70 to 80% of the water consumed will be generated as sewage, which will require proper disposal.
- Total estimated amount of generated wastewater will be about 2,250 m<sup>3</sup>. Disposal of wastewater without treatment will pollute the soil and groundwater resources of the area.
- Construction activities such as excavation and filling at the dam site, development of the main canal, distributaries, minors, access roads etc. will affect the existing soil pattern in the Project area and its surroundings.

- Fresh water supplies to Manchar Lake will be reduced to about 20 % of the current inflows from Nai Gaj.
- Camps will generate about 0.5 kg/person/day domestic solid waste comprising kitchen waste, garbage, putrescible waste, rubbish, and small portion of ashes and residues. Although quantity of waste is not too much, inappropriate disposal methods may have a negative impact on the physical environment of the Project area.
- Construction activities, machinery operation and blasting, movement of equipment, vehicles and other anthropogenic activities will disturb the scenic view and cause deterioration of the ambient air quality due to the dust and emissions as well as noise and vibrations.
- Existing drainage pattern will be changed during the construction and especially during floods.
- As the Project activities will be carried out within the residential/agricultural areas of the local community, as a result women activities in the field may be affected during the construction stage.
- The induction of outside labor may create social and gender issues due to the unawareness of local customs and norms. It will also cause hindrance to the mobility of the local women. There could also be theft problems for the community due to contractor's workers and vice versa.
- Surface water quality of the natural streams / nullahs and the other water bodies may get damaged due to the construction activities.
- During the construction phase, the general mobility of the local residents and their livestock in and around the Study Area is likely to be hindered.
- Unmonitored construction activities, e.g. blasting may create an accident risk for the local residents particularly the women and children.
- Usage of community common resources like potable water, fuel wood etc. by Contractor workforce may create conflicts between the community and the Contractor.
- Due to the impounding of the reservoir, an old pathway through the river will be lost forever and the locals may have to travel long distance as an alternative.
- Currently, the water of Nai Gaj is being used for various purposes such as irrigation, livestock and human consumption. This water also recharges the groundwater table of the lower riparian area along with other hill torrents. Due to the construction of the dam, supply of water to the lower riparian area will be attenuated. Peaks will be flatter hence water might not reach the areas where water reaches under current situation.
- After the implementation of the proposed intervention, flood patterns of Nai Gaj in the lower riparian area will be highly attenuated for low floods. It is estimated that high or peak floods will be attenuated to about 90 % as against the without dam condition.
- It is anticipated that groundwater table would be affected as lower riparians dependency on groundwater for domestic needs will increase significantly with the operation of the proposed dam.



### MITIGATION AND REMEDIAL MEASURES

Mitigation and remedial measures for the identified adverse impacts are suggested to reduce the effect of adverse impacts, if not completely removed. Some of the suggested mitigation measures are summarized below:

- Land acquisition, resettlement of affected population and compensation for the affected land based assets are some of the major issues of the Project . Valuation and costing of land acquisition, resettlement and compensation has been suggested. However, in order to address this impact, Resettlement Action Plan (RAP) is required, which is being prepared.
- To compensate for the loss of old pedestrian pathway, provision has been made and access roads are provided for the movements of locals living and travelling in and around the reservoir area.
- To protect the water rights of the lower riparians, a provision of regulated flow of 28,700 AF is being made during the dam operation.
- To compensate for the decrease in water flows from Nai Gaj to Manchar Lake, a provision of 50 cusecs continuous water supply from the dam to Manchar has been made.
- To restore the livelihood, it is suggested that government should allot alternative land or compensation equivalent to the existing market price of that land. Moreover, relocation assistance to the affected families should be provided.
- The Contractor will be required to train his workforce in the storage and handling of materials like oil, diesel, petrol and chemicals, etc., which can potentially cause soil contamination.
- A proper quarry development plan taking care of all the anticipated environmental impacts of the quarry activities including the access roads and storage areas is required to mitigate the impact of soil erosion.
- Construction camp will be located at least 500 m away from the local settlements to prevent the contamination of community-owned water resources.
- Approval from the locals (elders and leaders of nearby population) will be obtained before using the local water resources.
- The Contractor will be required to maintain close liaison with the local communities to ensure that any potential conflicts related to the common resource utilization for the Project purposes are resolved quickly.
- To reduce the impact of the attenuated floods, diversion dams, weir schemes and other drainage structures should be proposed in the lower riparian area at appropriate locations.
- In order to compensate for the decrease in fresh water supply to Manchar Lake, transmission of water from River Indus can also be one option. However, a comprehensive separate study is required to be carried out for Manchar Lake in order to have an overall assessment to find economical, sustainable and implementable solution.
- During the operation in quarry areas, provision of personal protective equipment (PPE) should be ensured by the suppliers.

