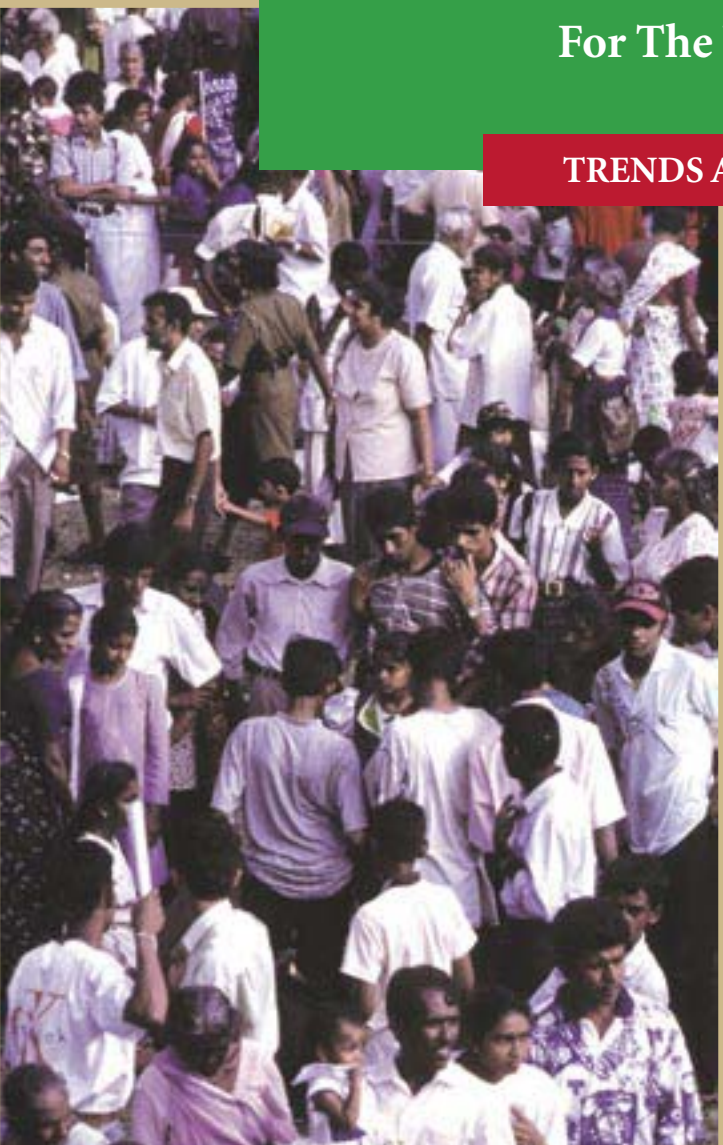
A Population Projection of Sri Lanka

For The New Millennium 2001-2101:

TRENDS AND IMPLICATIONS



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Institute for Health Policy

The Institute for Health Policy (IHP) is an independent, non-profit research institution that works to improve health and social systems in Sri Lanka and the wider Asia-Pacific region through research, analysis and training. Established in 2005 by a number of leading Sri Lankan health policy experts, the Institute is a regional centre of excellence for health and social policy research, working on its own and in partnerships with others.

The objectives of the Institute are to contribute to better health and social policies for all and to improve decision-making by undertaking original research, providing high quality and objective analysis, building capacity and promoting understanding by policy-makers and the public of the key challenges facing the societies that it works in. It is intended that the work Institute does should make a difference to the lives of people and society, whilst it seeks to be responsive to current needs, and aims to look ahead to identify and work on issues that are not a priority now, but will be in the future.

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Foreword

Long-term population projections form the basis for long and medium term planning for social and economic development. Although a number of population projections have been prepared for Sri Lanka in the past, none of the currently available ones have made use of the detailed data that have become available in the past four years. These include the detailed enumerations from the Census of Population conducted in 2001, the results of the demographic and health survey of 2000, and the most recent data from the Registrar General's Department on fertility, mortality and migration trends. In addition, as the country's population ageing poses increasing challenges for policy in areas such as pensions and long-term care, it is becoming essential that updated population projections are available that extend their time horizon to cover a full century, and there is also a corresponding need for a revised set of national life tables which not only incorporate the latest data but provide more detailed estimates for the over 65 year age group.

Recognising these gaps, the Institute for Health Policy commissioned Dr. Indralal De Silva, Professor of Demography, University of Colombo to undertake a long-term projection of Sri Lanka's population to 2101, and production of a new set of life tables reflecting current mortality patterns. These projections take into account the 5 percent sample tabulation of the enumerated age-sex population of the 2001 census of population and the latest 2000-2004 data on births, deaths and migration.

It is our earnest hope that these projections will be widely used by planners, researchers and others in their work related to social and economic development activities. It is expected that the 100 year time horizon of these projections and their linkage to a new set of life tables will be particularly useful for those involved in pensions, health and social planning in Sri Lanka.

We sincerely thank Professor De Silva for undertaking this important work on behalf of the Institute. We also thank the local demographers and the United Nations expert who reviewed the draft manuscript and provided valuable feedback to the author, and Dr. Neluka Silva of Colombo University for her editing.

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Executive Summary

The population projection developed for the period 2001 to 2101, using standard, high and low assumptions of fertility, mortality and international migration components, demonstrate important changes in size and structure of the future Sri Lankan population. As observed in the standard projection the total population, which amounted to 19.7 million in 2006, will reach its peak of 21.9 million in 2031, adding approximately 2.2 million to the present population. In preparation for this change the focus should be on the possible drain in the limited natural resource base, the many socio-economic and cultural implications related to these changes, and the necessary policy planning. The current population spread shows a skewed distribution favouring the Western Province, which has a population density which is approximately ten times higher than the Sri Lankan average. Much of the future addition to the total population of Sri Lanka is expected from the Western Province, which would aggravate the existing urban population problems and consequences, particularly in the unplanned urban environments.

It is important to note the implications of achieving below replacement level fertility, which will result in a decline of the total population, as well as a change in the structure of the total population. All three trajectories of the projections show a peaking in the population and a subsequent decline, thereafter, which will result in an increase in the demand for basic amenities in the near future and a decline in that demand thereafter. This fluctuation in demand should be taken into consideration when allocating resources for long term investments in the fields of health, education and housing, etc.

The reversal of the gender balance, favouring females, is another feature demanding policy focus, as this implies significant socio-economic and cultural consequences. This change will generate a significant difference in the participation of females in the labour force and in the occupational structure, which will be supported by the fertility decline towards below replacement level, as females will then have more time for such activity. Therefore, the creation of suitable job opportunities for the added labour force participants, especially for educated young women will be a challenge for the policy makers and planners.

Building up necessary infrastructure and institutional requirements to fulfill the demands of the rapidly growing elderly population, related to their health, economic and psychological requirements is another challenge. In addition, in relation to the labour force, the important factor to take note of will be the ageing and shrinkage of the labour force, and not ageing per se, as the changes occurring will result in an increase in the number of older workers, relative to the number of youth, and the slowdown in the labour force due to reduced supply of prime age workers.

The observed dramatic decline of the child population will reduce the commitment on financial resources to provide food, clothing, education and health for this group, which should be diverted to enhance the quality of their necessities, especially with respect to educational requirements, without releasing additional resources. In contrast to the child population the working age population (15-59 years) will grow in numbers until 2026, beyond that a decrease is projected.

Changes in the age structure will ultimately result in the change of dependency ratio with the child dependency decreasing, while the old age dependency increases. The projected changes in these two segments of dependency in the Sri Lankan population show a reduction in the total dependency ratio from 55.0 in 2001 to its lowest of 53.6 dependent persons in 2006 after which it will increase, and as a result of the rapid increase in the old age dependency, the total dependency will increase significantly after 2041. The changes in the dependency ratios as projected will result in Sri Lanka having the best demographic environment or "window of opportunity" that is conducive for rapid economic development in the five year period around 2006. Since this opportunity will not last long, Sri Lankan planners should not miss out on the demographic bonus and should work to gainfully utilize this opportunity, which would create a positive socio–economic and political environment in Sri Lanka.

A Population Projection of Sri Lanka for the New Millennium, 2001-2101: Trends and Implications

Introduction

Integrating population projections and relevant other data into the planning process will contribute to the success of development planning efforts. In this light it is important that attention is paid to the numerous demographic factors, such as future change in size, composition and distribution of the population. At the national level, most government and private institutions require population projections as an input into their estimates of future demand for services. The demand for health services and educational services are largely determined by the size and composition of the population. Also, the likely growth of towns and cities needs to be known, so that housing, transport and other services and amenities can be rationally planned. Undoubtedly, current population growth patterns will determine much of the future demand for these needs.

Planning for the future has become a prerequisite of modern socio-political life. The population size, composition and distribution at any given point in time would determine the demand and supply of the aforementioned socio-political commodities and services. Population projections play two distinctive roles in development planning and policy formulation. Firstly, estimates of future population are taken into consideration when setting various economic and social planning targets. Secondly, the consideration of the size of the probable future population may have implications for the desirable future pattern and rate of growth. Nonetheless, it is impossible to account for the future course of all the factors that govern population growth. Indeed, population change can, in itself, be affected by public policies and programmes. Projections can be used to estimate the likely demographic impact of planning decisions and policy changes, as well as the planning and policy implications of demographic change. Hence it can be concluded that the role of a demographer is not only to incorporate opinion on future birth and death rates, but also to influence the growth path of these events (Romanic, 1990).

Ideally, the size of future populations should be estimated in the greatest detail possible. However, the extent of detail required in projections may vary according to the intended use. For instance, for a few purposes, an estimate of a population total may suffice, but for most planning purposes some compositional detail is required, and often more than a simple breakdown by age and sex.

Population projections are essentially concerned with future growth, and are utilised to assess the plausible demographic situations of a country, through an understanding of the processes that may lead to a particular scenario at a future date, as well as to

highlight what implications we could expect in the future, as a result (Shryock and Siegel, 1971). It is also useful for users of such projections to discuss the extent of departures from the actual turnout, as well as to indicate the record of accuracy in previous projections made for Sri Lanka. However, before moving into projecting the Sri Lankan population for the new millennium, investigation of past trends of the population is of vital importance.

Past Trends in Population Growth

Sri Lanka's population has grown almost eight times since the first national census of 1871, which recorded only 2.4 million people. The first doubling of the population took place in 54 years, between 1871 and 1925. It doubled again in 35 years, between 1925 and 1960. This doubling, within a short period, resulted in a relatively high rate of population growth. When can we expect to have a population of 19.2 million in Sri Lanka, that is, exactly double the size reported in 1960? Demographic estimates suggest that the size of the population will have reached 19.2 million by the year 2003, a doubling in 43 years (Table 1). It should be noted that the population of 18.7 million enumerated at the latest census of population of 2001 is slightly lower than twice population reported in year 1960, which was 9.6 million.

The growth of the Sri Lankan population during the present century has not been uniform. Until 1946 the average annual inter-censual rate of growth never exceeded 2 per cent (Table 1). Nevertheless the post-war years reveal a sudden spurt in the rate of growth. The rate shot up to 2.8 per cent in the period 1946-53, and remained more or less the same during the period 1953-63. During this period the mortality rate had decreased , while the birth rate remained high. As a reaction to the potential problems caused by such rapid growth, policies and programmes to reduce fertility were initiated

Table 1: Population Growth and Density, Sri Lanka, 1871-2003

Year	Population ('000)	Average Annual Growth Rate (%)	Density (Per sq km.)
1871 → 2.4 million	2,400	-	37
1881	2,760	1.41	43
1891 (Doubled in 54 years)	3,008	0.86	47
1901	3,566	1.70	55
1911	4,106	1.41	63
1921	4,499	0.91	70
1925 → 4.8 million			
1931 (Doubled in 35 years)	5,307	1.67	82
1946	6,657	1.51	103
1953	8,098	2.84	125
1960 → 9.6 million			
1963	10,582	2.63	165
1971 (Doubled in 43 years)	12,690	2.22	196
1981	14,847	1.67	230
2001	18,735	1.14	290
2003 → 19.2 million	19,252	-	-

Note: Except 1925, 1960 and 2003 rest are census years.
Source: Various census reports of the Department of Census and Statistics; Statistical Abstract (2004).

since late 1950. As a consequence of these activities, after 1963, , there was a clear decline in the rate of growth, while at present it stands at about one per cent.

Even though the present rate of population growth is low, Sri Lanka still adds more than 200,000 people to its population annually. The country, covering a land area of 65,610 square kilometres, ranks as one of the most densely populated countries in the Asian region. It is estimated that there will be about 300 persons per square kilometre by the turn of the century (Table 1).

As in many other countries, the population of Sri Lanka is not evenly distributed. Some parts within the country are very densely populated while others are less populous. As noted in the last population census of 2001, about 57 per cent of the population was located in the Wet Zone that constitutes only about 21 per cent of the total land area of the country. Colombo, the smallest of the 25 districts in Sri Lanka, has a population density which is about 11 times the national average.

Demographic trends, particularly the growing size of the population and its uneven distribution, has made a strong influence on the natural resource base of the country and many efforts aimed at achieving sustainable development and balanced growth. For instance, by 1881, the forest cover was estimated at 84 per cent of the land area, and by 1992 it has declined to 25 per cent. Therefore, the inverse relationship between population growth and forest cover is evident, when one notes that in 1881 the population of the country was less than 3 million and by 1992 it had reached a figure over 17 million (Ministry of Health, Highways and Social Services, 1995).

The continuing growth and uneven distribution of population have brought increasing concern to the government of Sri Lanka, since the growth of the population has been far more rapid than could be sustained by the economy. Nevertheless, Sri Lanka has a long history of government involvement in population policies, and the population dynamics. In this venue subjects considered for policy interventions were immigration and emigration, mortality and morbidity, fertility and family planning, population redistribution, and recently, reproductive health. Sri Lanka has been among the first few countries in Asia to recognize the relationship between population dynamics and socio-economic development. Thus projecting the future population of Sri Lanka is of crucial importance in all aspects of socio-economic planning and an important element in the planning process (De Silva, 1994).

Methodology

A number of methods are in use for projecting national and sub-national populations. They can be classified into two broad categories: mathematical methods and cohort component methods. Mathematical methods directly project the total population, when the initial size of the population and assumptions on future rates of population growth are given. The cohort component method, project population by age and sex, employs the age and sex structure of the initial population, together with assumptions on the future components of population change, such as fertility, mortality and migration (Leete, 1992).

The basic principle of the component method is that, the number of persons of a given age and sex alive in the population in any given year, is the number of persons in the population one year earlier, aged one year younger, less any deaths during the year plus or minus any migrants. The numbers of children under age 1 are the survivors at birth estimated to occur during the year, again adjusted for migration. Given the initial population and assumptions about the course of future fertility, mortality and migration, the process can be repeated indefinitely (see Appendix E). This type of projection can be carried out with data organized in single years of age or in age groups (typically five-year age groups).

The component method used to project the population by age and sex in five-year age groups involves:

i) Taking a base population distributed by age and sex in five-year age groups;

ii) Applying survival ratios to each sex and age group to obtain the population alive five years later, and thus five years older;

iii) Obtaining the number of births during the intervening period by applying age-specific fertility rates to the female population; these births must be divided into male and female births by multiplying by 104/204 and 100/204 respectively (assuming the sex ratio at birth is 104), and then converted to survivors aged 0-4 at the end of the five year period, by multiplying by the appropriate survival ratio;

iv) Adjustment for migration (adjustment for loss or gain of population due to migration);

v) Repeating the process to obtain the projected population five years after the date of commencement, ten years afterwards, fifteen years afterwards, and so on.

Data, Time Horizon and Assumptions

Data

To project the national population of Sri Lanka using the demographic cohort component method, the following types of input data are required:

i) Age and sex structure of the population of the base year;
ii) Level and age pattern of mortality;
iii) Level and age pattern of fertility;
iv) Level and age pattern of net international migration.

Sri Lanka has a history of conducting regular population censuses dating as far back as 1871. However, it is only in the latter part of the 20th century serious laps in census-taking is experienced. Ten years after the 1981 census of population the scheduled census of population of 1991 was not undertaken, mainly due to civil unrest and its impact on the country's population. The latest census was carried out on 17 July 2001. Therefore, by 2001 20 years will have lapsed without a census of the population of Sri Lanka. During that 20-year period vital registration systems continue to provide statistics, which has been used to make the population estimates. Apart from not having census of population for the past 20 years (1981 to 2000), it is generally believed that after 1983 the quality of the Sri Lankan vital registration system, particularly the registration of deaths and international migration, has deteriorated.

Moreover, the 2001 census of population was not a complete enumeration for, the final count was not made in the districts of Jaffna, Mullativu and Killinochchi, and in four other districts namely, Mannar, Vavuniya, Batticaloa and Trincomalee, only a partial enumeration was possible. Although a complete enumeration was made only in 18 out of 25 districts, for the balance 7 districts population was estimated by using information gathered during census pre enumeration stage. Thus the total population of 18.7 million reported for the entire country in the 2001 population census comprise both enumerated and estimated segments. (Department of Census and Statistics, 2001)

To generate a population projection through the cohort component method, the base year population has to be identified first. The base year population of the projection is the resident population of Sri Lanka by age and sex on the last population census of 17th July 2001. At the time of making the present projection the age-sex distribution of five year age groups were available only from 5 per cent of the total population count.

In these population projections, the 2001 population (base year) is brought forward, by using the observed trends in fertility, mortality and international migration. The immediate tasks then was to examine demographic changes in Sri Lanka and elsewhere, predict the trends in fertility, mortality and international migration after 2001.

Different sets of assumptions are utilised to ascertain the future course of the three components of population growth. The most plausible set of assumptions for future rates of fertility, mortality and international migration will yield the most credible estimate of future population, which will be referred to as the standard population projection.

A combination of alternative trends in fertility, mortality and international migration, favouring high growth yielding a high population projection, and another combination leading to low growth leading to a low population projection, have also been used to make allowances for deviations which may occur with reference to the assumed most plausible path. To this end the plausibility of the three sets of assumptions which, in turn, lead to a standard population projection, and high and low projections, have been analysed.

Time Horizon

Population estimates can be projected for a wide range of years into the future, depending on the availability of analytical resources and data. It also seeks to address how population projections for the future would also depend on the socio-economic issues . For example, middle range projections of 10 to 25 years into the future are usually required for planning educational, health and housing services. Long-range projections with a time horizon greater than 25 years are needed for planning the management of water and forestry resources, major transportation and recreational facilities, and for planning pensions and social security systems. For instance, United Nations (2000) provides long-range projections of the population of the world and nine major areas from 1995-2150, which has a time horizon of over 150 years, whereas population projections for the immediate future are usually required for short-term economic analyses.

For the purposes of this study, the population projections of future Sri Lanka are limited to the next ten decades. This time horizon extends from 2001 to 2101, and primarily assesses the long-term demographic scenario and its implications on the Sri Lankan population.

Assumptions for Components of Population Change

Fertility, mortality and migration are the three components of population growth of any given country. Different sets of assumptions were formulated for Sri Lanka on the future course of these three components. It is also pertinent to examine to what extent population policies may themselves influence and change the existing population trajectories. We have to examine various possibilities for population changes under several assumptions, including the choice of population policy methods. In this connection, the past and current rates of fertility, mortality and international migration need to be considered.

When making population projections the most critical component is fertility. Mortality, except as it affects infants and children, can be under- or overstated by fairly substantial margins without greatly distorting the projections, since its impact is largely on those of old age, whose remaining life years is not long, and whose number is typically small (United Nations, 1988). The migratory pattern of a population is also not as critical as fertility, since it is affected greatly by unpredictable and exogenous factors such as war, famine, and the economic situation of a country and, in particular, changes in administrative restrictions on immigration.

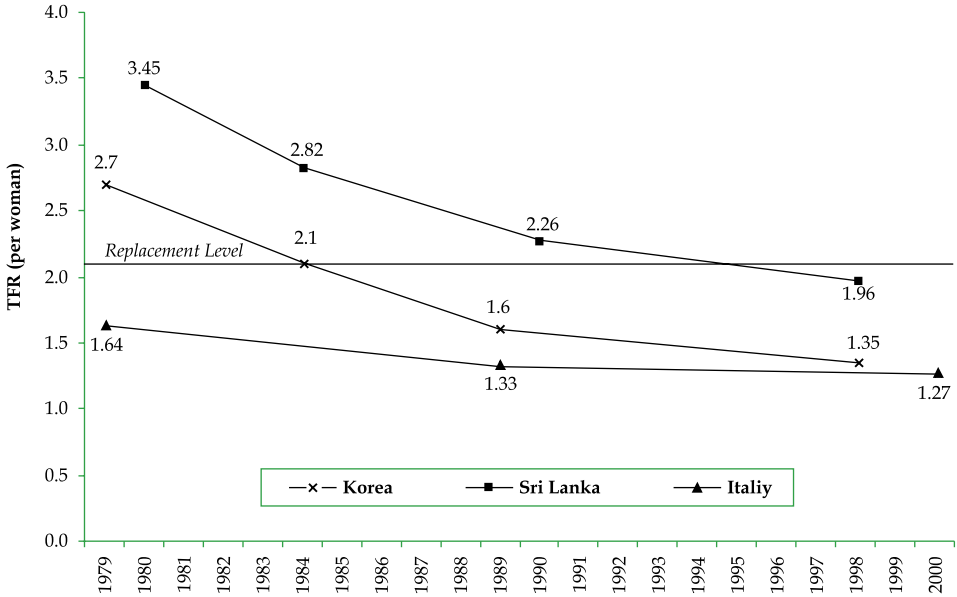
Fertility: Past, Present and Future

Sri Lanka has entered the third stage of demographic transition, namely the phase of declining fertility, which is common in several other developing countries in the Asia and Pacific regions. A declining fertility rate has been evident since the early 1960s. The total fertility rate (TFR) for selected years of 1953 and 1995-2000 period is given in Table 2. TFR decreased from 5.32 in 1953 to 3.45 children per woman in 1981, and it dropped further to 2.26 during the 1988-93 period, and to a further1.96 in 1995-2000.

The measure which is denoted by the 'replacement level fertility' indicates an average quantum of current fertility which would be maintained by the next generation of daughters. It is a point measure, estimated using the quantified fertility levels of a cohort of women who are currently in the reproductive age who, on average will have daughters to replace them. By definition a TFR of 2.1 is a replacement level of fertility.

The question whether Sri Lanka has reached the replacement level of fertility was discussed in an earlier publication by the same author (De Silva, 1994a). In this study, using data from several sources such as the two Demographic and Health Surveys (DHS) of 1987 and 1993, the Census of 1981 and the Registrar General's Department, De Silva concluded that TFR in Sri Lanka would have declined to replacement level of fertility in the mid-1990s. With the availability of data from the 2000 DHS, the above hypothesis was further confirmed; survey reports of 1995-2000 period have measured the TFR in Sri Lanka to be in the range of 1.96 children per woman, which is even below the replacement level of 2.1. Thus based on the above sources, figure 1 clearly indicates that TFR of Sri Lanka would have achieved replacement fertility by 1994-1995 the latest. Estimates from Korea show achievement of replacement fertility as early as 1985. Italian fertility was well below the replacement level even by 1980 and in the year 2000 it had fallen as low as a TFR of 1.27 (Figure 1).

Figure 1: Decline of TFR in Sri Lanka, Republic of Korea and Italy, 1979-2000



It should be noted, that the 1987, 1993 and 2000 DHS excluded the Northern and Eastern Provinces of Sri Lanka owing to the civil disturbances prevailing in the island. According to the 1981 and 2001 population Censuses, these two provinces comprised of 14 per cent and 13 per cent of the total population of Sri Lanka, respectively. Of the two provinces, the Eastern Province had a relatively high level of fertility in comparison to the national average, while fertility in the Northern Province was not significantly different from the rest of the country (De Silva et al., 1986).

If it is assumed that in the two excluded provinces, the previous pattern of regional differentials in fertility prevailed, the assumption that the overall fertility rate for the whole island would have reached replacement level by 1995 at the latest (Figure 1) is still valid. This assumption would not hold good only if the level of fertility in the Northern and Eastern Provinces had increased or had cased to decline, when compared to the national trends (Puvanarajan and De Silva, 2001). However, anecdotal reports suggest that marriage and child bearing have become more and more difficult in these two provinces due to many demographic as well as socio-economic factors, several of which are related to the ongoing civil strife. Available data from other regions in the world that have experienced prolonged internal conflict, for example Lebanon during the 1970s and 1980s, also suggest that civil strife typically has little effect on long term trends in fertility.

Table 2 : Total Fertility Rate (per woman), 1953 to 1995-2000

Source	Year/Period	TFR
Census, registration	1953	5.32
Census, registration	1963	5.33
World Fertility Survey, 1975	1965	5.19
Own-children	1966-77	4.72
World Fertility Survey 1975	1970	4.45
Registration	1970	4.22
Census, registration	1971	4.16
Own-children	1971-75	3.89
World Fertility Survey 1975	1975	3.60
Registration	1978	3.55
Own-children	1976-80	3.50
Census, registration	1981	3.45
Demographic & Health Survey 1987	1982-87	2.82
Demographic & Health Survey 1993	1988-93	2.26
Demographic & Health Survey 2000	1995-2000	1.96

Source: Ratnayake et al., (1994); Department of Census and Statistics (2002).

