3. POPULATION SIZE, STRUCTURE, DISTRIBUTION AND CHANGES

de Jure => Basic
de facto => New migrant area

3.1 Population Size

defacto

There are two types of counts for measuring population size; one counting of population where present on census date and other count is at normal or usual residence. The former is known as de-facto count and the latter as de-jure count of population size. Each one has its own merits and demerits, the detailed of which has already provided in chapter 2. Since 1981 Pakistan is counting population both on de-jure and de-facto counts basis and prior to that population was enumerated as de-jure count only. The intent of introducing both counts is to reduce chances of misreporting. Ideally speaking both de-jure and de-facto counts should match at national level if the effect of international migration is considered as 'nil' or suitably adjusted. By definition of census aliens and Pakistanis emigrants were out of the scope of the 1998 Census. Thus, only the figure left, which is likely to cause difference between the two counts, is Pakistanis repatriated and present some where in the country on census date. Such Pakistanis are enumerated as household members present. Thus, there is no possibility of creating difference between the two censuses counts due to repatriation of Pakistanis. So any difference registered between the two censuses counts must be due to the difference in level of reporting of events in these two counts.

In the 1998 Census 129.18 million persons were enumerated under de-jure count (excluding FATA) while 126.54 million persons were counted under de-facto count. The difference of 2.63 million persons between the two counts thus can be attributed to misreporting. This misreporting can either be due to misconception about reporting of household members temporarily absent or non-reporting in case of temporarily absence of all members of the household, or counting of guests/visitors, both at their normal residence and present place of enumeration etc. In Pakistani context, where there is strong tendency of reporting members permanently absent from the household, there is relatively far less chances of omission of members temporarily absent. Therefore, de-jure count can be taken as close proxy of the actual population.

Contrary to the above, people do not bother to report guests/visitors staying with them. Thus, where slackness, negligence or lack of interest have been shown on the part of any enumerator, the respondent generally does not inform about guests/visitors present there on census date. So, the guests/visitors are most likely to be omitted from the count. In other words de-facto count is under counted. This supported by the fact that the de-facto count is less than the de-jure count as emerged from the 1998 Census. Also there is a general tendency of under reporting of children particularly under one year and females. However, such under reporting probably affect equitably both the counts. To sum up misreporting has been found in the 1998 Census data but de-jure count is more reliable than de-facto count. Moreover the formal count provides comparable data with earlier censuses than the latter count.

In the 1998 Census population was enumerated as 132,352,279 persons living in four provinces, FATA and Islamabad Federal Capital Territory, excluding Allai area of Batagram District, the missed population was estimated as 52,960 persons. The census count includes all persons present in Pakistan on the dawn of 5th March 1998 including those who were alive at

that time but subsequently died, repatriated Pakistanis and aliens but excluding children born after the dawn of 5th March, Pakistanis emigrated before that date and diplomats and their families living in the country. However as per government policy the alien population was excluded from the published data.

3.2 Population Structure

3.2.1 Sex structure

Classification or grouping or division of population with respect to any of its characteristic is called as structure of population with respect to that characteristic, e.g. division of population into males and females is known as 'sex structure' of population. Similarly if population is divided into different age groups it is known as 'age structure' of population, so is the age-sex structure and so on.

Sex characteristic of population is very important for demographic studies. Separate data on males and females are important for analytical studies of many other socio- economic and demographic characteristics of population, assessment of population data with respect to their completeness and reliability. Any policy, planning and its implementation dealing with any aspect of human being can not conceive to achieve its ultimate objectives without giving due consideration to male and female composition of population. Therefore social scientists, economists, researchers and planners are very much concerned with sex structure of a population. Sex structure reveals male and female composition in the population which can be measured as sex ratio, and masculinity proportion of either sex in relation to other. Sex ratio and Masculinity proportion are defined as number of males per hundred females and number of males or females in total population. In mathematical notations these are represented as:

$$\text{Sex ratio (SR)} = \frac{\text{Males}}{\text{Females}} \times 100$$

$$\text{Masculinity proportion of males } (MP_m) = \frac{P_m}{P_t \text{ or } (P_m + P_f)} \times 100$$

Where P_m is male population, P_f is female population and P_t is total population.