- Most of the plant species, which are high to medium tolerant in the dry season, will not be affected due to the attenuation of flood flows and loss of the nutrient rich water.
- Overall impact on the lower riparians will be a decrease in the fish production. However, the reservoir will create great fish resources as the water in the reservoir would be 59 m deep with an area of 2,063 hectares.
- To mitigate the impact on land use in the lower riparian area, surface water of Nai Gaj and other hill torrents joining Nai Gaj downstream of the dam may be used by constructing weir schemes etc. for developing alternative sources of irrigation water for the lower riparians.
- The potential impact of water logging and salinity in the command area needs to be verified through sub-surface hydrogeological studies and suitable remedial measures.
- The Contractor will have to select the specific timings for the construction activities so as to cause the least disturbance to the local population particularly women considering their peak movement hours.

### **ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)**

In order to implement the suggested environmental mitigation measures and to provide implementation framework along with budgeting and cost, an environmental management and monitoring plan (EMMP) has been developed.

Major role players for the implementation of EMMP are WAPDA (through WEC), Project contractor, supervisory consultant, Sindh Environmental Protection Agency (SEPA) and local government and non-government organizations. Roles and responsibilities along with their existing setup and capacity and recommendations for further capacity enhancement and training needs are also suggested. It is highlighted that although the responsibilities for executing and monitoring the mitigation measures have been delegated to different organizations, WAPDA will hold the primary responsibility for ensuring the full implementation of EMMP.

EMMP also includes the change management plan, site restoration plan, environmental monitoring plan, communication and documentation plan, auditing and estimation of environmental costs for the Project.

### **CONCLUSION AND RECOMMENDATIONS**

Based on the available data, predicted impacts and the proposed mitigation measures to alleviate the adverse impacts, it can be safely concluded that "Nai Gaj Dam Project" will bring economic improvement for the locals especially to the cultivators of command area and its construction is recommended to fulfill the needs of the Sindh Province. Adequate provision has been made in the Project to compensate for the shortfall of flows to Manchar Lake and to cater for the water rights of the lower riparian.

**ROLE OF FINANCIAL INSTITUTION IN MANAGEMENT OF  
QUALITY ENVIRONMENT IN PAKISTAN**

**Farman Ahmad Chaudhary**  
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**ABSTRACT**

Due to globalization and adaptation of modern agricultural technology Pakistan is self sufficient in food, especially in white gold (flour, rice, cotton and sugar).

Due to excess use of pesticides and fertilizers, change in cropping pattern are lacking place, which result in many environmental problems. We can do a lot through motivations, awareness by teaching and communicating our religious thought.

**INTRODUCTION**

**Surah-78: An-Naba (The Tidings)**

- 6 – Have we not made the earth an expanse?
- 7 – And the high Hills bulwarks.
- 8 – And we have created you in pairs.
- 9 – And have appointed your sleep for repose.
- 10 – And have appointed the night as cloak.
- 11 – And have appointed the day for livelihood.
- 12 – And We have build above you seven strong heavens.
- 13 – And have appointed a dazzling lamp.
- 14 – And have sent down from the raining clouds abundant water.
- 15 – Thereby to produce grain and plants.
- 16 – And garden of thick foliage.

**Surah-76: Al-Muddathhir (Cloak One)**

- 4 – O thou enveloped in thy cloak.
- 5 – Arise and warn.
- 3 – Thy lord magnifies.
- 4 – Thy raiment purifies.
- 5 – Pollution shuns.

**Sayings of Holy Prophet (P.B.U.H)**

- i) Cleanliness is part of faith.
- ii) He, who made adulteration, is not our companion.
- iii) Do not dry your hands with towel or anything before taking meal.

I was born in early fifties in a God gifted independent Islamic State, Punjab, Pakistan. Punjab (Five rivers rich soil) and Sialkot district (sub mountainous tract of Himalayas, few miles from the state of Jammu and Kashmir state.