Certain countries in Asia such as Thailand and China, along with Sri Lanka, had attained replacement level fertility in the mid-1990s. According to India's 1992-93 National Family Health Survey, the two Indian states of Kerala and Goa had reached below replacement level fertility rates of 1.9, while Tamil Nadu is on the verge of achieving a below replacement level (International Institute of Population Sciences, 1995). Over the last 40 years or so, the level of fertility continuously declined in Kerala, which is indicated by the TFR, which was 4.1 in 1971, 3.1 in 1980 and 2.1 in 1990. After achieving the replacement level of fertility (TFR of 2.1), many demographers in India and elsewhere were of the opinion that a future decline was unlikely; however, Kerala's TFR did decline further, i.e. to 1.7 by the year 1993 (Rajan and Zachariah, 1998).

Both Kerala and Goa have a pattern of childbearing similar to that of Sri Lanka, with a very low fertility rate as a result of late marriages and childbearing at a late age (De Silva, 1997). Taken in conjunction with trends observed in Tamil Nadu and other states in southern India, achievement of replacement level fertility in Sri Lanka in the mid-1990s is, in fact, consistent with the patterns observed in the neighbouring populations who have a close cultural affinity to our own population. Given the more developed status of Sri Lanka's health care, the family planning programme, educational services and higher rates of female participation in the labour force, it is expected that Sri Lanka will continue to be at the forefront of future fertility decline in the South Asian Region.

Assumptions for the Future Fertility

Taking in to consideration the patterns of fertility transition in Sri Lanka, in the present study, for the standard variant (Table 3) of the population projections for the period 2001-2006, a TFR of 1.98 is assumed. For the low variant and high variant projections of the same period, the TFR is estimated to be 1.86 and 2.10 respectively.

The next consideration was to assume whether TFR will stabilise at the replacement level or whether it will continue to decline. It is reasonable to expect that the current declining trend in fertility will continue in the future. Once the fertility levels reach a downward trend, the forces which led to the initiation and continuation of that course will not cease to operate, even when the total fertility rate reached a replacement level (Kohler et al., 2002). The above assumption, adopted for the projections of the developed countries, was based on a broad survey of possible societal changes in the future (Lutz, 1996). In the four decades from the late 1950s to the late 1990s the TFR of the developed world dropped by 44 percent, from 2.82 to 1.57 births per woman, with more than two-third of this decline occurring before the late 1970s (Bongaarts, 2002).

The assumption that fertility will eventually recover to replacement level, adopted by the United Nations and some other institutions, has not gained much support (Westoff, 1991). An increase in the use of contraceptives and induced abortion (De Silva, 1994a; De Silva et al., 2000), and females, in particular, contracting marriage at a later age (De Silva, 1997), are the two major factors that have led to a reduction in the level of fertility in Sri Lanka. There is little indication that these trends will cease in the near future. The existing trend in fertility could be changed only by sudden reversals of social norms related to fertility, significant set backs in the use of contraceptives and induced abortions, or government policies geared towards increasing the level of fertility.

Many developed countries that reached replacement level fertility many decades ago showed a continuous decline until a TFR of about 1.3 was reached. According to the Council of Europe (2003), 14 countries attained lowest-low fertility levels (TFR at or below 1.3) are shown in Table 4. Italy and Spain were the first countries to attain and sustain lowest-low fertility levels in 1993. Italy, in fact, achieved the replacement level fertility as early as 1977.

Table 3: Assumed Total Fertility Rates, 2001-2006 to 2096-2101: High, Standard and Low Projections

Years	High	Standard	Low
2001-2006	2.10	1.98	1.86
2006-2011	2.03	1.88	1.76
2011-2016	1.92	1.77	1.62
2016-2021	1.79	1.60	1.45
2021-2026	1.70	1.53	1.36
2026-2031	1.69	1.49	1.30
2031-2036	1.72	1.50	1.32
2036-2041	1.78	1.56	1.35
2041-2046	1.83	1.62	1.40
2046-2051	1.88	1.66	1.45
2051-2056	1.95	1.70	1.46
2056-2061	2.00	1.73	1.49
2061-2066	2.03	1.76	1.50
2066-2071	2.07	1.79	1.50
2071-2076	2.10	1.80	1.50
2076-2081	2.12	1.80	1.49
2081-2086	2.12	1.80	1.49
2086-2091	2.13	1.80	1.48
2091-2096	2.14	1.80	1.46
2096-2101	2.15	1.80	1.45

By 2002 the lowest level of fertility (TFR of 1.10) of the world is reported from Ukraine followed by the Czech Republic (TFR of 1.17). There are some other countries in Europe, such as Germany, Russian Federation and Switzerland, which are all approaching lowest-low level of fertility (Table 4).

Over the past two decades, most of the European countries have shown fertility decline to attain lowest-low fertility but, at a slower place, and in a few countries in the world fertility has turned upward slightly, for example, in France, Netherlands, and Denmark (Kohler et al., 2002). By 1990 TFR was 1.67 and 1.78 in Denmark and France but increased to 1.72 and 1.89 by 2002, respectively.

These average trends in fertility conceal much variation among regions and countries (Kohler et al., 2002). In the late 1990s the highest total fertility rates among the developed region were observed in North America (2.00) and Australia/New Zealand (1.80). Although focus on the "more developed" world (as defined by the UN), it is worth noting that fertility has also dropped well below replacement level in several Asian populations where socio-economic development has been rapid (e.g. in Hong Kong, Singapore, China and Republic of Korea).

Table 4 : Lowest-low Fertility in Selected Countries in Europe

	TFR				Most recent year TFR fell
	1980	1990	2000	2002	below 2
Lowest-low fertility countries					
Greece	2.23	1.39	1.29	1.25	1983
Italy	1.64	1.33	1.24	1.27	1977
Spain	2.20	1.36	1.24	1.25	1982
Bulgaria	2.05	1.82	1.30	1.21	1984
Czech Republic	2.10	1.90	1.14	1.17	1987
Hungary	1.91	1.87	1.32	1.30	1983
Latvia	1.90	2.01	1.24	1.24	1980
Lithuania	1.99	2.03	1.39	1.24	1991
Poland	2.26	2.05	1.34	1.24	1992
Romania	2.43	1.84	1.31	1.26	1990
Armenia	2.33	2.63	1.11	1.21	1992
Ukraine	1.95	1.89	1.09	1.10	1981
Selected other countries					
Germany	1.56	1.45	1.38	1.31	1971
Russian Federation	1.86	1.90	1.21	1.32	1990
Switzerland	1.55	1.58	1.50	1.40	1972

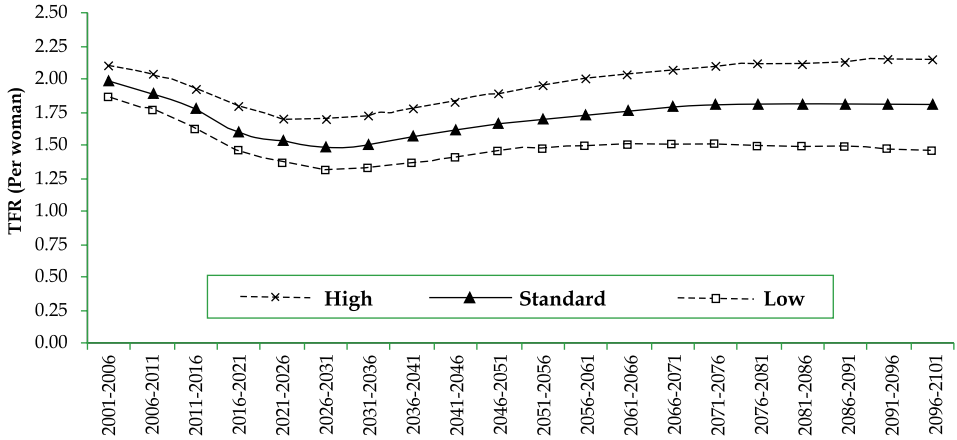
Sources: Council of Europe (2003); Martin et al. (2003); Mathews and Hamilton (2002)

Among Asian countries, Japan and Republic of Korea indicated the lowest-low levels of fertility, indicating a TFR of 1.19 and 1.29 in 2003 respectively. Japan reached the replacement level fertility (TFR of 2.04) in 1959, and it has taken about three and a half decades to achieve the present level, which is about 0.8 less than the replacement level (Ministry of Health and Welfare, Japan, 2000). A study done on fertility in urban China (Zhao, 2001) has also shown that the one-child policy reduced the TFR of urban China to a level of 1.15 starting in 1980, and it is one of the largest low-fertility populations worldwide.

When hypothesizing the future scenarios of fertility of Sri Lanka, a pertinent question is whether this country will join the group of lowest-low fertility countries at some future time point in this century? Given the cultural and social practice in Sri Lanka it is unlikely that we reach the lowest-low fertility level at this time frame. Moreover co-existence of different ethno-religious minority groups would not permit a very low level of fertility in Sri Lanka because such a low level of fertility undoubtedly could change their relative position in Sri Lankan society.

Thus, in the standard projection in Table 3, it is assumed that TFR of Sri Lankan women will decline to 1.5 by the year 2026-2031 and would remain at that level until 2031-2036 and, thereafter, by the latter part of the projection period, indicate a slight upward trend leading to a TFR of 1.7 and 1.8 (Table 3). This pattern is considered the plausible fertility assumption for Sri Lanka, during 2001-2101 and for the coming decades; is shown in Figure 2.

Figure 2 : Assumed Total Fertility Rates, 2001-2006 to 2096 2101: High, Standard and Low Projections



For the high variant of these projections, it is assumed that fertility will reach the lowest level (TFR of 1.69) by 2026-2031 and increase to replacement level by 2066-2076 and remain at that level for the subsequent projection period. For the low projection, it is assumed that the decline will be faster and that a TFR of 1.30 would be reached by the period 2026-2031, and an increase in the rate is assumed after that. The three fertility assumptions, standard, high and low, developed for the period 2001 to 2101 are shown in Figure 2. It should be noted that the longer the time horizon, the variability attached to fertility measure tends to increase significantly. For instance, the difference between the TFR of high and low assumptions during 2001-2006 is only 0.24 (2.10- 1.86), but during 2096-2101 the corresponding difference is estimated to be almost one child (0.7) per woman.

Mortality: Past, Present and Future

An accurate analysis of mortality trends using time series data is handicapped by the non-availability of reliable data for the earlier phase of past years, though a definite downward trend in the death rate is noticeable since 1921. The period 1921-1945 was generally a period of general decline in mortality (United Nations, 1976),

nevertheless, there were occasional bad years in which heavy toll on deaths occurred. The rapid mortality decline, observed during the post World War II period in Sri Lanka, contributed towards achieving a phenomenal increase in the life expectancy of Sri Lankan Population. A parallel pattern of mortality decline during the same period was observed in a number of other developing countries including Mauritius, Cuba, and Mexico.

Sri Lanka has progressed substantially, in reducing the mortality level of its population during a period covering more than seven decades, particularly showing a significant reduction in mortality between 1946 and 1981. The crude death rate declined from 30 deaths per 1000 population in 1920 to 6 deaths by 2003. During this period the life expectancy at birth increased by 21 years for men and 27 years for women. In 1952, female life expectancy was 2.1 years lower than that of males, however, the estimated life expectancy for the period 1980-1982 shows that it was 4.4 years higher, and had reached a longevity level of 67.7 years for males and 72.1 years for females (Table 5).

The sharp decline in mortality in the post World War II period was largely due to the eradication of malaria, expansion of health services and education, and better distribution of food supplies with general improvements in the economy of the country (United Nations, 1976). The social infrastructure that was developed before Independence and the improvements in the economic well being, together with an increase in the average level of consumption (Ministry of Health & Women's Affairs, 1992), rapidly yielded positive results in terms of an increase in the expectation of life among the Sri Lankan population. The health related indicators for Sri Lanka demonstrate a success story, despite the fact that compared to many countries in the world, health expenditure in Sri Lanka is significantly low by any standard (WHO, 2002).

Table 5 : Life Expectancy at Birth, Sri Lanka, 1920-22 to 2000-2002

Period	Male	Female	Difference (M-F)
1920-22	32.7	30.7	2.0
1945-47	46.8	44.7	2.1
1952	57.6	55.5	2.1
1962-64	63.3	63.7	-0.4
1970-72	64.0	66.9	-2.9
1980-82	67.7	72.1	-4.4
1991	71.1	74.8	-3.7
2000-2002	68.1	76.6	-8.5

Note: Except the year 1991 life expextancy figures are based on observed mortality and enumented population. Life expectancy figures of 1991 are projected values taking past trend of mortality. Life expectancy of 2000-2002 are generated for the study (Appendix D). Source: Department of Census and Statistics (1991).

The fact that the scheduled Census of Population 1991, which was to be held 10 years after the 1981 Census, had not been conducted, denied the availability of an acceptable recent base year population data, for the computation of life expectancies in a direct manner, for various age groups of Sri Lankan population. Consequently, the Department of Census and Statistics (1991), used a projection procedure to estimate the life expectancy for 1991, and according to that projection, the life expectancy of Sri Lankan population had increased to 71.1 years for males and 74.8 years for females (Table 5). Nevertheless, for such computations, the heavy toll on young males caused by the civil strife during 1980's have not been considered, because a majority of such deaths had not been registered with the civil registration system.

In addition to the aforementioned lapses in the death registration system, different sources of data for recent years, indicate varying degrees of mortality decline in Sri Lanka. For instance, the reported infant mortality rate (IMR) of 19.1 for 1000 live births, for the year 1991, based on data from the vital registration system differs considerably from the IMR estimate of 25.3, calculated using data collected by Demographic and Health Survey (DHS) 1993. However, IMR of 24.6, derived from the DHS 2000, for the year 1993 is significantly higher than the value (17.5) reported by the vital registration system (Department of Census and Statistics,2002). Yet, IMR estimate of above both sources, reported for the year 1998, match each other closely.

In Sri Lanka birth and death registrations are compulsory by law, nevertheless, some events are not registered for various reasons. Among the home delivery cases non-registration of infant deaths are significantly higher, in comparison to those that occur in institutions. In addition, when an infant dies immediately after birth, non-registration of vital events, that is, birth and death is believed to be significant in many remote parts of the country. Similarly, under-registration of deaths of persons who were very old is also significantly high in these areas. Apart from these facts, a study conducted by the UNICEF (2002) highlighted a certain degree of under registration of maternal deaths. According to this study conducted in 1996, only 80 out of a total of 312 maternal deaths were found to be reported to the civil registration system.

At the national level it was only in 1980 that a survey was conducted by the Department of Census and Statistics (1984) to assess the completeness of birth and death registration. The survey estimates indicated that only about 98.8 per cent of births and 94 per cent of deaths are being registered in the entire country, and the estimated completeness of death registration in urban, rural and estate sectors were 92.9, 92.2 and 100.0 per cent, respectively.

Thus after 1983 the efficiency of death registration in Sri Lanka has declined due to under-registration as indicated in the examples given in the above paragraph. Many researchers surmise that in contemporary Sri Lanka, the under registration of various types of deaths is in the region of 8-10 per cent of the total annual deaths. Thus in the present study, 8 per cent of under registration of deaths were assumed, and necessary adjustments are made to the age-sex specific mortality schedules.

The uncertainty of mortality changes among the Sri Lankan male and female populations during the recent past was taken into account, when abridged life tables for the period 2000-2002 were computed, to be used for the present population projections exercise. In this computation age-sex distribution of population was obtained from the 2001 Population Census, and age-sex distribution of deaths for the period 2000-2002 was obtained from the civil registration system. Moreover, age-specific mortality statistics have been appropriately adjusted for under-registration of both sexes before computing the life tables (Appendix D).

The computation of life tables is a key element in the assessment of how well, or poorly, health systems perform. The efficient performance of the health system is mainly linked to the socio-economic and political status of a given country. The life expectancy, derived from the life tables for Sri Lanka, using the latest available data, indicate an expected longevity of life of 68.5 years at birth, for males in 2000-2002, which is 2.5 years less than the figure projected (71.1 years) for 1991. Compared with the figure estimated for 1980-1982 there is a marginal increase by 2000-2002. In contrast to males, the expectancy of life for females increased up to 76.6 years by 2000-2002 (Table 5).

This trend shows that unlike in the past, large sex differences in life expectancy persist in present Sri Lanka. In 1980-1982 the difference in male and female life expectancy at birth was only 4.4 while in 2000-2002 the gender difference of longevity, favouring females increased to 8.5 years. The Sri Lankan situation is not exceptional, since the female advantage in life expectancy had widened to 10 or more years in a number of countries in the world. Some of the countries where the highest levels of such difference were observed are contemporary Belarus (12.2 years), Russian Federation (11.3 years), Kazakhstan (11.1 years).

The Sri Lankan advantage in female life expectancy of over 8 years clearly demonstrates that during the last two decades the socio-cultural and political factors were more favourable for females and not very supportive for the overall improvement of health situation of males. Insurgency, civil strife, suicides, accidents, homicides, all of which were prevalent at high levels during the last three decades in Sri Lanka had taken a higher toll on the lives of males, when compared to their female counterparts.

Assumptions for Future Mortality

Sri Lanka's present mortality levels are relatively low when compared to many countries in the region. The fact that a relatively high level of life expectancy has been reached in Sri Lanka indicates that an additional level of effort is required to increase it further. In Sri Lanka, the prevention and treatment of illnesses that occur in the early years of life have substantially improved. As a result, the infant and child mortality rates have been greatly reduced. More people reach an upper age limit, and it is now timely to investigate if there is still room for a further reduction of the mortality rate in Sri Lanka.

Compared to the levels of mortality achieved by some of the other developing countries, there is a possibility for a further reduction of the current rate of mortality in Sri Lanka. The Republic of Korea, achieved an IMR of 4 per 1,000 live births in 2004, which indicates that Sri Lanka's IMR is four times higher. Even though by 2004 IMR has been reduced to 16 per 1000 live births, a further reduction in infant mortality in Sri Lanka could mainly be expected through an enhancement in maternal and child health services, particularly by improving the health service delivery in remote areas of the country.

Another important consideration is Japan, which is located in Asia and has a cultural background similar to Sri Lanka. Japan reports the world's highest level of life expectancy for both sexes. Therefore, when projecting the upper limit of future life expectancy of population of Sri Lanka , the consideration whether Sri Lanka would be able to achieve the present mortality level of Japan, even by the end of the 21st century is worthwhile.

The present levels of life expectancy of Sri Lankan males and females are fairly comparable with the corresponding Japanese estimates of 1970. However, Japan's life expectancy level has increased remarkably during the last three decades, showing an increase from 74.6 to 82.5 years between 1970 and 1993 for females, and an increase from 69.3 to 76.3 years during the same period for males (Ministry of Health and Welfare, Japan, 2000). Even after achieving the highest level of life expectancy in the world, Japan still continues to demonstrate an increase in national longevity. Figures show that female life expectancy in Japan has increased from 82.5 years in 1993 to 84.3 years in 1999, and male life expectancy from 76.3 to 77.6 years during the same period.

A comparison of trends in IMR in Sri Lanka and Japan during the last two decades shows the possibility for Sri Lanka to achieve Japan's present level of mortality at the end of the present century. Even with a moderate rate of economic development, it can be expected that Sri Lanka can also achieve such a level. Thus, the life expectancy at birth assumed for Sri Lanka for the period 2096-2101 is fairly similar to that which is observed in contemporary Japan, which is presently the highest life expectancy in the world. With further decrease in mortality, the expectation of life of males and females

is assumed to be 77.87 years and 84.9 years respectively, at the end of the projection period (Table 6 and 7). This is taken as the plausible path and the assumption of life expectancy for Sri Lanka for the standard projection.

Table 6 : Assumed Life Expectancy at Birth for Males, 2001-2006 to 2096-2101: High, Standard and Low Projections

Period	High	Standard	Low
2001-2006	69.60	68.67	67.60
2006-2011	69.70	68.79	67.65
2011-2016	70.40	69.20	68.00
2016-2021	71.30	70.00	68.60
2021-2026	72.10	70.60	69.10
2026-2031	72.80	71.20	69.60
2031-2036	73.40	71.70	70.10
2036-2041	73.90	72.20	70.60
2041-2046	74.50	72.70	71.10
2046-2051	75.00	73.24	71.50
2051-2056	75.60	73.70	71.90
2056-2061	76.11	74.30	72.40
2061-2066	76.73	74.80	72.80
2066-2071	77.30	75.20	73.40
2071-2076	77.80	75.80	73.80
2076-2081	78.30	76.30	74.30
2081-2086	78.70	76.80	74.70
2086-2091	79.10	77.20	75.10
2091-2096	79.50	77.60	75.50
2096-2101	80.00	77.87	75.80

Table 7 : Assumed Life Expectancy at Birth for Females, 2001-2006 to 2096-2101: High, Standard and Low Projections

Period	High	Standard	Low
2001-2006	77.46	76.81	76.05
2006-2011	77.55	76.82	76.10
2011-2016	78.17	77.20	76.15
2016-2021	78.66	77.70	76.59
2021-2026	79.20	78.20	77.02
2026-2031	79.75	78.67	77.38
2031-2036	80.40	79.20	77.73
2036-2041	80.89	79.60	78.17
2041-2046	81.41	80.10	78.60
2046-2051	81.94	80.54	79.04
2051-2056	82.40	80.98	79.30
2056-2061	82.73	81.33	79.75
2061-2066	83.20	81.80	80.27
2066-2071	83.70	82.20	80.62
2071-2076	84.14	82.56	81.06
2076-2081	84.66	83.00	81.41
2081-2086	85.10	83.43	81.94
2086-2091	85.54	83.89	82.29
2091-2096	86.00	84.39	82.73
2096-2101	86.46	84.90	83.20

The three alternative assumptions of future trends in mortality rates for assumed middle, high and low variants of the projection are shown in tables 6 and 7. The middle path is taken as the plausible path and the standard projection. The rapid improvement in life expectancy is taken as the low mortality path and the slow improvement in life expectancy as the high mortality path. Under the high value assumption, life expectancy at birth for females will increase from 77.46 years in 2001-2006 to 86.46 years in 2096-2101, while under the low assumption it will reach 83.20 years at the end of the projection period. In the low mortality path an increase in the life expectancy, from 67.60 to 75.80 years for the entire time horizon of the projection is assumed for males, while under the high mortality assumption the corresponding increase is from 69.60 to 80.00 years only (Figures 3 and 4).

However, it should be noted that the increase in male and female life expectancy for the period 2001-2006 to 2006-2011 is significantly smaller than the rest of the projection period. This particular pattern of mortality is incorporated into life expectancy levels in order to capture 30,000-35,000 tsunami deaths occurred in Sri Lanka on 26th December 2004, of which the majority were females.

The next consideration was selecting a suitable age pattern of mortality for Sri Lankan males and females for the projection. The observed female age pattern of mortality in the period 2000-2002 in Sri Lanka is closely matched with the Coale-Demeny North model. The male age pattern on the other hand, in general, is matched to the United Nations Chilean model, although the young age group (0 to 10 years) mortality is the North pattern. Thus these particular model life tables were selected to represent the Sri Lankan situation when projecting the future mortality transition.

