

**UPCOMING SCENARIO OF AGING POPULATION: PAKISTAN**

**Ammara Nawaz Cheema<sup>1</sup>**  
Department of Mathematics  
Air University, Islamabad.  
Email: <sup>1</sup>ammara\_qau@yahoo.com

**ABSTRACT**

*Aging of population may have its implications at individual, family, community and economic level. This paper explains how aging population will behave in the future based on projection assumptions. Future prospects and issues are identified and categorized alongwith relevance of aging population trend examined in a survey consisting of 341 observations. The findings demonstrate that aging population of Pakistan will increase in the forthcoming years. Among several reasons for increase in aging population, the most important is decline in death rate. The overall sex ratio indicates a better coverage of female in coming decades. For the next 50 years, the life expectancy may rise to 70.7 years. The old age dependency ratio may also increase in the times to come. Married elderly females may be less in number as compared to married elderly males. The high prevalence of other-than-married elderly females deserves special consideration in policy-making and planning. There exists much variation in the literacy rate of both elderly male and female. As the study reflects future pattern of aging population, its findings may be of interest for researchers and practitioners.*

**Key words:** projection, survey, sex ratio, life expectancy, dependency ratio, literacy rate

**1. INTRODUCTION**

The segment of elderly population is increasing due to improved health facilities especially in the western part of the world. 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).

**2. OVERVIEW OF AGING POPULATION**

United Nations (1992) has focused upon age-structure of population in the light of increasing proportion of the elderly, fast improvement in health facilities, and declining birth rates. The past research addressed various issues regarding the changing 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, according to UN population projections, the proportion of the elderly population 60 years and above will be 15.1 percent of the total population by 2050. Hashmi (2003) agreeably concludes that after 2030 the expected rapid increase in elderly population may create a problem by the year 2050 for the country. Hafeez (2004) confirms that the age structure of Pakistan's population was going to change rapidly due to decline in fertility and continuing improvement in longevity of age. The results showed population of 60 years and over had increased many folds in size and also as a proportion of total population during the next four decades.

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 Nizam-ud-din (2006), between now and 2050, the number of older persons will rise from 600 million to at most two billion. The UN (2007) as well estimated that the number of people 60 years or older in Pakistan will reach around 42 million by 2050. In the same light, Nayab (2008) used the medium variant of UN projection to analyze Pakistan's changing demography. The total fertility rate (TFR) is expected to continue to fall, reaching a near replacement level by 2050 Afzal (1999). The share of population bearing working age will touch its peak in 2045 to 68 percent before starting to decline again, and the reason would be the growing old age population instead of young Phang (2005). The proportion of the elderly in the total population is projected showed a substantial increase only after 2025 with old dependency ratio likely to show an increasing trend after 2025 Nayab (2008).

Arif and Chaudhary (2008) argued that Pakistan had entered the demographic bonus phase. There was a proven link between youth unemployment and social exclusion. Pakistan's youth population is projected to peak by 2015 after which Pakistan will witness declining young members. 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).

### **3. Methodology & Research Instrument**

After reviewing different research methods which are commonly in use, 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 reasearch purpose. We use factor analysis because it refers to a variety of statistical techniques whose common objective is reducing to manageable number many variables that are belonging together and having overlapping measurement characteristics (Kim and Mueller, 1978). The past research shows that researchers of various disciplines use factor analysis in their daily research (Hotelling, 1942; Barki and Hartwick, 2001; Palanisamy and Sushil, 2001; McHaney, 2002; Hong and Kim, 2002; Ishikawa, 2002 Hackbarth, et.al., 2003).

Two important measures to determine the appropriateness of the factor analysis and to quantify the degree of intercorrelations among the variables are the Bartlett test of sphericity and measure of sampling adequacy (see Kaiser, 1970; Kaiser, 1974). The procedure for a factor analysis is described in terms of three stages such as: i) provisional factor loadings are determined, ii) then these are modified by a process of factor rotation to obtain a model for the data that is easier to interpret, and iii) finally, factor scores are calculated, which are the values of the factors for the individuals that have known X values. For deciding the number of factors to extract, the researcher generally begins with some predetermined criteria, which are the Eigen value criterion (Hair et.al., 1998; Manly, 2005).