Masculinity proportion of females (MP_f) = $\frac{P_f}{P_t \text{ or } (P_m + P_f)} \times 100$ or $\frac{P_f}{P_t} \times 100$

$MP_f = 100 - MP_m$

Computation procedure

According to the 1998 Census of Pakistan the total population was 132,352,279, of this 68,873,686 were males and 63,478,593 were females. The Computation procedures for SR, MR(m) and MR(f) are:

$$SR = \frac{68,873,686}{63,478,593} \times 100 = 108.50 \text{ percent or } 108.5 \text{ males for every } 100 \text{ females.}$$

$$MR(m) = \frac{68,873,686}{132,352,279} \times 100 = 52.04 \text{ males amongst every } 100 \text{ persons.}$$

$$MR(f) = \frac{63,478,593}{132,352,279} \times 100 = 47.96 \quad \text{or } 100 - 52.04 = 47.96 \text{ females amongst}$$

every 100 persons.

If any of the above three estimates is known the other two can be worked out as:

$$\text{Sex ratio (SR)} = \frac{\text{Males}}{\text{Females}} = \frac{\text{Males}}{\text{Females}} + 1 - 1 = \frac{\text{Males + Females}}{\text{Females}} - 1$$

$$= \frac{P_m + P_f}{P_f} - 1 \quad \text{or} \quad 1 / \left(\frac{P_f}{P_m + P_f}\right) - 1 = (1 / MR_f) - 1$$

$MR_f = 1/(1+SR)$ or $1+SR = 1/MR_f$ or $SR = 1/MR_f - 1 = (1-MR_f)/MR_f$ or

$SR = (1-MR_f)/MR_f$

Since $MR_m = 1 - MR_f$ therefore $MR_m = 1 - 1/(1+SR) = \frac{SR}{1+SR}$ or

$MR_m = 1 - 1/(1+SR)$ or $1/(1+SR) = 1 - MR_m$ or

$1+SR = 1/(1 - MR_m)$ or

$SR = 1/(1-MR_m) - 1$

Given SR =1.0850, then $MR_f = 1/(1+SR) = 1/(1+1.0850) \times 100 = 47.96$ percent.

$MR_m = SR/(1+SR) = 1.0850/(1+1.0850) = 52.04$ percent.

Conversely, given $MR_m = 0.5204$ then $SR = 1/(1-0.5204)-1 = 108.50$ percent.

$MR_f = 0.4796$ then $SR = (1-0.4796)/0.4796 = 108.50$ percent.

Genetically sex ratio at birth should be around 105 with average range from 104 to 106. Because of genetic factor females are more powerful than males at birth thus their chances of survival are far more than male babies resulting possibility of declining sex ratio after birth unless it is disturbed by sex selective health care and cultural values. Sex ratio beyond the above range can shed doubt about the reliability of the data.

Sex ratio in Pakistan was above 115 males per 100 females in 1951 which is gradually declining with time and it was estimated at 108.5 percent in 1998. This indicates that female coverage is improving over time though still there is a lot of room in improving their reporting. They are generally under reported at their birth, especially by mothers having age between 15 and 19 years.

3.2.2 Age Structure

The age structure is the most important demographic variable of population. Most of analytical techniques depend upon the age structure. Thus the reliability of any statistical methods largely depends upon the degree of accuracy of age data. The age structure of population is generally given by single years of age or by age groups which may be five years or ten years of age or broad age groups like under 15, 15-49, 15-60, 65 plus etc. Age can be measured as on last birth day, nearest birth day or next birth day but generally it is measured as on last birth day or in completed years.

A person who has not reached the first birth day is termed as infant, who has not attained the puberty age is known as a child, who has attained the puberty age is known as adolescent, who

has reached age of maturity called as an adult and a person who has reached the age of retirement is known as old person. Age structure of a population could guide about number of infants, children, adolescents, young people and old people living in a society economically active population, potential for school going population etc. Knowledge about such groups of people is playing a vital role in any population development activities at national level as well as at sub-national level.