At that time our eating habits were as vegetarians. Organic natural products, milk, whey etc., green vegetables. There was no use of fertilizers, water was free of chemicals, no use of loud speaker, every village has water reservoir, abundant fishes available, pure air available, means of transport, animals and cycles. 85% population was living in villages in the rural areas. There was no democracy and problems were solved in the community centre in the villages. There was no tension. Life was simple, secure and if we recall the memory. Crime rate was negligible.

God has gifted us rich soil, zero elevation to highest mountains, diversified climate where we can grow all types of crops, fruits, vegetables, sea foods and rare animals. We are rich with the flora and fauna. Soil fertility and value varies from inch to inch.

We are self sufficient in food and five types of white gold i.e. flour, rice, cotton, sugar cane, mineral water and also rich is animal wealth. Our breeds and varieties crops have peculiar characteristics in aroma, taste and rich in nutrients.

Pakistan is facing environmental challenges and issues which are linked with:

1. Economic Growth
2. High Population Density
3. Poverty
4. Rapid Urbanization
5. Industrialization
6. Destruction of flora and fauna
7. Deforestation
8. Disturbance in weathering element
9. Natural Calamities
10. Disturbance in Eco system
11. Use of Fertilizer, insecticides, weedicides, fungicides in plant kingdom. Use of chemical is injurious to the health of animals and various breeds and species of useful animals and plants.
12. Texture and structure of soil changed
13. Use of modern technology in agriculture sector
14. Poor water management
15. Use of explosive material, suicide bombing, burning of field crops and wastes, use of hydrocarbons, diesel, two stroke engines etc.
16. Useful animals' species like vulture dis-appeared.

### **1) Economic Growth in Pakistan**

The main issue in economic development of Pakistan has been the Good Governance and proper utilization of funds since the imposition of Martial Law by the Field Martial Muhammad Ayub Khan (October 27, 1958). We cannot deny the fact that economic growth is an agent factor in reducing the poverty and provides resources for human development.

Good governance ensures transparency, efficiency and rationality in utilization of public funds and natural resources, and acts as catalyst in the growth of private sector activities and improves the public sector services. It helps in implementation of rule of

law in the country. Bad governance promotes the culture of corruption, in – equality, adopting short cut methods to become rich without merit.

### **What is Good Governance:**

As First Caliph, Abu Bakr (R.A.) described in his first speech after assuming office. *“I have been given authority over you. Although I am not the best of you. If I do well please help and if I do wrong, set me right, loyalty to tell the truth to a leader, treason to hide it. The weak among you will be powerful in my eyes until I secure his right. If Allah (SWT) so wills, the strong among you shall be weak in my eyes until I get the right from him. If the people do not follow in the way of Allah (SWT), he will disgrace them. Obey me as long as I obey Allah (SWT) and his Prophet (PBUH). If I dis-obey them you owe me no obedience.”*

### **2) High Population Density**

Malnutrition, unbalanced diet, un hygienic diet, housing, health problems, availability of polluted water, low literacy rate etc.

### **3) Poverty**

Non provision of basic needs of life, food, fiber and shelter, lack of educational facilities, risk in crime rates, deterioration of law and order situation, education, sense of responsibility being good citizen.

### **4) Rapid Urbanization (Rural 85% to 65%)**

Agricultural land converted into housing schemes. Pressure on cities as transportation, use of diesel, petrol buses, smoking, sewerage water, lack of planning, pressure on government resources, increase in temperature etc.

### **5) Industrialization**

Pollution of water of subsoil rivers due to non – installation of treatment plants, exposing poisonous gases and waste products, fermentation; causes diseases and disturb eco – system, increase in heat, use of chemicals are all injurious to health.

### **6) Mass Destruction of Flora & Fauna**

Plant and animals species are dis-appearing due to the use of chemicals, fertilizers, weedicides etc. Air pollution, water pollution, soil born diseases and change of habitat, and modernization of society.

### **7) Disturbance in weathering element**

(Melting of Glaciers and High Floods in Catchment Areas)

- a) **Melting of Glaciers:** Increase in temperature to deforestation, use of LPG, increased population density, forest converted into grazing land due to eradication of weeds and other lower plants, soil structure and water holding capacity, disturbed, use of explosive material, wars etc.
- b) **High Floods:** Elimination of reservoirs, ponds, catchment areas to agricultural lands and construction of houses, roads, canals, motorways, railways, tracts due to lack of organic matter etc; the water holding capacity decreased. Grazing of land,

strip cropping in hilly tracts. Due to high temperature on earth, melting of glaciers, soil erosions etc.