The loadings that greater than the factor weight criteria of 0.5 are judged significant (Hair et.al., 1979; Hair, et.al., 1995; Marbal, 2003; Bhatti, 2005). Estimates greater than 0.70 are generally considered to meet the reliability criterion (see Nunnally, 1978; Shih, 2003; Bhatti, 2005). So, the generally lower limit of Cronbach’s alpha is 0.70 although it may decrease to 0.60 in much exploratory research (Robinson, 1991). We constructed life tables since it is a valuable asset for researchers who work with population statistics (Rowland, 2003). Research and applied work generally require life table to supply assumptions or answer questions (Preston et.al., 2002). It has great importance in demography from its beginning and now it plays a central role in population growth and structure. It is the most widely used method of analysis in demographic work (Hinde, 1998). While Population projection is described to estimate the total size or composition of the population at future dates (Mandal et.al., 1989), projections are based on the assumptions, which were considered in the realm of possibility (see Srinivasan, 1998; Preston et.al., 2002). Population projection is the process which demographers used to made their forecasts about the future population and it provides a real test of the demographer’s understanding about major components of the population change (Hinde, 1998).

It is a scientific attempt to see the future population scenario conditioned in making assumptions by using data related to the past available at that point of time (Census of India, 2001). Population projections may be prepared for the total population of nations, their principal geographic subdivisions, and for residence classes such as urban and rural population and size of localities (Shryock and Siegel, 1973). Projection of population, according to (O’Neill, 2005) is mostly used in terms of educational characteristics (enrollment and attainment), economic characteristics (economically active population, employment distributed by occupation or industry), and social aggregates (households and families). Projections for smaller regions include other characteristics as well which might include educational and labor force composition, urban residence, or household type (O’Neill et.al., 2001). The projection may differ from one country to another depending upon the method applied. The diversity of types of projections is driven by the diversity of users' needs (Lutz et.al., 1996). Planning by the government may be effected by the phenomenon of aging population with its potential social and economic impact. Such a planning process and may need longer-term projections with the need for more information about the health status and living arrangements of the elderly (O’Neill et.al., 2001) as proposed by the English economist Cannan (1895) and re-introduced by Whelpton (1936). Research has since continued on effective way of using expert opinion in projections (Ahlburg 2000). ). Different population projections are typically made by the governments along with national and international agencies from time to time in various parts of the world.

In this study, we have adopted the Component method of projection, which is the widely used by the researcher community. This technique is adopted with regards to development plans about the size and characteristics of future population. According to Srinivasan (1998), in this method, data is used pertaining components of population growth fertility, mortality and migration, and required three things as follows:

- A base population to initiate the projection
- A set of assumptions related to course of events such as births, deaths and migration during the projection period
- A method for the application of assumptions to the base population.

Preston et al. (2002) believes that the Component method of projection is now the only method to represent the rare consensus for social science. As this method synthesizes the separate projection of mortality, fertility, and migration, it has established itself as an important tool in population research. Based on such reasons Rowland (2003) considers it as a predominant method used by government agencies in the United States, United Kingdom and in many other countries of the world.

According to Hollmann et.al., (2000), population projection based on Component method can be expressed by the following equation:

$$P_t = P_{t-n} + B_{t-n,t} - D_{t-n,t} + M_{t-n,t} \text{ ----- (1)}$$

According to Hinde (1998), in this context, generally the researchers require four sets of data for Component method of projection, i) a base year population subdivided by age and sex, ii) sex specific life tables for the projection period, iii) age specific fertility rates for the projection period, and iv) age and sex specific net migration rates for the projection period. In order to produce accurate population projections, Keilman (1990) maintains that accurate baseline data on population size and age structure, fertility, mortality, and migration, are critical.

## 4. Data Analysis & Conclusions

### 4.1 Factor Analysis

Factor analysis considered 29 variables and ignored 11 variables which have not enough strength for further consideration. To see the pattern of correlations we use the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy which is 0.632, and indicates mediocre as Hair et.al., (1998) described. This meets the fundamental requirements of factor analysis. So, we can apply the factor analysis for our study.

According to the Kaiser rule, is to drop all components with Eigen values under 1, which is specified under the extraction options, resulting in 9 factors. The alternative criterion for deciding how many factors to retain is the Cattell Scree test, which plots the components as the X axis and the corresponding Eigen values as the Y axis as shown in following figure.

Looking at the rotated matrix (factor loadings), the living facilities has high loadings from 4 socio-economic variables of aging population: TV as source of information, source of light, housing facilities latrine, source of cooking fuel, and had moderate loading on housing facility bathroom and Others as source of information such as chatting/ gossiping etc. School/college attendance, highest level passed, specialization in education are strongly associated with education. Three variables: previous district of residence, district of birth and duration of stay in residence are positively associated with migration. Occupational and employmental status are strongly associated with employed workers. Telephone, newspaper, and internet are strong media of information. The disability is associated with two variables i.e. intensity and nature. The variables residential status and fax as source of information are moderately associated with multiple components.

