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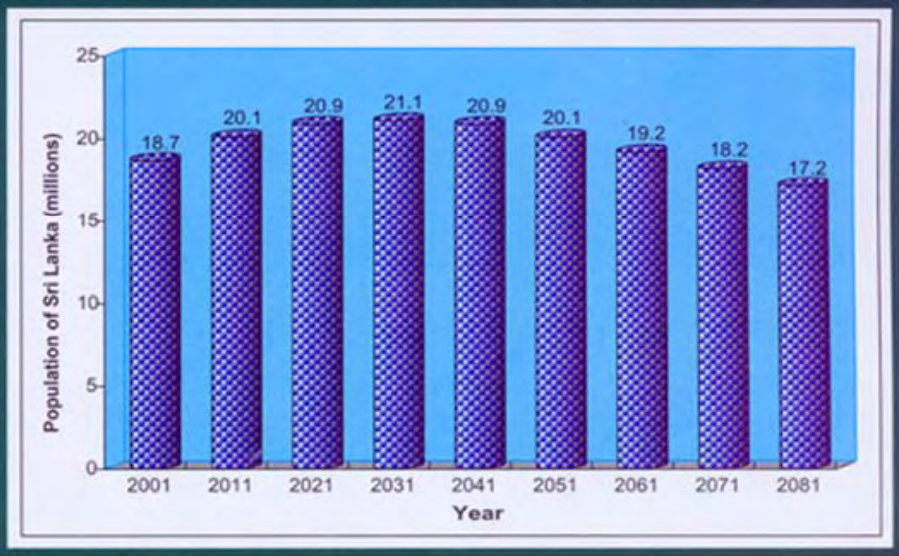
Beyond Twenty Million: Projecting the Population of Sri Lanka 2001-2081



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Abstract

In the past decades, Sri Lanka has been passing through the demographic transition shifting from high to lower level of fertility and mortality. Considerable progress in increasing the life expectancy over many decades has been noted. Between 1946 and 1991, the life expectancy at birth has increased by 24 years for men and by 30 years for women.

Alongside the declining trends in mortality, fertility decline has been evident since the early 1960s. Fertility declined from 5.3 live births per woman in 1953 to 1.9 in 1995-2000. Thus, Sri Lanka is one of the poorest countries in the world to have achieved below replacement level fertility, where replacement fertility has been defined as 2.1 children per woman. 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 fertility reaches replacement level.

Besides mortality and fertility, international migration also plays an important role in deciding the total population of Sri Lanka. In Sri Lanka, the currently prevailing major migration flow is the streaming of semi and unskilled workers to the West Asian countries in large numbers for employment. The trend which began in late 1970s has increased significantly over the last two decades.

As a result of changes in fertility, mortality and migration components, the Sri Lankan population has changed significantly. It has grown almost eight times since the first national census of 1871, which recorded only 2.4 million people. The population size has increased from 14.8 million in 1981 to 18.7 million in 2001. The doubling of the population took place in 54 years between 1871 and 1925 and it doubled again in 35 years between 1925 and 1960.

According to the standard projection, the population would reach 20.1 million by 2011, and could attain its peak by 2031 with a size of 21.1 million. A near-zero population growth rate would be attained during 2021 to 2036 where the total size of the population could be around 21 million. However, beyond 2040s, primarily due to significantly low level of fertility, the total size of the Sri Lankan population would decline.

Taking 18.7 million as the population size in 2001, it is expected that an addition of 2.4 million in the next three decades could create a number of demographic, social, economical, environmental and cultural threats to Sri Lankan society. Alongside an increase in the total size, the Sri Lankan population will undergo major changes in its age-sex structure and distribution in the coming decades. The reversal of the gender balance favouring females is an important feature in the new millennium. Sri Lankan policy planners will have to confront many issues that are expected to emerge in the near future, from being one of the few developing countries to reach well below replacement fertility, and cope with the resulting ageing of the population.

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පසුගිය දශක ගණනාවක සිටම සළුලතාව හා මරතෘතාව ඉහළ සිට පහළ බසින ජනවිකාශ සංක්‍රාමීය අවධියක ශ්‍රී ලංකාව පසුවේ. දශක බොහෝ ගණනක සිට මරතෘතාවේ පහළ බැසීමට අනුරූපීව ආයු අපේක්ෂාව ඉහළ යාමේ සැලකිය යුතු ප්‍රගතියක් ශ්‍රී ලංකාව අත්පත් කරගෙන ඇති බව විද්‍යාමානව තිබේ. වර්ෂ 1946-1991 අතරතුර කාල සීමාවේ දී උපතේ දී පුරුෂ ආයු අපේක්ෂාව වසර 24කින් ද ස්ත්‍රී ආයු අපේක්ෂාව වසර 30කින් ද ඉහළ ගොස් තිබේ.

මරතෘතාව පහළ වැටීමක් පවත්නා අතරතුරම 1960 දශකයේ මුල් භාගයේ සිට සළුලතාවේ පහළ බැසීමක් ද පෙනෙන්නට තිබේ. 1953 වර්ෂයේ දී කාන්තාවක් බිහි කළ මුළු දරුවන් සංඛ්‍යාව 5.3ක් වූ අතර 1995-2000 වන විට එය 1.9 දක්වා අඩු විය. මේ අනුව පැහැදිලි වන්නේ ශ්‍රී ලංකාව ආදේශක සළුලතා මට්ටමටත් වඩා අඩු අගයකට ළඟා වී ඇති ලෝකයේ සංවර්ධනය වන රටවලින් එකක් වන බවය. ආදේශක සළුලතා මට්ටම යනු එක් කාන්තාවක් දරුවන් 2.1ක් බිහි කරන මට්ටමය. සළුලතාව පහළ බැසීමේ ප්‍රවණතාවක් ආරම්භ වුවාට පසුව එය ආරම්භ වීම හා පවත්වා ගෙන යාමට හේතු වූ සාධක සළුලතාව ආදේශක මට්ටමට ළඟා වූ පසුව ද එලෙසම ක්‍රියාත්මක වේ.

සළුලතාව සහ මරතෘතාව හැරුණුකොට ශ්‍රී ලංකාවේ මුළු ජනගහනය තීරණය කිරීමේදී ජාත්‍යන්තර සංක්‍රමණය ද වැදගත් සාධකයක් වන්නේය. දැනට ශ්‍රී ලංකාවේ ප්‍රධානතම සංක්‍රමණ ධාරාවක් ලෙස අධ්‍ය හා නුපුහුණු ශ්‍රමිකයින් විශාල වශයෙන් බටහිර ආසියාතික රටවල් කරා රැකියාවක් පිණිස ඇදීයාම දැකිය හැකිය. 1970 දශකයේ අග භාගයේ ආරම්භ වූ මෙම ප්‍රවණතාවය පසුගිය දශක දෙකක කාලය තුළ කැපීපෙනෙන අයුරින් වර්ධනය වී තිබේ.

සළුලතාව, මරතෘතාව හා සංක්‍රමණය යන සාධක හේතුකොට ගෙන ශ්‍රී ලංකාවේ ජනගහනය කැපීපෙනෙන අයුරින් වෙනස් වී තිබේ. 1871 ප්‍රථම ජන සංගණනයට අනුව දසලක්ෂ 2.4 ක්ව පැවති ජනගහනය ඉන් ඉක්බිතිව මේ වන විට අටගුණයකින් වර්ධනය වී තිබේ. 1981 දී දසලක්ෂ 14.8 ක්වූ ජනගහනය 2001 වර්ෂයේදී දසලක්ෂ 18.7 ක් දක්වා වූ වර්ධනයක් වාර්තා කළේය. 1871 සහ 1925 දක්වා වූ අවුරුදු 54 ක කාල පරාසය තුළදී ජනගහනය දෙගුණ වීමක් ද 1925 සිට 1960 දක්වා කාලය තුළ නැවතත් ජනගහනය දෙගුණ වීමක් ද සිදු විය.

පිළිගත් මධ්‍ය පරිමාණ ප්‍රක්ෂේපණ වලට අනුව 2011 වනවිට ජනගහනය දසලක්ෂ 20.1 මට්ටමකට ළඟාවනු ඇති අතර 2031 වනවිට එහි උපරිමය වන දසලක්ෂ 21.1 ක් දක්වා ලඟාවනු ඇත. 2021 සහ 2036 කාල පරාසය තුළ ශූන්‍යයට ආසන්න ජනගහන වර්ධන අනුපාතිකයකට ශ්‍රී ලංකාව ළඟාවනු ඇති අතර මුළු ජනගහනයේ සංඛ්‍යාව දසලක්ෂ 21 ක් පමණ විය හැකි ය. කෙසේ වෙතත් 2040 දශකයෙන් ඔබ්බට මූලික වශයෙන් සළුලතා මට්ටම කැපීපෙනෙන අයුරින් පහළ වැටීම හේතුකොට ගෙන ශ්‍රී ලංකාවේ සමස්ත ජනගහනයේ ප්‍රමාණය අඩුවනු ඇත.

2001 වර්ෂයේ දී ජනගහනය ප්‍රමාණාත්මක වශයෙන් දසලක්ෂ 18.7 ක් වශයෙන් ගත්කල ඉදිරි දශක තුන තුළ වැඩිවන දසලක්ෂ 2.4 ක් වූ ජනගහනය හේතුකොට ගෙන ශ්‍රී ලාංකික සමාජයට ජනවිකාශමය, සමාජමය, ආර්ථික, පාරිසරික මෙන්ම සංස්කෘතිකමය තර්ජනයන්ට මුහුණදීමට සිදුවනවා ඇත. ජගනහනය ප්‍රමාණාත්මකව වැඩිවීම හැරුණුකොට ඉදිරි දශක කීපය තුළ ශ්‍රී ලංකාවේ ජනගහනය වයස හා ස්ත්‍රී පුරුෂ ව්‍යුහය සැලකිය යුතු වෙනසකට භාජනය වේ.

නව සහස්‍රකයේ විද්‍යාමාන වීමට ඇති වැදගත් ලක්ෂණයක් නම් පිරිමින්ගේ සංඛ්‍යාව ඉක්මවා ගැහැණු සංඛ්‍යාව වැඩිවී ස්ත්‍රී පුරුෂ අනුපාතය පරිවර්තනයකට භාජනය වීම ය. මේ අනුව සළුලතාව ආදේශක මට්ටමටත් වඩා පහළ බැස ඇති සංවර්ධනය වන රටවලින් එකක් වශයෙන් ද රට සමගාමීව මහළු බවට පත්වන ජනගහනයක් ඇති රටක් වශයෙන් ද නුදුරු අනාගතයේ දී පැනනඟින්නා වූ ගැටළු රාශියකට මුහුණ දීමට ශ්‍රී ලංකාවේ ප්‍රතිපත්ති සම්පාදකයන් හට සිදුවනු ඇත.

சாரம்

கடந்த தசாப்தங்களில் இலங்கையில் சனத்தொகையில் கருவளம் மற்றும் இறப்பு வீதம் உயர் மட்டத்திலிருந்து கீழ் மட்டம் வரை ஒரு நிலையிலிருந்து இன்னொரு நிலைக்கு மாறுதலடைவதனை பிறப்பு, இறப்பு, நோய் முதலியவற்றின் குடிநிலைப் புள்ளியியலின் நிலைமாறல் ஊடாக காணக் கூடியதாகவுள்ளது. கடந்த பல தசாப்தங்களாக ஆயுள் மீதான நம்பிக்கை அதிகரித்து வருவதில் கணிசமான முன்னேற்றம் அவதானிக்கப்பட்டுள்ளது. 1946 க்கும் 1991 க்கும் இடைப்பட்ட காலப்பகுதியில் பிறப்பின் போதே எதிர்பார்க்கும் ஆயுட்காலம் நம்பிக்கை ஆண்களுக்கு 24 வருடங்களாகவும், பெண்களுக்கு 30 வருடங்களாகவும் அதிகரித்துள்ளது.

இறப்பு வீதத்திலான வீழ்ச்சியடையும் போக்குகளுடன் சேர்த்து வருவள வீழ்ச்சி 1960 ஆம் ஆண்டுகளில் முற்பகுதிகளிலிருந்து தெரிந்த நிலையில் இருந்தது. கருவளமானது 1953 ஆம் ஆண்டில் பெண் ஒருவருக்கு 5.3 உயிர்ப் பிரசவங்களிலிருந்து 1995 - 2007 ஆண்டுப் பகுதிகளில் 1.9 ஆக வீழ்ச்சியடைந்தது. இதன் பிரகாரம் இலங்கை பதிலீட்டு கருவளமட்டத்திற்கும் கீழான மட்டத்தை அடைந்துள்ள உலகின் மிகவும் வறிய நாடுகளில் ஒன்றாக உள்ளது. இங்கு பதிலீட்டுக் கருவளமானது பெண் ஒருவருக்கு 2.1 பிள்ளைகள் என வரையறை செய்யப்பட்டுள்ளது. கருவள மட்டங்கள் கீழ் நோக்கிய போக்கை அடைந்ததுடன் அந்த வழிமுறையின் ஆரம்பத்திற்கும் தொடர்ச்சிக்கும் வழிவகுத்த சக்திகள் வருவளமானது பதிலீட்டு மட்டத்தை அடைந்தாலும் கூட தொழிற்படுவதை நிறுத்த மாட்டா.

இறப்பு வீதத்துக்கும் கருவளத்துக்கும் அப்பால் சர்வதேசப் புலப்பெயர்வும் கூட இலங்கையின் மொத்த சனத்தொகையை தீர்மானிக்கும் முக்கியமான ஒரு பங்கை வகிக்கின்றது. இலங்கையில் தற்போது நிலவிக் கொண்டிருக்கும் பெரிய புலப்பெயர்வுப் பாய்ச்சல், வேலை வாய்ப்பிற்காக பெரும் எண்ணிக்கையில் மேற்கு ஆசிய நாடுகளுக்கு ஓரளவு தேர்ச்சி பெற்ற வேலையாளர்களையும் கிரணமான தேர்ச்சி பெற்ற வேலையாளர்களையும் ஒழுங்குபடுத்துவதாகும். 1970 ஆம் ஆண்டுகளின் பிற்பகுதியில் ஆரம்பித்த இப்போக்கு கடந்த 2 தசாப்தங்களிலும் கணிசமான அளவில் அதிகரித்துள்ளது.