Figure 3 : Assumed Life Expectancy at Birth for Males, 2001-2006 to 2096-2101: High, Standard and Low Projections

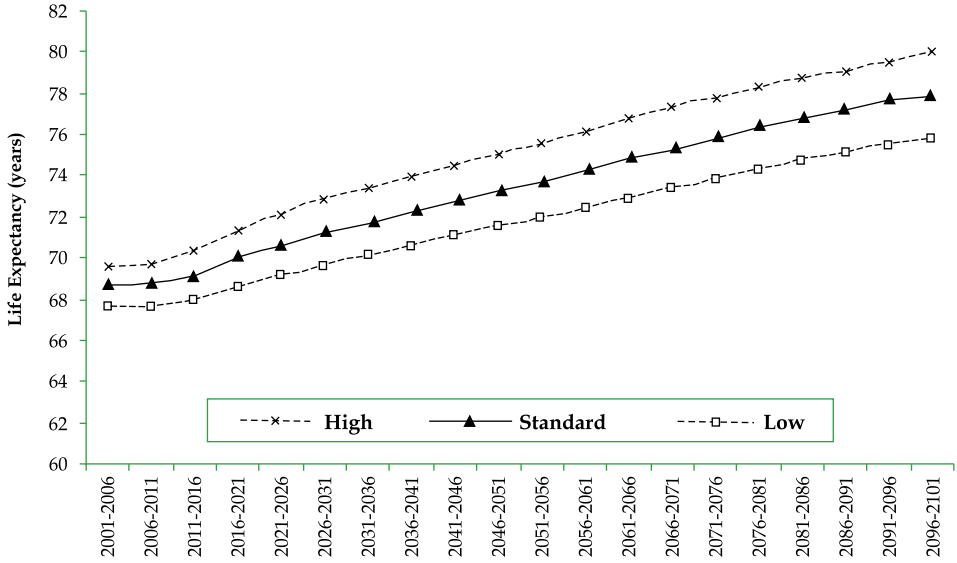
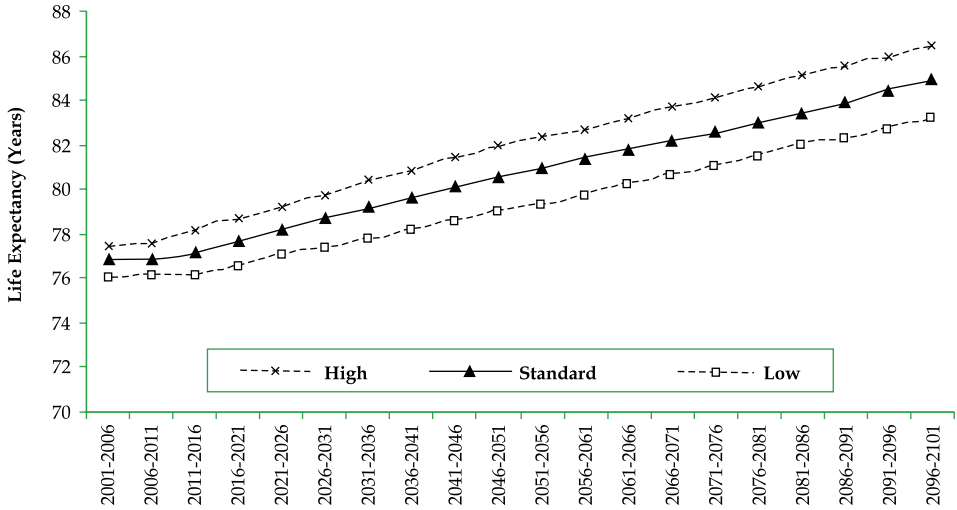


Figure 4 : Assumed Life Expectancy at Birth for Females, 2001-2006 to 2096-2101: High, Standard and Low Projections



Migration: Past, Present and Future

Unlike fertility and mortality, migration responds more rapidly to events such as war, famine, economic conditions and restrictions on immigration. In countries with small populations, in particular, migration is often more important than either fertility or mortality in determining population change. The government may hence consider migration to be a component of population change over which it can exert substantial influence in the medium-term and sometimes even in the short-term. It should be noted that since these population projections are concerned only with the national population, only the anticipated future international migration trends have been incorporated into the projections. Internal migration trends within the country are not relevant and thus they are not considered.

The notable trend in migration, especially after Independence in 1948, has been observed among the Sri Lankan Burgher community, who migrated to Australia and New Zealand. Official statistics show that a total of 423,503 Sri Lankans left the country in search of greener pastures during the period 1957 -1971. Subsequently, the out migration flow was more related to the exodus of professionals who migrated for permanent settlement in the more developed countries. This phenomenon, popularly referred to as the "brain drain", severely affected the economy of Sri Lanka. The inability of the government to provide suitable employment opportunities for the educated people in the country has been identified as the main reason for this migration trend. In the 1970s the pattern of migration changed to mostly semi- and unskilled workers who left in large numbers, on contract basis, to West Asia for employment. The labour migration to the Middle East assumed significant proportions only after the

introduction of the, "free flow" migration policy by the Sri Lankan Government in the late 1970s. This phenomenon was initially trigged by the backward and almost stagnant economic base of the country, but subsequently, the out migration of low and middle level workers increased as a response to external stimuli.

Economic development in the Middle East countries since the 1970's paved the way for a massive technological development and an expanded construction industry, opening up new employment opportunities in overseas employment for skilled, semiskilled and unskilled labour of South and Eastern Asian region. This market expanded in the 1980s and 1990s. The contract labour migration trend, defined as a migration event for a short period only, mostly one to two years, with a facility for renewal can be described as an expansion of the previous out migration pattern with a different focus. The impetus of contract migration for families in the region, providing labour resources for development work in the Middle Eastern Countries was large and varied. Such an economic impact is seen at the family, community and village level of the out-migrants and an inevitable socio- cultural impact at the point of destination and also among return migrants at the point of origin.

Contract labour migration involves most countries of South Asia. However, the major players are Bangladesh, India, Pakistan and Sri Lanka. Saudi Arabia, Kuwait, U.A.E., Qatar and Lebanon are the major labour receiving countries which have captured over 80 per cent of Sri Lankan labour departing to work in foreign countries.

As reported by the Sri Lanka Bureau of Foreign Employment, annual labour out-migration rose to over 170,000 in 1995 compared to 14,000 in 1986 (Table 8). Females accounted for 33 per cent of the total migrants in 1986, but by 1995 the female component increased to 73 per cent of the total. Of the total labour migration, the female proportion in Sri Lanka is found to be significantly higher than any other country in Asia who supply labour for the foreign markets. At present, annually over 200,000 leave the country for foreign employment. The Bureau has collected data on out-migration of Sri Lankan workers, but no statistics for the return of the migrants have been collected. Officials of the Bureau say that the volume of return migrants in recent years from West Asian countries to Sri Lanka is considerably less than the volume of out-migrants.

The Department of Immigration and Emigration of Sri Lanka has continued over many decades to publish data on international movements in terms of arrivals and departures rather than by their actual visa status. Without detailed information on arrivals and departures in terms of their visa status (temporary, semi-permanent or permanent), it is a difficult task to develop clear assumptions in relation to international migration. At the same time some Sri Lankans continue to obtain tourist visas to visit countries such as India, from where they subsequently travel to make a semi-permanent or permanent home in a third country of a better economic status. During the last two years, there was a large number of arrests of young men who attempted to sail out of the country illegally, by boats, largely to reach European countries. The volume of undocumented (illegal) boat travellers who left the country successfully could not be obtained.

Table 8 : Departures for Foreign Employment, 1986-2004

	Male		Female		
Year	Number	%	Number	%	Total
1986	11,023	76.2	3,433	23.7	14,456
1987	10,647	75.4	3,480	24.6	14,127
1988	8,309	45.1	10,119	54.9	18,428
1989	8,680	35.1	16,044	64.9	24,724
1990	15,377	36.1	27,248	63.9	42,625
1991	21,423	33.0	43,560	67.0	64,983
1992	34,858	28.0	89,636	72.0	124,494[b]
1993	32,269	25.0	96,807	75.0	129,076[b]
1994	16,377	27.2	43,791	72.8	60,168
1995	46,021	26.7	126,468	73.3	172,489
1996	43,112	26.5	119,464	73.5	162,576
1997	37,552	25.0	112,731	75.0	150,283
1998	53,867	33.7	105,949	66.3	159,816
1999	63,720	35.4	116,015	64.5	179,735
2000	59,793	32.8	122,395	67.2	182,188
2001	59,807	32.5	124,200	67.5	184,007
2002	70,522	34.6	133,251	65.4	203,773
2003	74,508	35.5	135,338	64.5	209,846
2004[a]	79,979	37.5	133,474	62.5	213,453

Notes: [a] Provisional; [b] Airport Survey - SLBFE
Source: Information Technology Division - SLBFE

Another stream of migration which started from aftermath of communal riots in 1983 is the mass scale out migration of Sri Lankan Tamils to countries like Canada, Australia, U.K., Switzerland, France, Germany and Norway. "This Tamil Diaspora" is considered to have been supporting the country's economy immensely at the time. Presumably over 200,000 Tamils are living in the countries listed above.

In addition to this complex scenario of international migration since 1983, reliable data on refugee migration from Sri Lanka's Northern and Eastern provinces, destined particularly to India, is not available. Some of the refugees have already moved on from India to other parts of the world. Some still remain in India, while some have returned to Sri Lanka, and no reliable data are available for these migratory movements. However, after the cease-fire agreement between the Government and LTTE in 2001 around 60,000 Tamils who were living in foreign countries, came back to Sri Lanka. Thus preparation of migration assumptions for population projection was even more complex than assumptions regarding fertility and mortality.

Assumptions for the Future Migration

The above facts demonstrate the difficulty in assessing Sri Lankan migration data during past few decades. Even if official data systems were to collect better statistics on international migration, constraints would continue to exist when developing better assumptions for modelling population trends. The following assumptions on net migration were developed, therefore, after careful examination of existing data and some consultation with officials in the Department of Immigration and Emigration and the Sri Lanka Bureau of Foreign Employment.

Data from the Department of Immigration and Emigration show that there was a significant change in the volume of annual net migration during the last two decades. As Table 9 indicates, except during the period 1995-1999, Sri Lanka has reported net out-migration for all other quinquennial periods. Net out-migration was highest during the period of 1980-84 (-451,752) and lowest during 2000-04 (-59,765).

Table 9 : Arrivals and Departures, 1980-2004

Period	Arrivals	Departures	Net gain/loss
1980-1984*	2,509,144	2,960,896	-451,752
1985-1989*	2,197,774	2,321,814	-124,040
1990	565,897	545,900	+19,997
1991	552,571	620,361	-67,790
1992	767,247	839,229	-71,982
1993	817,086	846,556	-29,470
1994	897,507	897,170	+337
1990-1994*	3,600,308	3,749,216	-148,908
1995	918,775	954,214	-35,439
1996	861,355	854,940	+6,415
1997	920,995	916,459	+4,536
1998	925,136	942,275	-17,139
1999	1,028,613	941,186	+87,427
1995-1999*	4,654,874	4,609,074	+45,800
2000	1,002,371	973,387	+28,984
2001	881,689	911,042	-29,353
2002	1,023,043	1,033,695	-10,652
2003	1,204,120	1,229,681	-25,561
2004	1,463,164	1,486,347	-23,183
2000-2004*	5,574,387	5,634,152	-59,765

Note: * Arrivals and departures for entire five year period.
Source: Statistical Abstracts of various years.

As in the case of fertility and mortality, three assumptions were developed for international migration, considering the future employment opportunities that would be available in Middle East and elsewhere. The demand and supply forces that govern the local labour supply and foreign demand for Sri Lankan migratory labour have been considered in this projection.

Table 10 : Assumed Male Net Migrants, 2001-2006 to 2096-2101: High, Standard and Low Projections (in thousands)

Period	High	Standard	Low
2001-2006	-27.2	-29.0	-30.8
2006-2011	-29.4	-32.0	-34.0
2011-2016	-27.0	-33.5	-36.2
2016-2021	-15.5	-20.0	-26.7
2021-2026	-7.2	-10.0	-14.4
2026-2031	-3.0	-5.0	-7.3
2031-2036	-1.0	-1.0	-2.0
2036-2041	0.0	0.0	0.0
2041-2046	0.0	0.0	0.0
2046-2051	0.0	0.0	0.0
2051-2056	0.0	0.0	0.0
2056-2061	0.0	0.0	0.0
2061-2066	0.0	0.0	0.0
2066-2071	0.0	0.0	0.0
2071-2076	0.0	0.0	0.0
2076-2081	0.0	0.0	0.0
2081-2086	0.0	0.0	0.0
2086-2091	0.0	0.0	0.0
2091-2096	0.0	0.0	0.0
2096-2101	0.0	0.0	0.0

Table 11 : Assumed Female Net Migrants, 2001-2006 to 2096-2101: High, Standard and Low Projections (in thousands)

Year	High	Standard	Low
2001-2006	-29.0	-31.0	-33.0
2006-2011	-31.6	-34.0	-36.5
2011-2016	-34.8	-38.0	-40.0
2016-2021	-24.0	-32.0	-37.0
2021-2026	-9.4	-15.0	-23.4
2026-2031	-4.0	-6.0	-9.7
2031-2036	-1.5	-2.5	-4.0
2036-2041	0.0	0.0	0.0
2041-2046	0.0	0.0	0.0
2046-2051	0.0	0.0	0.0
2051-2056	0.0	0.0	0.0
2056-2061	0.0	0.0	0.0
2061-2066	0.0	0.0	0.0
2066-2071	0.0	0.0	0.0
2071-2076	0.0	0.0	0.0
2076-2081	0.0	0.0	0.0
2081-2086	0.0	0.0	0.0
2086-2091	0.0	0.0	0.0
2091-2096	0.0	0.0	0.0
2096-2101	0.0	0.0	0.0

In the most plausible path (standard) the net outflows were assumed to continue to increase up to the period 2011-16 for both males and females, and decline thereafter (Tables 10 and 11). As hypothesized in the standard variant, it is assumed that in the future more females will tend to out migrate than their male counterparts. After 2036 the net flow is assumed to be neutral (Figures 5 and 6). In the high variant, it was assumed that there would be no significant out-migration of both males and females after the period 2031-36. The low alternative follows the same trend but in each consequent period it assumed that a higher volume of net out-migrants will be produced.

Figure 5 : Assumed Male Net Migrants, 2001-2006 to 2096-2101: High, Standard and Low Projections

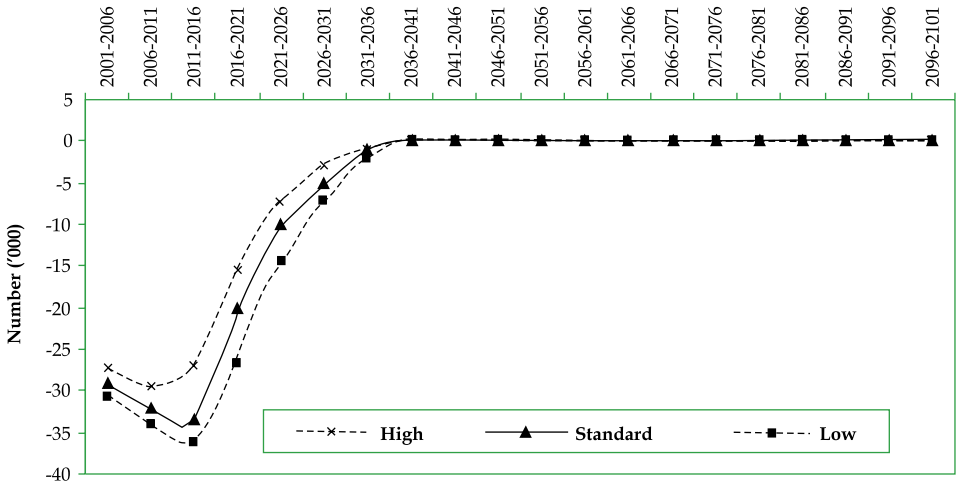
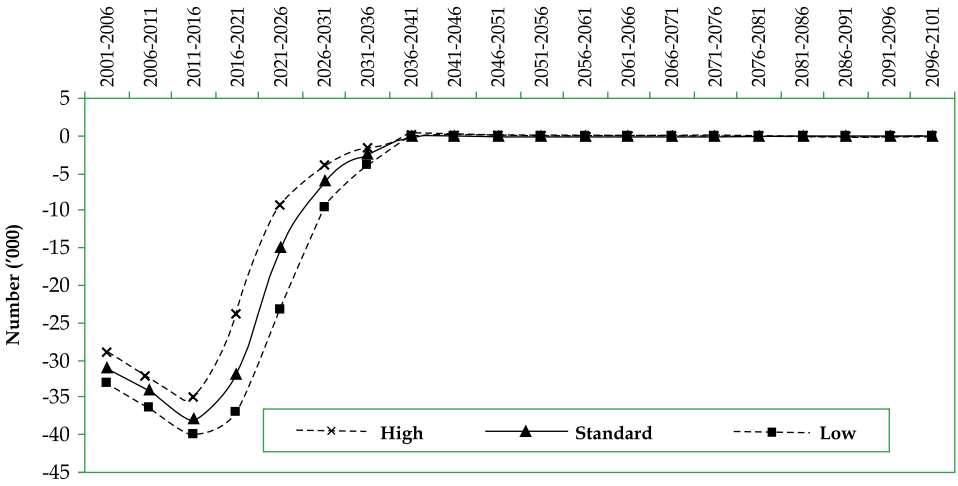


Figure 6 : Assumed Female Net Migrants, 2001-2006 to 2096-2101: High, Standard and Low Projections



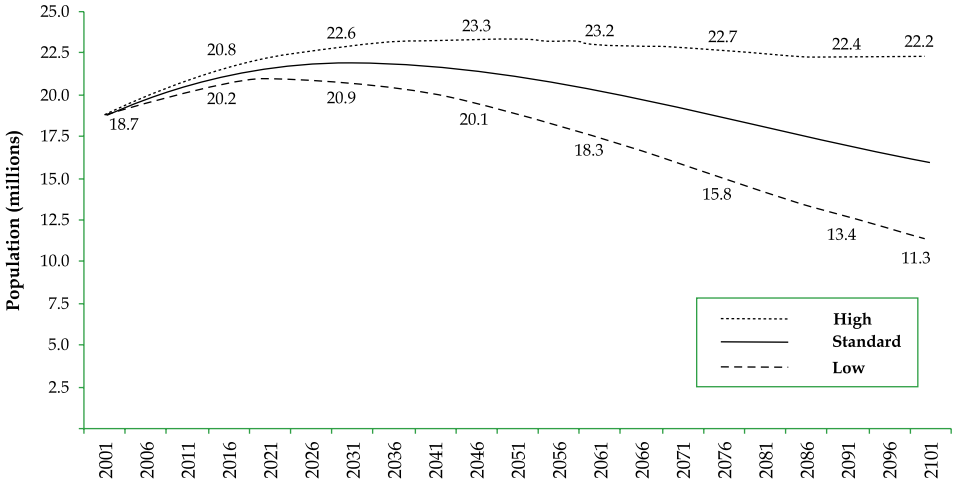
Trends of the Future Population

Size and Growth

The cohort component method, which involves a sequence of computations that are repeated for successive five-year time intervals, is used for projecting the future trends of the Sri Lankan population. These computations are based on assumptions on future demographic conditions to update the age and sex structure of the population, and to derive various indicators of the population size, structure and changes.

A simple combination of the standard assumptions on fertility, mortality and international migration with the base year population of 2001 will produce a standard population projection. Alternatively, the same growth components favouring high population growth patterns will produce a high forecast and the combination favouring low growth patterns will produce a low prediction. Of the three projections, the most plausible future population is presented in the standard population estimate, while high and low predictions indicate the possible upper and lower bounds. As shown in figure 7, the variability in the projected size of the Sri Lankan total population, derived through the high, standard and low projections will be lesser for the immediate future; however, the longer the time horizon, the greater the tendency for the variability to increase significantly. For instance, the difference between the projected population of the high and low variants by 2101 are noted to be about 11 million (22.2 - 11.3). However, the corresponding difference by 2011 is only about half a million. This pattern indicates that the longer the projection period, uncertainty attached to the assumptions tends to increase significantly. However, Sri Lanka's total population will continue to rise in the foreseeable future and reach stability for sometime and, thereafter, a declining trend could occur (Figure 7).

Figure 7: Projected Population of Sri Lanka, 2001 to 2101: High, Standard and Low Projections



According to the standard projection the population of Sri Lanka would reach 20.5 million by 2011, and 21.6 million by 2021, however, beyond 2046 the size of the population would decline significantly (Table 12). The size of the population would decline back to 17.9 million by 2081 and to 16.0 million by end of the present century. Thus, for about a quarter of a century, a period covering 2021 to 2046, with the total size of the population between 21.5 - 21.9 million, the numerical size of the population would be fairly stable. The standard population projection indicates that year 2031 will be the peak population of Sri Lanka, in which the size could reach as high as 21.9 million. Even though fertility in terms of TFR would start to increase from 1.5 in 2026-2031 to 1.8 in 2071-2076 and remain at the same level during the remaining part of the projection period (Table 3), the total size of the population would continue to decline, particularly in the latter part of the 21st century (Figure 7 and Appendix A).

Table 12 : Projected Population, 2001 to 2101: High, Standard and Low Projections (in thousands)

Period	High	Standard	Low
2001	18,734	18,734	18,734
2006	19,799	19,720	19,539
2011	20,774	20,558	20,221
2016	21,573	21,186	20,682
2021	22,162	21,580	20,897
2026	22,580	21,804	20,924
2031	22,888	21,883	20,776
2036	23,122	21,841	20,493
2041	23,282	21,712	20,102
2046	23,334	21,465	19,601
2051	23,278	21,104	18,992
2056	23,175	20,656	18,267
2061	23,036	20,145	17,476
2066	22,867	19,590	16,631
2071	22,707	19,030	15,778
2076	22,570	18,480	14,947
2081	22,462	17,944	14,139
2086	22,369	17,416	13,367
2091	22,282	16,910	12,632
2096	22,221	16,437	11,936
2101	22,216	16,012	11,292

In the high trajectory projection, the Sri Lankan population would reach a maximum of 23.3 million by 2046, while in the low trajectory, the highest total of 20.9 million will be reached in 2026 (Table 12; Appendices B and C). Depending on the three sets of projections, the final population in the year 2101 will be as high as 22.2 million or as low as 11.3 million.

All three projections, comprising the standard, high and low, computed in this exercise show that the population growth in numbers will continue for the next two decades (Figure 7). This is also true for the low projection, in which less than a replacement level fertility (TFR of 1.86) is assumed for the period 2001-2006. Since a significantly large number of women will be entering the reproductive age in the coming years, the Sri Lankan population currently demonstrates an in-built momentum for growth.

The absolute size of the Sri Lankan population will increase, despite the fact that its rate of growth will decrease gradually, as shown in table 13. If the population growth stabilizes at a very low, near zero level, when the crude birth and crude death rates reach the same level, the increase or decrease in population numbers will be minimal. As observed in the standard projection in figure 8, a near-zero population growth rate would be attained after the year 2021. The present (2001-2006) population growth rate in the standard projection will be about 1.03 per cent per annum, which will decline to a negative rate by the period 2031-2036, indicating a corresponding decline in the total population (Figure 8). In all three trajectories, the period 2001-2006 indicate the highest rate of growth.

In the low projection, a near-zero level, growth rate is seen after the year 2016, which will tend towards a negative growth rate after 2026, indicating a decline in the size of the total population (Table 13). In the high trajectory, a near-zero level growth could be expected after 2031, nevertheless, the decline of the total population and a negative growth will be expected only after 2046.

Figure 8 : Projected Change in Population Size and Annual Rate of Growth, 2001 to 2101: Standard Projection

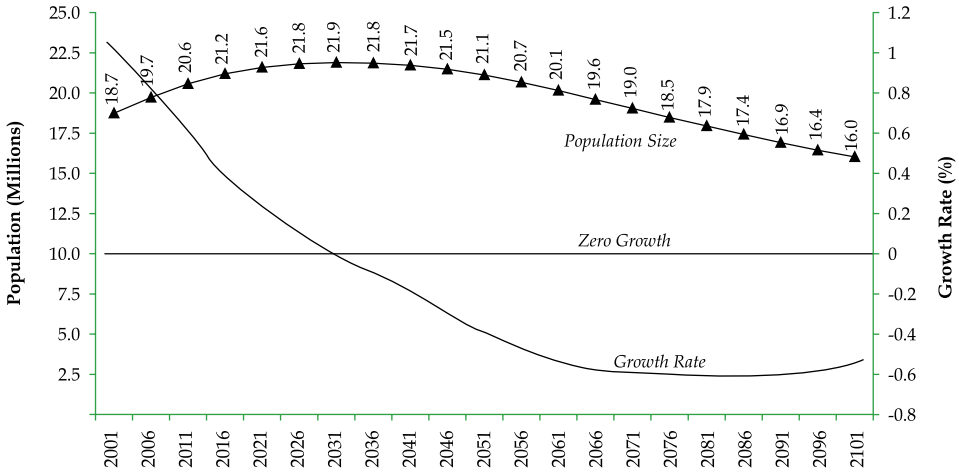


Table 13 : Average Annual Rate of Growth of Population During Quinquennial Periods, 2001-2006 to 2096-2101: High, Standard and Low Projections

Period	Rate of growth (per cent)		
	High	Standard	Low
2001-2006	1.11	1.03	0.84
2006-2011	0.96	0.83	0.69
2011-2016	0.75	0.60	0.45
2016-2021	0.54	0.37	0.21
2021-2026	0.37	0.21	0.03
2026-2031	0.27	0.07	-0.14
2031-2036	0.20	-0.04	-0.27
2036-2041	0.14	-0.12	-0.39
2041-2046	0.04	-0.23	-0.50
2046-2051	-0.05	-0.34	-0.63
2051-2056	-0.09	-0.43	-0.78
2056-2061	-0.12	-0.50	-0.88
2061-2066	-0.15	-0.56	-0.99
2066-2071	-0.15	-0.58	-1.05
2071-2076	-0.12	-0.59	-1.08
2076-2081	-0.10	-0.59	-1.11
2081-2086	-0.08	-0.60	-1.12
2086-2091	-0.08	-0.59	-1.13
2091-2096	-0.06	-0.57	-1.13
2096-2101	-0.03	-0.52	-1.11

Components of Population Growth

The cohort component method of population projection provides the facility to estimate the future components of population growth, including the crude birth rate (CBR), the crude death rate (CDR) and the natural increase. In the standard projection for the period 2001-2101 the crude birth rate declines from 17.1 births to 9.98 births per 1,000 people (Table 14). The crude death rate, meanwhile, increases from the current level of 6.2 to 15.2 deaths per 1,000 people by the end of the projection period. As a result of the inverse trends in the crude birth rate and crude death rate, the difference between these two rates, which is the rate of natural increase, declines from 10.9 to negative –5.2 per 1,000 people during the projection horizon (Table 14 and Figure 9).