Marital status, mother tongue, and radio as source of information are associated with one character component as marital status, mother tongue, and radio respectively. These factors derived but are single variable so; we do not interpret these factors and do not consider these as factors.

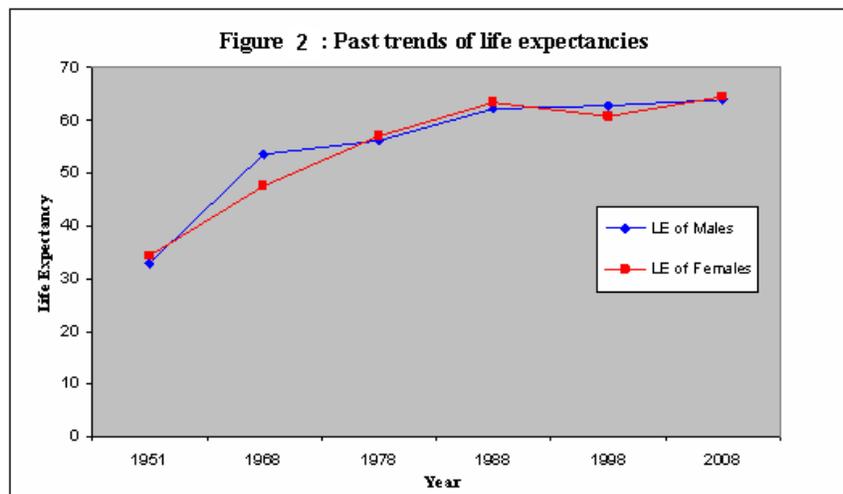
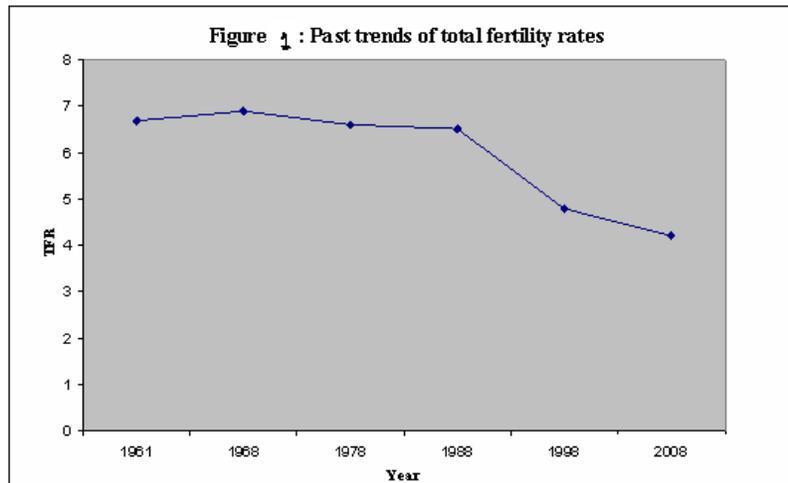
**TABLE 1: RELIABILITY CHECK**

| Serial # | Determinant and Component Items | Factor loading | Eigen Value | Variance explained | Cronbach's alpha |
|----------|---------------------------------|----------------|-------------|--------------------|------------------|
|          | <b>Living Facilities</b>        |                | 3.775       | 13.017             | <b>0.608</b>     |
| 1        | Source of Information TV        | -.879          |             |                    |                  |
| 2        | Source of Light                 | .864           |             |                    |                  |
| 3        | Housing Facilities Latrine      | .792           |             |                    |                  |
| 4        | Source of Cooking Fuel          | .769           |             |                    |                  |
| 5        | Housing Facilities Bathroom     | .632           |             |                    |                  |
| 6        | Other Information Source        | .565           |             |                    |                  |
|          | <b>Education</b>                |                | 2.714       | 9.358              | <b>0.741</b>     |
| 7        | Highest Level                   | .899           |             |                    |                  |
| 8        | School/College Attendance       | .855           |             |                    |                  |
| 9        | Specialization                  | .760           |             |                    |                  |
|          | <b>Migration</b>                |                | 2.521       | 8.692              | <b>0.731</b>     |
| 10       | Previous District of Residence  | .905           |             |                    |                  |
| 11       | District of Birth               | .903           |             |                    |                  |
| 12       | Duration of Stay in Residence   | .744           |             |                    |                  |
|          | <b>Employed Workers</b>         |                | 2.274       | 7.841              | <b>0.841</b>     |
| 13       | Employment Status               | .915           |             |                    |                  |
| 14       | Occupation                      | .907           |             |                    |                  |
|          | <b>Media of Information</b>     |                | 2.045       | 7.053              | <b>0.675</b>     |
| 15       | Telephone                       | .779           |             |                    |                  |
| 16       | Newspaper                       | .747           |             |                    |                  |
| 17       | Internet                        | .678           |             |                    |                  |
|          | <b>Disability</b>               |                | 1.751       | 6.038              | <b>0.665</b>     |
| 18       | Nature                          | .907           |             |                    |                  |
| 19       | Intensity                       | .890           |             |                    |                  |
|          | <b>Multiple Component</b>       |                | 1.403       | 4.838              | 0.398            |
| 20       | Residential Status              | .649           |             |                    |                  |
| 21       | Source of Information Fax       | .560           |             |                    |                  |