கருவளங்கள், இறப்பு வீதம், புலப்பெயர்வு ஆக்கக் கூறுகளிலான மாற்றங்களின் விளைவாக இலங்கையின் சனத்தொகையானது கணிசமான அளவில் மாற்றமடைந்துள்ளது. அது 2.4 மில்லியன் மக்களை மாத்திரம் பதிவு செய்த 1877 ஆம் ஆண்டின் முதலாவது தேசிய சனத்தொகையில் இருந்து அநேகமாக 8 மடங்குகளாக வளர்ச்சியடைந்துள்ளது. சனத்தொகை அளவானது 1981 ஆம் ஆண்டில் 14.8 மில்லியனிலிருந்து 2001 ஆம் ஆண்டு 18.7 மில்லியனாக அதிகரித்துள்ளது. 1871 ஆம் ஆண்டிலகுர்து 2001 ஆம் ஆண்டில் 18.7 மில்லியனாக அதிகரித்துள்ளது. 1871 ஆம் ஆண்டிற்கும் 1925 க்கும் இடையே உள்ள 54 ஆண்டுகளில் சனத்தொகை இரட்டிப்பாகியுள்ளதுடன் 1925 க்கும் 1960 க்கும் இடைப்பட்ட 35 ஆண்டுகளில் அது திரும்பவும் இரண்டு மடங்காக அதிகரித்துள்ளது.

நியம எறிகையின் பிரகாரம் சனத்தொகையானது 2011 ஆம் ஆண்டளவில் 20.1 மில்லியன் ஆக அதிகரிக்கும் என்பதுடன் அது 2031 ஆம் ஆண்டளவில் தனது உச்ச அதிகரிப்பை 21.1 மில்லியன் அளவுடன் அடைய முடியும். பூஜ்ஜியத்துக்குக் கிட்டிய சனத்தொகை வீதம் 2021 இலிருந்து 2036 வரையுள்ள காலப்பகுதியில் அடையப்படும். இதில் சனத்தொகையின் மொத்த அளவானது ஏறக்குறைய 21 மில்லியனாக இருக்கும். எனினும் 2040 ஆம் ஆண்டுகளுக்கு அப்பால் முதனிலையாக குறிப்பிடத்தக்கதாக கருவளத்தின் குறைந்த மட்டம் காரணமாக இலங்கை சனத்தொகையின் மொத்த அளவு வீழ்ச்சியடையும்.

18.7 மில்லியனை 2001 ஆண்டு சனத்தொகை அளவாக எடுத்துக் கொண்டு பார்க்குமிடத்து அடுத்த 3 தசாப்தங்களிலும் 2.4 மில்லியன் சனத்தொகைச் சேர்க்கையானது பல பிறப்பு, இறப்பு, நோய்கள், சமூக, பொருளாதார, சூழல் மற்றும் கலாசார அச்சுறுத்தல்களை இலங்கைச் சமூகத்தில் உருவாக்கலாம். மொத்த அளவிலான ஒரு அதிகரிப்புப் பக்கமாக இலங்யின் சனத்தொகையானது அதன் வயது, பால் கட்டமைப்பிலும், பரம்பலிலும் இனிவரும் தசாப்பதங்களில் பெரிய மாற்றத்திற்கு உட்படும். பெண்களுக்குச் சாதமாகவுள்ள பால் சமநிலையானது தலைகீழாக்கப்பட்டது. புதிய ஆயிரமாம் ஆண்டு ஒரு முக்கியமான அமிசமாக இருக்கும். இலங்கையின் கொள்கைத் திட்ட அமைப்பாளர்கள் பதிலீட்டுக் கருவளத்திற்கு மிகவும் கீழேயுள்ள சில வளர்முக நாடுகளில் ஒன்றாக இலங்கை இருப்பதற்கும் சனத்தொகையின் முதிர் வயதடையும் விளைவை அது சமாளிப்பதற்கும் சமீபத்திய எதிர்காலத்தில் எழுமென எதிர்பார்க்கப்படும் பல விடயங்களையும் எதிர்நோக்க வேண்டியதாக இருக்கும்.

1. Introduction

There has been enormous concern about the consequences of human population growth for the environment and for social and economic development. Thus population projections are of crucial importance in socio-economic planning and are an important element in the planning process. Integrating population projections and data into the planning of development activity will contribute to the success of development efforts. In this light it is important that due 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 departments require population projections as an input into their estimates of future demand for services. The demand for pensions and the growth in the labour force, for example, 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. It is population growth that will drive much of the future demand for these needs.

It is evident that planning for the future has become a requisite of modern socio-political life. Population projections play two distinct 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.

However, it is impossible to account for the future course of all the factors that govern population growth. Indeed, population change can in it-self be affected by public policies and programmes. Therefore, population change can be regarded as being to some extent a dependent rather than an independent variable in the planning process (Romanic, 1990). 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 one could conclude that the demographer not only incorporates opinion on future birth and death rates but also influences them.

Ideally, the size of future populations should be estimated in the greatest detail possible. However, the extent of detail required in projections may vary considerably. For instance, for a few purposes, a simple population total may suffice, but almost always some compositional detail is required, and often more than a simple breakdown by age and sex. For example, labour force projections require a breakdown by employment status and perhaps occupation, while for housing planning it is essential to produce projections of households by size and type rather than by population only.

Whenever projections are discussed, the question arises as to whether they should be called *predictions* or *forecasts*. A distinction must be made between predictions and forecasts. When the author or the subsequent user of a projection is willing to describe it as indicating the most likely population at a given date, it will be termed a forecast. At the other extreme, a model worked out to illustrate certain analytical relationships, on assumptions that are described as highly unlikely, would not be regarded as constituting a forecast of future population growth (Shryock and Siegel, 1971).

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. It is also useful for users of such projections to discuss the extent of departures from the actual turn-out, as well as to indicate the record of accuracy in previous projections made for Sri Lanka.

1.1 Methodology

A variety of methods can be used to project a nation's population. 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, employing 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.

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. 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.

The projections presented here have been compiled using the computer software PEOPLE developed for the Overseas Administration of U.K. by R. Leete (1992).

2. Data, Time Horizon and Assumptions

2.1 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. Ten years after the 1981 census of population the scheduled census of population of 1991 was not undertaken due to civil unrest in the country. The latest census was carried out on 17 July 2001. However, the 2001 census of population was not a complete enumeration for, the final count was not made in the districts of Janna, Mullativu and Killinochchi and four other districts only a partial enumeration was possible. Thus a complete enumeration was made only in 18 out of 25 districts.

Therefore, 20 years have elapsed by 2001 without a census of population of Sri Lanka. During this 20 year period vital registration systems continue to provide statistics, which has been used to make the population estimates. However, when the 2001 population census counts were compared with the population estimates of year 2000 and immediately previous years, made by the registration system, a significant discrepancy emerged. For instance the population estimate of 19.4 million given by the registration system for the year 2000 was significantly higher than the population count of 18.7 million reported in 2001 census. Presumably such deviation indicates of a deterioration of the quality of births, deaths and international migration statistics of Sri Lanka over the last two decades.

To generate a population projection through the cohort component method, the base year population given to be first. The base year population of the projection is the resident population of Sri Lanka by age and sex on 1st July 2001. At the time of making the present projection the age-sex distribution of five year age groups were not available. However the Department of Census and Statistics has reported the total population of Sri Lanka as 18.7 on 17 July 2001. And also made available the male and female population of less than 18 years old and 18 years and above. Such information along with number of other statistics were used in estimating age-sex structure of population of 2001.

In these population projections, the 1981 population is brought forward, by using the observed trends in fertility, mortality and international migration to match with the 2001 population count and it's broad age-sex structure. It should be noted that only after adjusting for under-enumeration in the1981 census of population, particularly the 0-4 age group, is the population of 1981 brought forward to the middle of that year. Forwarding of the population to middle of the year 1981 and subsequently forwarding to middle of 2001 was made by using the same computer software package PEOPLE referred to earlier. For this purpose, required information on fertility, mortality and international migration were obtained from published as well as unpublished statistics of the Registrar General's Department, Department of Census and Statistics and other sources.

The process of adjusting the population numbers by age and sex from 1981 to 2001 in order to estimate the age structure of base year population of 2001 through the PEOPLE programme is a technical exercise. It serves to illustrate some basic principles, and allows several important points to be made. Basically, what we require is to project the survival of each age-sex population group forward by 5 years using the survivorships; for instance those surviving from 0-4 age group in 1981 to 5-9 age group in 1986. Therefore, as a first step of the estimation procedure, appropriate male and female model life tables were examined and selected to represent the observed mortality level of Sri Lanka during the periods of 1981-1986, 1986-1991, 1991-1996 and 1996-2001. The reported life expectancy values in the published Sri Lankan life tables of 1980-82 and 1990-92 were used to guide the estimation procedure (Department of Census and Statistics, 1991). Appropriate male and female model life tables were selected from a pool of model life tables only when the chosen model life table matched with the observed mortality level of Sri Lanka during that period. It is widely believed that during the periods 1981-1986 and 1986-1991 death registration in Sri Lanka has suffered from under-registration (particularly in the case of male deaths). Therefore, when selecting a suitable male model life tables, some allowance was made to account for the under-registration of deaths.

It is clear that forwarding population numbers from 1981 to 1986 and subsequently to 2001 requires survival factors (to represent mortality), whereas estimating the population born after 1981 require both fertility and survival factors. For instance, this is so for the population aged 0-4 in 1986, which would have been born during the period 1981-86 and then survived until 1986. For these, it is first necessary to use fertility factors to estimate the total number of births there would have been born from 1981-86 and then to estimate their survival, since some would have died before 1986. Therefore to estimate the population aged 0-4 years in 1986, an appropriate total fertility rate (TFR) for 1981-86 was determined utilising all available data sources. An appropriate TFR value was selected only when the selected TFR matched with the observed fertility level of Sri Lanka during that period since registration of births is believed to be near complete in Sri Lanka. Comparability between the expected and the observed number of births during 1981-1986 was given strong consideration when finalising the value of TFR for the period 1981-1986 and so on. Finally, all available statistics on international migration were integrated into the estimation of the 1986 population. The same estimation procedure was repeated for the period 1986-1991, 1991-1996 and 1996-2001 in order to obtain population by age and sex, which is the base population of the projection (see Appendix B).

Quantification of Sri Lanka's demographic scenario up to 2001 which is the base year for these projections relatively straightforward using observed demographic variables. The immediate task then was to predict the trends in fertility, mortality and international migration after 2001.

Different sets of assumptions are utilised to ascertain the future courses 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 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.

2.2 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. Population projections for the future would also depend on the socio-economic issues, which it seeks to address. 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. United Nations (1992) provides long-range projections of the population of the world and nine major areas from 1950-2150. 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, were limited to the next eight decades. The time horizon extends from 2001 to 2081, and primarily assesses the long term demographic scenario of the Sri Lankan population. The projections also allow assessment of the fertility target set by the Ministry of Health. The target includes achieving replacement level fertility by the year 2000, followed by achieving zero population growth (i.e. stable population) by the year 2040 or 2045.

2.3 Assumptions

Population growth is driven by three components: fertility, mortality and migration. Different sets of assumptions were formulated 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 has consistently been 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 economic situation of a country and in particular, changes in administrative restrictions on immigration.[i]

2.4 Fertility Change and Assumptions for the 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 region. A declining fertility rate has been evident since the early 1960s. The total fertility rate (TFR) for selected years between 1953 and 1995-2000 is given in Table 1. TFR decreased from 5.32 in 1953 to 3.45 children per woman in 1981, and it dropped further from 2.26 in 1988-93 to 1.96 in 1995-2000.

Table 1
Total Fertility Rate, 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).

The Sri Lankan Government's support for the declining fertility rate is summarised the following statement:

As successive governments in Sri Lanka have emphasised, there remains an important need to curb the growth of the population in order to ensure a better distribution of available resources. Indeed, the Government has set a quantitative target in its population policy statement issued in 1991, to achieve replacement level fertility, that is a TFR of 2.1, by the year 2000 (Ministry of Health and Women's Affairs, 1992).

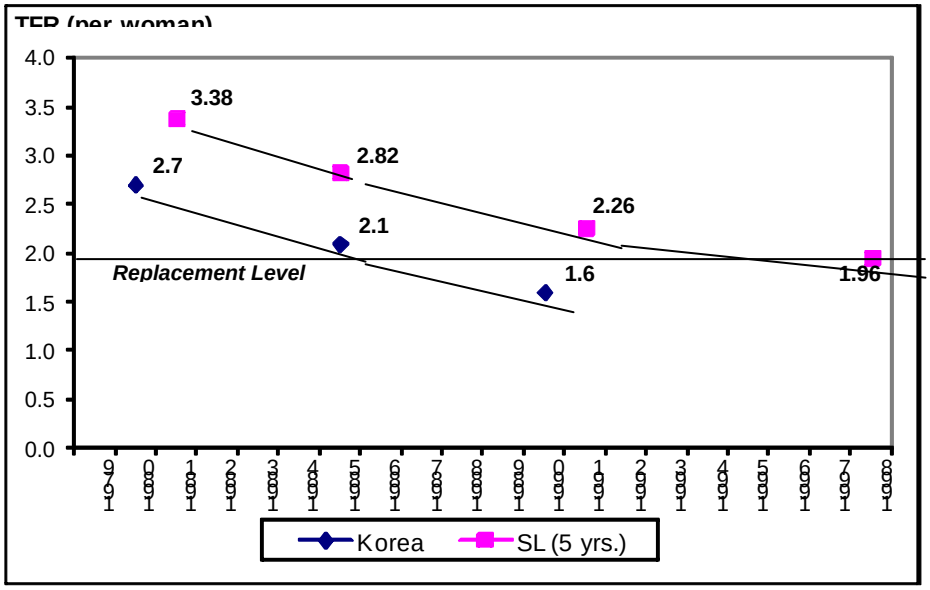
The question of whether Sri Lanka has reached replacement level fertility was discussed in an earlier publication by the same author (De Silva. 1994a). He uses data from the two Demographic and Health Surveys (DHS) of 1987 and 1993, as well as fertility estimates based on the 1981 census and registration. De Silva argues in his publication by using two different approaches of trend analysis, that Sri Lanka's TFR would have achieved replacement level fertility much before the year 2000. With the availability of the data from 2000 DHS the above argument became more acceptable since

the latest survey reports a TFR of 1.96 children per woman for the period 1995-2000, which is even below the replacement level of 2.1. Thus figure 1 clearly indicate that TFR of Sri Lanka would have achieved replacement fertility by 1994-1995 the latest. Estimates from Korea indicate of early achievement of replacement fertility as far back 1985.