Change in fertility rate first affects the infant followed by gradual affect on child population, adolescents, and adults and at the end old population. Mortality equally affects all age groups but its effect varies from age group to group. Its effect is very high at early age groups particularly in infancy and more so in first week and first month, then its effect taper of to a bare minimum level at adult ages and then starts increasing with further advancing in ages. Migration also changes the age structure but its effect is always at two different geographic units that is one place of origin and other place of destination. However reasons for change in age structures of population of receiving areas and loosing areas are altogether different. The receiving areas have socio-economic pull forces attracting people from loosing areas where push forces are persuading the people to quit the areas of deprivation.

On the other hand, age structure influences the demographic, social and economic characteristics of the population. Population with high proportion of females in reproductive ages generally has high level of fertility and with low proportion of females low fertility level. If fertility starts declining even then population will continue to grow for quite some time because of future mothers already been born. This is commonly known as 'population momentum'. Population with high proportion of children usually has high level of mortality with low proportion of children low mortality level. Mortality level also increases with increased proportion of older people in a society. Thus age structure determines the momentum of growth of population.

Age structure also plays a vital rule in determining the potential school going population, children to be inoculated against seven fetal diseases, manpower, voting population, population needing National Identity Cards, women of child bearing ages, old age population etc. Because of difference in age structure of population of two or more countries or regions some demographic parameters (crude birth rates, crude death rates) can not be compared without standardization of their age structures. Age structure is very important, too, in evaluating and

smoothing population data. Age is considered to be a very crucial variable in applying some statistical models and estimation of many parameters.

Age Dependency Ratio

Age dependency ratio (ADR) is one of important but crude indicator to see economic burden on bread-earners in a society. For estimating age dependency ratio population can be divided into three broad age groups, children under 15 years (P_{0-14}), persons between ages 15 and 65 years (P_{15-64})who are considered to be economically active or productive and older people 65 years and over (P_{65+}). Then age dependency ratio and its two components can be worked out as:

$$ADR = \frac{P_{0-14} + P_{65+}}{P_{15-64}} \times 100$$

$$\text{ADR (for children)} = \frac{P_{0-14}}{P_{15-64}} \times 100$$

$$\text{ADR (for older persons)} = \frac{P_{65+}}{P_{15-64}} \times 100$$

ADR = ADR (for children) +ADR (for older persons)

Given from the 1998 Census population of children under 15 equal 56064747, population between 15 and 65 equal 68586126, and number of older people aged 65 and over equal 4525075 the age dependency ratio and its components can be computed as:

$$ADR = \frac{P_{0-14} + P_{65+}}{P_{15-64}} \times 100 = \frac{56064747 + 4525075}{68586126} \times 100 = \frac{60589822}{68586126} \times 100 = 88.34\ \%$$

$$\text{ADR (for elder)} = \frac{P_{0-14}}{P_{15-64}} \times 100 = \frac{4525075}{68586126} \times 100 = 6.60 \text{ percent}$$

$$\frac{P_{65+}}{} \quad 56064747$$

ADR (for ~~older persons~~ Childerns) = $\frac{\text{---------}}{P_{15\text{-}64}} \times 100 = \frac{\text{----------}}{68586126} \times 100 = 81.74$ percent

Errors in Age Reporting

An error in the censuses or surveys is an outcome of interaction between two groups of people that is an enumerator or interviewer and a respondent. It could be due to negligence, incompetence, lack of art of asking questions or probing and/ or biased attitude on the part of an enumerator in recording information. Or it could be due to poor knowledge, lack of interest, time factor, reluctance in furnishing information, misunderstanding with the enumerator and/or biased attitude on part of respondent in providing information to the enumerator.

There are two types of errors; those are coverage errors and content errors. Coverage errors comprised under-reporting and over- reporting. Combine together are known as gross errors and difference of two are called as net errors. If magnitude of under-reporting exceeds the magnitude of over-reporting it is known as net under reporting other-wise net over-reporting errors. The magnitude and type of coverage errors vary with age and sex. It is very high at early ages especially for children under one and more so for female children. At adult ages it is more or less sex selective and at old age it is linked with both sexes.