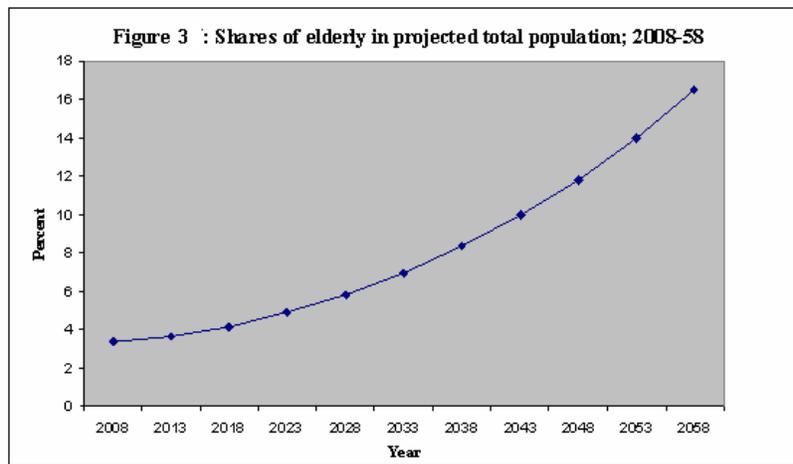
As Table 1 indicates the most critical factor is employed workers, the second important factor is education, the third significant factor is migration, the fourth influenced factor is media of information, the fifth important factor is disability and the sixth one is living facility because these factors satisfied the reliability condition. So, these six factors influence the aging population.

**4.2 Projection**

For projections, at first step we smooth population by age and sex by Strong method using US Beare software SPECTRAM. For projection of aging population of Pakistan upto 2058, past trend of fertility, mortality and inter migration are examined. Earlier research showed a declining trend in total fertility rate (TFR) and increasing trend in life expectancy in Pakistan context. We plot this total fertility rates and life expectancy in figure 1 and 2.



After reviewing the past trends of total fertility rate and life expectancy by using the UN Asia fertility table, one can anticipate that if population follows same trend then in 2058 total fertility rate will be at 1.00. Similarly, by using the UN South Asia’s life table we believe that life expectancy of males will be at 70.0 and females at 71.4 in 2058. Following these assumptions we used the UN medium variant of population projections. Key projection results are shown in Appendix Table 1. This table includes fertility, mortality, vital rates, sex ratios, dependency ratios, percent of residence, total population and elderly population for each projected period. From the raised sample drawn, in 2008 there were 43,436 persons of age 60 and above, sharing 3.39 percent of total population living in ICT. It is projected that by 2033 aging population will rise to 151,568 contributing to 6.98 percent which is about 3.59 percent more than 2008 level of elderly population. By the year 2058, aging population is estimated to increase by nearly 9.67 times and its share in total population will rise to 16.54 percent. Figure 3 shows this increasing trend of share of elderly population with respect to total population from 2008 to 2058. If the goals of fertility decline and life expectancy raise are attained, then by 2058, the elderly population of ICT will be 420,215 which is ten times larger than it is now.



### a. Age Structure of Aging Population

Projected population age structure of the ICT shows extremely negatively skewed distribution. With the passage of time, aging of population will increase first slowly and then rapidly, so we can assess declining death rates as aging population size expands.

### b. Old Age Dependency and Sex Ratio of Elderly People

Old age dependency ratios can be taken as a proxy for the ratio of elderly of the dependent population to economically active population. Actually, this ratio ignores the fact that many people over 65 have their own domestic support, and it might be possible that those below 65 are themselves dependent, for example, as a result of ill-health or disability. Our projected old age dependency ratio in Table 1 shows an increasing trend from 4.08 percent in 2008 to 14.68 percent in 2058. This increase will mainly be a result of mortality decline of reasonably low level in future.