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

If allowance is made for the two exclude provinces, by assuming that the previous pattern of regional differentials in fertility was maintained, it is still likely that the overall fertility rate for the whole island would have reached replacement level by 1995 at the latest (Figure 1). This assumption would not hold, if fertility in the Northern and Eastern Provinces had increased or had cased to decline in parallel with national trends. 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 internal conflict. 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 internal strife typically has little effect on long term trends in fertility.

Figure 1
Decline of TFR in Sri Lanka and Republic of Korea



Source: De Silva, 1994a; Department of Census and Statistics (2002).

Even though Figure 1 shows that replacement level fertility was achieved by 1994-95, that level is not considered as the national fertility estimate for the purpose of this projection. It is more likely that Sri Lanka would have attained the TFR of 2.1 in 1995, well ahead of the government's target of the year 2000.

It is also important to note the long term implications of achieving below-replacement level-fertility, which will result not only in an eventual decline in the total population but also in a rapidly ageing population structure. This change will require substantial shifts in policies to cater to subsequent needs (De Silva, 1994b).

Certain countries in Asia such as Thailand and China along with Sri Lanka, have also attained replacement level fertility in the early 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 in the verge of achieving a below replacement level (International Institute of Population Sciences, 1995). Over the Last 40 years or so, fertility has been in continuous decline in Kerala. According to the SRS, crude birth rate decline from 31.1 per thousand in 1971 to 25.6 per thousand in 1981, dropping to 16.1 per thousand in 1993. For instance, TFR was 4.1 in 1971, 3.1 in 1980 and 2.1 in 1990. Kerala reached the replacement level of fertility at the beginning of the 1990s. At this stage, 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 & Zachariah, 1998).

Both Kerala and Goa have a pattern of childbearing similar to that of Sri Lanka, with a very low fertility rate before the age of 25 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 early 1990s is in fact consistent with the patterns seen in those neighbouring populations with closest cultural affinity to our own. In fact, 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 should be expected that Sri Lanka will continue to be at the forefront of future fertility decline in the South Asian Region.

Given the uncertainties in transition in the trend of fertility in Sri Lanka, in projections in the present study, a TFR of 2.0 is assumed as the standard variant for the period 2001-2006 (Table 2). This figure is more conservative than the DHS estimate of 1.96 of 1995-2000. On the other hand, TFR is estimated to be 1.84 for the period 2001-2006 in the low variant of these projections.

The next concern for demographers lies in whether TFR will stabilise at the replacement level or whether it will continue to decline. It is reasonable to believe that the trend of a decline 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 reaches a replacement level.

Table 2
Assumed Total Fertility rates, 2001-2006 to 2076-2081: High, Standard, and Low Projections

Period	High	Standard	Low
2001-2006	2.20	2.00	1.84
2006-2011	2.13	1.90	1.70
2011-2016	2.05	1.80	1.60
2016-2021	1.97	1.70	1.50
2021-2026	1.90	1.60	1.40
2026-2031	1.90	1.60	1.36
2031-2036	1.90	1.60	1.36
2036-2041	1.90	1.60	1.36
2041-2046	1.90	1.60	1.36
2046-2051	1.90	1.60	1.37
2051-2056	1.90	1.60	1.37
2056-2061	2.00	1.70	1.44
2061-2066	2.00	1.70	1.44
2066-2071	2.00	1.70	1.44
2071-2076	2.10	1.80	1.54
2076-2081	2.10	1.80	1.54

For the developed countries the above assumption is based on a broad survey of possible societies changes in the future (Lutz, 1996). The United Nations and some other institutions have assumed however, that fertility will eventually recover to replacement level, which has not gained much support (Westoff, 1991). An increase in the use of contraceptives and induced abortions (De Silva, 1994a; De Silva et al., 2000), and females in particular contracting marriage at a later age (De Silva, 1997), are 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.

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).

Many developed countries which 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 (2001), 14 countries attained lowest-low fertility levels during the 1990s (only few of those 14 is shown in Table 3). Italy and Spain were the first countries to attain and sustain lowest-low fertility levels in 1993 (TFR at or below 1.3). The average TFR reported in Southern Europe was 1.4 during the period of 1990-1995 (United Nations, 1995).

Table 3
Total Fertility Rate (TFR) of Selected Developed Countries

	TFR		
Country	**1985**	**1990**	**1999**
Greece	1.67	1.39	1.28
Italy	1.42	1.33	1.23
Spain	1.64	1.36	1.20
Bulgaria	1.98	1.82	1.23
Hungary	1.85	1.87	1.29
Armenia	2.56	2.63	1.20
Russia	2.05	1.90	1.17
Ukraine	2.02	1.89	1.19

Source: Council of Europe, (2001).

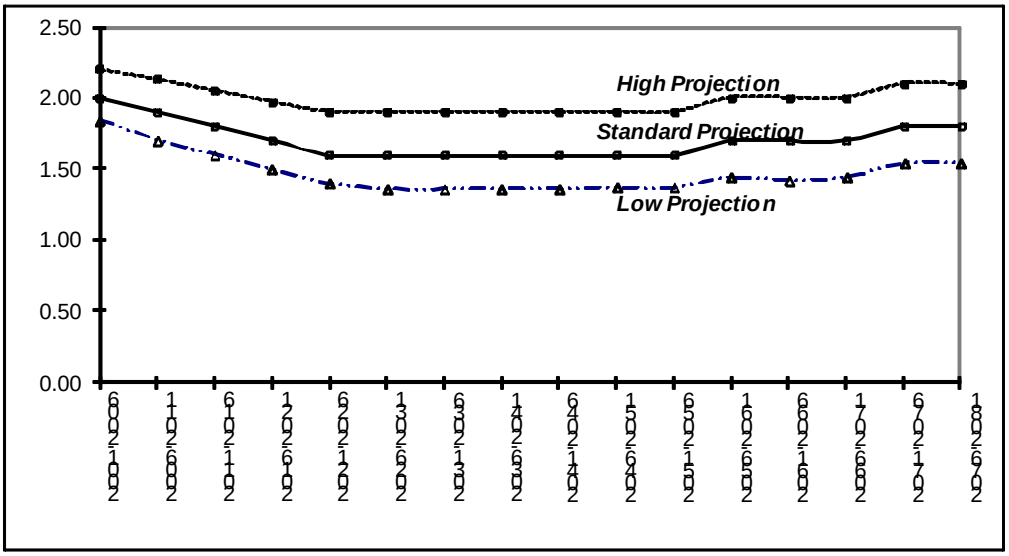
Over the past two decades, some of the European countries have shown fertility decline has continued but at much slower place, and in a few countries fertility has turned upward slightly- for example in Denmark, Finland, Norway, and the United Status. By 1990s TFR is 1.7 in France and Denmark and close to 2.1 in the United Status (Kohler et al., 2002).

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 were observed in North America (2.00), Australia/New Zealand (1.80), and Northern Europe (1.67) and the lowest in Japan (1.4), Southern Europe (1.32), and Eastern Europe (1.28). Although focus on the "more developed" world (as defined by the UN), it is worth noting that fertility has also dropped 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).

Among Asian countries, Japan reports one of the lowest fertility levels, indicating a TFR of 1.4 in 2000. Japan achieved its 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 0.6 less than the replacement level (Ministry of Health and Welfare, Japan, 2000).

In the standard projection in Table 2 it is assumed that TFR of Sri Lankan women will decline to 1.6 by the year 2021-2026 and remain at that until 2051-2056 and thereafter show an slight upward trend leading to TFR of 1.7 and 1.8 by the latter part of the projection period (Table 2). This pattern over the 2001-2086 period is considered the plausible fertility assumption for coming decades (Figure 2).

Figure 2
Assumed Total Fertility Rates, 2001-2006 to 2076-81: High, Standard and Low Projections



For the high variant of these projections, it is assumed that the TFR will reach the replacement level of 2.13 by 2006-2011, then decline further to 1.90 by 2021-2026 and remain at the same level until 2051-2056 and increased to 2.0 level by the latter part of the projection period. For the low projection, it is assumed that the decline will be faster and that a TFR of 1.37 would be reached by the period 2046-2051, and it increased after that. The three fertility assumptions, standard, high and low, developed for the period 2001 to 2081 are shown in Figure 2.

2.5 Mortality Change and Assumptions for the Future

Sri Lanka has made considerable progress in reducing the mortality level of its population over the last many decades. Consequently between 1946 and 1981 the life expectancy at birth has increased by 21 years for men and 27 years for women. The life expectancy at birth for the period 1980-82 was 67.7 years for men and 72.1 years for women (Table 4).

Table 4
Life Expectancy at Birth: 1920-22 to 1990-92

Year	Male	Female
1920-22	32.7	30.7
1945-47	46.8	44.7
1952	57.6	55.5
1962-64	63.3	63.7
1970-72	64.0	66.9
1980-82	67.7	72.1
1990-92	71.1	74.8

Source: Department of Census and Statistics, 1991.

The sharp decline in mortality in the post World War II period has largely been 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. The social infrastructure that was developed before independence began to yield positive results rapidly in terms of average life expectation among the Sri Lankan population. This was a result of the improvements in the economic well-being and on the increase in the average level of consumption (Ministry of Health, 1992).

Yet, 2001 Census data are not publish as broadly, and only estimated figures can be presented to highlight the most recent level of mortality in Sri Lanka. As projected by the Department of Census and Statistics, by 1991 the life expectancy would have been reached to about 71 years for males and 75 years for females (Table 4).

Different sources of data indicate varying degrees of mortality decline in Sri Lanka in recent years. For instance, the reported infant mortality rate (IMR) of 18.5 for the year 1991 obtained from the vital registration system differs considerably from the IMR estimate of 25.3, obtained from the 1993 DHS. The quality of the death registration system, particularly of infants and children, seems to be deteriorating in recent years. On the other hand, mortality estimates derived from the 1993 DHS for previous periods are broadly comparable with registration data (Department of Census and Statistics, 1995). Infant and child mortality estimates derived from the 1993 DHS seem more reliable than the corresponding estimates of the vital registration system. Therefore, when the increase in life expectancy was assumed for males and females in projections of future population size and its composition, this higher than reported level of child mortality has been incorporated into the trend (Table 5).

Sri Lanka's present mortality levels are relatively low compared with those of many countries in the region. The fact that a relatively high level of life expectancy has been reached in Sri Lanka indicates that additional levels of effort are required to increase it further. To a great extent in Sri Lanka, the prevention and treatment of illnesses that occur in the early years of life have substantially improved. Infant and child mortality rates as a result, have been greatly reduced. Consequently, more people are reaching what appears to be an upper age limit, and it is now timely to ask if there is still room for a further reduction of the mortality rate in Sri Lanka.

It is evident when examining the level of mortality achieved by some of the developing countries, that a clear possibility still exists for a further reduction of the rate of mortality in Sri Lanka. On comparing Sri Lanka’s infant mortality rate with that of the Republic of Korea, which achieved an IMR of 8 per 1,000 live births in 1992 (Grant, 1994), Sri Lanka’s IMR is approximately three times higher. Even though by late 1990s IMR has reduced to 18 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 covering remoter areas of the country.

When projecting the upper limit of future life expectancy of Sri Lankans, it is worth considering whether it is possible for Sri Lanka to achieve the present mortality level of Japan, even by the mid

21st century. The present levels of life expectancy of Sri Lankan males and females are fairly comparable with the corresponding Japanese estimates of 1970.

Japan's life expectancy level has increased remarkably during the last two 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 82.2 years in 1992 to 84.3 years in 2000. A comparison of trends in IMR in Sri Lanka and Japan during the last two decades shows the possibility for Lankan females to achieve Japan's present level of life expectancy of 84 years in another 70 years. Even with a moderate rate of economic development, Sri Lanka could be expected to achieve such a level during early period of 2070s. Moreover, the life expectancy at birth assumed for Sri Lanka for the period 2071-2076 is fairly similar to that which is observed in contemporary Japan, which is presently the lowest life expectancy in the world. With further decrease in mortality, the expectation of life of females is assumed to be 84.6 years at the end of projection period (Table 5).

Table 5
Assumed Life Expectancy at Birth for Males and Females
2001-2006 to 2076-2081: High, Standard, and Low Projections

Period	Male			Female		
	High	Standard	Low	High	Standard	Low
2001-2006	70.35	69.93	69.23	76.35	75.70	75.10
2006-2011	71.09	70.39	69.69	77.15	76.29	75.35
2011-2016	71.55	70.85	70.15	77.98	76.88	75.80
2016-2021	72.11	71.31	70.51	78.78	77.48	76.20
2021-2026	72.76	71.76	70.76	79.47	78.07	76.67
2026-2031	73.32	72.22	71.12	80.17	78.67	77.17
2031-2036	73.93	72.68	71.43	80.86	79.26	77.66
2036-2041	74.34	73.14	71.94	81.55	79.85	78.15
2041-2046	74.85	73.60	72.35	82.35	80.45	78.55
2046-2051	75.36	74.06	72.76	82.94	81.04	79.14
2051-2056	75.82	74.52	73.22	83.53	81.63	79.73
2056-2061	76.28	74.98	73.68	84.13	82.23	80.33
2061-2066	76.73	75.43	74.13	84.72	82.82	80.92
2066-2071	77.19	75.89	74.59	85.32	83.42	81.52
2071-2076	77.65	76.35	75.05	85.91	84.01	82.11
2076-2081	78.11	76.81	75.51	86.50	84.6	82.70

The three alternative assumptions of the future trend in mortality rates as middle, high and low values, are shown in Table 5. Again the middle path is taken as the plausible path and taken as standard. 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 standard assumption, life

expectancy at birth for males will increase from 69.93 years in 2001-2006 to 76.81 years in 2076-81. Of the low mortality path the increase is assumed from 70.35 to 78.11 years for the entire time horizon of the projection while under the high mortality assumption the corresponding increase is from 69.23 to 75.51 years only (Figures 3 and 4).