The CBR and CDR are expected to be more-or-less identical with a value of 10.4 per 1000 population by 2031, at which point of time, the natural increase would be zero (Figure 9). However, beyond that, natural increase would mark with negative values. This indicates the fact that beyond the year 2031 more deaths than the births are

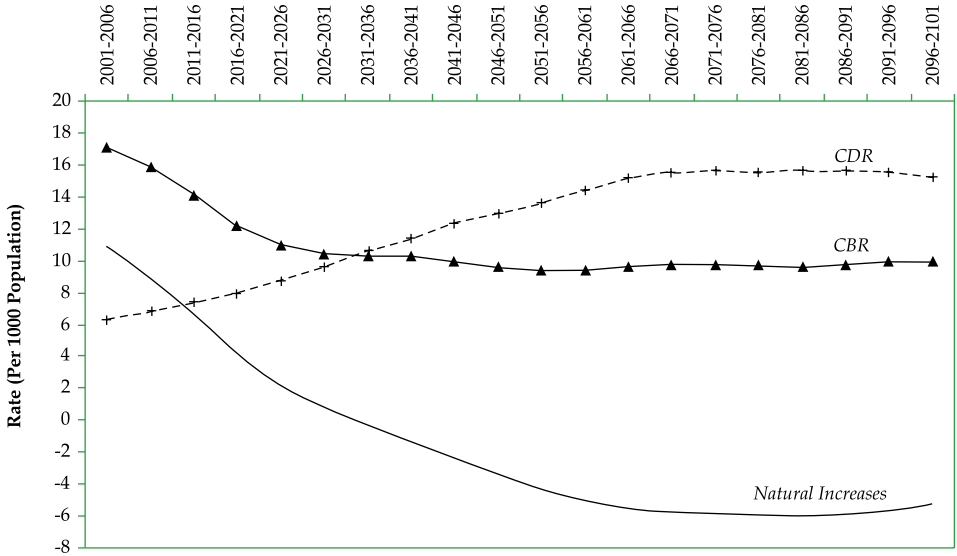
expected from the Sri Lankan population. As shown in figure 9 until 2031, the decrease in the rate of natural increase is projected to be much stronger than the decrease in the subsequent period.

Table 14 : Birth Rate, Death Rate and Rate of Natural Increase per 1000 Population, 2001-2006 to 2096-2101: Standard Projection

Period	Crude Birth Rate	Crude Death Rate	Natural Increase
2001-2006	17.12	6.25	10.87
2006-2011	15.82	6.84	8.98
2011-2016	14.12	7.42	6.70
2016-2021	12.14	7.97	4.17
2021-2026	11.00	8.71	2.29
2026-2031	10.46	9.64	0.82
2031-2036	10.28	10.62	-0.34
2036-2041	10.27	11.46	-1.19
2041-2046	10.01	12.29	-2.28
2046-2051	9.59	12.99	-3.40
2051-2056	9.39	13.69	-4.30
2056-2061	9.40	14.40	-5.00
2061-2066	9.59	15.17	-5.58
2066-2071	9.78	15.59	-5.81
2071-2076	9.78	15.63	-5.85
2076-2081	9.69	15.59	-5.90
2081-2086	9.68	15.65	-5.97
2086-2091	9.77	15.67	-5.90
2091-2096	9.91	15.57	-5.66
2096-2101	9.98	15.22	-5.24

It should be noted that, in future, the effect of rising numbers in the older age groups, where mortality is high, will override the effect of declining mortality conditions. This will result in an increase in the crude death rate as opposed to deterioration in the pattern of mortality. The same trend in the crude death rate has been observed for all developed countries, and also for some of the developing countries.

Figure 9 : Projected Change in Crude Birth Rate, Crude Death Rate and Rate of Natural Increase, 2001-2006 to 2096-2101: Standard Projection



Main Features of the Future Population

The age and sex structure of a population is a significant parameter that influences current and future determinants of growth, namely fertility, mortality and migration. There are various methods to analyse the gender and age group specific structural composition of a population, nevertheless, only a few selected methods have been utilized for the forthcoming analysis.

Gender Balance

Sri Lanka, though located in the South Asian region, has not adhered to the common South Asian model. Of the total population of 18,734 thousand enumerated in the population census of 2001, the sex ratio is estimated to be 97.9 (Table 15). In other words, in 2001, for every 100 females in Sri Lanka, there were only 98 males. However, the corresponding estimate in 1953 was 111.5, which clearly demonstrates the excess of males in the Sri Lankan society at that time.

Table 15 : Projected Population by Sex, 2001 to 2101: Standard Projection

Period	Male ('000)	Female ('000)	Sex Ratio (Males per 100 females)
2001	9,268.1	9,466.2	97.9
2006	9,719.8	9,999.8	97.2
2011	10,099.0	10,458.8	96.6
2016	10,373.0	10,812.5	95.9
2021	10,538.5	11,041.4	95.4
2026	10,617.7	11,186.1	94.9
2031	10,629.0	11,253.5	94.4
2036	10,585.7	11,255.4	94.1
2041	10,502.4	11,209.9	93.7
2046	10,366.5	11,098.9	93.4
2051	10,176.1	10,928.0	93.1
2056	9,943.4	10,712.3	92.8
2061	9,686.3	10,458.6	92.6
2066	9,411.9	10,178.3	92.5
2071	9,140.1	9,889.5	92.4
2076	8,877.8	9,602.5	92.5
2081	8,627.6	9,316.2	92.6
2086	8,383.4	9,032.8	92.8
2091	8,156.1	8,753.4	93.2
2096	7,943.3	8,493.6	93.5
2101	7,750.8	8,261.4	93.8

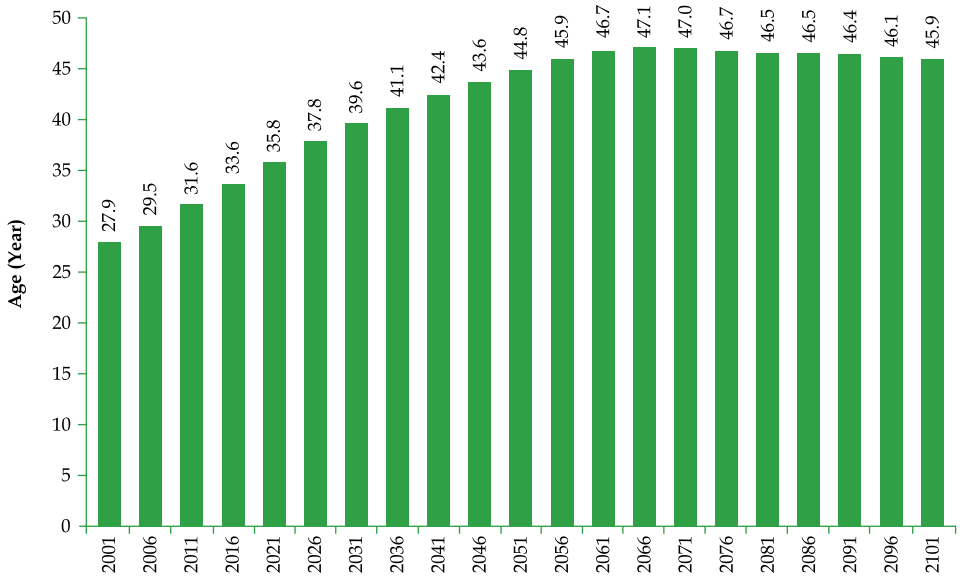
During the 1990s, more females have been identified in the Sri Lankan population and in the coming decades the female favoured sex ratio is expected to increase further, primarily due to the greater improvement in female than male life expectancy. For instance, as the standard projection highlights, when the Sri Lankan population reaches its peak in 2031 the sex ratio would be 94.4 males per 100 females, and by 2071 it would be further reduced to a level of 92.4 males per 100 females. Beyond 2071 the sex ratio would increase marginally; however, even by 2101 the excess of females over males will be a significantly strong feature of the Sri Lankan population.

Median Age

A rapid rise in the median age of the population is an important feature, which reflects the ageing pattern of the population and the future demographic trends in Sri Lanka. In 2001, the median age was 27.9 years, which means that half of the population was below 27.9 years. The median age in the standard projection, however, will rise to 39.6

years by 2031 and rise further to 46.5 years by the year 2086, because of the rapid decline in fertility and mortality (Figure 10).

Figure 10 : Projected Median Age, 2001 to 2101: Standard Projection (in years)



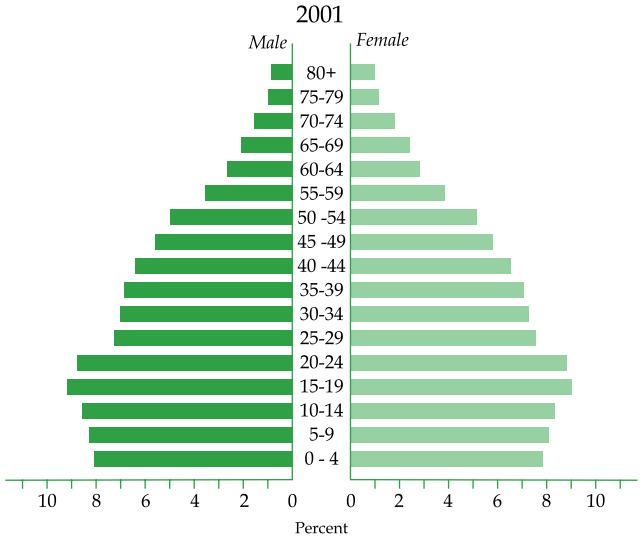
The shift of the median age of the population towards the older age groups is also seen in the high and low projections (Appendix B & C), which show a median age of 38.6 years and 40.7 years, respectively, by the year 2031. By 2086, the high and low trajectories show that the median ages are 42.9 and 49.8, respectively. These trends show how fast the Sri Lankan population is ageing and suggest the likelihood of Sri Lanka becoming one of the fastest ageing countries in Asia.

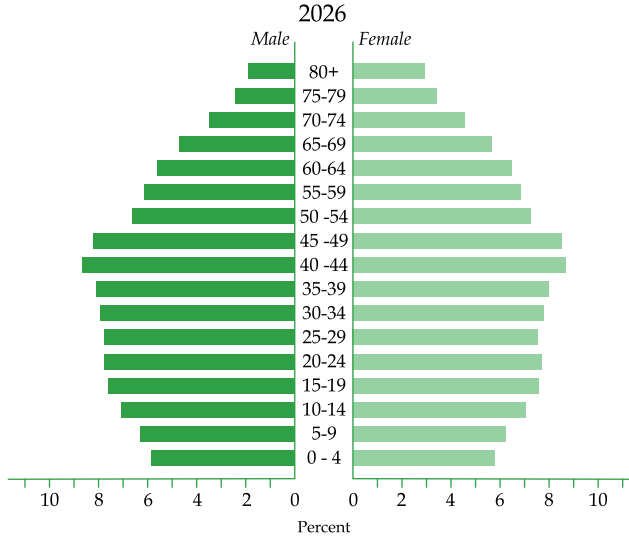
Age and Sex Structure

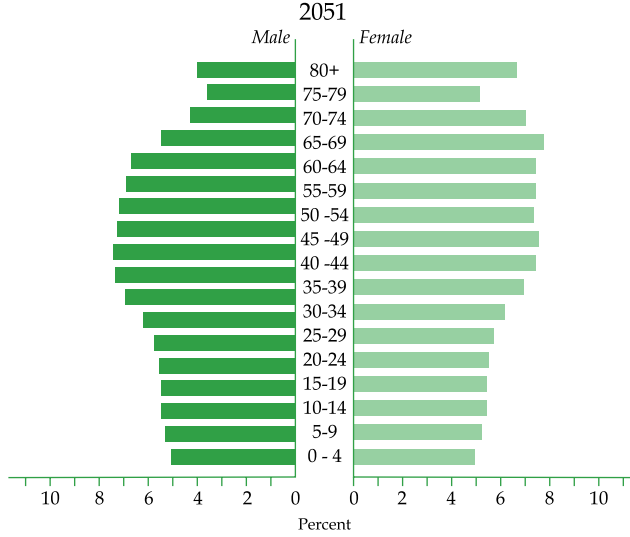
The age and sex composition of populations (either in absolute numbers or proportions), when plotted graphically, will produce an age pyramid. The base of a pyramid indicates the segment of population in the youngest ages while the top indicates the oldest ages. The proportions of people in the various age and sex categories change because of the continuous action of population growth components, namely mortality, fertility and migration. The pyramid is an illustration of the biological history of a population – the results of 100 years of births, deaths and migration.

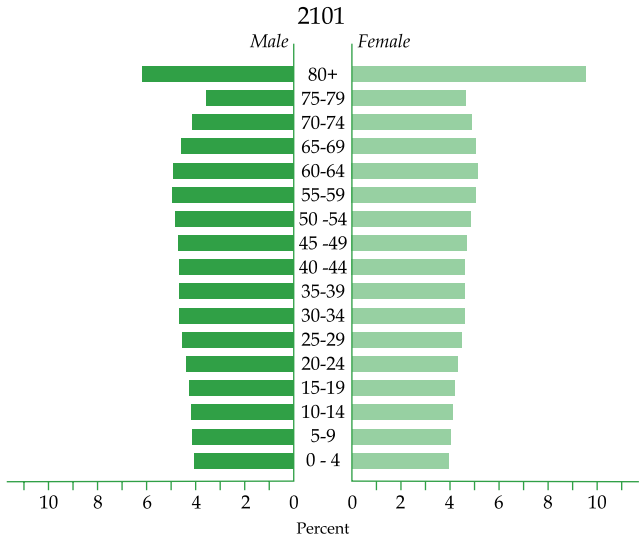
Sri Lanka's population will undergo major changes in its age structure in the coming decades. The population age structures of 2001, 2026, 2051 and 2101 shown in figure 11 clearly indicate the impact of the rapid decline in fertility and the improvement in life expectancy. The age and sex structure of the population pyramid for the year 2001, demonstrates the effect of continuous changes occurred in various age, sex categories, due to changes in the population growth components. A number of important characteristics are visible. Firstly, the fact that the fertility levels has been reduced significantly and are still continuing to decline; is evident because the pyramid has a relatively smaller base (0-4 years) compared to advanced age groups, that is, 5-9, 10-14 etc. Secondly, the proportion of children (< 15 years) is higher than the elderly population (60+ years). Thirdly, the proportion of working age population (15-59 years) is significantly higher than the combined proportionate magnitude of children and the elderly. Thus, compared to any other pyramid shown in figure 11, the total dependency is shown to be at the lowest level in 2001.

Figure 11: Projected Change in Age-Sex Structure of the Population, 2001, 2026, 2051 and 2101: (Standard Projection)




2026
Male
Female
80+
75-79
70-74
65-69
60-64
55-59
50 -54
45 -49
40 -44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0 - 4
10 8 6 4 2 0 0 2 4 6 8 10
Percent


2051
Male
Female
80+
75-79
70-74
65-69
60-64
55-59
50 -54
45 -49
40 -44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0 - 4
10 8 6 4 2 0 0 2 4 6 8 10
Percent



The last diagram in figure 11, which represents the projected age-sex structure as at 2101, indicate a significant deviation from the 2001 structure. By the end of the present century the pyramidal shape of the structure would disappear greatly and a high dependency pattern is expected with its largest component in the older ages. Among the older age groups the proportion of females would be significantly higher than that of males. The age and sex structure of 2101 demonstrate the completion of the demographic transition, thus the structure changed significantly from a pyramid shape to that of a barrel shape. The diagrams 2 and 3 of figure 11 shows the continuity of the observed pattern of the demographic transition up to years 2026 and 2051 respectively. By 2051 the elderly population will reach a significantly large proportion and the female proportion of the 80 year population segment would be about twice that of the corresponding male proportion.

Population by Broad Age Groups

It should be noted that, the children of less than 15 years are the most susceptible to the assumptions that have been utilized in all three projection scenarios. Their numbers will depend on the key determinants affecting the changes in fertility, namely the changes in the number of women in reproductive ages and changes in infant and child mortality.

Child Population (Under 15 years)

The projected numerical size and percentage of children of less than 15 years of age are shown in table 16. The child population of 4.9 million enumerated in 2001 is expected to decrease to 4.7 million by 2011. Because of the declines in fertility and also due to continuing out migration, by 2031 their number will be about 3.5 million. As fertility remains more-or-less at a stable level the numerical size of the child population will stabilize at 3.3-3.5 million during 2030s and 2040s. Beyond 2040, the child population will continue to decline and would reach 2.5 million by end of the 21st century.

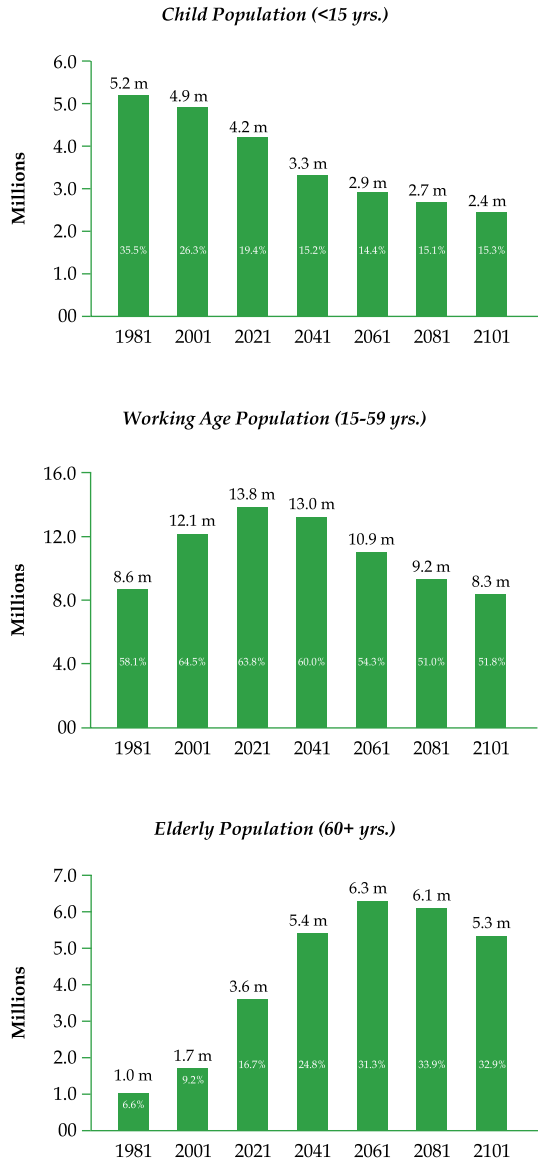
The proportion of child population aged less than 15 years was about 26.3 per cent at the commencement of the projection in 2001 and is expected to decline steadily over the projection period (Table 16). The proportion will decrease to 16.1 and 15.3 per cent at 2031 and 2101 respectively. It should be noted that even though fertility is expected to increase marginally to a TFR of 1.8 and remain at that level during the latter part of the 21st century (Table 3) the proportion of under 15 age category would not change significantly, but remain around 15 per cent of the total population. The increase in the life expectancy, particularly among the elderly groups, hides the effect generated from the increase in fertility. Consequently, the percentage of child population would remain stable.

Table 16 : Number and Percentage Distribution of Population by three Broad Age Groups, years 2001 to 2101 (Standard Projection)

Year	Children (<15 yrs.)		Working Ages (15-59 yrs.)		Elderly (60+ yrs.)	
	Number ('000)	%	Number ('000)	%	Number ('000)	%
2001	4,922.4	26.3	12,080.5	64.5	1,731.4	9.2
2006	4,807.4	24.4	12,836.7	65.1	2,075.7	10.5
2011	4,692.4	22.8	13,294.8	64.7	2,570.4	12.5
2016	4,523.6	21.4	13,591.9	64.2	3,070.2	14.5
2021	4,196.1	19.4	13,778.8	63.8	3,605.1	16.7
2026	3,825.3	17.5	13,863.2	63.6	4,115.0	18.9
2031	3,520.3	16.1	13,826.2	63.2	4,536.1	20.7
2036	3,363.2	15.4	13,589.3	62.3	4,888.8	22.4
2041	3,299.0	15.2	13,026.7	60.0	5,386.7	24.8
2046	3,244.7	15.1	12,389.5	57.7	5,831.2	27.2
2051	3,149.3	14.9	11,874.0	56.2	6,080.6	28.8
2056	3,018.3	14.6	11,401.3	55.2	6,236.1	30.2
2061	2,902.9	14.4	10,939.5	54.3	6,301.7	31.3
2066	2,839.0	14.5	10,415.9	53.2	6,335.3	32.3
2071	2,807.2	14.8	9,893.2	52.0	6,329.1	33.3
2076	2,769.3	15.0	9,451.3	51.1	6,260.0	33.9
2081	2,703.3	15.1	9,156.8	51.0	6,083.6	33.9
2086	2,618.2	15.0	8,944.6	51.4	5,853.0	33.6
2091	2,543.0	15.0	8,750.0	51.7	5,616.5	33.2
2096	2,488.9	15.1	8,537.1	51.9	5,410.8	32.9
2101	2,445.6	15.3	8,302.0	51.8	5,264.3	32.9

More than 35 per cent of the Sri Lankan population in 1981 were identified to be children, which are the key feature of a "young population" (Figure 12). The relative magnitude of the proportion of children declined almost by 10 percentage points in 2001, and at present (2006) children of less than 15 years comprise about one-quarter of the population.

Figure 12 : Expected Change in three Broad Age Groups, 1981 to 2101 (Standard Projection)



Working Age Population (15-59 years)

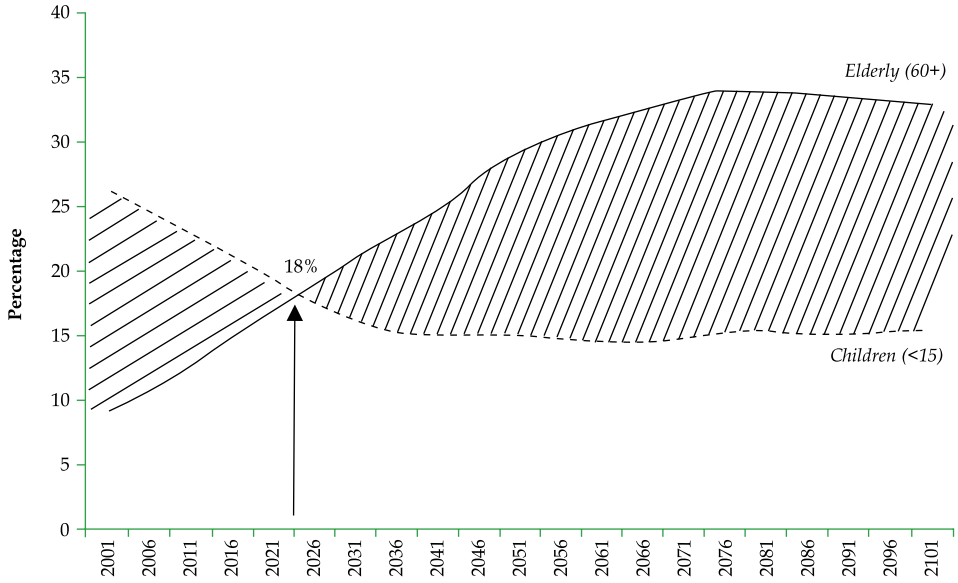
In contrast to the child population, the working age population between 15 and 59 years of age will continue to increase numerically until 2026 and show a decline thereafter (Table 16). The working age population which was 8.6 million in 1981 increased to 12.1 million by 2001 (Figure 12). The enumerated working age population amounting to 65.1 per cent of the total population in 2006 is observed to be the peak, when compared with the working age proportions of the population of later time intervals, computed for the entire 21st century. Beyond 2006 the percentage of working age population would decline gradually and reach 63.2 per cent and 51.4 per cent by 2031 and 2086 respectively. Since the 1970's, the proportionate share of the child population to the total population started to decline, while the share of the working age population increased.

Elderly Population (60+ years)

The elderly population who are 60 years and beyond is expected to change significantly. Only one million elderly were identified in 1981 (Figure 12), and their proportion to the total population was only 6.6 per cent. The proportion had increased gradually during the past many decades. The elderly population of 1.7 million enumerated in 2001 is expected to increase 3.6 million by 2021, which will be doubled during the immediate 20-year period. Consequent to the declining trend in fertility and mortality in the coming years, particularly during 2031 and 2061 periods, there will be 4.5 million and 6.3 million elderly respectively (Table 16). In terms of the proportion of elderly to the total population, a strong linear increase is visible, indicating that the elderly population comprising 9.2 per cent of the total population in 2001 would increase to 16.7 by 2021. By 2041, one out of every four persons in Sri Lanka is expected to be an elderly person. Demonstrating the effect of the demographic transition occurring in Sri Lanka, during the latter part of the 21st century about one-third of the Sri Lankan population would be elderly (Table 16).