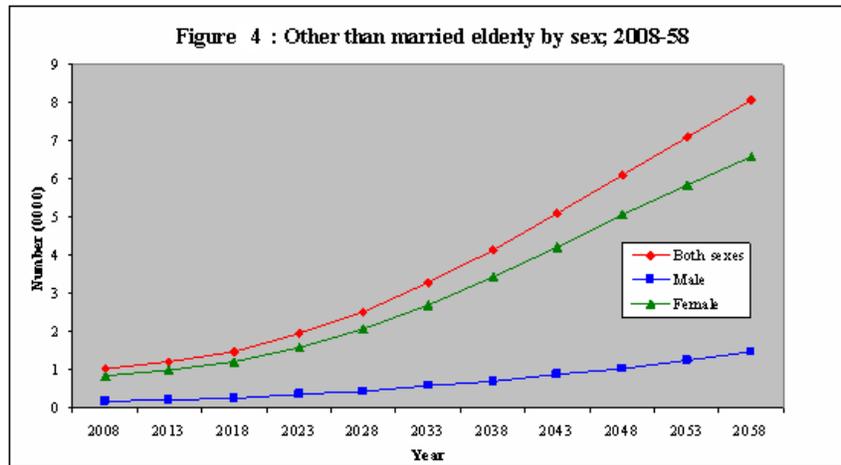
| Year | Old age dependency ratio |       |       | Sex ratio of aged |        |        |
|------|--------------------------|-------|-------|-------------------|--------|--------|
|      | Total                    | Urban | Rural | Total             | Urban  | Rural  |
| 2008 | 4.08                     | 3.47  | 5.50  | 120.17            | 125.02 | 113.10 |
| 2013 | 3.83                     | 3.32  | 5.18  | 125.74            | 135.19 | 110.98 |
| 2018 | 4.09                     | 3.58  | 5.56  | 125.63            | 135.10 | 109.31 |
| 2023 | 4.59                     | 4.05  | 6.31  | 121.16            | 129.60 | 104.91 |
| 2028 | 5.45                     | 4.86  | 7.59  | 114.84            | 122.30 | 98.71  |
| 2033 | 6.36                     | 5.72  | 9.00  | 106.33            | 112.52 | 91.17  |
| 2038 | 7.60                     | 6.89  | 10.91 | 99.64             | 104.92 | 84.88  |
| 2043 | 8.96                     | 8.20  | 13.11 | 94.92             | 99.32  | 80.67  |
| 2048 | 10.60                    | 9.79  | 15.77 | 92.07             | 95.76  | 77.98  |
| 2053 | 12.47                    | 11.65 | 18.82 | 91.33             | 94.38  | 77.26  |
| 2058 | 14.68                    | 13.88 | 22.46 | 91.41             | 93.86  | 77.28  |

From the overall sample, the overall sex ratio has shown a consistent decline relative to male population from 116 in 1951 to 103.43 in 2008. The rise in female population indicates a better coverage of females in coming decades and it is clear that there will a fall in female mortality as compare to male mortality. Females at the extreme old age have important implications for the kind of care because they are mostly widowed and lack financial resources. Table 2 reveals sex ratio of elderly population and their future trend in sex ratio by residence. A relative deficiency of males is apparent as 120.17 in 2008 and 91.41 in 2058. However, the projections based on current age structure and mortality levels indicate that relatively greater number of females among the elderly. By the year 2058, it appears that 91 males will be left for every 100 females at age above 60 in ICT.

### c. Marital Status of Elderly Population

Marital status is an important aspect before the aging population, because it reflects the living arrangements and family structure.

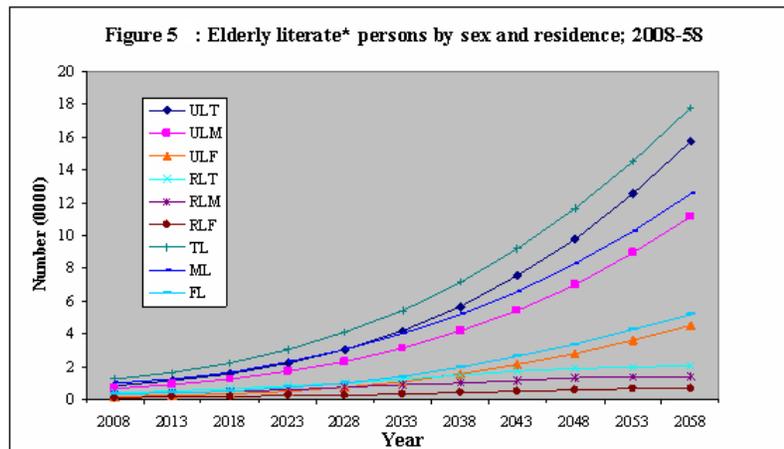
In 1998, about 78.1 and 48.8 percent of elderly males females respectively were married, which will increase to 92.6 and 56.2 percent by 2008. From our study raised sample, in 2008 there were 43,436 aged persons of whom 10,395 are in ‘other than married’ status i.e. mostly widowed. This figure will reach 32,885 in 2033 and it is expected that if the assumption hold true in 2058, this category will grow to 80,711 in which 30 percent will be elderly females. As we observe that in Figure 4 the number of ‘other than married females’ will be much higher than the same category of males in coming years. This indicates that after reaching age 60, the chances of females getting re-married are less than males. The size of ‘other than married’ is almost thrice as much higher among females than males and shows declining trend of male population in percentages over time. In Pakistan, it is common that on loss of spouse, males typically get remarried while females after death of their husbands generally do not re-marry and themselves to service for their children. As the percent of ‘other than married’ is considerably large, this needs special care and formulation of special programmes for the elderly who belongs to broken families.