Figure 3
Assumed Life Expectancy at Birth for Males, 2001-2006 to 2076-2081: High, Standard, and Low Projections

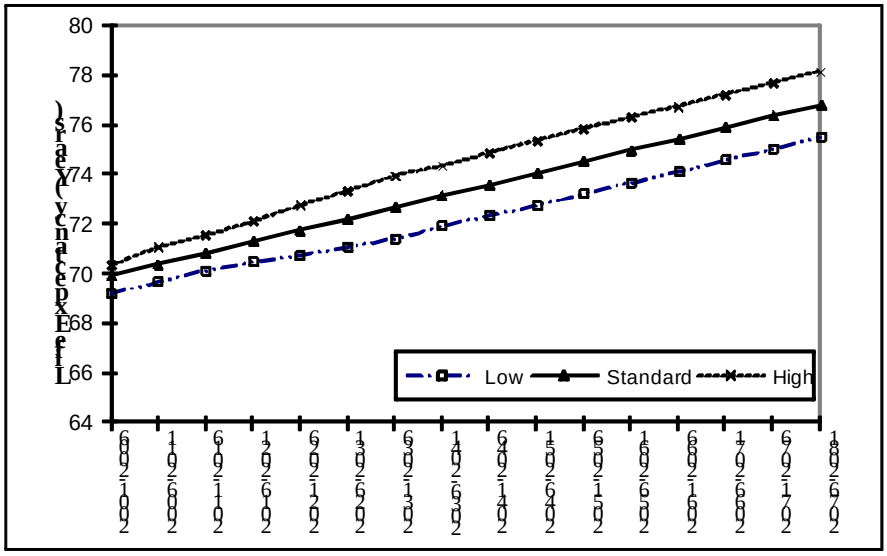
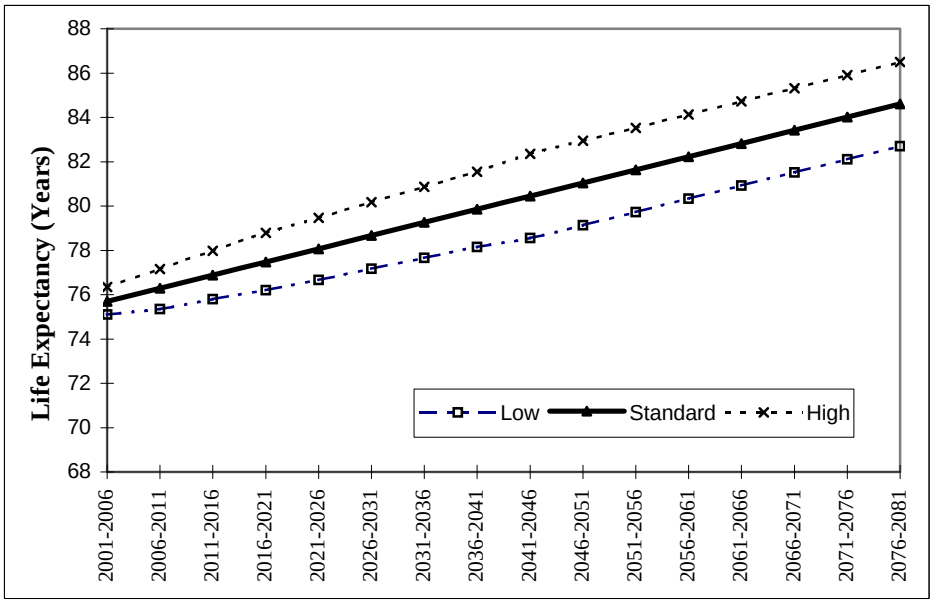


Figure 4
Assumed Life Expectancy at Birth for Females, 2001-2006 to 2076-2081: Standard, High and Low Projections



A suitable age pattern of mortality for Sri Lankan males and females has then been considered for the projection. Since the observed age pattern of mortality of the males and females in Sri Lanka is

closely matched with the Coale-Demeny North model (Department of Census and Statistics, 1991), this particular model life table was selected to represent the Sri Lankan situation.

2.6 Migration Change and Assumptions for the Future

Migration is of particular importance for government planners because, unlike fertility and mortality, migration responds more rapidly to events such as war, famine, economic conditions and restrictions on immigration. Yet, especially in countries with small populations, 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 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.

A notable trend in migration has been observed among many Sri Lankans of Burgher origin who migrated to Australia and New Zealand especially after independence in 1948. Official statistics show that a total of 423,503 Sri Lankans left the country in search of greener pastures during the period of 1957 to 1971. In the 1970s this trend changed with mostly semi- and unskilled workers migrating to West Asia in large numbers for employment.

As reported in the Airport Surveys of the Bureau of Foreign Employment, annual labour out-migration rose to over 170,000 in 1995 compared with 25,875 in 1979. Females accounted for 43 per cent of the total migrants in 1979, but by 1994 the female component increased to 83 per cent of the total. The Bureau of Foreign Employment has collected data on out-migration at the Airport, 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.

Economic development in the Middle East countries since 1970’s, which paved 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 labour migration trend referred to as contract migration can be described as an expansion with a different focus, of the trend which prevailed hither to, where the event of migration was defined to be for a short period only, mostly one to two years, with a facility for renewal. 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. 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 third countries a better economic status. During the last couple of years there has been large number of arrests of young men, by the authorities, who were attempting to leave the country through boats largely to European countries. The volume of undocumented (illegal) boat travellers who left the country successfully could not be obtained. However the year 2001 population census count indicate the existence of significant undocumented such out-migration trend from Sri Lanka to elsewhere.

Adding to this already complex scenario of international migration no reliable data could be obtained on refugee migration from Sri Lanka's Northern and Eastern provinces to India since 1983. Some of the refugees have already moved on from India to other parts of the globe. Some still remain in India and some have returned to Sri Lanka, and no reliable data are available on these migrants as a result of these factors preparation of migration assumption for the population projection becomes even more difficult, than assumptions regarding fertility and mortality.

The above facts demonstrate the difficulty in monitoring Sri Lankan migration at departure points. 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 Bureau of Foreign Employment.

Data from the Department of Immigration and Emigration show that there was an annual net out-migration of 43,000 and 24,000 people during the periods of 1981-1990 and 1991-2000 respectively. It was assumed that this figure was an underestimate of actual migration flows, because outflows made up primarily of migrants from the Northern and Eastern Provinces to India and elsewhere and boat people went largely unrecorded. The out-migration figure was accordingly adjusted to 39,000 for the period 2001-2006 (Table 6).

In adjusting the out-migration figures upward, a special note was also made of a related factor. During the JVP-led youth insurgency in the 1987-91 period between 40- and 50,000 youth the majority of whom were Sinhala and aged 20-34, died in circumstances in which their deaths were not officially registered. The above figures would have had the effect of reducing average life expectancy and have implications for the overall size and composition of the population, but it is not advisable to introduce them into the usual mortality assumptions because the effect would have been purely temporary. One of the ways to incorporate the figures into the projection would be by treating

them as net losses, having the same effect as emigration. Any over-adjustment in the net migration figures described above would tend to be counterbalanced by the impact of these losses, which have not been otherwise incorporated into the projections.

Table 6
Assumed Net Migrants, 2001-2006 to 2076-2081: High, Standard, and Low Projections (in thousands)

Period	Male			Female		
	High	Standard	Low	High	Standard	Low
2001-2006	-87.40	-93.40	-98.40	-96.60	-102.60	-107.60
2006-2011	-58.50	-66.50	-81.50	-74.40	-83.40	-97.40
2011-2016	-29.20	-39.20	-63.20	-51.70	-62.70	-90.70
2016-2021	-9.60	-29.60	-56.60	-25.40	-44.40	-83.40
2021-2026	-2.60	-20.60	-45.60	-10.40	-25.40	-70.40
2026-2031	0	0	-31.00	0	- 5.00	-63.00
2031-2036	0	0	-21.00	0	0	-48.00
2036-2041	0	0	-10.00	0	0	-35.00
2041-2046	0	0	0	0	0	-22.00
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

Note: Negative sign (-) indicates net migration is outwards

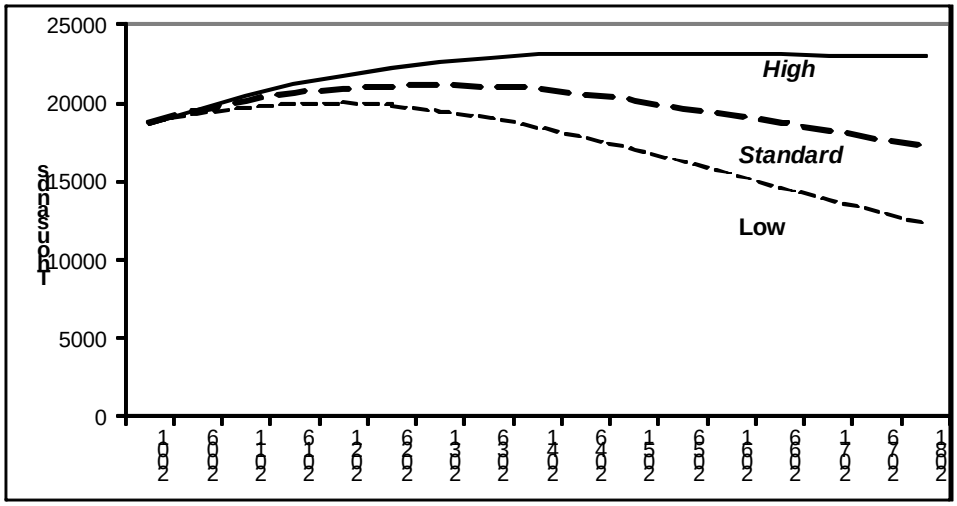
As done in the case of fertility and mortality, three assumptions were developed for international migration. In the most plausible path (standard) the net outflows were assumed to continue to decline up to the period 2021-26 for males and 2031-36 for females, and be insignificant thereafter. In the high alternative, it was assumed that there would be no significant out-migration after the period 2021-26. In the low alternative meanwhile, out-migration of males was assumed to decline up to 2036-2041 and for the females to decline up to 2041-2046,and be insignificant thereafter (Table 6).

3. Size and Growth of the Future Population

Future populations are projected using the cohort component method which involves a sequence of computations that are repeated for successive five-year time intervals. The computations use assumptions on future demographic conditions to modify the age and sex structure of the population, as well as to derive various indicators of the population size, structure and changes. The computations produce the age and sex structure projections for five-year intervals up to the end of the projection period, along with different types of indicators for these time intervals.

Figure 5

Projected Population, 2001 to 2081: High, Standard & Low Projections



A simple combination of standard assumptions on fertility, mortality and international migration along with the base population of 2001, produces a standard population projection. Alternatively, fertility, mortality and international migration favouring high population growth will produce a high population projection and the combination favouring low growth will produce a low population projection. Of the three projections, the most plausible future population will be represented by the standard population projection, while high and low projections will indicate the possible upper and lower bounds (Figure 5). As shown in figure 5, the variability in the projected size of the Sri Lankan total population through the high, standard and low projections will be lesser for immediate future, however the longer the time horizon the variability tend to increase significantly.

Whether replacement level or below replacement level fertility is assumed for the period of 2001-2006, Sri Lanka's total population will continue to rise in the foreseeable future. According to the standard projection the population would reach 20.1 million by 2011, and then reach an almost-stable level of 21 million by the year 2016 (Table 7). This stability would remain until 2041 and beyond that the size of the total population would decline and back to 17.2 million by 2081. Thus for about 25 year period covering 2016 to 2041 the total size of the population of Sri Lanka would be around 21.0 million. However, beyond that point, primarily due to assumed significantly low level of fertility, the total size would decline (Table 7).

Table 7
Projected Population, 2001 to 2081:
Standard, High and Low Projections (in thousands)

Year	High	Standard	Low
2001	18734.5	18734.5	18734.5
2006	19606.5	19462.7	19272.8
2011	20438.5	20110.6	19672.4
2016	21174.2	20629.7	19923.2
2021	21778.8	20948.2	19979.5
2026	22237.2	21087.7	19829.9
2031	22619.0	21146.1	19505.7
2036	22916.9	21075.8	19030.7
2041	23116.7	20883.6	18442.9
2046	23208.5	20564.9	17756.0
2051	23207.0	20149.3	17017.7
2056	23148.9	19670.9	16224.8
2061	23141.6	19217.4	15432.2
2066	23104.4	18724.0	14604.4
2071	23038.1	18211.0	13790.5
2076	23005.2	17727.3	13025.9
2081	22959.4	17242.5	12293.5

In the high trajectory of the population projection the Sri Lankan population would reach a maximum of 23.2 million by 2046, while in the low trajectory the population would reach the highest total of 20.0 million by 2021. Depending on the three sets of projections taken, the final population in the year 2081 will be as high as 22.9 million or as low as 12.3 million. As noted in the standard projection the total population of Sri Lanka would decline marginally from 18.7 million in 2001 to 17.2 million in 2081, achieving the stability of total size of 21 million during the period 2016 to 2041.

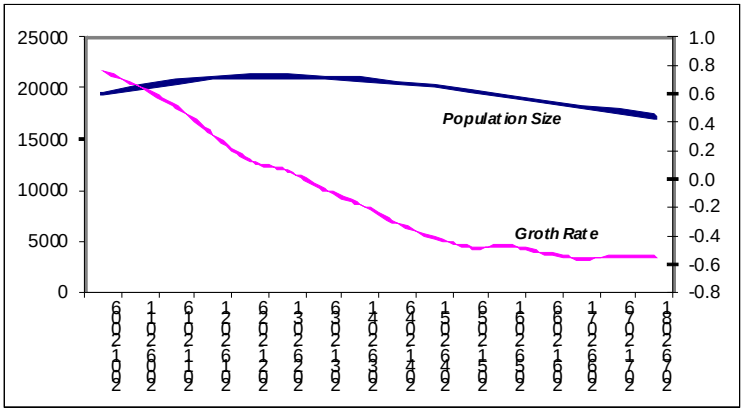
Whichever of the standard, high and low population projections is accepted, the growth in future numbers will continue (Table 8). This is also true for the low projection as well, in which below replacement level fertility (TFR of 1.84) is assumed for the period 2001-2006. Since a significantly large number of women will be entering reproductive ages in coming years, the Sri Lankan population currently demonstrates a built-in momentum for growth.