Although ageing of the Sri Lankan population continues, even at 2021 the proportion of children in the population would be out numbered by elderly (Figure 13). However, between 2021 and 2026 the above pattern would change in opposite direction. As shown in figure 13, in 2024 the child percentage and elderly percentage in the Sri Lankan population would equilibrate at 18 per cent. However, beyond 2024 the percentage of elderly will increase significantly and the percentage difference between elderly and children will be wider, in favour of elderly.

Figure 13 : Relative Size of Child (<15 years.) and Elderly (60+ years.) Populations, 2001 to 2101 (Standard Projection)



The age structure transition in Sri Lanka is primarily the effect of past trends in fertility and mortality decline and assumptions adopted for the future population growth patterns. The demographic transition experienced in Sri Lanka have not been uniform, nevertheless, the current phase of changes indicate that the Sri Lankan demographic environment is conducive for rapid economic development, given the condition that necessary socio-economic polices are in place to achieve the maximum benefit of the situation. This "demographic bonus" could also be identified as the "window of opportunity", implying that the time horizon of the opportunity is limited to 10 to 15 years only.

Implications

Change in the Total Size

The population projection for Sri Lanka up to 2101, for the three trajectories (high, standard and low) demonstrate important comparable changes in size and structure, reflecting many, trajectory-specific, socio-economic and cultural implications. According to the standard projection, the total population which amounted to 19.7 million in 2006, reaches its peak of 21.9 million in absolute numbers in the year 2031 (Table 12 and Figure 8). The gross addition to the total population up to the year 2031 is approximately 2.2 million (the difference between 21.9 and 19.7 million). In the high projection, the total population reaches the peak level of 23.3 million in the year 2046

and the gross addition to the population approximates 3.5 million. The lowest addition of 1.4 million to the current Sri Lankan population, when it reaches a peak level of 20.9 million in 2026 is associated with the low projection scenario.

The net additions to the population up to the peak years reflected in the three trajectories in the projection exercise, focus on the possible drain on the limited natural resource base of the country and the related socio-economic planning implications, when providing for the gross addition to the population. The magnitude of the implications varies according to the size of the addition. The current population spread show a skewed distribution favouring the Western Province and the wet zone. The Census of 2001 (Department of Census and Statistics 2001) showed that at least one third of the population in the 18 districts counted was concentrated in the Western Province, and at least 80 per cent in the wet zone of the country. Urbanization that is occurring in the country is largely concentric of these areas. The internal migration pattern of the country, indicate that a bulk of the net addition would be concentrated in-and-around the Western Province of the country, which has approximately ten times higher population density, when compared to the Sri Lankan average of 290 persons per sq. km. The most plausible scenario, suggested by the standard projection, shows that there will be an added 2.2 million people to the present population base of 19.7 million which will be an enormous challenge in absolute numbers, when planning for this added segment of population. Further increase of population concentration in the Western Province would aggravate the already degenerated urban population problems and consequences, particularly in the unplanned urban environments.

Due recognition should be given to the long term implications of achieving below-replacement level-fertility. There will not only be an eventual decline in the numerical value of the total population, but also significant changes in the population age sex structure. It is important to note that in all three trajectories of the projection, a gradual decline of the total population in the latter part of the 21st century is indicated. The standard projection indicates that, once the population reaches its maximum of 21.9 million in 2031, the total size will decline to 20.1 and 16.9 million by 2061 and 2091, respectively.

There are important implications resulting from the expected changes in the size and structure of the total population of Sri Lanka. The gradually declining trend, visible in the period subsequent to the peaking of the population needs serious consideration, particularly, the first increase of the population total which approximated 22 million in 2031 and the gradual decline in the subsequent period. The increase in the population total would lead to an increase in the demand for the basic amenities, in the immediate quarter of a century and a decline in that demand when the size of the total population starts to decline from 2031. This fluctuation in demand should be considered when allocating resources for long term investment in buildings for health and educational and other purposes and in other related infrastructure. The demand for housing should decline significantly in the next quarter of a century, if the family formation

patterns and the net addition of housing units remain constant. The possible variation in the demand patterns may be expected with the immerging special feature of family dynamics such as 'feminisation' of the household headship in Sri Lanka (De Silva, 2005).

Change in the Age and Sex Structure

Another feature of the observed structural changes in the projected Sri Lankan population that demands policy focus is the reversal of the gender balance. The estimated sex ratio using 1981 census data was male favoured (104 males per 100 females). The latest census taken in 2001 shows that for every 100 females there were only 97.9 men, which suggests that the pattern has changed. The sex ratio will decline to 95.4 in 2021, showing an excess of one-half million females over males (Table 15). Beyond 2021 the ratio will further decline to reach a value of 92.4 men for every 100 females in 2071. The major proportion of the net addition of 2.2 million people to the present population (in 2006) will be females. Thus the change in the sex structure would generate a different set of socio-economic and cultural consequences.

The female favoured sex ratio would generate a significant change in the participation of females in the labour force and in the occupational structure. A greater number of females added to the population will be in prime working ages, who will want to participate in the production of economic goods and services for the country. In the context of declining fertility towards below-replacement level, the number of females opting for labour force participation would be enhanced, because they will have more time for such activity. The unemployment rates, especially for young persons and females currently exceeding two digit levels, will be further increased. Creation of suitable job opportunities for the added labour force participants, particularly for educated young women will be a challenge for policy makers and planners.

Responding adequately to a wide range of socio-economic and health consequences of the growing elderly population in the 21st century will be another challenge faced. Throughout the 21st century, the phenomenon of continuous upward rise in the elderly population who are 60 years and above is seen to be parallel to a sustained declining trend in the child population. The proportion of elderly, inclusive of the "young" and the "old elderly", in 2041, would approximate one-forth of the total population and by 2101, one-third of the total population. The considerable number who would be retiring from active life, but are still able to participate actively in the production of goods and services, are the young aged, who are in the age segment 60 to 74 years, and the larger number, senile and frail, who would simply slide into dependency, will be the old elderly. The consequent economic, social including health, psychological requirements and support needed by these two segments of the population need to be provided. Necessary infrastructural and institutional requirements have to be put in place. In relation to the labour force, ageing consists of an increase in the number of older workers relative to the number of young ones. Another facet of the ageing trend of the population is the slowdown in labour force due to the reduced supply of prime

age workers. Thus it is the contribution of labour force ageing and shrinkage that is important, not the ageing per se. To cater to subsequent needs, this change will require substantial shifts in policies (Abeykoon, 1996; De Silva, 1994b).

Substantial long term implications are associated with the observed dramatic decline in the under 15 segment of the population. At the beginning of the present century, the number of children under 15 years was 4.9 million but at the end of the century the numerical size will decline to 2.4 million, showing a decline of child population by one-half. The relative proportion of children under 15, to the total population will also be on the decline (Table 16). Although in the next 10 years the decline in total child population will be marginal, beyond that, the declining trend would accelerate. Thus in terms of implications the demand generated by this particular group for food, clothing, education and health will gradually change. For instance, in the field of education, quality of education should take priority over quantity. Financial resources used for building additional schools and other primary and secondary level schooling facilities, could be diverted to emphasize and increase research and training, so that the quality of education in these levels is increased and non-participation in primary, junior and senior levels of education would drop significantly. The quality of primary and junior school education could be enhanced without releasing additional resources.

In contrast to the child population the working age population (15-59 years) will grow in numbers until 2026, beyond that a decrease is projected (Table 16). The 12.1 million reported in 2001 will increase to 13.9 by 2026. However, in terms of proportions the highest is observed in 2006 with 65.1 per cent of the total population of Sri Lanka identified to be in prime working age group. Even though their proportion will be on the decline, the growth in numbers in the working age population is an economic benefit to the nation, provided that they will be gainfully employed.

The Dependency Burden

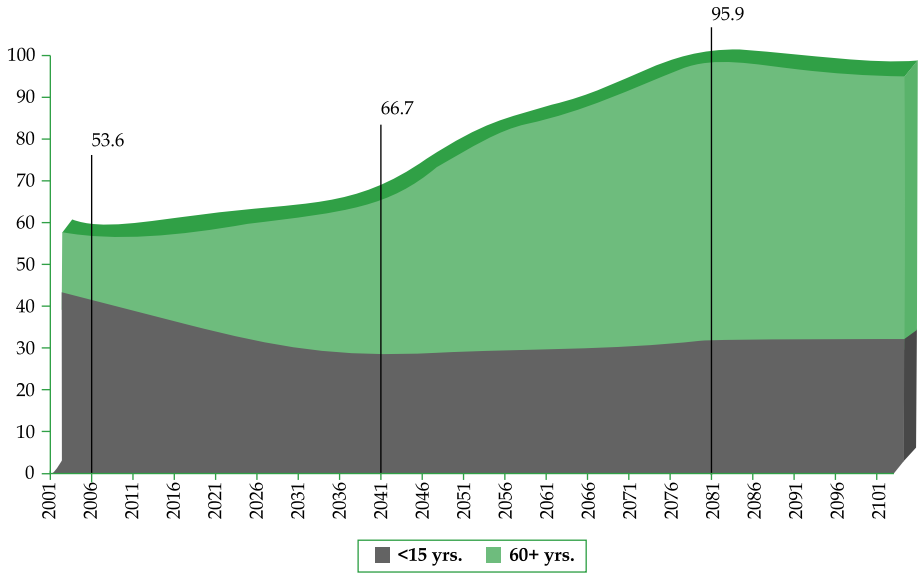
Changes in the different components in age structure have major implications for the country's socio-economic and development activities. Thus, changes in the functional age groups, namely children (0-14 years), adults of working age (15-59 years) and the elderly (60+ years) can be presented by a summary measure known as the dependency ratio. The age structure changes of a population determine the change in the level of demographic dependency. Three dependency ratios, comprising the child dependency, old age dependency and, the combination of these two – known as total dependency, are presented in the table 17. The dependency ratio is defined as the number of dependents to the number of persons between 15 and 59 years.

Table 17 : Projected Dependency Ratio, 2001 to 2101: Standard Projection

Period	Child Dependency (<15 years)	Old Age Dependency (60+ years)	Total Dependency
2001	40.7	14.3	55.0
2006	37.4	16.2	53.6
2011	35.3	19.3	54.6
2016	33.3	22.6	55.9
2021	30.4	26.2	56.6
2026	27.6	29.7	57.3
2031	25.5	32.8	58.3
2036	24.7	36.0	60.7
2041	25.3	41.4	66.7
2046	26.2	47.1	73.3
2051	26.5	51.2	77.7
2056	26.5	54.7	81.2
2061	26.5	57.6	84.1
2066	27.3	60.8	88.1
2071	28.4	64.0	92.4
2076	29.3	66.2	95.5
2081	29.5	66.4	95.9
2086	29.3	65.4	94.7
2091	29.1	64.2	93.3
2096	29.2	63.4	92.6
2101	29.4	63.4	92.8

At the beginning of the projection interval in 2001, the total dependency ratio was 55.0 dependent persons for every 100 working age persons; of which 41 persons were child dependents and 14 were old age dependents (Table 17). During the projection horizon child dependency decreases to 24.7 per cent by 2036, while old age dependency increases in an accelerated manner to reach 63.4 persons for every 100 working age persons by the year 2101. The projected changes in these two segments of dependency in Sri Lankan population show a reduction in the total dependency ratio from 55.0 in 2001 to it's lowest of 53.6 dependent persons in 2006. Thereafter, the overall dependency increases to 55.9 dependents by the year 2016 and to 58.3 per cent by the year 2031. As a result of the rapid increase in old age dependency, which out-paces the decline in young age dependency, the overall dependency is projected to increase significantly after 2041 (Figure 14).

Figure 14 : Projected Dependency Ratio, 2001 to 2101: Standard Projection



These dependency ratios imply that there is likelihood that the future age structure would have a favourable impact on the economy of Sri Lanka. In the five-year period around 2006, the Sri Lankan population would have the best demographic environment or "window of opportunity" that is conducive for rapid economic development. However, by 2011 the dependency ratio would be increased back to the 2001 level (55 per cent). The low dependency ratio observed Sri Lanka is a result of the past demographic trends. This is an opportunity that needs to be used immediately.

Each country would undergo a period comprising of a "window of opportunity" or a "demographic bonus" during the age structure transition. The "window of opportunity" would have a positive impact on economic growth as observed in almost all countries in Southeast Asia. The newly industrialized countries such as Republic of Korea, Singapore, Taiwan etc. have utilized the "window of opportunity" offered by the best demographic environment, in which the dependency was the least, for their rapid economic take-off. A few decades back, such economic take-off was possible in these countries, when the highest proportion of their population was in the working ages.

As the "window of opportunity" exists with the provision of productive employment opportunities for the present Sri Lankan work force, the observed situation, if gainfully utilized, would generate positive results in socio-economic and political environment of Sri Lanka. As a country already endowed with highly invested human capital resources and with appropriate economic openness, Sri Lanka should strive for economic development immediately. This is an opportunity that will not last long, so that the Sri Lankan planners should not miss-out on the demographic bonus. If we miss-out the opportunity, then planners will have to address the consequences of an increasing dependency burden, which would further depress the efforts for required economic development.

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Appendix A

Results of the Standard Population Projection

Table 1- Population by age and sex, 2001: Standard Projection (in thousands)

2001			
Age Group	Male	Female	Total
0-4	807.1	785.9	1,593.0
5-9	829.9	811.5	1,641.4
10-14	855.2	832.8	1,688.0
15-19	918.2	904.0	1,822.2
20-24	878.1	882.5	1,760.6
25-29	726.6	756.9	1,483.5
30-34	700.5	727.3	1,427.8
35-39	685.3	707.0	1,392.3
40-44	642.3	653.4	1,295.7
45-49	560.1	580.3	1,140.4
50-54	497.5	517.4	1,014.9
55-59	356.6	386.5	743.1
60-64	265.1	284.0	549.1
65-69	206.8	241.3	448.1
70-74	156.3	179.7	336.0
75-79	98.0	115.9	213.9
80+	84.5	99.8	184.3
Total	9,268.1	9,466.2	18,734.3
Median Age	27.4	28.4	27.9
Summary			
Under 15	2,492.2	2,430.2	4,922.4
15-49	5,111.1	5,211.4	10,322.5
50-59	854.1	903.9	1,758.0
60+	810.7	920.7	1,731.4

Table 2 - Population by age and sex, 2006: Standard Projection (in thousands)

2006			
Age Group	Male	Female	Total
0-4	797.5	791.8	1,589.3
5-9	800.3	781.6	1,581.9
10-14	827.1	809.1	1,636.2
15-19	847.7	825.6	1,673.3
20-24	905.3	891.8	1,797.1
25-29	868.8	875.4	1,744.2
30-34	718.4	751.8	1,470.2
35-39	691.7	722.8	1,414.5
40-44	674.2	701.4	1,375.6
45-49	627.6	646.2	1,273.8
50-54	541.1	570.5	1,111.6
55-59	471.6	504.6	976.2
60-64	327.9	372.0	699.9
65-69	232.8	266.1	498.9
70-74	169.9	215.5	385.4
75-79	116.6	146.6	263.2
80+	101.3	127.0	228.3
Total	9,719.8	9,999.8	19,719.6
Median Age	28.9	30.2	29.5
Summary			
Under 15	2,424.9	2,382.5	4807.4
15-49	5,333.7	5,415.0	10,748.7
50-59	1,012.7	1,075.1	2,087.8
60+	948.5	1,127.2	2,075.7

Table 3 - Population by age and sex, 2011: Standard Projection (in thousands)

2011			
Age Group	Male	Female	Total
0-4	772.0	766.0	1,538.0
5-9	790.6	787.2	1,577.8
10-14	797.5	779.1	1,576.6
15-19	819.2	801.4	1,620.6
20-24	834.3	812.7	1,647.0
25-29	895.6	884.3	1,779.9
30-34	859.4	869.6	1,729.0
35-39	709.5	747.1	1,456.6
40-44	680.6	717.1	1,397.7
45-49	659.0	693.7	1,352.7
50-54	606.6	635.3	1,241.9
55-59	513.1	556.5	1,069.6
60-64	433.9	485.8	919.7
65-69	288.2	348.7	636.9
70-74	191.4	237.6	429.0
75-79	126.9	175.8	302.7
80+	121.2	160.9	282.1
Total	10,099.0	10,458.8	20,557.8
Median Age	30.8	32.3	31.6
Summary			
Under 15	2,360.1	2,332.3	4,692.4
15-49	5,457.6	5,525.9	10,983.5
50-59	1,119.7	1,191.8	2,311.5
60+	1,161.6	1,408.8	2,570.4

Table 4 - Population by age and sex, 2016: Standard Projection (in thousands)

2016			
Age Group	Male	Female	Total
0-4	715.1	709.2	1,424.3
5-9	765.4	761.4	1,526.8
10-14	787.8	784.6	1,572.4
15-19	789.4	770.8	1,560.2
20-24	805.5	787.5	1,593.0
25-29	824.9	805.2	1,630.1
30-34	886.0	878.5	1,764.5
35-39	849.1	864.5	1,713.6
40-44	698.3	741.4	1,439.7
45-49	665.6	709.4	1,375.0
50-54	637.3	682.4	1,319.7
55-59	575.8	620.2	1,196.0
60-64	472.7	536.3	1,009.0
65-69	382.0	456.2	838.2
70-74	237.5	312.2	549.7
75-79	143.4	194.6	338.0
80+	137.2	198.1	335.3
Total	10,373.0	10,812.5	21,185.5
Median Age	32.8	34.5	33.6
Summary			
Under 15	2,268.3	2,255.2	4,523.5
15-49	5,518.8	5,557.3	11,076.1
50-59	1,213.1	1,302.6	2,515.7
60+	1,372.8	1,697.4	3,070.2

Table 5 - Population by age and sex, 2021: Standard Projection (in thousands)

2021			
Age Group	Male	Female	Total
0-4	632.5	625.3	1,257.8
5-9	710.2	705.5	1,415.7
10-14	763.3	759.3	1,522.6
15-19	782.4	777.6	1,560.0
20-24	780.3	759.1	1,539.4
25-29	798.5	781.0	1,579.5
30-34	817.5	800.3	1,617.8
35-39	876.8	873.8	1,750.6
40-44	837.3	858.6	1,695.9
45-49	684.1	734.1	1,418.2
50-54	645.1	698.6	1,343.7
55-59	606.6	667.0	1,273.6
60-64	532.3	598.8	1,131.1
65-69	418.3	504.9	923.2
70-74	317.0	410.1	727.1
75-79	179.5	257.1	436.6
80+	156.8	230.3	387.1
Total	10,538.5	11,041.4	21,579.9
Median Age	34.9	36.8	35.8
Summary			
Under 15	2,106.0	2,090.1	4,196.1
15-49	5,576.9	5,584.5	11,161.4
50-59	1,251.7	1,365.6	2,617.3
60+	1,603.9	2,001.2	3,605.1

Table 6 - Population by age and sex, 2026: Standard Projection (in thousands)

2026			
Age Group	Male	Female	Total
0-4	583.6	576.8	1,160.4
5-9	628.9	623.1	1,252.0
10-14	708.7	704.2	1,412.9
15-19	759.9	755.5	1,515.4
20-24	776.6	771.2	1,547.8
25-29	775.0	755.0	1,530.0
30-34	792.5	777.5	1,570.0
35-39	810.0	796.8	1,606.8
40-44	865.6	868.6	1,734.2
45-49	821.3	850.9	1,672.2
50-54	664.1	723.8	1,387.9
55-59	615.3	683.9	1,299.2
60-64	562.4	645.3	1,207.7
65-69	472.8	565.3	1,038.1
70-74	348.8	455.7	804.5
75-79	241.2	339.7	580.9
80+	191.0	292.8	483.8
Total	10,617.7	11,186.1	21,803.8
Median Age	36.8	39.0	37.8
Summary			
Under 15	1,921.2	1,904.1	3,825.3
15-49	5,600.9	5,575.5	11,176.4
50-59	1,279.4	1,407.7	2,687.1
60+	1,816.2	2,298.8	4,115.0

Table 7 - Population by age and sex, 2031: Standard Projection (in thousands)

2031			
Age Group	Male	Female	Total
0-4	560.3	553.4	1,113.7
5-9	580.9	575.5	1,156.4
10-14	627.8	622.4	1,250.2
15-19	706.5	702.2	1,408.7
20-24	755.8	752.1	1,507.9
25-29	772.2	768.4	1,540.6
30-34	769.9	752.3	1,522.2
35-39	785.8	774.5	1,560.3
40-44	800.3	792.4	1,592.7
45-49	850.0	861.4	1,711.4
50-54	798.5	839.7	1,638.2
55-59	634.7	709.4	1,344.1
60-64	571.9	662.7	1,234.6
65-69	501.3	610.6	1,111.9
70-74	396.3	512.0	908.3
75-79	267.2	379.6	646.8
80+	249.6	384.9	634.5
Total	10,629.0	11,253.5	21,882.5
Median Age	38.4	40.8	39.6
Summary			
Under 15	1,769.0	1,751.3	3,520.3
15-49	5,440.5	5,403.3	10,843.8
50-59	1,433.2	1,549.1	2,982.3
60+	1,986.3	2,549.8	4,536.1

Table 8 - Population by age and sex, 2036: Standard Projection (in thousands)

2036			
Age Group	Male	Female	Total
0-4	552.4	545.2	1,097.6
5-9	558.1	552.5	1,110.6
10-14	580.0	575.0	1,155.0
15-19	626.5	621.3	1,247.8
20-24	703.9	700.2	1,404.1
25-29	752.3	750.0	1,502.3
30-34	767.7	766.2	1,533.9
35-39	763.9	749.8	1,513.7
40-44	777.0	770.8	1,547.8
45-49	786.6	786.4	1,573.0
50-54	827.3	850.9	1,678.2
55-59	764.3	824.0	1,588.3
60-64	591.2	688.6	1,279.8
65-69	511.3	628.7	1,140.0
70-74	421.9	555.3	977.2
75-79	305.2	429.1	734.3
80+	296.1	461.4	757.5
Total	10,585.7	11,255.4	21,841.1
Median Age	39.9	42.4	41.1
Summary			
Under 15	1,690.5	1,672.7	3,363.2
15-49	5,177.9	5,144.7	10,322.6
50-59	1,591.6	1,674.9	3,266.5
60+	2,125.7	2,763.1	4,888.8

Table 9 - Population by age and sex, 2041: Standard Projection (in thousands)

2041			
Age Group	**Male**	**Female**	**Total**
0-4	550.9	543.4	1,094.3
5-9	550.5	544.6	1,095.1
10-14	557.4	552.2	1,109.6
15-19	579.1	574.5	1,153.6
20-24	624.7	620.4	1,245.1
25-29	701.0	698.8	1,399.8
30-34	748.3	748.2	1,496.5
35-39	762.1	764.0	1,526.1
40-44	755.8	746.6	1,502.4
45-49	764.4	765.5	1,529.9
50-54	766.5	777.5	1,544.0
55-59	793.2	836.0	1,629.2
60-64	713.6	801.3	1,514.9
65-69	530.2	655.1	1,185.3
70-74	432.2	574.2	1,006.4
75-79	326.8	468.3	795.1
80+	345.7	539.3	885.0
Total	10,502.4	11,209.9	21,712.3
Median Age	41.2	43.7	42.4
Summary			
Under 15	1,658.8	1,640.2	3,299.0
15-49	4,935.4	4,918.0	9,853.4
50-59	1,559.7	1,613.5	3,173.2
60+	2,348.5	3,038.2	5,386.7

Table 10 - Population by age and sex, 2046: Standard Projection (in thousands)

2046			
Age Group	**Male**	**Female**	**Total**
0-4	533.1	525.3	1,058.4
5-9	549.1	542.9	1,092.0
10-14	549.9	544.4	1,094.3
15-19	556.5	551.8	1,108.3
20-24	577.5	573.7	1,151.2
25-29	622.2	619.2	1,241.4
30-34	697.5	697.2	1,394.7
35-39	743.2	746.2	1,489.4
40-44	754.5	760.9	1,515.4
45-49	744.2	741.7	1,485.9
50-54	745.7	757.1	1,502.8
55-59	736.0	764.4	1,500.4
60-64	742.1	813.8	1,555.9
65-69	641.9	763.7	1,405.6
70-74	450.0	600.0	1,050.0
75-79	336.7	486.6	823.3
80+	386.4	610.0	996.4
Total	10,366.5	11,098.9	21,465.4
Median Age	42.3	44.9	43.6
Summary			
Under 15	1,632.1	1,612.6	3,244.7
15-49	4,695.6	4,690.7	9,386.3
50-59	1,481.7	1,521.5	3,003.2
60+	2,557.1	3,274.1	5,831.2

Table 11- Population by age and sex, 2051: Standard Projection (in thousands)