- c) **Use of Chemicals:** Insecticides for Hunting, Fishing, Trapping of wild life, use of insecticides, weedicides, and fungicides especially pre – emergence weedicides destroys various species of useful animals. Useful and Nitrogen fixing bacteria, value of soil changed and adversely affected soil erosion due to non – availability of organic matter.
- d) **Use of Modern Technology in Agriculture:**
- i) Use of diesel in tractors, tube wells and other farm machinery.
  - ii) Improper use of fertilizes and chemicals, pesticides, fumigation to control the stored grain parts.
  - iii) Non use of organic matter, green maturing, FYM.
  - iv) Use of contaminated water in crops.
  - v) Burning/smoking of residuals of crops stubbles etc.
  - vi) No use of biological, cultural, legislative and radiation techniques to control the parts.
  - vii) No sense is using the fertilizers, pesticides etc.
  - viii) **Wastage of irrigation water** in flooding instead of sprinkling etc. according to the requirements of crop which is in inches. Run off, peculation, transpiration and losses of water through evaporation.
- **Wastage of Water:**
- No recycling of water, wastage of water in car washing, houses etc.
  - No planning
  - No billing of water
  - Tremendous use of tube wells for extraction of sub soil water
- **Poor Management System**
- Floods are also opportunity; seeds of plants are transported through water. Sandy soil has been converted into fertile lands and deserts have been changed into cropped area. Subsoil water will be available.

#### **RECOMMENDATIONS / SUGGESTIONS & FINDINGS**

1. Zarai Taraqiati Bank (ZTBL) has launched a scheme and selected two model villages in each District, where **Solar Energy system** will be provided with the co-ordination of Government of China; to overcome air pollution presently due to the use of diesel, kerosene oil, saving of energy, economically.
2. Discourage the use of diesel in transports system in cities by replacing two stroke rickshaws, tongas and replacing them with four stroke CNG rickshaws.  
National Bank of Pakistan (NBP) has taken the lead in this context and has advanced financing to 64,000 customers under the President's Rozgar Scheme.
3. Banks should not advance to corporate sector clients where treatments of plants are not available.
4. Import of weedicides should be banned and no loan should be advanced to importers and cultural practices should be adopted to eradicate weeds.

5. Agricultural Development loans for tube well/ tractors where diesel/petrol are being used, should be discouraged.
6. Production loans should be given to those borrowers who discourage the use of Combine Harvester for harvesting of Rice/ Wheat crop and undertaking should be obtained that borrower should not burnt the stubbles of crops to avoid air pollution through smoke.
7. Financial Institution encourage supervised agricultural programmes and technical knowhow should be provided at the door steps.
8. Integrated Rural Development programming should be launched and all facilities should be at village level e.g. education, health etc.
9. Fisheries should be encouraged. The use of insecticides/ ammunition in fishing must be stopped.
10. Encourage avenue plantation and loan facility should be provided.
11. Use of water as per requirement of crop in inches water instead of flooding.
12. Poverty alleviation program.
13. Only such housing schemes should be allowed that meets the min. environmental standards and do not destroy the environment. Farm houses and big houses having area of more than one kanal must be discouraged.
14. Consumer financing must be given to facilitate the individuals to increase employment and eliminate poverty.
15. Avenue plantation and loan for raising of nurseries and a forestation should be available at low rate of mark up.
16. Destruction of hills, for transportation of stones, for construction of houses and roads should immediately be stopped.
17. Housing schemes loans/ mortgage financing should not be approved without NOC from environmental department.
18. Farm housing loans, or loans for construction of house above 10 marla should not be sanctioned.
19. The fruit of oil palm tree, *Elaeis guineensis* is wonderfully versatile, oil squeezed from it and goes into everything from biscuits to shampoos, surging global demand of another lucrative use for palm oil, making bio diesel, supposedly a greener and cheaper alternative for vehicles and generators.  
  
Palm oil tree plantation should immediately be started in the Baluchistan. A loan facility to farmers at soft lending rates is also recommended. It will also serve the purpose wind breaks against soil erosion in coastal lands.
20. Encourage the farming community to export the organic food/ animal products' which have greater demand in all over the world. Organic food which is grown without man made pesticides and fertilizer, is generally assumed to be more environmental friendly than conventional intensive farming which heavily relies on fertilizers.

21. Methanol plants for manufacturing from sugar cane crops should be encouraged to discourage the use of diesel.
22. Vultures species should be protected.
23. Farm, Yard manure, Green manure composite should be encouraged.

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