Table 8
Population Increase and Average Rate of Growth During Quinquennial Periods, 2001-2006 to 2076-2081: Standard, High and Low Projections (in thousand)

Period	High		Standard		Low	
	Absolute increase	Rate of growth (percent)	Absolute increase	Rate of growth (percent)	Absolute increase	Rate of growth (percent)
2001-2006	872.2	0.91	728.2	0.76	538.3	0.57
2006-2011	832.0	0.83	647.9	0.65	399.6	0.41
2011-2016	735.7	0.71	519.1	0.51	250.8	0.25
2016-2021	604.6	0.56	318.5	0.31	56.3	0.06
2021-2026	458.4	0.42	139.5	0.13	-146.6	-0.15
2026-2031	381.8	0.34	58.4	0.06	-324.2	-0.33
2031-2036	297.9	0.26	-70.3	-0.07	-475.0	-0.49
2036-2041	199.8	0.17	-192.2	-0.18	-587.8	-0.63
2041-2046	91.8	0.08	-318.7	-0.31	-686.9	-0.76
2046-2051	-1.5	-0.00	-415.6	-0.41	-738.3	-0.85
2051-2056	-58.1	-0.05	-478.4	-0.48	-792.9	-0.95
2056-2061	-7.3	-0.01	-453.5	-0.47	-792.6	-1.00
2061-2066	-37.2	-0.03	-493.4	-0.52	-827.8	-1.10
2066-2071	-66.3	-0.06	-513.0	-0.56	-813.9	-1.15
2071-2076	-32.9	-0.03	-483.7	-0.54	-764.6	-1.14
2076-2081	-45.8	-0.04	-484.4	-0.55	-732.4	-1.16

In the standard projection, the absolute addition to the total population is about 2.4 million (the difference between 21.1 and 18.7 million) before the total population reach its peak in the year 2031 (Table 7 & Figure 6)). In the high projection, the absolute addition to the total population is about 4.5 million at the time it reaches the level of 23.2 million in the year 2046. The low projection indicates the lowest addition of 1.3 million to the current Sri Lankan population, before it reaches a peak level of 20.0 million in 2021.

Figure 6
Projected Increase in Population Size and Decease in Rate of Growth, 2001-2006 to 2076-2081: Standard Projection



Even though the absolute size of the Sri Lankan population will increase, its rate of growth will decrease gradually as shown in table 8. If the population growth stabilises at a very low level near zero, through the attainment of almost the same levels of crude birth and crude death rates, the increase or decrease in population will be minimal. As observed in the standard projection in figure 6, 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 0.76, which will decline to a negative rate by the period 2031-2036, indicating a corresponding decline in the total population.

In the low projection, a near-zero level growth rate is seen after the year 2011, which will attain a negative growth rate after 2021, indicating a decline in the size of the total population (Table 8).

4. Components of Population Growth

In the standard projection for the period 2001-2081 the crude birth rate declines from 16.32 births to 9.5 births per 1,000 people (Table 9). The crude death rate meanwhile increases from the current level of 6.7 to 15.1 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 9.7 to negative –5.5 per 1,000 people during the projection horizon (Table 9 and Figure 7).

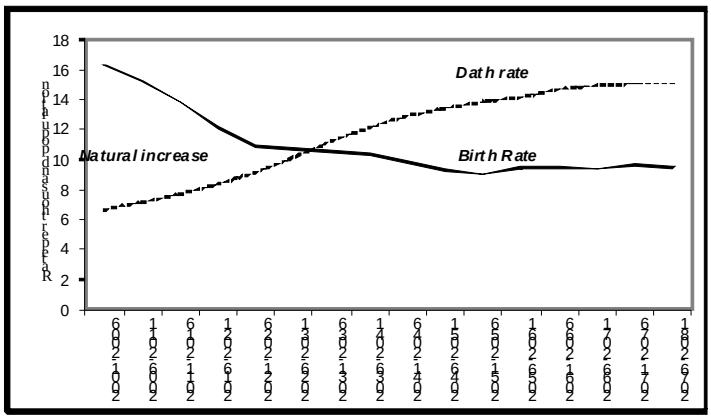
Table 9
Birth Rate, Death Rate and Natural Increase, 1991-96 to 2036-41
Standard, High and Low Projections (per thousand)

Period	High			Standard			Low		
	Crude Birth Rate	Crude death rate	Natural Increase	Crude Birth Rate	Crude death rate	Natural increase	Crude birth rate	Crude death Rate	Natural increase
2001-2006	17.50	6.48	11.02	16.32	6.67	9.68	14.74	6.91	7.83
2006-2011	16.46	6.82	9.64	15.21	7.15	8.06	13.43	7.49	5.94
2011-2016	15.13	7.28	7.85	13.80	7.70	6.10	12.25	8.17	4.09
2016-2021	13.73	7.78	5.95	12.12	8.34	3.78	10.95	8.98	1.97
2021-2026	12.70	8.42	4.28	10.93	9.16	1.76	9.67	10.01	-0.34
2026-2031	12.61	9.21	3.40	10.70	10.15	0.55	8.88	11.23	-2.34
2031-2036	12.64	10.03	2.62	10.57	11.24	-0.67	8.42	12.64	-4.22
2036-2041	12.45	10.71	1.74	10.32	12.15	-1.83	8.05	13.85	-5.79
2041-2046	12.02	11.23	0.79	9.86	12.93	-3.08	7.71	15.06	-7.35
2046-2051	11.58	11.59	-0.01	9.35	13.43	-4.08	7.42	15.91	-8.49
2051-2056	11.35	11.85	-0.50	9.04	13.85	-4.81	7.13	16.68	-9.54
2056-2061	11.93	11.99	-0.06	9.52	14.18	-4.67	7.31	17.33	-10.01
2061-2066	11.93	12.25	-0.32	9.50	14.70	-5.20	7.11	18.13	-11.02
2066-2071	11.83	12.40	-0.58	9.39	14.95	-5.56	7.14	18.61	-11.47
2071-2076	12.20	12.49	-0.29	9.71	15.10	-5.38	7.55	18.95	-11.40
2076-2081	12.04	12.44	-0.40	9.51	15.05	-5.55	7.47	19.04	-11.57

In the high projection however, the decline in the crude birth rate from 17.5 to 11.9 by 2061-2016 and thereafter the increase in the crude death rate is less rapid. As a result of this trend, the rate of natural increase in the high projection is around –0.40 per 1,000 people by the period 2076-81.

In the low projection, the rise in death rate is more rapid than the drop in birth rate. The rate of natural increase in the low projection therefore, drops rapidly to approach a zero growth level by the period 2016-2021 and shows negative growth thereafter.

Figure 7
Projected Decrease in Crude Birth Rates and Increase in Death Rates, 2001-2006 to 2076-2081: Standard Projections



It should be noted that, in the 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.

5. Characteristics of Future Population

The age structure of a population is a significant factor that influences current and future fertility, mortality and migration. There are various methods by which to analyse the age structure of a population. Only three are discussed in this section, namely median age, the distribution by broad age groups and, the dependency ratio.

5.1 Median Age

In all the three levels of population projections, a rapid rise in the median age of the population is a conspicuous feature of the future demography of Sri Lanka. In 2001, the median age is 29.6 years, which means that half of the population is below 29.6 years. The median age in the standard projection however will rise to 40.4 years by 2031 and rise further to 47 years by the year 2081, because of the rapid decline in fertility and mortality (Table 10 and Figure 8).

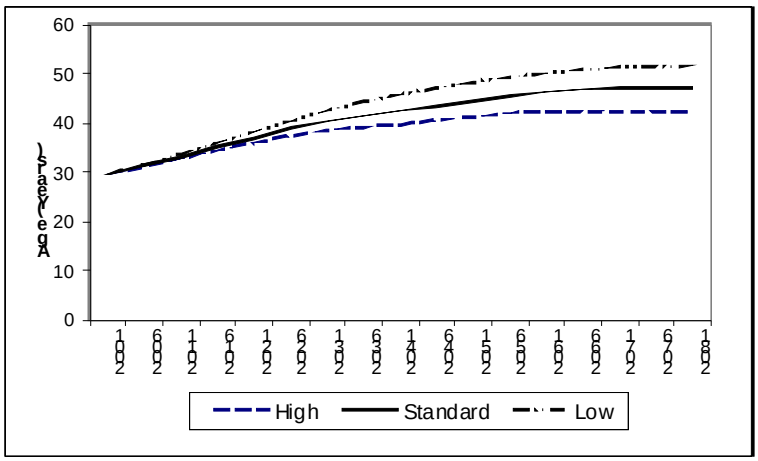
Table 10
Median Age, 2001 to 2081:
Standard, High and Low Projections (in years)

Year	High	Standard	Low
2001	29.65	29.65	29.65
2006	31.19	31.39	31.66
2011	32.84	33.23	33.78
2016	34.51	35.17	36.06
2021	36.03	37.04	38.28
2026	37.47	38.86	40.43
2031	38.58	40.44	42.48
2036	39.23	41.57	44.30
2041	39.72	42.52	45.79
2046	40.55	43.47	47.14
2051	41.36	44.52	48.31
2056	42.05	45.57	49.28
2061	42.41	46.37	50.12
2066	42.46	46.84	50.83
2071	42.42	46.99	51.35
2076	42.38	46.98	51.55
2081	42.42	47.09	51.61

The shift of the median age of the population towards the older age groups is also seen in the high and low projections, which give a median age of 42.4 years and 51.6 years respectively by the year 2081. These trends show how fast the Sri Lankan population is becoming aged and how Sri Lanka will be one of the fastest ageing countries in Asia.

Changes in the different components in age structure have major implications for the country's socio-economic development activities. Therefore, changes in the functional age groups, namely children (0-14 years), adults of working age (15-59 years) and the elderly (60+ years) are discussed in the following sections using their projected percentage distribution and dependency ratios.

Figure 8
Projected Median Age, 2001 to 2081:
Standard, High and Low Projections



5.2 Population by Broad Age Groups

Sri Lanka's population will undergo major changes in its age structure in the coming decades. The population age structures of 2001 and 2081 clearly indicate the impact of the rapid decline of fertility and improvement in life expectancy (Figure 9). The population age structure beyond year 2016 poses a new challenge to Sri Lankan society, particularly ageing and potential work force.

The proportion of the young population aged less than 15 years was about 25 per cent in 2001 and it is projected to decline steadily over the projection period (Table 11). The proportion of the young is expected to decrease to 14.8, 17.9 and 11.9 per cent at the end of the projection period, in standard, high and low variants respectively. It should be noted that greater the decrease in fertility, the greater the decrease in the proportions in the under 15 age category.

Figure 9
Projected Contrasts in the Age Structure of the Population, 2001, 2041 and 2081: Standard Population (percentage)