**d. Elderly Literate**

In 1981, literate population of age 60+ was 12.60 percent in which 18.40 percent were males and 4.60 percent were females. This figure increased to 18.58 percent in the year 1998 where 26.85 percent were males with 8.70 percent, females and at present it has reached at 28.52 percent in which 39.60 percent are males and 15.22 percent are females. This increasing trend shows that literacy level will increase in coming decades. Here we see that males are more literate than females each year following.

As in 2008, from the raised sample, there are 12,387 aged persons among total of 43,436 literate population, in which the share of aged females numbering 2,999 (15.20 percent) is significantly small. This indicates that there is need to improve educational policies and to create awareness among the masses about the importance of education. If we meet the MDG then by 2058 this literacy rate will reach 60 percent for males’ age and 22.5 percent for aged females. In absolute number, by 2058, 1,39049 aged persons will be literate comprising 40,519 females and 98,530 males. In Figure 5 we see the projected trend of aged literate people by sex and residence.



Where \* stands for abbreviation ULT for total literate persons in urban area, ULM for male literate in urban area, ULF for female literate in urban area, RLT for total literate persons in rural area, RLM for male literate in rural area, RLF for female literate in rural area, TL for total literate in both area, ML for literate males in both areas, and FL for females literate in both areas.

It is clear from the figure 5 that in coming years education in country will rise and two-fifths of aged populations will be literate by 2058. As we discussed earlier, education is a critical factor in many aspects. For example, it helps to determine quality of life, good employment opportunities, and to enable reading/writing without any help. On the other hand, illiterate persons are always neglected by the society as they cannot get good jobs, and hence perceived not to move with advanced society and technology.

#### e. Economically Active Elderly Population

Economically active population (EAP) normally decline at old age. In 1998, 30.9 percent of the aging population was EA with 55.5 percent males and 1.6 percent share of females. At present, the situation is worse where 17.5 percent of aging population is EA of which 26.6 percent are males and 6.53 percent are females. This shows that over the years share of females in EAP has increased to 4.93 percent while that of males decreased to 28.9 percent. Table 3 reveals EAP among the elderly and projected trend by sex.

| Year | Economically active population |       |        | Un-employed |      |        |
|------|--------------------------------|-------|--------|-------------|------|--------|
|      | Both sexes                     | Male  | Female | Both sexes  | Male | Female |
|      | Rate                           |       |        |             |      |        |
| 2008 | 17.48                          | 26.60 | 6.53   | 7.22        | 3.40 | 11.80  |
| 2013 | 18.26                          | 26.94 | 7.38   | 7.20        | 3.76 | 11.52  |
| 2018 | 18.84                          | 27.28 | 8.22   | 7.28        | 4.12 | 11.24  |
| 2023 | 19.23                          | 27.62 | 9.07   | 7.41        | 4.48 | 10.96  |
| 2028 | 19.56                          | 27.96 | 9.92   | 7.56        | 4.84 | 10.68  |
| 2033 | 19.80                          | 28.30 | 10.77  | 7.72        | 5.20 | 10.40  |
| 2038 | 20.11                          | 28.64 | 11.61  | 7.84        | 5.56 | 10.12  |
| 2043 | 20.50                          | 28.98 | 12.46  | 7.93        | 5.92 | 9.84   |
| 2048 | 20.98                          | 29.32 | 13.31  | 7.99        | 6.28 | 9.56   |
| 2053 | 21.56                          | 29.66 | 14.15  | 8.02        | 6.64 | 9.28   |
| 2058 | 22.16                          | 30.00 | 15.00  | 8.04        | 7.00 | 9.00   |

As size of economically active population only tells the quantity of labour and not its quality. Projection indicates that one-fifths of the aging population will be economically active by 2038. It means, almost 38,829 aged persons out of 1,93070 will stay economically active by 2038 in ICT. Among them, 27,600 people will be males and 11229 females. Low participation rate of female compared to male indicates that being economically active depends on the hours of work, nature of work, holidays, etc. In 2008, unemployment rate of elderly is 7.22 percent of aging population in which 3.4 percent are males and 11.8 percent are females. Unemployment rates by sex are higher for female workers as compared to males. The higher unemployment rates are indication of slow down in the economic activity. We observe that in the forthcoming years, economically active population will increase. Participation of elderly females in labour force would be less than males. The rate of elderly economically active males will be 30 percent by 2050. This indicates that there will be more job opportunities for elderly in coming decades and it might be taken as positive in the sense that the elderly will have their own source of income.