2051			
Age Group	**Male**	**Female**	**Total**
0-4	504.9	496.8	1,001.7
5-9	531.6	524.8	1,056.4
10-14	548.5	542.7	1,091.2
15-19	549.1	543.9	1,093.0
20-24	555.1	551.0	1,106.1
25-29	575.4	572.7	1,148.1
30-34	619.3	617.8	1,237.1
35-39	693.0	695.4	1,388.4
40-44	736.2	743.2	1,479.4
45-49	743.5	756.0	1,499.5
50-54	726.8	733.8	1,460.6
55-59	717.2	744.8	1,462.0
60-64	690.2	744.8	1,435.0
65-69	669.7	777.6	1,447.3
70-74	547.3	703.4	1,250.7
75-79	352.8	513.5	866.3
80+	415.5	665.8	1,081.3
Total	10,176.1	10,928.0	21,104.1
Median Age	43.5	46.2	44.8
Summary			
Under 15	1,585.0	1,564.3	3,149.3
15-49	4,471.6	4,480.0	8,951.6
50-59	1,444.0	1,478.6	2,922.6
60+	2,675.5	3,405.1	6,080.6

Table 12 - Population by age and sex, 2056: Standard Projection (in thousands)

2056			
Age Group	**Male**	**Female**	**Total**
0-4	485.5	477.1	962.6
5-9	503.6	496.4	1,000.0
10-14	531.1	524.6	1,055.7
15-19	547.8	542.2	1,090.0
20-24	547.8	543.2	1,091.0
25-29	553.2	550.0	1,103.2
30-34	572.8	571.4	1,144.2
35-39	615.6	616.2	1,231.8
40-44	686.9	692.6	1,379.5
45-49	726.0	738.5	1,464.5
50-54	726.9	748.1	1,475.0
55-59	700.0	722.1	1,422.1
60-64	673.9	726.3	1,400.2
65-69	624.6	713.6	1,338.2
70-74	573.2	720.2	1,293.4
75-79	431.3	607.7	1,039.0
80+	443.2	722.1	1,165.3
All age	9,943.4	10,712.3	20,655.7
Median Age	44.5	47.3	45.9
Summary			
Under 15	1,520.2	1,498.1	3,018.3
15-49	4,250.1	4,254.1	8,504.2
50-59	1,426.9	1,470.2	2,897.1
60+	2,746.2	3,489.9	6,236.1

Table 13 - Population by age and sex, 2061: Standard Projection (in thousands)

2061			
Age Group	Male	Female	Total
0-4	475.7	466.9	942.6
5-9	484.3	476.7	961.0
10-14	503.1	496.2	999.3
15-19	530.4	524.2	1,054.6
20-24	546.6	541.5	1,088.1
25-29	546.0	542.3	1,088.3
30-34	550.9	548.8	1,099.7
35-39	569.7	569.9	1,139.6
40-44	610.6	613.7	1,224.3
45-49	678.0	688.2	1,366.2
50-54	710.7	730.9	1,441.6
55-59	701.4	736.5	1,437.9
60-64	659.4	704.8	1,364.2
65-69	612.0	697.3	1,309.3
70-74	537.3	663.7	1,201.0
75-79	454.9	626.8	1,081.7
80+	515.3	830.2	1,345.5
Total	9,686.3	10,458.6	20,144.9
Median Age	45.2	48.3	46.7
Summary			
Under 15	1,463.1	1,439.8	2,902.9
15-49	4,032.2	4,028.6	8,060.8
50-59	1,412.1	1,467.4	2,879.5
60+	2,778.9	3,522.8	6,301.7

Table 14 - Population by age and sex, 2066: Standard Projection (in thousands)

2066			
Age Group	Male	Female	Total
0-4	473.4	464.1	937.5
5-9	474.7	466.4	941.1
10-14	483.9	476.5	960.4
15-19	502.6	495.8	998.4
20-24	529.3	523.5	1,052.8
25-29	545.0	540.6	1,085.6
30-34	544.0	541.1	1,085.1
35-39	548.2	547.4	1,095.6
40-44	565.3	567.7	1,133.0
45-49	603.1	609.9	1,213.0
50-54	664.4	681.3	1,345.7
55-59	686.8	719.9	1,406.7
60-64	662.1	719.5	1,381.6
65-69	600.7	678.5	1,279.2
70-74	528.8	652.3	1,181.1
75-79	428.9	583.5	1,012.4
80+	570.7	910.3	1,481.0
Total	9,411.9	10,178.3	19,590.2
Median Age	45.3	48.8	47.1
Summary			
Under 15	1,432.0	1,407.0	2,839.0
15-49	3,837.5	3,826.0	7,663.5
50-59	1,351.2	1,401.2	2,752.4
60+	2,791.2	3,544.1	6,335.3

Table 15 - Population by age and sex, 2071: Standard Projection (in thousands)

2071			
Age Group	Male	Female	Total
0-4	470.1	460.5	930.6
5-9	472.4	463.7	936.1
10-14	474.3	466.2	940.5
15-19	483.4	476.2	959.6
20-24	501.6	495.2	996.8
25-29	527.9	522.7	1,050.6
30-34	543.1	539.5	1,082.6
35-39	541.4	539.7	1,081.1
40-44	544.2	545.3	1,089.5
45-49	558.8	564.2	1,123.0
50-54	591.7	603.9	1,195.6
55-59	643.1	671.4	1,314.5
60-64	650.0	704.0	1,354.0
65-69	605.5	694.3	1,299.8
70-74	522.0	637.8	1,159.8
75-79	425.5	578.3	1,003.8
80+	585.1	926.6	1,511.7
Total	9,140.1	9,889.5	19,029.6
Median Age	45.1	48.9	47.0
Summary			
Under 15	1,416.8	1,390.4	2,807.2
15-49	3,700.4	3,682.8	7,383.2
50-59	1,234.8	1,275.3	2,510.1
60+	2,788.1	3,541.0	6,329.1

Table 16 - Population by age and sex, 2076: Standard Projection (in thousands)

2076			
Age Group	Male	Female	Total
0-4	457.1	447.3	904.4
5-9	469.2	460.1	929.3
10-14	472.1	463.5	935.6
15-19	473.8	465.9	939.7
20-24	482.5	475.6	958.1
25-29	500.3	494.4	994.7
30-34	526.1	521.6	1,047.7
35-39	540.7	538.1	1,078.8
40-44	537.7	537.6	1,075.3
45-49	538.2	541.9	1,080.1
50-54	548.8	558.8	1,107.6
55-59	573.7	595.3	1,169.0
60-64	610.4	657.0	1,267.4
65-69	597.2	680.7	1,277.9
70-74	529.8	655.4	1,185.2
75-79	424.0	569.6	993.6
80+	596.2	939.7	1,535.9
Total	8,877.8	9,602.5	18,480.3
Median Age	44.8	48.7	46.7
Summary			
Under 15	1,398.4	1,370.9	2,769.3
15-49	3,599.3	3,575.1	7,174.4
50-59	1,122.5	1,154.1	2,276.6
60+	2,757.6	3,502.4	6,260.0

Table 17 - Population by age and sex, 2081: Standard Projection (in thousands)

2081			
Age Group	Male	Female	Total
0-4	440.7	430.6	871.3
5-9	456.3	446.9	903.2
10-14	468.9	459.9	928.8
15-19	471.6	463.2	934.8
20-24	473.0	465.4	938.4
25-29	481.4	474.9	956.3
30-34	498.8	493.4	992.2
35-39	524.0	520.4	1,044.4
40-44	537.2	536.2	1,073.4
45-49	532.3	534.5	1,066.8
50-54	529.2	537.0	1,066.2
55-59	533.2	551.2	1,084.4
60-64	546.5	583.3	1,129.8
65-69	563.9	636.6	1,200.5
70-74	526.8	644.9	1,171.7
75-79	435.3	589.0	1,024.3
80+	608.5	948.8	1,557.3
Total	8,627.6	9,316.2	1,7943.8
Median Age	44.6	48.4	46.5
Summary			
Under 15	1,365.9	1,337.4	2,703.3
15-49	3,518.3	3,488.0	7,006.3
50-59	1,062.4	1,088.2	2,150.6
60+	2,681.0	3,402.6	6,083.6

Table 18 - Population by age and sex, 2086: Standard Projection (in thousands)

2086			
Age Group	Male	Female	Total
0-4	427.7	417.5	845.2
5-9	439.9	430.3	870.2
10-14	456.0	446.8	902.8
15-19	468.5	459.7	928.2
20-24	470.9	462.7	933.6
25-29	472.0	464.7	936.7
30-34	480.0	474.0	954.0
35-39	496.8	492.3	989.1
40-44	520.8	518.5	1,039.3
45-49	532.0	533.5	1,065.5
50-54	523.8	529.8	1,053.6
55-59	515.0	530.0	1,045.0
60-64	509.1	540.7	1,049.8
65-69	506.6	566.3	1,072.9
70-74	500.1	605.2	1,105.3
75-79	436.0	582.9	1,018.9
80+	628.2	977.9	1,606.1
Total	8,383.4	9,032.8	17,416.2
Median Age	44.6	48.3	46.5
Summary			
Under 15	1,323.6	1,294.6	2,618.2
15-49	3,441.0	3,405.4	6,846.4
50-59	1,038.8	1,059.8	2,098.6
60+	2,580.0	3,273.0	5,853.0

Table 19 - Population by age and sex, 2091: Standard Projection (in thousands)

2091			
Age Group	Male	Female	Total
0-4	419.8	409.3	829.1
5-9	427.0	417.2	844.2
10-14	439.6	430.1	869.7
15-19	455.6	446.6	902.2
20-24	467.8	459.2	927.0
25-29	469.9	462.1	932.0
30-34	470.7	463.9	934.6
35-39	478.2	472.9	951.1
40-44	494.0	490.6	984.6
45-49	516.1	515.8	1,031.9
50-54	524.1	528.7	1,052.8
55-59	510.5	523.3	1,033.8
60-64	493.1	520.5	1,013.6
65-69	474.1	525.9	1,000.0
70-74	452.3	540.2	992.5
75-79	417.8	550.1	967.9
80+	645.5	997.0	1,642.5
Total	8,156.1	8,753.4	16,909.5
Median Age	44.5	48.1	46.4
Summary			
Under 15	1,286.4	1,256.6	2,543.0
15-49	3,352.3	3,311.1	6,663.4
50-59	1,034.6	1,052.0	2,086.6
60+	2,482.8	3,133.7	5,616.5

Table 20- Population by age and sex, 2096: Standard Projection (in thousands)

2096			
Age Group	Male	Female	Total
0-4	413.8	403.2	817.0
5-9	419.1	409.0	828.1
10-14	426.7	417.1	843.8
15-19	439.3	430.0	869.3
20-24	454.9	446.2	901.1
25-29	466.8	458.6	925.4
30-34	468.7	461.3	930.0
35-39	469.0	462.9	931.9
40-44	475.6	471.5	947.1
45-49	489.7	488.3	978.0
50-54	508.7	511.7	1,020.4
55-59	511.4	522.6	1,034.0
60-64	489.7	514.6	1,004.3
65-69	460.4	507.4	967.8
70-74	424.9	503.7	928.6
75-79	379.9	494.5	874.4
80+	644.7	991.0	1,635.7
Total	7,943.3	8,493.6	1,6436.9
Median Age	44.3	47.9	46.1
Summary			
Under 15	1,259.6	1,229.3	2,488.9
15-49	3,264.0	3,218.8	6,482.8
50-59	1,020.1	1,034.3	2,054.4
60+	2,399.6	3,011.2	5,410.8

Table 21- Population by age and sex, 2101 Standard Projection (in thousands)

	2101		
Age Group	**Male**	**Female**	**Total**
0-4	406.1	395.6	801.7
5-9	413.1	403.0	816.1
10-14	418.8	409.0	827.8
15-19	426.4	417.0	843.4
20-24	438.7	429.6	868.3
25-29	454.1	445.6	899.7
30-34	465.7	457.8	923.5
35-39	467.1	460.4	927.5
40-44	466.6	461.6	928.2
45-49	471.7	469.3	941.0
50-54	483.0	484.6	967.6
55-59	496.9	506.2	1,003.1
60-64	491.3	514.6	1,005.9
65-69	458.5	502.8	961.3
70-74	414.3	488.1	902.4
75-79	358.9	464.4	823.3
80+	619.6	951.8	1,571.4
Total	7,750.8	8,261.4	1,6012.2
Median Age	44.1	47.7	45.9
Summary			
Under 15	1,238.0	1,207.6	2,445.6
15-49	3,190.3	3,141.3	6,331.6
50-59	979.9	990.8	1,970.7
60+	2,342.6	2,921.7	5,264.3

Appendix B

Results of the High Population Projection

Table 1 - Population by age and sex, 2001: High Projection (in thousands)

2001			
Age Group	Male	Female	Total
0-4	807.1	785.9	1,593.0
5-9	829.9	811.5	1,641.4
10-14	855.2	832.8	1,688.0
15-19	918.2	904.0	1,822.2
20-24	878.1	882.5	1,760.6
25-29	726.6	756.9	1,483.5
30-34	700.5	727.3	1,427.8
35-39	685.3	707.0	1,392.3
40-44	642.3	653.4	1,295.7
45-49	560.1	580.3	1,140.4
50-54	497.5	517.4	1,014.9
55-59	356.6	386.5	743.1
60-64	265.1	284.0	549.1
65-69	206.8	241.3	448.1
70-74	156.3	179.7	336.0
75-79	98.0	115.9	213.9
80+	84.5	99.8	184.3
Total	9,268.1	9,466.2	1,8734.3
Median Age	27.4	28.4	27.9
Summary			
Under 15	2,492.2	2,430.2	4,922.4
15-49	5,111.1	5,211.4	10,322.5
50-59	854.1	903.9	1,758.0
60+	810.7	920.7	1,731.4

Table 2 - Population by age and sex, 2006: High Projection (in thousands)

2006			
Age Group	Male	Female	Total
0-4	825.0	817.7	1,642.7
5-9	801.0	782.1	1,583.1
10-14	827.3	809.4	1,636.7
15-19	848.2	826.2	1,674.4
20-24	906.2	892.8	1,799.0
25-29	869.5	876.0	1,745.5
30-34	719.1	752.3	1,471.4
35-39	692.4	723.3	1,415.7
40-44	675.1	702.0	1,377.1
45-49	628.7	646.7	1,275.4
50-54	542.2	571.2	1,113.4
55-59	472.8	505.4	978.2
60-64	329.1	372.8	701.9
65-69	233.9	267.0	500.9
70-74	171.0	216.5	387.5
75-79	117.6	147.6	265.2
80+	102.4	128.3	230.7
Total	9,761.5	10,037.3	19,798.8
Median Age	28.9	30.1	29.5
Summary			
Under 15	2,453.3	2,409.2	4,862.5
15-49	5,339.2	5,419.3	10,758.5
50-59	1,015.0	1,076.6	2,091.6
60+	954.0	1,132.2	2,086.2

Table 3 - Population by age and sex, 2011: High Projection (in thousands)

2011			
Age Group	Male	Female	Total
0-4	828.3	820.8	1,649.1
5-9	818.7	813.7	1,632.4
10-14	798.4	779.9	1,578.3
15-19	820.1	802.3	1,622.4
20-24	835.9	814.4	1,650.3
25-29	897.3	885.9	1,783.2
30-34	860.8	870.8	1,731.6
35-39	710.8	748.1	1,458.9
40-44	682.1	718.1	1,400.2
45-49	660.8	694.9	1,355.7
50-54	608.7	636.7	1,245.4
55-59	515.5	558.1	1,073.6
60-64	436.5	487.7	924.2
65-69	290.6	350.6	641.2
70-74	193.6	239.6	433.2
75-79	128.8	177.9	306.7
80+	123.5	164.2	287.7
Total	10,210.4	10,563.7	20,774.1
Median Age	30.6	32.1	31.4
Summary			
Under 15	2,445.4	2,414.4	4,859.8
15-49	5,467.8	5,534.5	11,002.3
50-59	1,124.2	1,194.8	2,319.0
60+	1,173.0	1,420.0	2,593.0

Table 4 - Population by age and sex, 2016: High Projection (in thousands)

2016			
Age Group	Male	Female	Total
0-4	780.3	771.5	1,551.8
5-9	822.6	816.8	1,639.4
10-14	816.3	811.4	1,627.7
15-19	791.8	772.5	1,564.3
20-24	808.9	789.8	1,598.7
25-29	828.1	807.6	1,635.7
30-34	889.1	880.8	1,769.9
35-39	851.9	866.4	1,718.3
40-44	701.0	743.2	1,444.2
45-49	668.6	711.4	1,380.0
50-54	641.0	684.7	1,325.7
55-59	580.1	622.9	1,203.0
60-64	477.4	539.5	1,016.9
65-69	387.1	460.1	847.2
70-74	241.9	316.2	558.1
75-79	146.9	198.4	345.3
80+	141.7	204.7	346.4
Total	10,574.7	10,997.9	21,572.6
Median Age	32.5	34.1	33.3
Summary			
Under 15	2,419.2	2,399.7	4,818.9
15-49	5,539.4	5,571.7	11,111.1
50-59	1,221.1	1,307.6	2,528.7
60+	1,395.0	1,718.9	3,113.9

Table 5 - Population by age and sex, 2021: High Projection (in thousands)

2021			
Age Group	Male	Female	Total
0-4	708.7	699.1	1,407.8
5-9	776.0	768.6	1,544.6
10-14	820.8	815.1	1,635.9
15-19	812.0	806.1	1,618.1
20-24	784.5	763.5	1,548.0
25-29	803.1	784.7	1,587.8
30-34	821.8	803.7	1,625.5
35-39	881.2	877.0	1,758.2
40-44	841.6	861.4	1,703.0
45-49	688.3	736.8	1,425.1
50-54	650.0	701.7	1,351.7
55-59	612.7	670.8	1,283.5
60-64	539.4	603.4	1,142.8
65-69	425.7	510.4	936.1
70-74	324.7	416.7	741.4
75-79	185.5	263.3	448.8
80+	164.0	240.3	404.3
Total	10,840.0	11,322.6	22,162.6
Median Age	34.3	36.3	35.3
Summary			
Under 15	2,305.5	2,282.8	4,588.3
15-49	5,632.5	5,633.2	11,265.7
50-59	1,262.7	1,372.5	2,635.2
60+	1,639.3	2,034.1	3,673.4

Table 6 - Population by age and sex, 2026: High Projection (in thousands)

2026			
Age Group	Male	Female	Total
0-4	659.4	649.7	1,309.1
5-9	705.7	697.5	1,403.2
10-14	774.7	767.7	1,542.4
15-19	818.1	812.5	1,630.6
20-24	807.4	801.7	1,609.1
25-29	780.2	760.5	1,540.7
30-34	798.1	781.9	1,580.0
35-39	815.5	800.9	1,616.4
40-44	871.6	872.6	1,744.2
45-49	827.7	854.8	1,682.5
50-54	670.5	727.6	1,398.1
55-59	623.0	688.5	1,311.5
60-64	571.7	651.1	1,222.8
65-69	483.4	572.4	1,055.8
70-74	359.5	464.1	823.6
75-79	251.2	349.2	600.4
80+	202.3	307.6	509.9
Total	11,020.0	11,560.3	22,580.3
Median Age	36.0	38.2	37.1
Summary			
Under 15	2,139.8	2,114.9	4,254.7
15-49	5,718.6	5,684.9	11,403.5
50-59	1,293.5	1,416.1	2,709.6
60+	1,868.1	2,344.4	4,212.5

Table 7- Population by age and sex, 2031: High Projection (in thousands)

2031			
Age Group	Male	Female	Total
0-4	655.2	644.8	1,300.0
5-9	657.1	648.7	1,305.8
10-14	704.8	696.9	1,401.7
15-19	773.0	766.3	1,539.3
20-24	815.0	810.0	1,625.0
25-29	803.8	799.5	1,603.3
30-34	776.1	758.4	1,534.5
35-39	792.6	779.6	1,572.2
40-44	807.3	797.3	1,604.6
45-49	858.2	866.6	1,724.8
50-54	807.6	845.0	1,652.6
55-59	644.0	714.9	1,358.9
60-64	583.1	669.5	1,252.6
65-69	514.5	619.4	1,133.9
70-74	410.6	522.7	933.3
75-79	280.4	391.4	671.8
80+	267.4	406.7	674.1
Total	11,150.7	11,737.7	22,888.4
Median Age	37.5	39.8	38.6
Summary			
Under 15	2,017.1	1,990.4	4,007.5
15-49	5,626.0	5,577.7	11,203.7
50-59	1,451.6	1,559.9	3,011.5
60+	2,056.0	2,609.7	4,665.7

Table 8 - Population by age and sex, 2036: High Projection (in thousands)

2036			
Age Group	Male	Female	Total
0-4	669.8	658.5	1,328.3
5-9	653.3	644.1	1,297.4
10-14	656.4	648.4	1,304.8
15-19	703.6	696.1	1,399.7
20-24	770.7	764.7	1,535.4
25-29	811.9	808.3	1,620.2
30-34	800.1	797.7	1,597.8
35-39	771.2	756.3	1,527.5
40-44	785.3	776.4	1,561.7
45-49	795.8	792.1	1,587.9
50-54	838.5	857.2	1,695.7
55-59	777.1	831.0	1,608.1
60-64	604.3	696.3	1,300.6
65-69	526.7	639.2	1,165.9
70-74	439.3	569.5	1,008.8
75-79	322.5	445.9	768.4
80+	320.8	492.9	813.7
Total	11,247.3	11,874.6	23,121.9
Median Age	38.6	41.1	39.8
Summary			
Under 15	1,979.5	1,951.0	3,930.5
15-49	5,438.6	5,391.6	10,830.2
50-59	1,615.6	1,688.2	3,303.8
60+	2,213.6	2,843.8	5,057.4

Table 9 - Population by age and sex, 2041: High Projection (in thousands)

2041			
Age Group	Male	Female	Total
0-4	679.1	666.9	1,346.0
5-9	668.0	657.9	1,325.9
10-14	652.7	643.8	1,296.5
15-19	655.6	647.9	1,303.5
20-24	702.0	695.2	1,397.2
25-29	768.1	763.3	1,531.4
30-34	808.4	806.5	1,614.9
35-39	795.4	795.6	1,591.0
40-44	764.6	753.3	1,517.9
45-49	774.7	771.4	1,546.1
50-54	778.3	783.8	1,562.1
55-59	808.1	843.5	1,651.6
60-64	730.8	810.3	1,541.1
65-69	547.5	666.8	1,214.3
70-74	451.5	591.3	1,042.8
75-79	347.0	491.0	838.0
80+	377.9	583.7	961.6
Total	11,309.7	11,972.2	23,281.9
Median Age	39.5	42.1	40.8
Summary			
Under 15	1,999.8	1,968.6	3,968.4
15-49	5,268.8	5,233.2	10,502.0
50-59	1,586.4	1,627.3	3,213.7
60+	2,454.7	3,143.1	5,597.8

Table 10 - Population by age and sex, 2046: High Projection (in thousands)

2046			
Age Group	Male	Female	Total
0-4	663.8	651.1	1,314.9
5-9	677.5	666.3	1,343.8
10-14	667.5	657.6	1,325.1
15-19	651.9	643.4	1,295.3
20-24	654.2	647.0	1,301.2
25-29	699.8	694.0	1,393.8
30-34	765.2	761.7	1,526.9
35-39	804.1	804.4	1,608.5
40-44	789.1	792.4	1,581.5
45-49	754.9	748.6	1,503.5
50-54	758.7	763.6	1,522.3
55-59	751.4	771.7	1,523.1
60-64	761.9	823.4	1,585.3
65-69	664.4	778.3	1,442.7
70-74	471.8	620.8	1,092.6
75-79	359.1	515.6	874.7
80+	426.1	672.4	1,098.5
Total	11,321.4	12,012.3	23,333.7
Median Age	40.5	43.0	41.8
Summary			
Under 15	2,008.8	1,975.0	3,983.8
15-49	5,119.2	5,091.5	10,210.7
50-59	1,510.1	1,535.3	3,045.4
60+	2,683.3	3,410.5	6,093.8

Table 11 - Population by age and sex, 2051: High Projection (in thousands)

2051			
Age Group	Male	Female	Total
0-4	643.0	630.1	1,273.1
5-9	662.4	650.5	1,312.9
10-14	677.0	666.0	1,343.0
15-19	666.7	657.1	1,323.8
20-24	650.6	642.6	1,293.2
25-29	652.3	645.9	1,298.2
30-34	697.3	692.5	1,389.8
35-39	761.4	759.7	1,521.1
40-44	798.1	801.2	1,599.3
45-49	779.7	787.5	1,567.2
50-54	740.1	741.1	1,481.2
55-59	733.6	752.2	1,485.8
60-64	709.9	754.2	1,464.1
65-69	694.8	793.3	1,488.1
70-74	575.1	729.3	1,304.4
75-79	377.5	547.4	924.9
80+	461.4	746.3	1,207.7
Total	11,280.9	11,996.9	23,277.8
Median Age	41.4	44.1	42.8
Summary			
Under 15	1,982.4	1,946.6	3,929.0
15-49	5,006.1	4,986.5	9,992.6
50-59	1,473.7	1,493.3	2,967.0
60+	2,818.7	3,570.5	6,389.2