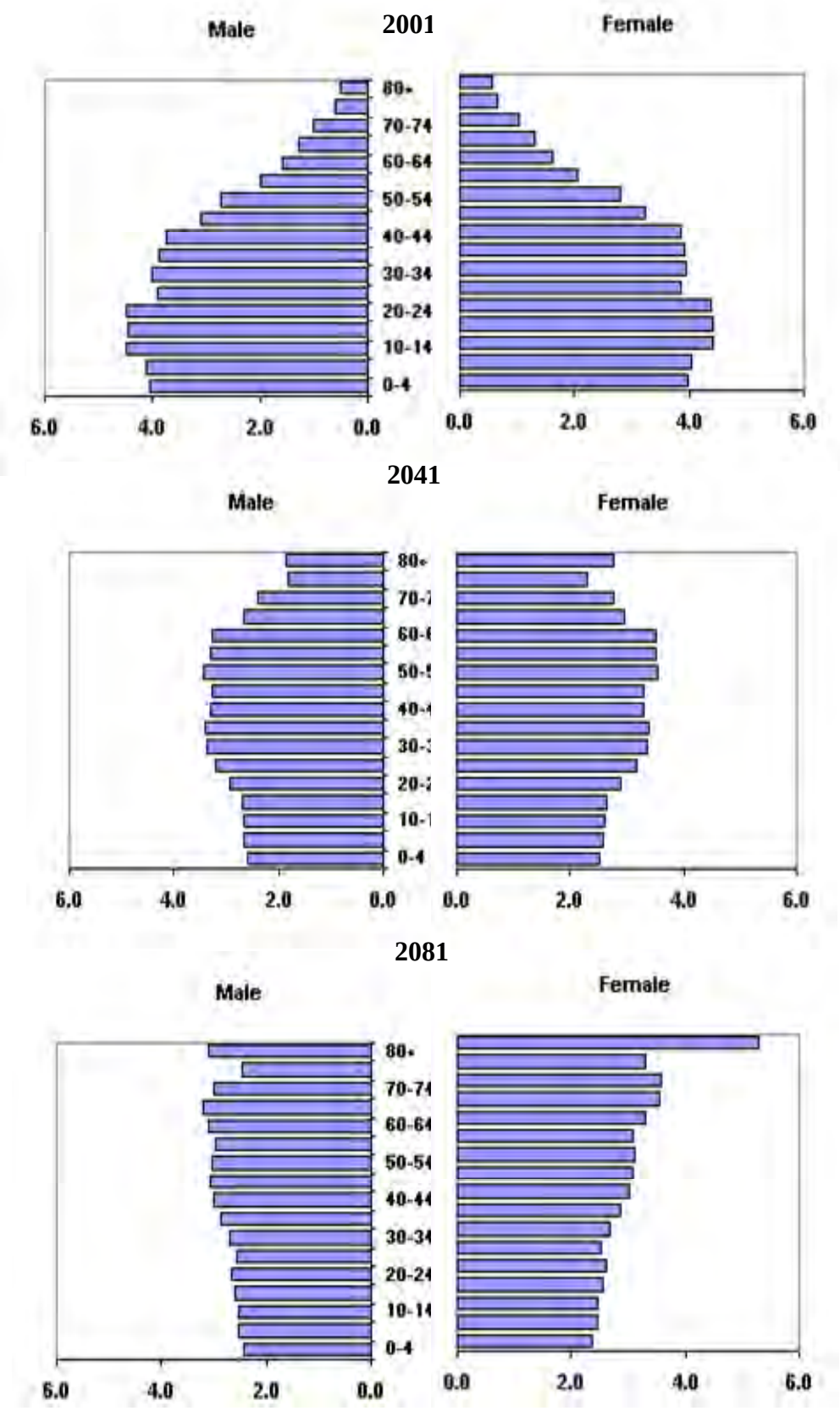


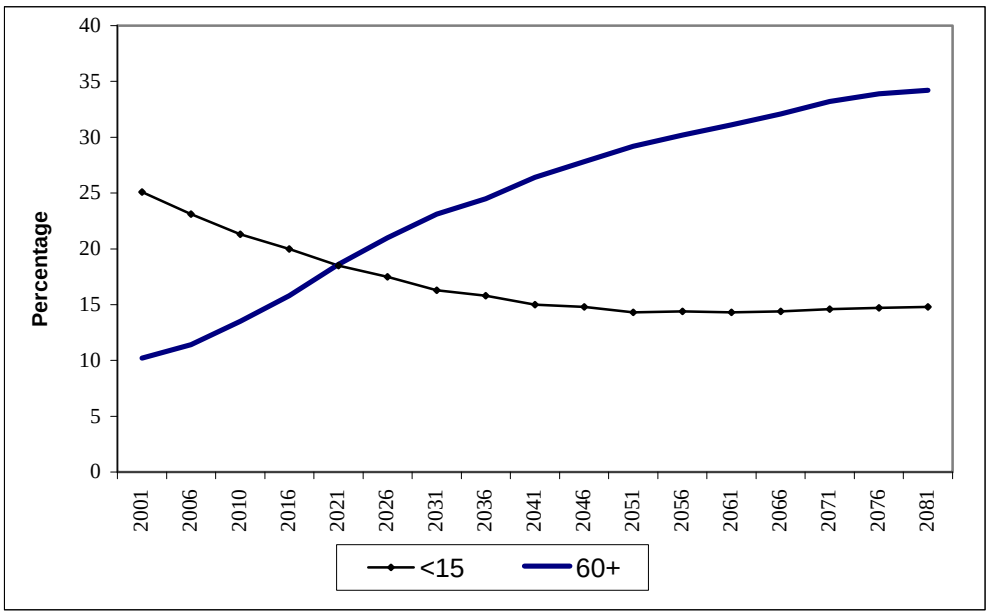
Table 11
Projected Percentage Distribution of Population of Sri Lanka
By Broad Age Groups, 2001-2081

Projection Variant and age	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2051	2056	2061	2066	2071	2076	2081
High																	
< 15	25.1	23.6	22.9	22.3	20.9	19.5	18.6	18.2	18.3	18.1	17.7	17.3	17.3	17.5	17.7	17.9	18.0
15-59	64.8	65.0	63.7	62.1	60.9	60.1	59.2	58.5	56.9	56.0	55.4	55.4	55.2	54.3	53.3	52.8	52.6
60+	10.2	11.4	13.4	15.5	18.1	20.4	22.2	23.3	24.8	25.9	26.8	27.3	27.5	28.3	29.0	29.4	29.4
Standard																	
< 15	25.1	23.1	22.0	20.8	19.2	17.5	16.3	15.8	15.6	15.4	14.9	14.4	14.3	14.4	14.6	14.7	14.8
15-59	64.8	65.4	64.5	63.4	62.2	61.4	60.6	59.8	58.0	56.8	55.8	55.4	54.7	53.5	52.2	51.3	51.0
60+	10.2	11.4	13.5	15.8	18.6	21.0	23.1	24.5	26.4	27.8	29.2	30.2	31.1	32.1	33.2	33.9	34.2
Low																	
< 15	25.1	22.5	20.6	18.7	17.2	16.2	14.4	16.2	14.4	13.4	12.8	12.4	12.0	11.7	1.2	11.5	11.6
15-59	64.8	66.0	65.7	65.2	63.6	61.8	61.2	61.8	61.2	60.4	58.5	56.9	55.2	54.1	63.1	51.8	50.8
60+	10.2	11.5	13.7	16.1	19.1	21.9	24.4	21.9	24.4	26.2	28.7	30.7	32.7	34.2	35.8	36.7	37.6

In contrast to the child population, the working age population between 15 and 59 years of age will continue to rise until 2006 and show a decline thereafter. This pattern is similar in all the three projections. In the standard projection for instance, the percentage of the working age population will increase from 64.8 per cent in 2001 to 65.4 per cent by the year 2006 and then decline to 51 per cent by 2081.

Proportion of the population age 60 years and over, rose from 5 per cent in 1946 to 10 percent in 2001. The onset of the ageing process was accelerated with the rapid decrease in fertility that occurred during that period (Figure 10).

Figure 10
Relative Size of the Child (<15) and Elderly (60+) Age Groups
2001 to 2081: Standard Projection



The proportion of the population in standard projection aged 60 years and over is expected to increase to about 16 per cent by 2016 in each projection trajectory, as a result of the future trends in fertility, mortality and international migration (Figure 10). The rapid growth of the elderly 60 years and over is expected throughout the 21st century. Thus by 2041 the proportion would be about one-forth of the total population in the standard projection. This situation could result in considerable socio-economic and health consequences. A considerable number would be retiring from active life and an even larger number would be simply sliding into dependency with a consequent need for economic and social support.

5.3 Dependency Ratio

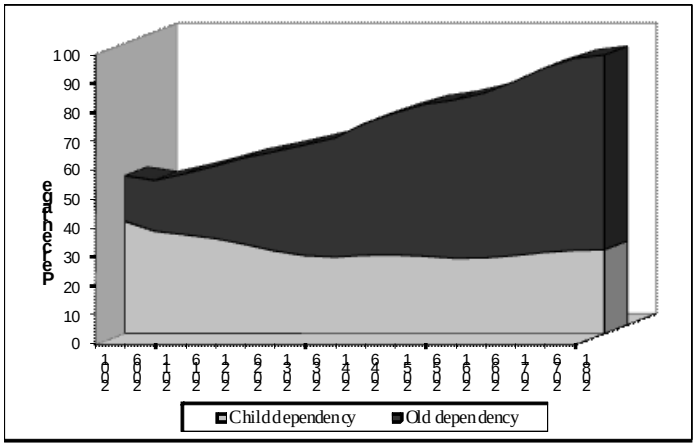
Change in the age structure of the population determines the change in the level of demographic dependency. Three dependency ratios, namely child dependency, old age dependency and, the combination of these two known as total dependency, are discussed in this study, though only for the standard projection. The dependency ratio is defined as the ratio between the number of total dependents to the number of persons between 15 and 59 years (Table 12).

Table 12
Dependency Ratios 2001 to 2081: Standard Projection

Year	Child dependency (< 15 years)	Old age dependency (60+ years)	Total dependency
2001	36.9	10.3	47.2
2006	33.5	11.3	44.8
2011	31.7	12.7	44.4
2016	30.3	15.5	45.8
2021	28.1	18.4	46.5
2026	25.9	22.1	48.0
2031	24.4	25.4	49.8
2036	24.0	28.2	52.2
2041	24.1	30.2	54.3
2046	24.2	33.3	57.5
2051	23.8	35.8	59.6
2056	23.3	38.3	61.6
2061	23.3	40.0	63.3
2066	23.8	41.7	65.5
2071	24.7	44.1	68.8
2076	25.3	46.4	71.7
2081	25.7	48.4	74.1

At the beginning of the projection interval in 2001, the total dependency ratio is 54.4 per cent, of which 38.7 per cent of the population is child dependents and 15.7 is old dependents (Table 12). During the projection horizon child dependency decreases to 28.9 per cent, while old age dependency increases in an accelerated phase to reach 67.1 per cent by the year 2081. The projected changes in these two segments of dependency in Sri Lankan population will bring a reduction in the total dependency ratio from 54.4 per cent in 2001 to it's lowest of 52.8 per cent by 2006. Thereafter however the overall dependency increases from 52.8 to 72.4 per cent by the year 2041 and to 96 per cent by the year 2081, as a result of the rapid increase in old age dependency which out-paces the decline in young age dependency (Figure 11). These dependency ratios imply that the future age structure are likely to have a favourable impact on the economy of Sri Lanka up to the year 2006. Beyond that point, economic planners will have to address the consequences of an increasing dependency ratio.

Figure 11
Projected Changes in Child and Old Dependency Ratios, 2001 to 2041:Standerd Projection



In relation to the labour force, ageing consists of an increase in the number of older workers relative to the number of young ones. At the same time the slowdown in labour force growth linked to ageing is reduced the supply of all workers. It is the contribution of labour force ageing and shrinkage that is important, not the ageing per se.

6. Conclusions

Population projections have a distinctive role in the development planning and policy formulation spheres. Awareness of the future population size is a crucial requirement, to target for the future economic and social planning perspectives. In the same venue, the size of the future population will set clues for the desirable future growth rates and patterns. In almost all countries in the world, planning for the future has become a requisite of modern socio-political life.

Over the last many decades, in order to understand the dynamics of future Sri Lanka population, Sri Lanka demographers have been engaging in generating a series of population projections. Therefore, in the planning process, the “population change” can be regarded as a dependent rather than an independent variable. Nevertheless, Sri Lanka is one of the few countries in the developing region where the ramifications of population growth have been recognized at early stages of the development process. Particularly after 1960s, a significantly large number of direct and indirect policies and programmes have been implemented to reduce the rapid growth of population.

Changes that occurred in the components of population growth, namely the fertility, mortality and international migration levels, have caused the Sri Lankan population to change significantly. It has grown almost eight times since the first national census of 1871, which recorded only 2.4 million people. The population size has increased from 14.8 million in 1981 to 18.7 million in 2001. Initially approximately 54 years, from 1871 to 1925 elapsed for the doubling of the population to take place, but due to rapid changes in the components of population growth, from 1925 to 1960, it doubled again in 35 years.

The time horizon of the present study, "Beyond Twenty Million: Projecting the Population of Sri Lanka 2001-2081", undertaken to assess the long-term demographic dynamics of the Sri Lankan population, covers the period 2001 to 2081. A standard population projection trajectory is produced by a combination of the standard assumptions on fertility, mortality and international migration for which the base year population is taken from the population census of 2001. Additionally, high and low trajectories of population projections for Sri Lanka for the same period were also attempted.

According to the standard projection, the population would reach 20.1 million by 2011 and could attain its peak by 2031, reaching a size of 21.1 million. A near-zero population growth rate would be attained during the period 2021 to 2036 where the total size of the population is approximated to be 21 million. Beyond 2040s, primarily due to a significantly low level of declined fertility, the size of the total Sri Lanka population would decline.

An addition of 2.4 million persons to the base year population of 2001, in the next three decades (2001 to 2031), could create a number of demographic, social, economic, the Sri Lankan population will undergo major composition changes in its age-sex structure and distribution. The reversal of the gender balance favouring females is an important feature in the new millennium. In the near future, the Sri Lankan policy planners will have to confront with many issue such as well below replacement fertility, increase of total dependency and consequent ageing of the population.

Appendix A

Table A1
Population by Age and Sex, 2001 and 2006: Standard Projection (in thousands)

	2001			2006		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	759.6	745.1	1504.7	764.3	743.3	1507.6
5-9	767.3	756.9	1524.2	746.9	734.8	1481.7
10-14	837.5	828.2	1665.7	760.7	751.1	1511.8
15-19	831.0	824.2	1655.2	815.9	807.4	1623.3
20-24	839.0	824.1	1663.1	795.4	789.5	1584.9
25-29	735.5	721.6	1457.1	817.9	807.6	1625.5
30-34	753.5	739.4	1492.8	719.5	711.8	1431.3
35-39	729.1	733.6	1462.6	739.7	732.1	1471.8
40-44	701.4	720.5	1421.9	715.6	725.6	1441.2
45-49	583.6	605.2	1188.9	686.3	710.6	1396.9
50-54	513.4	524.4	1037.9	565.7	592.9	1158.6
55-59	370.2	382.4	752.6	491.2	509.2	1000.4
60-64	298.1	303.5	601.6	346.7	365.9	712.6
65-69	238.6	247.4	486.0	268.7	282.4	551.1
70-74	186.6	193.0	379.6	202.3	218.8	421.1
75-79	116.6	122.4	238.9	142.1	155.4	297.5
80+	96.0	105.6	201.6	113.7	131.6	245.3
All ages	9357.0	9377.5	18734.5	9692.7	9770.0	19462.7
Median age	29.4	29.9	29.6	31.0	31.8	31.4
SUMMARY						
Under 15	2364.4	2330.2	4694.6	2271.9	2229.2	4501.1
15-49	5173.0	5168.6	10341.6	5290.3	5284.6	10575.0
50-59	883.7	906.8	1790.5	1056.9	1102.1	2159.0
60+	935.9	971.9	1907.8	1073.5	1154.1	2227.6

Table A2
Population by Age and Sex, 2011 and 2016: Standard Projection (in thousands)

	2011			2016		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	739.4	718.7	1458.1	693.3	673.6	1367.0
5-4	754.0	734.9	1488.8	731.6	712.2	1443.9
10-14	741.6	730.0	1471.6	749.9	731.1	1481.0
15-19	744.6	734.2	1478.8	730.8	717.2	1448.0
20-24	788.9	779.0	1567.9	726.8	712.6	1439.4
25-29	778.7	775.8	1554.5	776.1	768.3	1544.4
30-34	803.6	798.9	1602.5	767.4	768.8	1536.2
35-39	707.8	705.6	1413.4	792.5	793.2	1585.7
40-44	727.2	725.0	1452.3	697.0	699.5	1396.5
45-49	701.1	716.4	1417.6	713.4	716.7	1430.1
50-54	666.3	697.3	1363.7	681.6	704.1	1385.7
55-59	542.1	576.9	1119.0	639.5	679.9	1319.5
60-64	461.1	488.7	949.8	509.8	555.2	1065.0
65-69	313.3	341.7	655.0	417.6	458.1	875.7
70-74	228.6	251.0	479.6	267.4	305.2	572.6
75-79	154.7	177.4	332.1	175.6	204.8	380.4
80+	138.2	167.7	305.9	157.3	201.2	358.6
All ages	9991.2	10119.3	20110.6	10227.9	10401.8	20629.7
Median age	32.8	33.7	33.2	34.6	35.7	35.2
SUMMARY						
Under 15	2234.9	2183.6	4418.5	2174.8	2117.0	4291.8
15-49	5252.0	5234.9	10486.9	5204.1	5176.3	10380.3
50-59	1208.5	1274.2	2482.7	1321.2	1384.0	2705.2
60+	1295.9	1426.6	2722.5	1527.8	1724.5	3252.3