Content errors creep into the process of age reporting due to digital preference and age heaping. While age reporting people generally prefer digit 0 followed digits 5, then even number and least preference goes to odd number especially two digits surrounding 0 (see application of Myer's blended population index).Content errors are of two types –one reporting true contents as false and other reporting false contents as true. The total of these two types of content errors is known as gross misreporting error and their difference as net misreporting errors and if the first type of content errors exceeds the second type of errors then net misreporting errors is called as response bias.

Pathological sterility describes infertility caused by diseases, transmitted through sexual intercourse.

5. POPULATION THEORIES

Population theories are designed to explain or predict the interaction between changes in population and social, economic, psychological or other factors; they include purely conceptual treatments. The term is used with widely different meaning but in restricted sense it refers to a systematic treatment of the logical and mathematical foundations of quantitative relations among demographic phenomena in abstraction from their association with other phenomena. Population theories are concerned with the numerical study of population, its growth and its variables along with relationship between population changes and other variables like social, economic, biological, genetic, geographical, environment and health.

5.1 Demographic Transition

The world population has been estimated at 250 million in the year AD 1 and it took over 1500 years to reach 500 million. Two billion was reached around 1920s, three billion in 1960, four billion in 1975, five billion in early 1987 and six billion in 2000.

Up to 17th century, population growth was slow and steady. After the middle of 17th century, the rate of world population growth accelerated largely because of falling death rates as a result of:

- **Improved agriculture** led to increased food production and better nutrition (e.g. the Agricultural Revolution in England included better fertilizers, crop rotation, and winter crops).
- **Industrialization;** The development of the factory system meant a greater variety of manufactured goods. Factory production of machinery (e.g. the iron plough, steam engine etc.) also contributed to improved agriculture and transport.
- **Improved transport** made the distribution of food and other goods easier (e.g. in Europe, railways enabled food supplies to be sent rapidly from rural to urban areas).
- **Social reforms** e.g. laws regulating child labor in factories.
- **Greater control of temperature and humidity** in the home and at work may have contributed to the decline of some diseases.
- **Public sanitation** including improved water supplies and sewage disposal, and water

purification (e.g. filters eliminate cholera and typhoid from the water).

- **Improved personal hygiene** was possible because of 2 and 6 above (e.g. cheap easy wash cotton clothing and soap became generally available).
- **Asepsis and antisepsis** (the exclusion and killing of disease-causing organisms) developed by Joseph Lister in the later 19th century (e.g. the sterilization of surgi instruments).
- **Immunology** (the study, of the body's resistance to disease), e.g. Jenner's paper of 17 on inoculation against smallpox, and the discovery by Koch (1876) and Pasteur (187 that inoculation with a mild case of the disease prevented a serious case.
- **Biological factors** People become more resistant to some diseases, and some diseas such as scarlet fever become more benign (i.e. less dangerous).

5.2 Early Writings on Population

The idea of population theories exists in 500 B.C. by ancient Chinese. The main idea of:

- Ancient Chinese e.g. Confucius (500 B.C.) was excessive population growth depressi living standards of masses and an optimum relationship between population and the lan
- Ancient Greeks e.g. Plato, Aristotle (300 B.C.) was the optimum size of the city state, be achieved either by restricting or encouraging births with punishments or rewards.
- India e.g. Kautilya (300 B.C.) was optimum village size with too few people seen as great evil.
- Roman Empire e.g. Cicero (50 B.C.) was stimulating population growth, by givi privileges to those with children (more men would mean more military conquests).
- Judaism e.g. the Old Testament (B.C.) was that population growth was a God's plan (forth, and multiply).
- Early Christianity e.g. Augustine Aquinas (400 A.D.) was that celibacy morally good, high fertility was needed to counter high mortality and moral disapproval of abortio infanticide, and divorce.
- Mercantilists 17th and 18th centuries was state intervention in economic activity maximize national wealth increased population would mean larger armies, lower hou wages, and increased wealth.
- Physiocrats e.g. Quesnay (18th century) was rule by nature or laissez-faire i.e. government intervention, population dependent on subsistence, and agriculture the o source of wealth and benefits from social reform would be cancelled by populat increase.
- Malthus 1766-1834 (19th century) was of the view that unless checked, population wo tend to increase faster than subsistence.
- Classical economists e.g. Adam Smith and Ricardo was (19th century) diminish returns to labor; later writers such as Marshall emphasized increasing returns.