The results are consistent with earlier studies as:

- Proportion of the elderly population in urban area would rise (Hashmi and Jillani, 1993)
- After 2033, the expected rapid increase in elderly population might occur (Hashmi, 2003)
- Population of aged will increase many fold in size during the next four decades (Hafeez, 2004)
- Aged population will reach around 54 million by 2058. Approximately 4 percent old age population share would increase to almost 17 percent by 2058 (Nizam-ud-din, 2006; Nayab, 2008)
- Participation of elderly females in labour force would be less than males (Hashmi and Jillani, 1993)
- By 2058, sex ratio will reach below 95 percent (Hashmi and Jillani, 1993)
- Total fertility rate and dependency ratio will decline while old age dependency ratio will show an increasing trend after first decade in the 21st century (Nayab, 2008).

## 5. CONCLUSION

ICT population structure suggests quite a steep rise in the elderly population in the coming decades due to decline in fertility and increase in life expectancies. The elderly will be more in urban areas while the population of females will be more than the males. It is also projected that the number of females belonging to 'other than married' category will rise. In the future, elderly population with both males and females is likely to be more literate than today. Increase in the old age dependency ratio will increase in the coming years. The findings of this study may be of interest for the researchers and other data users who are working in the relevant area of research interest. It also provides guidelines to explore other social factors and their implications on the life of old age people in Pakistan.