Table A3
Population by Age and Sex, 2021 and 2026: Standard Projection (in thousands)

	2021			2026		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	622.7	605.6	1228.3	568.9	553.9	1122.9
5-9	687.0	668.9	1355.9	617.7	602.6	1220.3
10-14	728.2	709.5	1437.6	684.1	667.2	1351.3
15-19	741.0	721.8	1462.8	721.2	703.8	1425.1
20-24	716.3	701.6	1417.8	729.4	712.3	1441.7
25-29	716.3	704.7	1421.0	707.4	696.3	1403.7
30-34	766.1	762.7	1528.9	707.9	700.8	1408.8
35-39	757.7	764.2	1521.8	757.2	758.9	1516.1
40-44	781.2	787.3	1568.6	747.5	759.2	1506.7
45-49	684.3	692.2	1376.5	767.7	780.0	1547.8
50-54	694.3	705.3	1399.6	666.6	682.1	1348.7
55-59	655.0	687.7	1342.7	668.0	690.1	1358.1
60-64	602.4	655.9	1258.3	617.9	664.9	1282.8
65-69	462.8	522.0	984.8	548.0	618.7	1166.7
70-74	357.6	411.0	768.6	397.5	470.6	868.1
75-79	206.3	250.7	457.0	277.1	340.0	617.2
80+	179.9	238.1	418.0	210.9	290.9	501.8
All ages	10359.0	10589.3	20948.2	10395.1	10692.6	21087.7
Median age	36.3	37.7	37.0	38.0	39.7	38.9
SUMMARY						
Under 15	2037.8	1984.0	4021.8	1870.8	1823.7	3694.5
15-49	5162.9	5134.6	10297.5	5138.3	5111.5	10249.8
50-59	1349.3	1393.0	2742.3	1334.6	1372.2	2706.8
60+	1809.0	2077.7	3886.7	2051.4	2385.2	4436.6

Table A4
Population by Age and Sex, 2031 and 2036: Standard Projection (in thousands)

	2031			2036		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	561.9	547.6	1109.5	555.8	541.6	1097.5
5-9	566.0	553.1	1119.1	559.2	547.0	1106.2
10-14	616.0	602.2	1218.2	564.5	552.8	1117.3
15-19	681.3	666.4	1347.7	613.6	601.5	1215.1
20-24	716.2	702.5	1418.7	676.8	665.2	1342.1
25-29	723.3	710.4	1433.7	710.5	700.8	1411.3
30-34	701.1	694.2	1395.3	717.2	708.5	1425.7
35-39	700.8	698.3	1399.1	694.4	692.0	1386.3
40-44	748.0	754.9	1502.9	692.7	695.0	1387.7
45-49	735.4	753.1	1488.4	736.3	749.3	1485.6
50-54	748.8	769.8	1518.6	717.8	743.9	1461.7
55-59	642.3	668.7	1310.9	722.3	755.6	1477.9
60-64	631.3	668.7	1300.0	607.9	649.2	1257.1
65-69	563.5	629.2	1192.7	577.0	634.7	1211.7
70-74	472.3	560.5	1032.7	487.2	572.5	1059.7
75-79	309.6	392.0	701.6	369.6	470.0	839.6
80+	272.6	384.3	656.9	322.4	470.8	793.2
All ages	10390.2	10755.9	21146.1	10325.3	10750.5	21075.8
Median age	39.5	41.3	40.4	40.5	42.6	41.6
SUMMARY						
Under 15	1743.9	1702.9	3446.8	1679.6	1641.4	3321.0
15-49	5006.1	4979.8	9985.8	4841.5	4812.4	9653.9
50-59	1391.0	1438.5	2829.5	1440.1	1499.5	2939.6
60+	2249.3	2634.7	4884.0	2364.1	2797.2	5161.3

Table A5
Population by Age and Sex, 2041 and 2046: Standard Projection (in thousands)

	2041			2046		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	540.0	526.2	1066.2	510.2	496.9	1007.1
5-9	553.4	541.1	1094.6	537.9	525.7	1063.6
10-14	557.9	546.7	1104.6	552.2	540.9	1093.1
15-19	562.4	552.3	1114.8	556.0	546.3	1102.2
20-24	609.7	600.7	1210.4	559.1	551.6	1110.6
25-29	671.7	663.9	1335.6	605.3	599.5	1204.9
30-34	704.8	699.2	1404.0	666.5	662.4	1329.0
35-39	710.7	706.5	1417.2	698.7	697.3	1396.0
40-44	686.7	689.1	1375.7	703.2	703.7	1406.8
45-49	682.4	690.3	1372.7	676.9	684.6	1361.5
50-54	719.4	740.9	1460.3	667.3	682.9	1350.2
55-59	693.2	731.1	1424.3	695.6	728.7	1424.3
60-64	684.8	735.0	1419.8	658.2	712.2	1370.4
65-69	556.9	617.9	1174.8	628.6	702.0	1330.6
70-74	500.5	580.1	1080.5	484.6	568.5	1053.1
75-79	383.1	483.3	866.4	395.4	495.3	890.7
80+	386.5	575.4	961.9	425.9	644.9	1070.8
All ages	10203.9	10679.7	20883.6	10021.6	10543.3	20564.9
Median age						
SUMMARY	41.4	43.7	42.5	42.3	44.6	43.5
Under 15	1651.3	1614.0	3265.3	1600.3	1563.5	3163.7
15-49	4628.4	4601.9	9230.3	4465.7	4445.3	8911.0
50-59	1412.6	1472.0	2884.7	1362.9	1411.6	2774.5
60+	2511.6	2991.8	5503.4	2592.8	3122.9	5715.7

Table A6
Population by Age and Sex, 2051 and 2056: Standard Projection (in thousands)

	2051			2056		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	476.0	463.3	939.3	450.9	438.6	889.5
5-9	508.4	496.5	1004.9	474.5	462.9	937.4
10-14	536.8	525.5	1062.3	507.5	496.3	1003.7
15-19	550.4	540.5	1090.9	535.1	525.1	1060.2
20-24	552.8	545.5	1098.3	547.5	539.8	1087.3
25-29	555.3	550.6	1105.8	549.3	544.6	1093.9
30-34	601.0	598.2	1199.2	551.5	549.4	1100.9
35-39	661.1	660.7	1321.8	596.3	596.7	1193.0
40-44	691.7	694.5	1386.2	654.8	658.0	1312.9
45-49	693.6	699.2	1392.8	682.8	690.2	1372.9
50-54	662.5	677.5	1340.0	679.5	692.1	1371.6
55-59	645.9	672.1	1318.0	642.0	667.2	1309.2
60-64	661.5	710.8	1372.3	615.3	656.4	1271.7
65-69	605.6	682.6	1288.2	610.0	683.6	1293.6
70-74	548.8	650.6	1199.4	530.4	637.2	1167.7
75-79	384.6	491.8	876.4	437.7	570.0	1007.7
80+	454.5	699.0	1153.5	463.0	734.9	1197.9
All ages	9790.6	10358.7	20149.3	9528.0	10142.9	19670.9
Median age	43.3	45.7	44.5	44.2	46.9	45.6
SUMMARY						
Under 15	1521.2	1485.3	3006.4	1432.8	1397.8	2830.6
15-49	4305.9	4289.2	8595.0	4117.3	4103.7	8221.0
50-59	1308.4	1349.6	2658.0	1321.5	1359.3	2680.8
60+	2655.1	3234.8	5889.8	2656.4	3282.1	5938.5

Table A7
Population by Age and Sex, 2061 and 2066: Standard Projection (in thousands)

	2061			2066		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	464.0	451.3	915.3	452.1	439.4	891.5
5-9	449.6	438.2	887.8	462.8	450.9	913.7
10-14	473.7	462.7	936.4	448.9	438.1	886.9
15-19	506.0	495.9	1001.9	472.4	462.4	934.8
20-24	532.4	524.4	1056.9	503.6	495.3	998.9
25-29	544.1	538.9	1083.0	529.4	523.6	1053.0
30-34	545.7	543.5	1089.2	540.8	537.9	1078.7
35-39	547.4	548.0	1095.4	541.9	542.1	1084.0
40-44	590.9	594.3	1185.3	542.8	545.9	1088.7
45-49	646.8	654.0	1300.8	584.0	590.8	1174.9
50-54	669.4	683.4	1352.8	634.6	647.9	1282.5
55-59	659.2	682.1	1341.3	650.2	674.0	1324.2
60-64	612.5	652.4	1265.0	629.9	668.0	1297.9
65-69	568.7	633.5	1202.1	567.5	631.6	1199.1
70-74	536.1	642.9	1179.0	501.5	599.3	1100.8
75-79	425.2	565.3	990.5	432.0	576.2	1008.2
80+	507.6	827.1	1334.7	522.8	883.2	1406.0
All ages	9279.5	9937.9	19217.4	9017.3	9706.7	18724.0
Median age	44.9	47.8	46.4	45.1	48.5	46.8
SUMMARY						
Under 15	1387.3	1352.2	2739.5	1363.8	1328.3	2692.1
15-49	3913.4	3899.0	7812.5	3714.9	3698.1	7413.0
50-59	1328.7	1365.5	2694.1	1284.9	1321.9	2606.8
60+	2650.1	3321.2	5971.3	2653.7	3358.4	6012.1

Table A8
Population by Age and Sex, 2071 and 2076: Standard Projection (in thousands)

	2071			2076		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	435.7	423.2	858.9	439.0	426.0	865.0
5-9	451.0	439.1	890.1	434.8	422.9	857.7
10-14	462.1	450.7	912.9	450.4	439.0	889.4
15-19	447.7	437.8	885.6	461.1	450.5	911.6
20-24	470.3	461.9	932.2	445.8	437.4	883.3
25-29	500.9	494.6	995.5	467.9	461.3	929.2
30-34	526.3	522.7	1049.0	498.2	493.7	991.9
35-39	537.3	536.6	1073.9	523.1	521.5	1044.6
40-44	537.6	540.2	1077.8	533.2	534.9	1068.1
45-49	536.8	542.9	1079.7	531.9	537.5	1069.4
50-54	573.6	585.6	1159.2	527.6	538.5	1066.0
55-59	617.2	639.5	1256.7	558.4	578.6	1137.0
60-64	622.3	661.1	1283.5	591.6	628.4	1220.0
65-69	584.9	648.5	1233.4	579.2	643.7	1222.8
70-74	502.1	600.6	1102.7	519.4	619.7	1139.0
75-79	406.2	541.8	948.0	408.7	547.5	956.3
80+	538.8	933.4	1472.1	532.0	944.0	1476.0
All ages	8750.8	9460.3	18211.0	8502.4	9224.9	17727.3
Median age	45.1	48.9	47.0	45.0	49.0	47.0
SUMMARY						
Under 15	1348.9	1313.0	2661.9	1324.3	1287.8	2612.1
15-49	3556.9	3536.8	7093.6	3461.3	3436.8	6898.1
50-59	1190.7	1225.2	2415.9	1086.0	1117.0	2203.0
60+	2654.3	3385.4	6039.7	2630.9	3383.2	6014.1

Table A9
Population by Age and Sex, 2081: Standard Projection (in thousands)

	2081		
Age group	Males	Females	Persons
0-4	418.6	405.9	824.6
5-9	438.2	425.7	863.9
10-14	434.3	422.8	857.1
15-19	449.5	438.8	888.3
20-24	459.3	450.1	909.4
25-29	443.7	436.8	880.6
30-34	465.6	460.5	926.1
35-39	495.3	492.7	988.0
40-44	519.4	520.0	1039.4
45-49	528.0	532.4	1060.3
50-54	523.3	533.4	1056.6
55-59	514.2	532.4	1046.7
60-64	536.1	569.4	1105.5
65-69	551.9	613.5	1165.3
70-74	516.0	618.1	1134.1
75-79	424.9	569.7	994.6
80+	535.2	966.8	1502.0
All ages	8253.5	8989.1	17242.5
Median age	45.0	49.1	47.1
SUMMARY			
Under 15	1291.2	1254.5	2545.6
15-49	3360.7	3331.3	6692.0
50-59	1037.5	1065.8	2103.3
60+	2564.1	3337.4	5901.5

Table A10
Population by Age and Sex, 2001 and 2006: High Projection (in thousands)

	2001			2006		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	759.6	745.1	1504.7	823.0	800.9	1623.9
5-9	767.3	756.9	1524.2	747.7	735.6	1483.3
10-14	837.5	828.2	1665.7	761.1	751.5	1512.6
15-19	831.0	824.2	1655.2	817.2	808.7	1625.9
20-24	839.0	824.1	1663.1	797.5	791.6	1589.2
25-29	735.5	721.6	1457.1	819.0	808.7	1627.8
30-34	753.5	739.4	1492.8	720.4	712.5	1432.9
35-39	729.1	733.6	1462.6	740.4	732.7	1473.1
40-44	701.4	720.5	1421.9	716.1	726.3	1442.4
45-49	583.6	605.2	1188.9	686.8	711.3	1398.1
50-54	513.4	524.4	1037.9	566.2	593.6	1159.9
55-59	370.2	382.4	752.6	491.7	510.0	1001.8
60-64	298.1	303.5	601.6	347.2	366.7	714.0
65-69	238.6	247.4	486.0	269.2	283.3	552.5
70-74	186.6	193.0	379.6	202.9	219.9	422.7
75-79	116.6	122.4	238.9	142.6	156.5	299.2
80+	96.0	105.6	201.6	114.4	133.0	247.4
All	9357.0	9377.5	18734.5	9763.6	9842.9	19606.5
Median	29.4	29.9	29.6	30.8	31.6	31.2
SUMMARY						
Under	2364.4	2330.2	4694.6	2331.8	2288.0	4619.8
15-49	5173.0	5168.6	10341.6	5297.5	5291.8	10589.3
50-59	883.7	906.8	1790.5	1058.0	1103.6	2161.6
60+	935.9	971.9	1907.8	1076.3	1159.4	2235.8