- Anti-Malthusians e.g. Hazlitt (19th century) was preventive checks becoming more effective.
- Socialist and Marxist writers e.g. Marx (19th century) was population or surplus labor problems were the result of the capitalist economic system, and would be solved by the reorganization of society.
- Neo-Malthusians e.g. Ehrlich and Erlich and the environmentalists (19th and 20th century) were continuing population growth is unsustainable and must be checked by the use of birth control (Malthus himself was against birth control).
- Neo-classical economists e.g. the Chicago School (20th century) was the New Household Economics and the trade-off between the quantity and quality of children.

(Sources: United Nations 1973: Chapters; Brown 1978; Ehrlich and Ehrlich 1990).

It can be seen that early writers in India, China and Greece were concerned with the optimum or best population. In general the early Roman, Christian and Islamic writers were pro-natalist that is in favor of large families and rapid population, a view which is understandable given the high mortality of times. Writing on population was very speculative until John Graunt and other began the numerical study of population in 17th century.

5.3 Malthusian Theory

Malthus is considered as the first professional of demography partly because of its organized use of available data. According to Malthusian theory there was a universal tendency for population to outrun the means of subsistence. Malthus thought there was a conflict between two basic human needs-for subsistence (or food) and for passion between the two sexes ([redacted]). Population would increase up to the limits of subsistence unless checked. He assumed that population would increase in geometric progression (1, 2, 4, 8, 16,.....) and agricultural production in the arithmetic progression (1, 2, 3, 4, ...). Malthus described two categories of checks in population:

* Positive checks related to causes of death including poverty, disease, epidemics, famine and war.
* Preventive checks on the birth rate included what he termed improper acts such as abortion and contraception.

Initially Malthus regarded both positive and preventive checks as misery or vice. Later he introduced a new category of moral restraint, by which he mean delaying marriages until the means to support a family were available. Although the theories of Malthus dropped from favor during the 19th century, interest in them has revived in recent years because of rapid population growth in developing countries, wastage of natural resources and concern over food supply.

5.3.1 Some Criticisms on Malthus Theory

* Malthus emphasized the limited supply of land, but did not anticipate the benefits from improved transport combined with the opening up of new agricultural lands.
* Animals and plants can increase in geometric progression under favorable conditions.

Technology can also advance at a rapid rate. Improved agricultural methods, such as the use of fertilizers and new types of seed, have greatly increased productivity.

* Malthus did not envisage the control of fertility within marriage but in 1822 Francis advocated the use of birth control by married couples.
* Fertility can fall as economic development takes place and as the standard of living rises.
* Socialist writers also criticized the Malthus theory. They thought that the unequal distribution of economic was a major cause of misery.
* Marx and Engels denied the existence of a universal principle or law of population. On the contrary, they maintained that every stage of development has its own law of population.
* The writing of Malthus implied the law of 'diminishing returns' so that if capital and land were fixed, the addition of some workers would reduce per capita output.
* However Engels felt that scientific progress, combined with an increase in Labor force would overcome this.

5.4 Theory of Demographic Transition

By the beginning of 20th century mortality had fallen in many western countries and fertility was beginning to fall too. This experience gave rise to the major demographic theory i.e. the theory of demographic transition. Demographic Transition refers to the change in population from one stationary situation (where population growth is zero) to another. The two stationary conditions form an old balance and a new balance with an in-between period of imbalance as described below:

5.4.1 Old Balance (high fertility and high mortality)

A large number of births were necessary to compensate for the large number of deaths, especially maternal and child deaths. Maternal mortality was extremely high. In addition, a large proportion of children born (sometimes one-fourth to one-third) died within a year, after birth and about the same proportion died within 1 to 5 years of age and still more before reaching maturity.

5.4.2 New Balance (low fertility and low mortality) represents an improved condition of health especially due to good hygiene and nutrition leading to fewer deaths. Considerably less effort is required to bring a generation to maturity. Low fertility due to improved reproductive health and family planning practices.