Table 12 - Population by age and sex, 2056: High Projection (in thousands)

2056			
Age Group	Male	Female	Total
0-4	641.9	628.4	1,270.3
5-9	641.7	629.5	1,271.2
10-14	661.9	650.2	1,312.1
15-19	676.3	665.6	1,341.9
20-24	665.5	656.3	1,321.8
25-29	648.9	641.5	1,290.4
30-34	650.1	644.6	1,294.7
35-39	694.1	690.7	1,384.8
40-44	756.1	756.8	1,512.9
45-49	789.2	796.3	1,585.5
50-54	765.4	779.9	1,545.3
55-59	717.1	730.5	1,447.6
60-64	695.5	735.9	1,431.4
65-69	651.0	728.6	1,379.6
70-74	606.3	747.6	1,353.9
75-79	465.4	649.4	1,114.8
80+	498.1	818.7	1,316.8
All age	11,224.5	11,950.5	23,175.0
Median Age	42.2	45.1	43.6
Summary			
Under 15	1,945.5	1,908.1	3,853.6
15-49	4,880.2	4,851.8	9,732.0
50-59	1,482.5	1,510.4	2,992.9
60+	2,916.3	3,680.2	6,596.5

Table 13 - Population by age and sex, 2061: High Projection (in thousands)

2061			
Age Group	Male	Female	Total
0-4	651.8	637.3	1,289.1
5-9	640.7	627.8	1,268.5
10-14	641.2	629.3	1,270.5
15-19	661.3	649.8	1,311.1
20-24	675.1	664.8	1,339.9
25-29	663.8	655.3	1,319.1
30-34	646.9	640.3	1,287.2
35-39	647.3	643.0	1,290.3
40-44	689.5	688.1	1,377.6
45-49	748.1	752.3	1,500.4
50-54	775.5	788.8	1,564.3
55-59	742.9	769.0	1,511.9
60-64	681.9	715.2	1,397.1
65-69	640.8	712.1	1,352.9
70-74	572.0	688.8	1,260.8
75-79	495.4	669.2	1,164.6
80+	585.8	944.5	1,530.3
Total	11,160.0	11,875.6	23,035.6
Median Age	42.6	45.7	44.1
Summary			
Under 15	1,933.7	1,894.4	3,828.1
15-49	4,732.0	4,693.6	9,425.6
50-59	1,518.4	1,557.8	3,076.2
60+	2,975.9	3,729.8	6,705.7

Table 14 - Population by age and sex, 2066: High Projection (in thousands)

2066			
Age Group	Male	Female	Total
0-4	662.6	646.9	1,309.5
5-9	650.6	636.7	1,287.3
10-14	640.3	627.6	1,267.9
15-19	640.7	628.9	1,269.6
20-24	660.2	649.1	1,309.3
25-29	673.5	663.8	1,337.3
30-34	661.9	654.1	1,316.0
35-39	644.3	638.7	1,283.0
40-44	643.4	640.7	1,284.1
45-49	682.8	684.2	1,367.0
50-54	736.1	745.5	1,481.6
55-59	754.4	778.4	1,532.8
60-64	709.0	753.9	1,462.9
65-69	631.8	693.6	1,325.4
70-74	567.7	675.8	1,243.5
75-79	472.9	620.8	1,093.7
80+	660.1	1,036.4	1,696.5
Total	11,092.3	11,775.1	22,867.4
Median Age	42.4	45.7	44.1
Summary			
Under 15	1,953.5	1,911.2	3,864.7
15-49	4,606.8	4,559.5	9,166.3
50-59	1,490.5	1,523.9	3,014.4
60+	3,041.5	3,780.5	6,822.0

Table 15 - Population by age and sex, 2071: High Projection (in thousands)

2071			
Age Group	Male	Female	Total
0-4	672.4	655.6	1,328.0
5-9	661.5	646.5	1,308.0
10-14	650.2	636.6	1,286.8
15-19	639.8	627.3	1,267.1
20-24	639.7	628.3	1,268.0
25-29	658.8	648.2	1,307.0
30-34	671.7	662.6	1,334.3
35-39	659.4	652.6	1,312.0
40-44	640.6	636.6	1,277.2
45-49	637.6	637.3	1,274.9
50-54	672.6	678.4	1,351.0
55-59	717.5	736.2	1,453.7
60-64	722.3	764.2	1,486.5
65-69	660.3	732.9	1,393.2
70-74	564.1	661.1	1,225.2
75-79	474.3	613.5	1,087.8
80+	689.3	1,056.7	1,746.0
Total	11,032.1	11,674.6	22,706.7
Median Age	42.0	45.3	43.7
Summary			
Under 15	1,984.1	1,938.7	3,922.8
15-49	4,547.6	4,492.9	9,040.5
50-59	1,390.1	1,414.6	2,804.7
60+	3,110.3	3,828.4	6,938.7

Table 16 - Population by age and sex, 2076: High Projection (in thousands)

2076			
Age Group	Male	Female	Total
0-4	673.5	655.9	1,329.4
5-9	671.3	655.1	1,326.4
10-14	661.2	646.3	1,307.5
15-19	649.7	636.3	1,286.0
20-24	638.9	626.7	1,265.6
25-29	638.5	627.4	1,265.9
30-34	657.1	647.0	1,304.1
35-39	669.4	661.2	1,330.6
40-44	656.0	650.5	1,306.5
45-49	635.2	633.4	1,268.6
50-54	628.7	632.2	1,260.9
55-59	656.7	670.4	1,327.1
60-64	688.9	723.6	1,412.5
65-69	675.8	744.4	1,420.2
70-74	593.4	701.1	1,294.5
75-79	475.6	603.8	1,079.4
80+	712.5	1,071.8	1,784.3
Total	10,982.4	11,587.1	22,569.5
Median Age	41.8	44.9	43.3
Summary			
Under 15	2,006.0	1,957.3	3,963.3
15-49	4,544.8	4,482.5	9,027.3
50-59	1,285.4	1,302.6	2,588.0
60+	3,146.2	3,844.7	6,990.9

Table 17 - Population by age and sex, 2081: High Projection (in thousands)

2081			
Age Group	Male	Female	Total
0-4	673.7	655.4	1,329.1
5-9	672.5	655.5	1,328.0
10-14	671.0	655.1	1,326.1
15-19	660.7	646.1	1,306.8
20-24	648.9	635.7	1,284.6
25-29	637.7	625.9	1,263.6
30-34	637.0	626.4	1,263.4
35-39	655.0	645.7	1,300.7
40-44	666.1	659.2	1,325.3
45-49	650.9	647.5	1,298.4
50-54	627.1	628.6	1,255.7
55-59	614.9	625.1	1,240.0
60-64	632.4	659.8	1,292.2
65-69	647.4	706.6	1,354.0
70-74	611.3	715.2	1,326.5
75-79	504.9	645.1	1,150.0
80+	733.0	1084.1	1,817.1
Total	10,944.5	11,517.0	22,461.5
Median Age	41.6	44.6	43.1
Summary			
Under 15	2,017.2	1,966.0	3,983.2
15-49	4,556.3	4,486.5	9,042.8
50-59	1,242.0	1,253.7	2,495.7
60+	3,129.0	3,810.8	6,939.8

Table 18 - Population by age and sex, 2086: High Projection (in thousands)

2086			
Age Group	Male	Female	Total
0-4	674.6	655.8	1,330.4
5-9	672.7	655.1	1,327.8
10-14	672.2	655.5	1,327.7
15-19	670.5	655.0	1,325.5
20-24	659.9	645.9	1,305.8
25-29	647.8	635.0	1,282.8
30-34	636.3	624.9	1,261.2
35-39	635.1	625.2	1,260.3
40-44	652.1	643.9	1,296.0
45-49	661.3	656.3	1,317.6
50-54	643.0	642.8	1,285.8
55-59	614.2	621.9	1,236.1
60-64	593.5	615.9	1,209.4
65-69	596.5	645.4	1,241.9
70-74	588.7	680.8	1,269.5
75-79	523.8	661.2	1,185.0
80+	772.3	1,133.6	1,905.9
Total	10,914.5	11,454.2	22,368.7
Median Age	41.4	44.5	42.9
Summary			
Under 15	2,019.5	1,966.4	3,985.9
15-49	4,563.0	4,486.2	9,049.2
50-59	1,257.2	1,264.7	2,521.9
60+	3,074.8	3,736.9	6,811.7

Table 19 - Population by age and sex, 2091: High Projection (in thousands)

2091			
Age Group	Male	Female	Total
0-4	684.7	664.9	1,349.6
5-9	673.7	655.5	1,329.2
10-14	672.4	655.1	1,327.5
15-19	671.7	655.6	1,327.3
20-24	669.8	655.0	1,324.8
25-29	658.9	645.2	1,304.1
30-34	646.5	634.1	1,280.6
35-39	634.6	623.8	1,258.4
40-44	632.4	623.5	1,255.9
45-49	647.7	641.1	1,288.8
50-54	653.9	651.6	1,305.5
55-59	630.7	636.0	1,266.7
60-64	594.2	612.8	1,207.0
65-69	561.8	602.4	1,164.2
70-74	545.2	621.8	1,167.0
75-79	508.1	629.4	1,137.5
80+	814.0	1,174.0	1,988.0
Total	10,900.3	11,381.8	22,282.1
Median Age	41.1	44.0	42.5
Summary			
Under 15	2,030.8	1,975.5	4,006.3
15-49	4,561.6	4,478.3	9,039.9
50-59	1,284.6	1,287.6	2,572.2
60+	3,023.3	3,640.4	6,663.7

Table 20 - Population by age and sex, 2096: High Projection (in thousands)

2096			
Age Group	Male	Female	Total
0-4	696.3	675.4	1,371.7
5-9	683.8	664.6	1,348.4
10-14	673.5	655.5	1,329.0
15-19	672.0	655.3	1,327.3
20-24	671.1	655.7	1,326.8
25-29	668.8	654.4	1,323.2
30-34	657.6	644.3	1,301.9
35-39	644.8	633.0	1,277.8
40-44	632.1	622.1	1,254.2
45-49	628.4	620.8	1,249.2
50-54	640.9	636.5	1,277.4
55-59	642.2	644.7	1,286.9
60-64	611.6	626.6	1,238.2
65-69	564.4	599.4	1,163.8
70-74	516.2	580.4	1,096.6
75-79	473.9	574.9	1,048.8
80+	830.3	1169.3	1,999.6
Total	10,907.9	11,312.9	22,220.8
Median Age	40.7	43.4	42.0
Summary			
Under 15	2,053.6	1,995.5	4,049.1
15-49	4,574.8	4,485.6	9,060.4
50-59	1,283.1	1,281.2	2,564.3
60+	2,996.4	3,550.6	6,547.0

Table 21 - Population by age and sex, 2101 High Projection (in thousands)

2101			
Age Group	**Male**	**Female**	**Total**
0-4	705.9	683.8	1,389.7
5-9	695.4	675.2	1,370.6
10-14	683.6	664.7	1,348.3
15-19	673.1	655.8	1,328.9
20-24	671.4	655.5	1,326.9
25-29	670.2	655.1	1,325.3
30-34	667.7	653.5	1,321.2
35-39	656.1	643.2	1,299.3
40-44	642.6	631.2	1,273.8
45-49	628.5	619.4	1,247.9
50-54	622.5	616.3	1,238.8
55-59	630.6	629.8	1,260.4
60-64	624.5	635.2	1,259.7
65-69	583.4	612.9	1,196.3
70-74	521.9	577.5	1,099.4
75-79	452.6	536.6	989.2
80+	820.1	1,120.7	1,940.8
Total	10,950.1	11,266.4	22,216.5
Median Age	40.4	42.7	41.6
Summary			
Under 15	2,084.9	2,023.7	4,108.6
15-49	4,609.6	4,513.7	9,123.3
50-59	1,253.1	1,246.1	2,499.2
60+	3,002.5	3,482.9	6,485.4

Appendix C

Results of the Low Population Projection

Table 1 - Population by age and sex, 2001: Low Projection (in thousands)

2001			
Age Group	Male	Female	Total
0-4	807.1	785.9	1,593.0
5-9	829.9	811.5	1,641.4
10-14	855.2	832.8	1,688.0
15-19	918.2	904.0	1,822.2
20-24	878.1	882.5	1,760.6
25-29	726.6	756.9	1,483.5
30-34	700.5	727.3	1,427.8
35-39	685.3	707.0	1,392.3
40-44	642.3	653.4	1,295.7
45-49	560.1	580.3	1,140.4
50-54	497.5	517.4	1,014.9
55-59	356.6	386.5	743.1
60-64	265.1	284.0	549.1
65-69	206.8	241.3	448.1
70-74	156.3	179.7	336.0
75-79	98.0	115.9	213.9
80+	84.5	99.8	184.3
Total	9,268.1	9,466.2	18,734.3
Median Age	27.4	28.4	27.9
Summary			
Under 15	2,492.2	2,430.2	4,922.4
15-49	5,111.1	5,211.4	10,322.5
50-59	854.1	903.9	1,758.0
60+	810.7	920.7	1,731.4

Table 2 - Population by age and sex, 2006: Low Projection (in thousands)

2006			
Age Group	Male	Female	Total
0-4	722.0	719.0	1,441.0
5-9	799.4	781.0	1,580.4
10-14	826.8	808.8	1,635.6
15-19	847.1	825.0	1,672.1
20-24	904.2	890.9	1,795.1
25-29	867.9	874.7	1,742.6
30-34	717.5	751.3	1,468.8
35-39	690.7	722.3	1,413.0
40-44	673.0	700.8	1,373.8
45-49	626.2	645.5	1,271.7
50-54	539.5	569.8	1,109.3
55-59	469.8	503.8	973.6
60-64	326.2	371.1	697.3
65-69	231.2	265.2	496.4
70-74	168.2	214.3	382.5
75-79	115.1	145.4	260.5
80+	99.9	125.4	225.3
Total	9,624.7	9,914.3	19,539.0
Median Age	29.1	30.4	29.7
Summary			
Under 15	2,348.2	2,308.8	4,657.0
15-49	5,326.6	5,410.5	10,737.1
50-59	1,009.3	1,073.6	2,082.9
60+	940.6	1,121.4	2,062.0

Table 3 - Population by age and sex, 2011: Low Projection (in thousands)

2011			
Age Group	Male	Female	Total
0-4	709.2	706.2	1,415.4
5-9	714.7	714.1	1,428.8
10-14	796.2	778.2	1,574.4
15-19	818.2	800.4	1,618.6
20-24	832.5	811.0	1,643.5
25-29	893.4	882.6	1,776.0
30-34	857.3	868.3	1,725.6
35-39	707.5	746.0	1,453.5
40-44	678.3	716.0	1,394.3
45-49	656.2	692.4	1,348.6
50-54	603.2	633.8	1,237.0
55-59	509.5	554.8	1,064.3
60-64	429.8	483.8	913.6
65-69	284.5	346.6	631.1
70-74	188.1	235.6	423.7
75-79	124.0	173.5	297.5
80+	117.6	157.5	275.1
Total	9,920.2	10300.8	20,221.0
Median Age	31.1	32.6	31.9
Summary			
Under 15	2,220.1	2,198.5	4,418.6
15-49	5,443.4	5,516.7	10,960.1
50-59	1,112.7	1,188.6	2,301.3
60+	1,144.0	1,397.0	2,541.0

Table 4 - Population by age and sex, 2016: Low Projection (in thousands)

2016			
Age Group	Male	Female	Total
0-4	648.8	644.9	1,293.7
5-9	702.0	701.0	1,403.0
10-14	711.7	711.3	1,423.0
15-19	787.4	769.3	1,556.7
20-24	803.2	785.5	1,588.7
25-29	822.2	802.7	1,624.9
30-34	882.7	876.0	1,758.7
35-39	845.9	862.4	1,708.3
40-44	695.1	739.5	1,434.6
45-49	661.8	707.3	1,369.1
50-54	632.7	679.9	1,312.6
55-59	570.4	617.3	1,187.7
60-64	466.9	532.9	999.8
65-69	375.8	452.1	827.9
70-74	232.2	308.0	540.2
75-79	139.2	190.8	330.0
80+	131.7	191.6	323.3
Total	10,109.7	10,572.5	20,682.2
Median Age	33.3	35.0	34.1
Summary			
Under 15	2,062.5	2,057.2	4,119.7
15-49	5,498.3	5,542.7	11,041.0
50-59	1,203.1	1,297.2	2,500.3
60+	1,345.8	1,675.4	3,021.2

Table 5 - Population by age and sex, 2021: Low Projection (in thousands)

2021			
Age Group	Male	Female	Total
0-4	565.6	560.9	1,126.5
5-9	643.0	640.4	1,283.4
10-14	699.5	698.4	1,397.9
15-19	705.0	703.1	1,408.1
20-24	775.7	755.5	1,531.2
25-29	794.6	777.8	1,572.4
30-34	813.3	796.9	1,610.2
35-39	872.0	870.4	1,742.4
40-44	832.2	855.4	1,687.6
45-49	679.1	731.1	1,410.2
50-54	639.1	695.2	1,334.3
55-59	599.4	662.9	1,262.3
60-64	524.1	593.8	1,117.9
65-69	409.7	499.1	908.8
70-74	308.2	403.1	711.3
75-79	172.9	250.7	423.6
80+	148.9	220.4	369.3
Total	10,182.3	10,715.1	20,897.4
Median Age	35.5	37.4	36.5
Summary			
Under 15	1,908.1	1,899.7	3,807.8
15-49	5,471.9	5,490.2	10,962.1
50-59	1,238.5	1,358.1	2,596.6
60+	1,563.8	1,967.1	3,530.9

Table 6 - Population by age and sex, 2026: Low Projection (in thousands)

2026			
Age Group	Male	Female	Total
0-4	509.3	504.7	1,014.0
5-9	561.4	557.8	1,119.2
10-14	641.2	638.6	1,279.8
15-19	695.2	692.9	1,388.1
20-24	697.5	694.0	1,391.5
25-29	769.1	749.9	1,519.0
30-34	787.3	773.2	1,560.5
35-39	804.3	792.4	1,596.7
40-44	858.9	864.0	1,722.9
45-49	814.1	846.4	1,660.5
50-54	656.7	719.3	1,376.0
55-59	606.6	678.6	1,285.2
60-64	552.1	638.8	1,190.9
65-69	461.3	557.3	1,018.6
70-74	337.5	446.5	784.0
75-79	230.7	329.6	560.3
80+	179.5	277.7	457.2
Total	10,162.7	10,761.7	20,924.4
Median Age	37.6	39.9	38.7
Summary			
Under 15	1,711.9	1,701.1	3,413.0
15-49	5,426.4	5,412.8	10,839.2
50-59	1,263.3	1,397.9	2,661.2
60+	1,761.1	2,249.9	4,011.0

Table 7 - Population by age and sex, 2031: Low Projection (in thousands)

2031			
Age Group	Male	Female	Total
0-4	468.0	463.8	931.8
5-9	506.2	502.9	1,009.1
10-14	560.1	556.8	1,116.9
15-19	638.4	635.8	1,274.2
20-24	690.1	688.2	1,378.3
25-29	692.6	690.4	1,383.0
30-34	762.9	746.4	1,509.3
35-39	779.3	769.5	1,548.8
40-44	792.9	787.1	1,580.0
45-49	841.1	855.5	1,696.6
50-54	788.4	833.5	1,621.9
55-59	624.4	702.9	1,327.3
60-64	560.0	654.9	1,214.9
65-69	487.4	600.6	1,088.0
70-74	381.6	500.0	881.6
75-79	254.0	366.5	620.5
80+	232.3	361.8	594.1
Total	10,059.7	10,716.6	20,776.3
Median Age	39.6	41.9	40.7
Summary			
Under 15	1,534.3	1,523.5	3,057.8
15-49	5,197.3	5,172.9	10,370.2
50-59	1,412.8	1,536.4	2,949.2
60+	1,915.3	2,483.8	4,399.1

Table 8 - Population by age and sex, 2036: Low Projection (in thousands)

2036			
Age Group	Male	Female	Total
0-4	450.3	445.6	895.9
5-9	465.7	462.6	928.3
10-14	505.3	502.3	1,007.6
15-19	558.5	555.2	1,113.7
20-24	635.4	633.1	1,268.5
25-29	686.1	685.5	1,371.6
30-34	687.6	687.7	1,375.3
35-39	755.8	743.2	1,499.0
40-44	769.0	764.7	1,533.7
45-49	777.3	779.8	1,557.1
50-54	815.6	843.0	1,658.6
55-59	750.8	815.2	1,566.0
60-64	577.7	679.1	1,256.8
65-69	495.9	616.9	1,112.8
70-74	404.9	540.2	945.1
75-79	288.7	412.0	700.7
80+	273.2	428.9	702.1
Total	9,897.8	10,595.0	20,492.8
Median Age	41.3	43.8	42.6
Summary			
Under 15	1,421.3	1,410.5	2,831.8
15-49	4,869.7	4,849.2	9,718.9
50-59	1,566.4	1,658.2	3,224.6
60+	2,040.4	2,677.1	4,717.5

Table 9 - Population by age and sex, 2041: Low Projection (in thousands)

2041			
Age Group	Male	Female	Total
0-4	436.0	431.3	867.3
5-9	448.3	444.9	893.2
10-14	464.9	462.2	927.1
15-19	504.2	501.6	1,005.8
20-24	556.5	554.0	1,110.5
25-29	632.1	631.3	1,263.4
30-34	681.6	683.2	1,364.8
35-39	681.6	685.0	1,366.6
40-44	746.3	738.9	1,485.2
45-49	754.5	758.0	1,512.5
50-54	754.6	769.0	1,523.6
55-59	778.0	825.5	1,603.5
60-64	696.2	788.8	1,485.0
65-69	513.1	641.1	1,154.2
70-74	413.6	556.7	970.3
75-79	308.1	447.5	755.6
80+	316.9	496.4	813.3
Total	9,686.5	10,415.4	20,101.9
Median Age	42.9	45.5	44.2
Summary			
Under 15	1,349.2	1,338.4	2,687.6
15-49	4,556.8	4,552.0	9,108.8
50-59	1,532.6	1,594.5	3,127.1
60+	2,247.9	2,930.5	5,178.4

Table 10 - Population by age and sex, 2046: Low Projection (in thousands)

2046			
Age Group	Male	Female	Total
0-4	417.1	412.2	829.3
5-9	434.2	430.6	864.8
10-14	447.6	444.6	892.2
15-19	464.1	461.7	925.8
20-24	502.5	500.6	1,003.1
25-29	553.8	552.5	1,106.3
30-34	628.2	629.3	1,257.5
35-39	676.0	680.8	1,356.8
40-44	673.5	681.3	1,354.8
45-49	732.8	732.8	1,465.6
50-54	733.3	748.0	1,481.3
55-59	721.0	753.7	1,474.7
60-64	722.9	799.8	1,522.7
65-69	620.2	746.2	1,366.4
70-74	429.7	580.4	1,010.1
75-79	316.5	463.4	779.9
80+	352.2	557.6	909.8
Total	9,425.6	10,175.5	19,601.1
Median Age	44.4	47.0	45.7
Summary			
Under 15	1,298.9	1,287.4	2,586.3
15-49	4,230.9	4,239.0	8,469.9
50-59	1,454.3	1,501.7	2,956.0
60+	2,441.5	3,147.4	5,588.9

Table 11 - Population by age and sex, 2051: Low Projection (in thousands)

2051			
Age Group	Male	Female	Total
0-4	392.2	387.3	779.5
5-9	415.5	411.7	827.2
10-14	433.6	430.3	863.9
15-19	446.8	444.1	890.9
20-24	462.6	460.8	923.4
25-29	500.2	499.4	999.6
30-34	550.5	551.0	1,101.5
35-39	623.2	627.2	1,250.4
40-44	668.3	677.4	1,345.7
45-49	661.8	676.1	1,337.9
50-54	712.9	723.7	1,436.6
55-59	701.6	733.8	1,435.4
60-64	671.1	731.2	1,402.3
65-69	645.6	758.2	1,403.8
70-74	521.1	677.8	1,198.9
75-79	330.3	485.6	815.9
80+	376.1	602.5	978.6
Total	9,113.4	9,878.1	18,991.5
Median Age	45.5	48.3	46.9
Summary			
Under 15	1,241.3	1,229.3	2,470.6
15-49	3,913.4	3,936.0	7,849.4
50-59	1,414.5	1,457.5	2,872.0
60+	2,544.2	3,255.3	5,799.5

Table 12 - Population by age and sex, 2056: Low Projection (in thousands)

2056			
Age Group	Male	Female	Total
0-4	360.4	355.5	715.9
5-9	390.8	386.9	777.7
10-14	415.0	411.4	826.4
15-19	432.9	429.9	862.8
20-24	445.4	443.3	888.7
25-29	460.5	459.8	920.3
30-34	497.4	498.1	995.5
35-39	546.4	549.2	1,095.6
40-44	616.4	624.3	1,240.7
45-49	657.1	672.4	1,329.5
50-54	644.5	667.9	1,312.4
55-59	682.9	710.4	1,393.3
60-64	654.1	712.6	1,366.7
65-69	600.7	694.2	1,294.9
70-74	544.2	690.1	1,234.3
75-79	402.3	568.7	971.0
80+	398.6	643.0	1041.6
All age	8,749.6	9,517.7	18,267.3
Median Age	46.6	49.5	48.0
Summary			
Under 15	1,166.2	1,153.8	2,320.0
15-49	3,656.1	3,677.0	7,333.1
50-59	1,327.4	1,378.3	2,705.7
60+	2,599.9	3,308.6	5,908.5