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## Appendix I

## Summary Demographic Indicators - Total

|  | 2,008  | 2013   | 2018   | 2023   | 2028   | 2033   | 2038   | 2043   | 2048   | 2053  | 2058  |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Islamabad Population Projections, 2008 |        |        |        |        |        |        |        |        |        |       |       |
| Fertility                              |        |        |        |        |        |        |        |        |        |       |       |
| Input TFR                              | 4.20   | 3.88   | 3.56   | 3.24   | 2.92   | 2.60   | 2.28   | 1.96   | 1.64   | 1.32  | 1.00  |
| GRR                                    | 2.06   | 1.91   | 1.76   | 1.60   | 1.45   | 1.29   | 1.13   | 0.98   | 0.82   | 0.66  | 0.50  |
| NRR                                    | 1.79   | 1.67   | 1.54   | 1.42   | 1.29   | 1.16   | 1.02   | 0.89   | 0.75   | 0.61  | 0.46  |
| Mean Age of                            |        |        |        |        |        |        |        |        |        |       |       |
| Childbearing                           | 30     | 30     | 30     | 29.2   | 28.9   | 28.4   | 27.9   | 27.4   | 27.4   | 27.4  | 27.4  |
| Child-woman ratio                      | 1      | 1      | 1      | 0.46   | 0.43   | 0.38   | 0.33   | 0.29   | 0.25   | 0.21  | 0.16  |
| Fertility table: UN Asia               |        |        |        |        |        |        |        |        |        |       |       |
| Mortality                              |        |        |        |        |        |        |        |        |        |       |       |
| Male LE                                | 64.0   | 64.6   | 65.2   | 65.7   | 66.3   | 66.9   | 67.5   | 68.1   | 68.7   | 69.4  | 70.0  |
| Female LE                              | 64.5   | 65.2   | 65.8   | 66.5   | 67.2   | 67.9   | 68.6   | 69.4   | 70.1   | 70.7  | 71.4  |
| Total LE                               | 64.2   | 64.9   | 65.5   | 66.1   | 66.8   | 67.4   | 68.1   | 68.7   | 69.4   | 70.0  | 70.7  |
| IMR                                    | 73.0   | 70.3   | 67.6   | 65.0   | 62.4   | 59.8   | 57.2   | 54.7   | 52.1   | 49.6  | 47.1  |
| U5MR                                   | 104.5  | 99.8   | 95.4   | 91.2   | 87.1   | 82.9   | 78.7   | 74.5   | 70.3   | 66.5  | 62.6  |
| Life table: UN South Asia              |        |        |        |        |        |        |        |        |        |       |       |
| Immigration                            |        |        |        |        |        |        |        |        |        |       |       |
| Male immigration                       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0     |
| Female immigration                     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0     |
| Total immigration                      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0     |
| Vital Rates                            |        |        |        |        |        |        |        |        |        |       |       |
| CBR per 1000                           | 32.1   | 31     | 29.4   | 27.4   | 24.9   | 21.8   | 18.7   | 16.1   | 13.6   | 10.9  | 8.1   |
| CDR per 1000                           | 7.1    | 6.4    | 6.2    | 6.1    | 6.1    | 6.2    | 6.4    | 6.8    | 7.2    | 7.9   | 8.7   |
| RNI percent                            | 2.5    | 2.47   | 2.33   | 2.13   | 1.88   | 1.56   | 1.23   | 0.94   | 0.63   | 0.3   | -0.06 |
| GR percent                             | 2.5    | 2.47   | 2.33   | 2.13   | 1.88   | 1.56   | 1.23   | 0.94   | 0.63   | 0.3   | -0.06 |
| Doubling time                          | 28.1   | 28.5   | 30.1   | 32.9   | 37.2   | 44.7   | 56.6   | 74.5   | 109.5  | 229.1 | 0     |
| Annual births and deaths (Thousands)   |        |        |        |        |        |        |        |        |        |       |       |
| Births                                 | 41.04  | 45.06  | 48.23  | 50.17  | 50.57  | 48.21  | 44.29  | 40.2   | 35.27  | 28.97 | 21.54 |
| Deaths                                 | 9.06   | 9.25   | 10.09  | 11.16  | 12.39  | 13.68  | 15.13  | 16.86  | 18.8   | 20.93 | 23.14 |
| Population (Millions)                  |        |        |        |        |        |        |        |        |        |       |       |
| Total population                       | 1.28   | 1.45   | 1.64   | 1.83   | 2.03   | 2.21   | 2.37   | 2.5    | 2.59   | 2.65  | 2.67  |
| Male population                        | 0.65   | 0.74   | 0.83   | 0.93   | 1.03   | 1.11   | 1.19   | 1.25   | 1.3    | 1.33  | 1.33  |
| Female population                      | 0.63   | 0.71   | 0.81   | 0.9    | 1      | 1.09   | 1.17   | 1.24   | 1.29   | 1.32  | 1.33  |
| Percent 0-4                            | 16.09  | 13.72  | 13.21  | 12.46  | 11.55  | 10.36  | 9.03   | 7.85   | 6.75   | 5.6   | 4.34  |
| Percent 5-14                           | 27.25  | 26.52  | 24.1   | 22.14  | 21.46  | 20.51  | 19.19  | 17.41  | 15.53  | 13.78 | 11.98 |
| Percent 15-49                          | 49.13  | 51.32  | 53.03  | 54.22  | 54.12  | 54.3   | 54.76  | 55.27  | 55.5   | 55.26 | 54.76 |
| Percent 15-64                          | 54.44  | 57.56  | 60.23  | 62.54  | 63.54  | 64.96  | 66.7   | 68.61  | 70.33  | 71.79 | 73.13 |
| Percent 65 and over                    | 2.22   | 2.2    | 2.46   | 2.86   | 3.45   | 4.17   | 5.08   | 6.13   | 7.39   | 8.83  | 10.54 |
| Percent females 15-49                  | 49.53  | 52.04  | 53.87  | 54.9   | 54.49  | 54.36  | 54.53  | 54.84  | 54.93  | 54.62 | 54.1  |
| Sex ratio                              | 103.43 | 103.26 | 102.99 | 102.65 | 102.28 | 101.87 | 101.47 | 101.08 | 100.72 | 100.4 | 100.1 |
| Dependency ratio                       | 0.84   | 0.74   | 0.66   | 0.6    | 0.57   | 0.54   | 0.5    | 0.46   | 0.42   | 0.39  | 0.37  |
| Median age                             | 18     | 19     | 21     | 22     | 24     | 25     | 27     | 29     | 31     | 33    | 36    |
| Urban population                       | 0.88   | 1.03   | 1.2    | 1.38   | 1.57   | 1.76   | 1.93   | 2.09   | 2.23   | 2.33  | 2.4   |
| Rural population                       | 0.4    | 0.42   | 0.44   | 0.45   | 0.46   | 0.45   | 0.44   | 0.41   | 0.37   | 0.32  | 0.27  |
| Percent urban                          | 68.76  | 71.1   | 73.2   | 75.3   | 77.4   | 79.5   | 81.6   | 83.7   | 85.8   | 87.9  | 90    |
| Percent rural                          | 31.24  | 28.9   | 26.8   | 24.7   | 22.6   | 20.5   | 18.4   | 16.3   | 14.2   | 12.1  | 10    |