5.4.3 Imbalance (high fertility and low mortality) (Low fertility and High Mor
In between the old and new balance is the period of rapid natural increase. This growth is helpful for under populated nations which need more manpower, expanding markets and greater military potential. However it eventually results in too fast growth of population leading to economic, political and social chaos. A number of developing countries such as Pakistan and many African countries are in the phase of demographic transition.

Blacker (1947) discerned five phases of demographic transition as shown in Table 5.1.

Table 5.1: PHASES OF THE DEMOGRAPHIC TRANSITION

	Phase	Birth rates	Death Rates	Natural rate of increase	Examples
1	High stationary	High	High	Zero, or very low	Europe in the 14th century
2	Early expanding	High	Falling slowly	Slow	India and Pakistan before World War II
3	Late expanding	Falling	Falling faster than birth rates	Rapid	Southern and Eastern Europe before World War II and India after World War II
4	Low stationary	Low	Low	Zero, or very low	Australia, New Zealand, United States in the 1930s
5	Declining	Low	Higher than birth rates	Negative	France before World war II and East and West Germany in the 1970s

Source: Blacker 1947; Dyson 1978; Day 1977.

5.4.4 Onset of Fertility Transition in Pakistan

Fertility in Pakistan has shown a stubborn resistance to change. Because of sharp declines in mortality following World War II, the population of Pakistan was growing at the rate of 2.7 percent per annum around 1960.

A national policy of slowing population growth was articulated in 1960, with a program of family planning as the main tool. During its first two decades program appeared to have little impact on fertility and TFR continued to hover around six and seven births per women through 1970s and 1980s and the population growth rate approached 3 percent per annum (Sathar 1993). Repeated assertions that a decline in marital fertility was underway proved baseless.

Empirical evidence from multiple and independent studies carried out in the past one decade or so demonstrating the decline of marital fertility has finally begun in Pakistan.

It is mainly because of increasing use of modern contraception for the purpose of limiting family size, use of a method of contraception at the time of survey remained below 10 % through the 1980s, 12 % in 1990-91 (PDHS) to 18 % in 1994-95(PCPS) to 24 % in 1996-97(PFFPS) a rise of roughly of 2 % per annum; Singulate means ages at first marriages calculated from survey and Census data rose from 16.9 years in 1951 to 21.6 years in 1990-91 (PDHS) and 22.1 in 1996-7 (PFFPS); rapid urbanization (as compared to other countries in South Asia) of Pakistan about 33 percent of total population (Population Census Organization 1998).

There are no reliable estimates of the incidence of induced abortion. But judging from qualitative investigation induced abortion is a far more common method of birth control in Pakistan in the 1990s than had been previously assumed.

In view of classical hypothesis that fertility transition is a response to decline in mortality and improvement in social and economic conditions in Pakistan in the past four decades supports conflicting expectations. By many criteria the country's fertility transition was several decades over due. That ultimately has started declining but with unexpectedly rapid speed.

Mortality fell steadily beginning in the 1950s resulting in a rapid population growth in the 1960s that continued through 1980s. Urbanization, income and literary/schooling have increased steadily throughout these decades.

Table 5.3 WORLD POPULATION DOUBLING TIME SINCE 1650

Year	1650	1750	1850	1950	1960	1970	1980	1990
World Population (millions)	545	728	1171	2515	3019	3698	4450	5292
Growth rate %	-	0.29	0.48	0.77	1.84	2.05	1.87	1.75
Doubling time (years)	-	239.1	145.5	90.3	37.6	33.8	37.1	39.7

Source: 1650-1850 Carr-Saunders 1936:42,fig 8; (1950-90) UN 1998.

5.6.1 Mathematical Justification Doubling Time

Let us assume that population is a continuous function and growing exponentially then $P_t = P_o e^{rt}$
For doubling population $P_t = 2\ P_o$

Therefore the equation will become as $2P_o = P_o e^{rt}$ or

$2 = e^{rt}$

Taking common log of both sides we get $\log 2 = rt \log e$

$\log 2 = 0.301029996$ and $\log e = \log 2.718281828 = 0.434294481$

$t = (0.301029996 / 0.434294481)/r = 0.693147181/r \approx 70/r$ (if 'r' is in percentage).