Table 13 - Population by age and sex, 2061: Low Projection (in thousands)

2061			
Age Group	Male	Female	Total
0-4	342.5	337.5	680.0
5-9	359.1	355.1	714.2
10-14	390.3	386.7	777.0
15-19	414.3	411.0	825.3
20-24	431.6	429.3	860.9
25-29	443.6	442.4	886.0
30-34	458.1	458.6	916.7
35-39	493.9	496.6	990.5
40-44	540.7	546.9	1,087.6
45-49	606.6	620.0	1,226.6
50-54	640.6	664.7	1,305.3
55-59	618.3	656.3	1,274.6
60-64	638.1	690.8	1,328.9
65-69	587.3	677.9	1,265.2
70-74	508.6	633.9	1,142.5
75-79	422.5	581.9	1,004.4
80+	460.9	729.7	1,190.6
Total	8,357.0	9,119.3	17,476.3
Median Age	47.5	50.6	49.1
Summary			
Under 15	1,091.9	1,079.3	2,171.2
15-49	3,388.8	3,404.8	6,793.6
50-59	1,258.9	1,321.0	2,579.9
60+	2,617.4	3,314.2	5,931.6

Table 14 - Population by age and sex, 2066: Low Projection (in thousands)

2066			
Age Group	Male	Female	Total
0-4	325.7	320.9	646.6
5-9	341.4	337.3	678.7
10-14	358.7	355.0	713.7
15-19	389.7	386.4	776.1
20-24	413.2	410.5	823.7
25-29	429.9	428.4	858.3
30-34	441.4	441.4	882.8
35-39	455.0	457.4	912.4
40-44	489.0	494.6	983.6
45-49	532.5	543.3	1,075.8
50-54	591.9	613.3	1,205.2
55-59	615.3	653.7	1,269.0
60-64	578.7	639.1	1,217.8
65-69	574.3	659.0	1,233.3
70-74	498.9	622.3	1,121.2
75-79	396.7	539.2	935.9
80+	506.9	790.3	1297.2
Total	7,939.2	8,692.1	16,631.3
Median Age	48.1	51.4	49.8
Summary			
Under 15	1,025.8	1,013.2	2,039.0
15-49	3,150.7	3,162.0	6,312.7
50-59	1,207.2	1,267.0	2,474.2
60+	2,555.5	3,249.9	5,805.4

Table 15 - Population by age and sex, 2071: Low Projection (in thousands)

2071			
Age Group	Male	Female	Total
0-4	312.0	306.8	618.8
5-9	324.8	320.6	645.4
10-14	341.0	337.1	678.1
15-19	358.2	354.7	712.9
20-24	388.7	385.8	774.5
25-29	411.7	409.7	821.4
30-34	428.0	427.5	855.5
35-39	438.6	440.2	878.8
40-44	450.9	455.6	906.5
45-49	482.0	491.4	973.4
50-54	520.3	537.5	1,057.8
55-59	569.6	603.3	1,172.9
60-64	577.4	637.0	1,214.4
65-69	522.7	610.9	1,133.6
70-74	490.3	607.6	1,097.9
75-79	391.8	533.5	925.3
80+	515.3	795.0	1,310.3
Total	7,523.3	8,254.2	15,777.5
Median Age	48.2	51.8	50.1
Summary			
Under 15	977.8	964.5	1,942.3
15-49	2,958.1	2,964.9	5,923.0
50-59	1,089.9	1,140.8	2,230.7
60+	2,497.5	3,184.0	5,681.5

Table 16 - Population by age and sex, 2076: Low Projection (in thousands)

2076			
Age Group	Male	Female	Total
0-4	296.5	291.3	587.8
5-9	311.1	306.5	617.6
10-14	324.5	320.5	645.0
15-19	340.6	336.8	677.4
20-24	357.4	354.2	711.6
25-29	387.4	385.1	772.5
30-34	409.9	408.8	818.7
35-39	425.4	426.4	851.8
40-44	434.8	438.5	873.3
45-49	444.7	452.7	897.4
50-54	471.3	486.3	957.6
55-59	501.2	529.0	1,030.2
60-64	535.4	588.5	1,123.9
65-69	522.8	610.6	1,133.4
70-74	447.8	566.4	1,014.2
75-79	386.8	525.8	912.6
80+	518.8	802.7	1,321.5
Total	7,116.4	7,830.1	14,946.5
Median Age	48.0	52.0	50.1
Summary			
Under 15	932.1	918.3	1,850.4
15-49	2,800.2	2,802.5	5,602.7
50-59	972.5	1,015.3	1,987.8
60+	2,411.6	3,094.0	5,505.6

Table 17 - Population by age and sex, 2081: Low Projection (in thousands)

2081			
Age Group	Male	Female	Total
0-4	279.6	274.4	554.0
5-9	295.8	291.1	586.9
10-14	310.9	306.4	617.3
15-19	324.1	320.2	644.3
20-24	339.8	336.4	676.2
25-29	356.2	353.6	709.8
30-34	385.9	384.3	770.2
35-39	407.7	407.7	815.4
40-44	422.0	424.7	846.7
45-49	429.2	435.7	864.9
50-54	435.3	448.1	883.4
55-59	454.8	478.8	933.6
60-64	472.2	516.4	988.6
65-69	486.2	565.2	1,051.4
70-74	449.8	568.5	1,018.3
75-79	355.3	493.8	849.1
80+	520.8	808.4	1,329.2
Total	6,725.6	7,413.7	14,139.3
Median Age	47.8	51.9	49.9
Summary			
Under 15	886.3	871.9	1,758.2
15-49	2,664.9	2,662.6	5,327.5
50-59	890.1	926.9	1,817.0
60+	2,284.3	2,952.3	5,236.6

Table 18 - Population by age and sex, 2086: Low Projection (in thousands)

2086			
Age Group	Male	Female	Total
0-4	262.6	257.6	520.2
5-9	278.9	274.1	553.0
10-14	295.5	290.9	586.4
15-19	310.5	306.2	616.7
20-24	323.4	319.8	643.2
25-29	338.8	335.8	674.6
30-34	354.9	352.9	707.8
35-39	383.9	383.3	767.2
40-44	404.5	406.1	810.6
45-49	416.7	422.0	838.7
50-54	420.5	431.4	851.9
55-59	420.5	441.4	861.9
60-64	429.1	468.0	897.1
65-69	429.8	497.6	927.4
70-74	419.7	529.7	949.4
75-79	358.6	501.3	859.9
80+	502.7	798.0	1,300.7
Total	6,350.6	7,016.1	13,366.7
Median Age	47.7	51.8	49.8
Summary			
Under 15	837.0	822.6	1,659.6
15-49	2,532.7	2,526.1	5,058.8
50-59	841.0	872.8	1,713.8
60+	2,139.9	2,794.6	4,934.5

Table 19 - Population by age and sex, 2091: Low Projection (in thousands)

2091			
Age Group	Male	Female	Total
0-4	246.5	241.6	488.1
5-9	262.0	257.3	519.3
10-14	278.7	274.0	552.7
15-19	295.2	290.7	585.9
20-24	309.9	305.8	615.7
25-29	322.5	319.3	641.8
30-34	337.6	335.2	672.8
35-39	353.2	352.0	705.2
40-44	381.0	381.8	762.8
45-49	399.7	403.6	803.3
50-54	408.7	417.9	826.6
55-59	406.7	425.1	831.8
60-64	397.5	431.7	829.2
65-69	391.7	451.8	843.5
70-74	372.5	468.2	840.7
75-79	336.4	470.5	806.9
80+	499.5	806.1	1,305.6
Total	5,999.3	6,632.6	12,631.9
Median Age	47.7	51.9	49.8
Summary			
Under 15	787.2	772.9	1,560.1
15-49	2,399.1	2,388.4	4,787.5
50-59	815.4	843.0	1,658.4
60+	1,997.6	2,628.3	4,625.9

Table 20 - Population by age and sex, 2096: Low Projection (in thousands)

2096			
Age Group	Male	Female	Total
0-4	231.1	226.3	457.4
5-9	246.0	241.4	487.4
10-14	261.8	257.2	519.0
15-19	278.4	273.8	552.2
20-24	294.6	290.4	585.0
25-29	309.1	305.3	614.4
30-34	321.4	318.7	640.1
35-39	336.0	334.3	670.3
40-44	350.7	350.6	701.3
45-49	376.7	379.5	756.2
50-54	392.3	399.8	792.1
55-59	395.8	412.1	807.9
60-64	385.4	416.3	801.7
65-69	364.2	417.7	781.9
70-74	341.4	427.1	768.5
75-79	300.9	419.2	720.1
80+	486.5	794.4	1,280.9
Total	5672.3	6264.1	11,936.4
Median Age	47.7	51.9	49.9
Summary			
Under 15	738.9	724.9	1,463.8
15-49	2,266.9	2,252.6	4,519.5
50-59	788.1	811.9	1,600.0
60+	1,878.4	2,474.7	4,353.1

Table 21 - Population by age and sex, 2101 Low Projection (in thousands)

2101 (000)			
Age Group	**Male**	**Female**	**Total**
0-4	218.4	213.8	432.2
5-9	230.6	226.1	456.7
10-14	245.8	241.3	487.1
15-19	261.6	257.1	518.7
20-24	277.9	273.5	551.4
25-29	293.9	290.0	583.9
30-34	308.1	304.7	612.8
35-39	320.0	317.9	637.9
40-44	333.7	333.1	666.8
45-49	346.8	348.7	695.5
50-54	370.0	376.1	746.1
55-59	380.4	394.5	774.9
60-64	375.7	404.0	779.7
65-69	354.1	403.7	757.8
70-74	318.7	396.5	715.2
75-79	277.3	384.9	662.2
80+	457.7	755.1	1,212.8
Total	5,370.7	5,921.0	1,1291.7
Median Age	47.8	52.1	50.0
Summary			
Under 15	694.8	681.2	1,376.0
15-49	2,142.0	2,125.0	4,267.0
50-59	750.4	770.6	1,521.0
60+	1,783.5	2,344.2	4,127.7

Appendix D

Male & Female Life Tables of Sri Lanka, 2000-2002

Table1: Abridged male life table (adjusted and smoothed) Sri Lanka, 2000-2002

Age	$_nm_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	$_nS_x$	T_x	e_x
0	0.01542	0.01521	100000	1521	98610	0.98349a	6805001	68.05
1	0.00083	0.00331	98479	326	393136	0.99682b	6706391	68.10
5	0.00047	0.00237	98153	233	490184	0.99739	6313255	64.32
10	0.00057	0.00285	97920	279	488904	0.99580	5823071	59.47
15	0.00128	0.00637	97641	622	486852	0.99022	5334167	54.63
20	0.00271	0.01346	97019	1306	482088	0.98454	4847315	49.96
25	0.00337	0.01669	95713	1597	474636	0.98321	4365226	45.61
30	0.00338	0.01677	94116	1578	466666	0.98236	3890590	41.34
35	0.00384	0.01900	92538	1758	458433	0.97816	3423924	37.00
40	0.00515	0.02543	90780	2309	448420	0.96946	2965491	32.67
45	0.00744	0.03657	88471	3235	434727	0.95557	2517071	28.45
50	0.01098	0.05351	85236	4561	415413	0.93499	2082344	24.43
55	0.01626	0.07826	80675	6314	388406	0.90529	1666931	20.66
60	0.02405	0.11370	74361	8455	351620	0.86327	1278524	17.19
65	0.03549	0.16346	65906	10773	303542	0.80522	926904	14.06
70	0.05220	0.23143	55133	12759	244417	0.72773	623363	11.31
75	0.07640	0.32068	42374	13588	177869	0.62941	378945	8.94
80	0.11096	0.43153	28785	12422	111952	0.44324c	201076	6.99
85	0.18360	……..…	16364	16364	89124	……..…	89124	5.45

Notes: a - Value given is for survivorship of 5 cohorts of birth to age group 0-4 = L(0,5)/500000.
b - Value given is for S(0,5) = L(5,5)/L(0,5).
c - Value given is S(80+,5) = T(85)/T(80).

Table2: Abridged female life table (adjusted and smoothed) Sri Lanka, 2000-2002

Age	$_nm_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	$_nS_x$	T_x	e_x
0	0.01267	0.01253	100000	1253	98857	0.98620a	7661051	76.61
1	0.00076	0.00303	98747	299	394241	0.99726b	7562194	76.58
5	0.00040	0.00201	98448	198	491744	0.99795	7167953	72.81
10	0.00042	0.00210	98250	206	490734	0.99722	6676209	67.95
15	0.00075	0.00373	98044	366	489369	0.99556	6185475	63.09
20	0.00100	0.00501	97678	489	487196	0.99489	5696105	58.32
25	0.00102	0.00507	97189	493	484708	0.99502	5208909	53.60
30	0.00099	0.00495	96696	479	482292	0.99478	4724201	48.86
35	0.00114	0.00566	96217	545	479775	0.99341	4241908	44.09
40	0.00157	0.00781	95672	747	476611	0.99027	3762134	39.32
45	0.00243	0.01208	94925	1147	471976	0.98450	3285523	34.61
50	0.00369	0.01962	93778	1840	464660	0.97456	2813547	30.00
55	0.00658	0.03240	91938	2979	452840	0.95792	2348887	25.55
60	0.01100	0.05363	88959	4771	433786	0.93057	1896048	21.31
65	0.01841	0.08829	84188	7433	403670	0.88658	1462262	17.37
70	0.03077	0.14348	76755	11013	257886	0.81817	1058591	13.79
75	0.05116	0.22787	65743	14981	292810	0.71769	700705	10.66
80	0.08427	0.34886	50762	17709	210146	0.48480c	407895	8.04
85	0.16715	.....	33053	33053	197749	.....	197749	5.98

Notes: a - Value given is for survivorship of 5 cohorts of birth to age group 0-4 = L(0,5)/500000.
b - Value given is for S(0,5) = L(5,5)/L(0,5).
c - Value given is S(80+,5) = T(85)/T(80).

Appendix E

Projection Methodology and Glossary

Projection Methodology

PEOPLE projects the population by using the demographic cohort component method. In the computation process separate projections are made for males and females in the five year age bands for each five-year interval of the projection period. The number of persons of a given sex and five-year age group five years after the base year is obtained by multiplying the base population by age-sex-specific five-year survivorship ratios. Algebraically:

$$P_{x+5}^{t+5} = P_x^t \quad S_{x,\text{to } x+5}^{t+2.5}$$

where Px, is the number of persons of a given sex at mid-year t in five-year age group x, and S represents the sex specific five-year survivorship ratio of a given sex.

In cases where migration is assumed (it can be either international migration in the context of national projections, or internal in the context of sub-national projections) the net number of migrants of a given sex is added to, or subtracted from, the population of each five-year age group at the end of each time interval. Thus:

$$P_{x+5}^{t+5} = (P_x^t \; S_{x,\text{to } x+5}^{t+2.5}) + NM_{x+5}^{t,t+5}$$

where NM is the net number of in-migrants during the five-year interval. The migration assumptions incorporated into national or sub-national population projections, when specified in terms of net numbers of migrants, are usually extrapolations of census migration data. Such data are generally surviving net migrants by age at the time of the census. When defined in this manner, it is not necessary to subject the migrants to mortality in the first period of entry into the projections.

Whereas deaths to migrants are only assumed to occur at intervals after t+5, the migrants are included in the number of women of ages 15 to 49 at time t+5 and are therefore, subjected to the fertility rates in the interval t,t+5. This approach is particularly important in the context of sub-national projections. Thus, in areas where there is net out-migration of women, they are deducted before the births are calculated. Conversely, in areas where there is net in-migration of women, they are added before the computation of births.

Alternatively, PEOPLE allows you to use age-sex specific net migration rates (per person) Mx, defined as:

$$M_x^{t+2.5} = NM_x^{t,t+5} / 0.5(P_x^t + P_x^{t+5})$$

where NM is the net number of migrants over the five-year period. A differing method of computing migration rates is to define the denominator as

$$P_x^{t+5} - 0.5NM_x^{t,t+5}$$

However, that migration rate is not entirely consistent with the way the rate is used in the projection when computing net numbers of migrants.

When using net migration rates, PEOPLE computes the net number of migrants in the projection by applying the rates to the average population aged x over each five-year period:

$$NM_x^{t,t+5} = M_x^{t+2.5} [0.5(P_x^t + P_x^{t+5})]$$

which is equal to:

$$= M_x^{t+5} [0.5(P_x^t + P_{x-5}^t S_{x-5}^{t+2.5})]/(1-0.5M_x^{t+2.5})$$

In order to obtain the population aged 0-4 at a time t+5, the projected number of births occurring during the five-year period is calculated by applying assumed sets of age-specific fertility rates to women in each five-year age group between 15 and 49. The formula is:

$$TB^{t,t+5} = \sum_{i=1}^{7} [0.5(FP_i^t + FP_i^{t+5}) f_i^{t+2.5}.5]$$

where TB is the total projected number of births to women aged 15-49 in the five-year period from mid-year t to t+5; FP, is the number of women at mid year t in the five-year age group i (starting from women aged 15-19) and $f^{t+2.5}_i$ is the age-specific fertility rate at the mid-point of the five year period (defined as births to women in a given age-group i divided by the mid-period number of women aged i). Note that the female population aged i at t+5 is the projected number adjusted for migration.

The total number of births in each five-year period is then split into males and females by applying sex proportions at birth (users can specify the appropriate sex ratio at birth, otherwise PEOPLE's default value is 1.06 male babies per female baby).

$$FB^{t,t+5} = TB^{t,t+5}1/1+1.06$$

where FB represents female births. Male births are obtained as total births minus female births.

The population of a given sex at ages 0-4 at time t+5 is then obtained as the survivors of the projected births plus or minus net migrants. The formula used is:

$$P_{0-4}^{t+5} = (B^{t,t+5} S_{B \text{ to } 0-4}^{t+2.5}) \pm NM_{0-4}^{t,t+5}$$

PEOPLE recognizes that some users of population projections will not be solely interested in the population in standard five-year age-groups and for standard five-year time periods. Some users will be interested in different segments of the age structure and non-standard time intervals. Generally, in developing countries accurate data are not available on fertility, mortality and migration by single years of age, nor is the quality of the base population of sufficient reliability to make the projections by single years of age and single year time periods, although PEOPLE version 3.0 offers user the option of making the projection by single years of age and single calendar years.

PEOPLE also gives the option of obtaining the projected five-year age-group and five-year time period figures for single year age bands and single calendar years. These are obtained through the use of Sprague multipliers and exponential interpolation between the same birth cohort at different five-year time intervals. That is, first base and projected populations at each five-year time interval are split into single years of age. Then for each age above 4, except for the terminal ages, the population classified by single years of age for the intervening years is obtained by means of exponential interpolation between the same cohorts at different five year time intervals.

This approach is generally satisfactory but in some instances the Sprague interpolation procedure yields inconsistent cohort progressions through time, if the results are inconsistent an alternative approach would be to carry the base population forward using single year survivorship ratios. If only five year survivorship ratios are available these can be readily disaggregated into single years of age by taking the fifth root and then interpolating between adjacent values.

Glossary

Age-Dependency Ratio. The ratio of persons in the ages defined as dependent (under 15 and over 64 years) to persons in the ages defined as economically productive (15-64 years) in a population.

Age-Sex Structure. The composition of a population as determined by the number or proportion of males and females in each age category. The age-sex structure of a population is the cumulative result of past trends in fertility, mortality and migration. Information on age-sex composition is an essential prerequisite for the description and analysis of many other types of demographic data.

Ageing of Population. A gradual process in which the proportions of adults and elderly increase in a population, while the proportions of children and adolescents decrease. This results in a rise in the median age of the population. Ageing occurs when fertility rates decline while life expectancy remains constant or improves at the older ages.

Birth Rate (or crude birth rate). The number of births per 1,000 population in a given year. Not to be confused with growth rate.

Census. A canvass of a given area, resulting in an enumeration of the entire population and the compilation of demographic, social and economic information pertaining to that population at a specific time. See also survey.

Childbearing Years. The reproductive age span of women, arbitrarily assumed for statistical purposes to be 15-49 years of age.

Child-woman Ratio, The ratio of young children to woman of reproductive age group, which include the mothers at a given period of time.

Cohort. A group of people sharing a common temporal demographic experience who are observed through time. For example, the birth cohort of 1,900 is the people born in that year. There are also marriage cohorts, school class cohorts and so forth.

Cohort Analysis. Observation of a cohort's demographic behaviour through life or through many periods; for example, examining the fertility behaviour of the cohort of people born between 1991-96 through their entire childbearing years. Rates derived from such cohort analysis are cohort measures.

Crude Rate. Rate of any demographic event computed for an entire population.

Death Rate (or crude death rate). The number of deaths per 1,000 population in a given year.

Dependency Ratio. The ratio of the economically dependent part of the population to the productive part; arbitrarily defined as the ratio of the elderly (age 65 and older) plus the young (under age 15) to the population in the working ages (ages 15-64).

Fertility. The actual reproductive performance of an individual, a couple, a group or a population.

Fertility Rate. The number of live births per 1,000 women of ages 15-49 years in a given year.

Growth Rate. The rate at which a population is increasing/decreasing in a given year due to natural increase and net migration, expressed as a percentage of the base population.

Infant Mortality Rate. The number of deaths to infants under one year of age per 1,000 live births in a given year.

Life Expectancy. The average number of additional years a person would live if current mortality trends were to continue. Most commonly cited as life expectancy at birth.

Median Age. The age that divides a population into two numerically equal groups; that is, half the people are younger than this age, and half are older.

Migration. The movement of people across a specified boundary for the purpose of establishing a new permanent residence. Divided into international migration (migration between countries) and internal migration (migration within a country).

Mortality. Deaths as a component of population change.
Natural Increase/Decrease. The surplus/deficit of births over deaths in a population in a given time period.

Old Population. A population with a relatively high proportion of middle-age and elderly persons, a high median age and thus a lower growth potential.

Population Projection. Computation of future changes in population numbers, given certain assumptions about future trends in the rates of fertility, mortality and migration. Demographers often issue low, medium (also known as standard) and high projections of the same population, based on different assumptions of how these rates will change in the future.

Population Register. A government data collection system in which the demographic and socio-economic characteristics of all or part of the population are continuously recorded. The registers record the major events such as birth, marriage, moves and death that happen to each individual, and the registers are usually used for administrative purposes such as social security and voter registration.

Rate of Natural Increase/Decrease. The rate at which a population is increasing or decreasing in a given year due to a surplus or deficit of births over deaths, expressed as a percentage of the base population.

Replacement Level Fertility. The level of fertility at which a cohort of women on the average are having only enough daughters to replace themselves in the population. By definition, replacement level is equal to a net reproduction rate of 1.0. The total fertility rate (TFR) is also used to indicate replacement level fertility, and a TFR of 2.1 is considered to be replacement level.

Survey. A canvass of selected persons or households in a population usually used to infer demographic characteristics or trends for a larger segment or all of the population. See also census.

Total Fertility Rate (TFR). The average number of children that would be born alive to a woman (or a group of women) during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given year.

Vital Statistics. Demographic data on births, death, fetal deaths, marriages and divorces.

About the Author

W. Indralal De Silva is Professor of Demography (Chair) and Head of the Department of Demography, University of Colombo, Sri Lanka where he has served since 1979. In addition, he has extended his services to several government institutions, NGOs and private sector organizations during the past decades. He has published a number of books and monographs and presented over 30 research papers at international conferences and has also published over 40 research articles in reputed local and international journals. His research interests have been on fertility, mortality, migration, ageing, population and labour force projections, and reproductive health in developing counties with special emphasis on Sri Lanka.

Professor De Silva obtained his Bachelor's degree in Development Studies from the University of Colombo in 1977 and his Masters and Doctoral degrees in Demography from the Australian National University in 1985 and 1990, respectively. He was a Visiting Professor at the National University of Singapore in 2004, Harvard School of Public Health during 1996-98 and a Visiting Fellow at the Australian National University in 1990-91.

About the Book

This publication, *A Population Projection of Sri Lanka: 2001-2101*, is both timely and important. It provides long term projections of population showing the changing age and sex structure of the population under three different scenarios. It is evident that from the current youthful population, Sri Lanka's population will swell in the middle age groups in about three decades from now, and thereafter would rapidly age beyond the second half of this century. These demographic changes will pose important short and long term opportunities and challenges for socio-economic development in Sri Lanka. The final outcome of these however, will depend on the effectiveness of strategies that will be adopted in the coming decades. I am pleased that Professor Indralal De Silva who was one of my students in population studies at the University of Colombo has undertaken this useful study.

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