Table 5.4 DOUBLING TIME OF FUTURE POPULATION OF PAKISTAN

Year	1998	2000					
Population (millions)	132	141					
Growth rate %	2.69	2.3	2.20	2.10	2.00	1.80	1.5
Doubling time (years)	26	30	32	33	35	39	46

If population continue to grow at the inter-censal growth rate of 2.69 percent per year th population of 132 million observed in 1998 will double by 2024. If the population of Pakista will grow from 141 million base populations in 2000 at the rate of 2.3 percent every year then i will double by 2030 and if population will grow at average rate of 1.50 percent annually then i will double by the year 2046.

5.7 Population Stabilization

The prime focus of population study is population growth and its components. The mo important grouping of human beings is the family. Therefore, the family represents the molecul unit of society which passes through the reproduction process and contributes to the growth population.

A family is considered as a single primary unit for statistical analysis of other areas of populati growth such as fertility, mortality, migration, economic growth and social changes. Families pa through a systemic life cycle which brought changes in their sizes and composition. The changes have, in turn, important bearing on individuals in the field of consumption, savi pattern, economic participation and social welfare etc. Moreover changes in the process

modernization, industrialization and urbanization are bound to influence the size and structure of family, especially in bringing about a reduction in its size.
A review of Pakistan's population increase during the last few decades indicates that Pakistan is among those developing countries where family size norms have remained very high. Many countries with comparable socio-economic development, as that of Pakistan, have achieved desired family size norms, thus making the prospect of early population stabilization easier.
Future population of Pakistan could be determined by examining the couple's reported family size, their demands for children and measuring their motivation for fertility limitation, Pakistan society is considered to be a traditional patriarchal in nature with respect to its family structure and fertility behavior.

5.7.1 Family Norms in Pakistan

In Pakistan it is evident that the norms of a family large size were quite consistent, past surveys have shown that women had more than six children (on average) in the 1970s which has slightly declined to more than six children in the 1980s. During the 1990s the total fertility rate has further declined to 5.4 children and by the end of last century the TFR was recorded to be around 4.8.

5.7.2 Desired Family size

The desire for more children has remained very high as 40% women have reported their desires for more children in the near future or they want to have them after a gap of two years. In Pakistan desire for son was quite prominent, as the data of PFFP Survey has indicated in 1996-97. It was found that son preference was very strong among women who had no son or one son in their family. About 44.6 percent women with one or two children want to delay the next child for two years. This group of women could be focused for adoption of family planning services.

5.7.3 Unwanted Pregnancies

The gap between actual and desired fertility reported by the women leads to unwanted pregnancies. Around 22 percent women wanted to delay their third pregnancies. However the desire to stop the child bearing has been reported by majority of women with birth order of 5 and more children. Similarly, as the age of women increases the proportion of women with unwanted pregnancies increases.

5.7.4 Family Planning

Family planning consists in the restriction or limitation of births either temporarily to achieve the desired interval between successive births or permanently to prevent more births than desired. Studies carried out for unmet and met needs of family planning in Pakistan suggest that there is a need to focus the women who had up to three children for spacing between births. In this way the use rate of family planning methods can be raised in a shorter period.

5.7.5 Future Population of Pakistan

In view of the family size norms, the future population of Pakistan has been estimated under three scenarios.

1. The population of Pakistan would be around 217 million by the year 2023 and this might happen if, under high variant, the TFR of 5.0 children in 1998 would decline to 2.6 children in 2023. This is based on the assumption that the family planning programme will not succeed much during this period.
2. The medium variant of declining to 2.4 children by the year 2003 would result in 212 million populations with annual growth rate of 1.4 percent. This may be the future situation if the present progress in family planning and socio-economic development continues.
3. The third scenario leads to achieving the replacement level, fertility that is, 2.1 children by the year 2023 or before it. This would be the future goal but this requires very strong family planning and socio-economic progress. Under this variant, the population would be 204 million and it will be growing at 1.2 percent per annum.

However, even with 2.1 children per family, the population will be growing at 1.2 percent growth rate during 2023. The population would be stabilized and it is assumed that because of population momentum it will further take 40 to 50 years to reach the stabilization. So there is a need to put our efforts into strong family planning and socio-economic development program in the country for the welfare of future generations.