Table A11
Population by Age and Sex, 2011 and 2016: High Projection (in thousands)

	2011			2016		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	812.6	790.2	1602.9	779.4	757.9	1537.3
5-9	813.5	793.4	1606.9	805.8	784.9	1590.7
10-14	743.0	731.4	1474.4	809.9	790.4	1600.3
15-19	746.8	736.5	1483.3	734.3	720.9	1455.2
20-24	793.1	783.4	1576.6	732.4	718.8	1451.2
25-29	782.5	779.5	1562.0	782.3	774.6	1556.9
30-34	806.1	801.0	1607.1	772.6	773.7	1546.4
35-39	709.6	707.1	1416.7	796.1	796.3	1592.4
40-44	728.7	726.4	1455.2	699.6	701.9	1401.6
45-49	702.5	718.0	1420.5	715.8	719.2	1435.0
50-54	667.8	699.1	1366.9	683.9	707.0	1391.0
55-59	543.6	578.9	1122.4	642.1	683.5	1325.6
60-64	462.6	491.0	953.6	512.3	559.1	1071.5
65-69	314.7	343.9	658.7	420.4	462.7	883.1
70-74	230.1	253.4	483.5	269.9	309.7	579.6
75-79	156.2	179.9	336.0	177.9	209.3	387.2
80+	140.2	171.6	311.8	160.7	208.7	369.4
All	10153.6	10284.9	20438.5	10495.5	10678.7	21174.2
Median						
SUMMARY	32.4	33.3	32.8	33.9	35.1	34.5
Under	2369.1	2315.1	4684.2	2395.0	2333.2	4728.2
15-49	5269.3	5252.0	10521.3	5233.2	5205.4	10438.6
50-59	1211.4	1278.0	2489.4	1326.0	1390.6	2716.6
60+	1303.8	1439.8	2743.6	1541.2	1749.5	3290.7

Table A12
Population by Age and Sex, 2021 and 2026: High Projection (in thousands)

	2021			2026		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	732.6	713.1	1445.7	696.3	678.0	1374.3
5-9	774.6	754.9	1529.5	729.0	711.5	1440.5
10-14	803.2	783.2	1586.4	772.5	754.0	1526.5
15-19	804.7	784.8	1589.5	799.6	780.5	1580.1
20-24	726.3	711.6	1437.8	798.7	780.2	1578.9
25-29	725.0	713.7	1438.7	720.2	708.7	1428.9
30-34	774.5	770.7	1545.2	718.7	711.2	1429.9
35-39	764.4	770.3	1534.7	767.0	768.1	1535.1
40-44	786.1	791.7	1577.8	755.5	766.6	1522.1
45-49	688.0	696.0	1384.0	773.9	785.9	1559.8
50-54	697.8	709.6	1407.4	671.7	687.6	1359.3
55-59	658.7	692.9	1351.6	673.3	696.6	1369.9
60-64	606.5	662.3	1268.9	623.7	673.0	1296.7
65-69	466.9	529.2	996.2	554.6	629.2	1183.7
70-74	362.0	419.4	781.3	403.9	482.2	886.2
75-79	209.9	258.2	468.2	283.5	352.5	636.0
80+	185.2	250.7	435.9	219.0	310.2	529.2
All	10766.4	11012.4	21778.8	10960.9	11276.2	22237.2
Median	35.3	36.8	36.0	36.6	38.3	37.5
SUMMARY						
Under	2310.4	2251.2	4561.6	2197.8	2143.6	4341.4
15-49	5269.0	5238.8	10507.8	5333.6	5301.3	10634.9
50-59	1356.6	1402.4	2759.0	1345.0	1384.2	2729.2
60+	1830.5	2119.9	3950.5	2084.6	2447.2	4531.8

Table A13
Population by Age and Sex, 2031 and 2036: High Projection (in thousands)

	2031			2036		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	705.7	687.7	1393.4	719.6	700.5	1420.1
5-9	693.4	677.5	1370.8	703.2	687.1	1390.2
10-14	727.3	711.2	1438.5	691.9	677.2	1369.1
15-19	769.7	753.4	1523.1	724.9	710.6	1435.6
20-24	794.6	779.4	1574.1	765.3	752.4	1517.7
25-29	792.8	778.7	1571.5	789.2	778.0	1567.2
30-34	714.5	707.1	1421.6	786.9	777.0	1564.0
35-39	712.3	709.3	1421.6	708.6	705.2	1413.8
40-44	758.7	765.0	1523.7	705.0	706.5	1411.5
45-49	744.5	761.6	1506.0	748.3	760.1	1508.3
50-54	756.4	777.3	1533.7	728.4	753.6	1482.0
55-59	649.0	676.1	1325.1	731.9	764.9	1496.8
60-64	638.7	678.2	1316.9	616.9	659.2	1276.1
65-69	571.8	641.7	1213.5	587.3	649.3	1236.5
70-74	481.6	576.9	1058.5	498.7	593.4	1092.1
75-79	318.2	409.3	727.5	381.8	497.1	878.8
80+	285.3	414.2	699.5	340.3	516.7	857.0
All	11114.4	11504.7	22619.0	11228.2	11688.7	22916.9
Median	37.5	39.6	38.6	38.1	40.4	39.2
SUMMARY						
Under	2126.4	2076.3	4202.8	2114.7	2064.7	4179.4
15-49	5287.0	5254.6	10541.6	5228.1	5189.9	10418.0
50-59	1405.3	1453.4	2858.8	1460.4	1518.5	2978.8
60+	2295.6	2720.3	5015.9	2425.0	2915.7	5340.7

Table A14
Population by Age and Sex, 2041 and 2046: High Projection (in thousands)

	2041			2046		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	717.0	697.8	1414.8	697.6	678.8	1376.4
5-9	717.2	699.9	1417.1	714.9	697.2	1412.1
10-14	701.8	686.8	1388.6	716.0	699.6	1415.6
15-19	689.8	676.7	1366.4	699.8	686.3	1386.1
20-24	721.0	709.7	1430.7	686.2	675.8	1362.1
25-29	760.3	751.1	1511.3	716.5	708.6	1425.1
30-34	783.6	776.4	1560.0	755.3	749.6	1504.8
35-39	780.7	775.0	1555.7	777.8	774.3	1552.2
40-44	701.7	702.4	1404.1	773.6	772.0	1545.5
45-49	695.8	702.1	1397.9	693.0	698.1	1391.1
50-54	732.7	752.4	1485.1	682.0	695.3	1377.3
55-59	705.6	742.1	1447.7	710.7	741.5	1452.2
60-64	696.7	746.9	1443.6	672.9	725.9	1398.8
65-69	568.4	633.7	1202.1	643.6	721.3	1364.9
70-74	513.7	605.5	1119.2	499.1	596.8	1095.8
75-79	397.0	519.0	915.9	411.2	538.6	949.8
80+	410.2	646.1	1056.4	455.1	743.8	1198.9
All	11293.3	11823.4	23116.7	11305.2	11903.3	23208.5
Median	38.6	41.0	39.7	39.3	41.8	40.6
SUMMARY						
Under	2136.1	2084.5	4220.5	2128.5	2075.5	4204.0
15-49	5132.8	5093.3	10226.1	5102.1	5064.7	10166.8
50-59	1438.4	1494.5	2932.8	1392.7	1436.8	2829.5
60+	2586.0	3151.2	5737.2	2681.8	3326.3	6008.2

Table A15
Population by Age and Sex, 2051 and 2056: High Projection (in thousands)

	2051			2056		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	674.2	655.4	1329.6	660.9	642.0	1302.9
5-9	695.8	678.2	1374.0	672.5	654.9	1327.4
10-14	713.8	696.9	1410.7	694.8	678.0	1372.8
15-19	714.0	699.2	1413.2	711.9	696.5	1408.5
20-24	696.4	685.5	1381.9	710.8	698.4	1409.2
25-29	682.3	674.8	1357.0	692.6	684.5	1377.1
30-34	712.1	707.2	1419.3	678.3	673.5	1351.8
35-39	750.0	747.7	1497.7	707.4	705.6	1413.0
40-44	771.1	771.5	1542.6	743.9	745.1	1489.0
45-49	764.5	767.5	1532.0	762.5	767.3	1529.8
50-54	679.9	691.7	1371.6	750.6	760.8	1511.5
55-59	662.3	685.8	1348.1	661.0	682.9	1343.9
60-64	678.9	726.4	1405.4	633.7	672.9	1306.7
65-69	623.2	703.1	1326.3	630.2	705.6	1335.8
70-74	567.2	683.1	1250.3	551.1	669.2	1220.3
75-79	401.8	535.8	937.6	459.0	618.6	1077.6
80+	489.1	820.7	1309.8	501.7	869.8	1371.6
All	11276.4	11930.5	23207.0	11223.1	11925.8	23148.9
Median	40.0	42.7	41.4	40.6	43.6	42.1
SUMMARY						
Under	2083.7	2030.5	4114.2	2028.2	1974.9	4003.1
15-49	5090.3	5053.4	10143.7	5007.4	4971.0	9978.4
50-59	1342.2	1377.5	2719.7	1411.7	1443.7	2855.4
60+	2760.2	3469.2	6229.4	2775.8	3536.1	6311.9

Table A16
Population by Age and Sex, 2061 and 2006: High Projection (in thousands)

	2061			2066		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	694.3	673.9	1368.1	694.4	673.5	1367.9
5-9	659.5	641.6	1301.1	693.0	673.5	1366.4
10-14	671.7	654.8	1326.4	658.7	641.5	1300.2
15-19	693.1	677.7	1370.8	670.2	654.5	1324.7
20-24	708.9	695.9	1404.8	690.4	677.1	1367.5
25-29	707.2	697.5	1404.6	705.5	695.0	1400.5
30-34	688.8	683.3	1372.1	703.6	696.3	1399.9
35-39	674.1	672.1	1346.2	684.8	682.0	1366.8
40-44	702.0	703.3	1405.3	669.3	670.1	1339.4
45-49	736.0	741.4	1477.4	695.0	700.1	1395.1
50-54	749.4	761.1	1510.4	723.9	735.8	1459.7
55-59	730.7	751.8	1482.5	730.2	752.7	1483.0
60-64	633.5	671.2	1304.7	701.3	740.1	1441.5
65-69	589.6	655.5	1245.1	590.7	655.6	1246.3
70-74	559.2	675.0	1234.2	525.0	630.1	1155.1
75-79	448.3	611.1	1059.4	457.1	621.5	1078.7
80+	552.3	976.1	1528.3	571.9	1039.9	1611.8
All	11198.5	11943.1	23141.6	11165.1	11939.3	23104.4
Median	40.7	44.1	42.4	40.6	44.3	42.5
SUMMARY						
Under	2025.4	1970.2	3995.6	2046.1	1988.4	4034.5
15-49	4910.1	4871.2	9781.3	4818.7	4775.1	9593.9
50-59	1480.0	1512.9	2992.9	1454.2	1488.5	2942.7
60+	2782.9	3588.8	6371.7	2846.1	3687.2	6533.3

Table A17
Population by Age and Sex, 2071 and 2076: High Projection (in thousands)

	2071			2076		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	687.7	666.3	1354.1	709.1	686.0	1395.1
5-9	693.3	673.1	1366.4	686.8	665.9	1352.7
10-19	692.2	673.4	1365.6	692.7	673.0	1365.7
15-19	657.4	641.3	1298.7	691.0	673.2	1364.2
20-24	667.7	654.0	1321.7	655.1	640.8	1295.9
25-29	687.3	676.2	1363.5	664.8	653.1	1318.0
30-34	702.2	693.8	1396.0	684.2	675.2	1359.3
35-39	699.8	695.0	1394.7	698.6	692.5	1391.1
40-44	680.3	680.0	1360.3	695.3	693.0	1388.3
45-49	663.0	667.1	1330.2	674.0	677.0	1351.0
50-54	684.2	694.9	1379.1	652.7	662.3	1315.0
55-59	706.3	727.9	1434.2	667.6	687.6	1355.2
60-64	702.0	741.4	1443.4	679.7	717.1	1396.8
65-69	655.5	723.6	1379.0	658.2	725.1	1383.3
70-74	527.7	631.1	1158.9	589.0	697.2	1286.2
75-79	431.3	581.7	1013.0	436.8	583.5	1020.3
80+	592.1	1087.3	1679.3	585.3	1081.9	1667.1
All	11129.9	11908.2	23038.1	11120.9	11884.3	23005.2
Median	40.6	44.3	42.4	40.6	44.2	42.4
SUMMARY						
Under	2073.3	2012.8	4086.1	2088.6	2024.9	4113.5
15-49	4757.6	4707.5	9465.1	4763.0	4704.8	9467.8
50-59	1390.4	1422.8	2813.3	1320.3	1349.8	2670.1
60+	2908.6	3765.1	6673.6	2949.0	3804.8	6753.7

Table A18
Population by Age and Sex, 2081: High Projection (in thousands)

		2081	
Age group	Males	Females	Persons
0-4	699.6	675.6	1375.2
5-9	708.3	685.6	1393.9
10-14	686.4	665.9	1352.2
15-19	691.7	672.8	1364.5
20-24	688.8	672.6	1361.5
25-29	652.4	639.9	1292.3
30-34	661.9	652.1	1314.0
35-39	680.9	673.9	1354.7
40-44	694.2	690.6	1384.8
45-49	688.9	690.0	1378.8
50-54	663.4	672.1	1335.5
55-59	636.8	655.3	1292.1
60-64	643.1	677.4	1320.5
65-69	639.4	701.4	1340.8
70-74	595.3	698.7	1294.0
75-79	491.5	644.5	1136.0
80+	588.2	1080.4	1668.6
All	11110.7	11848.7	22959.4
Median	40.6	44.2	42.4
SUMMARY			
Under	2094.3	2027.0	4121.3
15-49	4758.7	4691.9	9450.6
50-59	1300.2	1327.3	2627.6
60+	2957.5	3802.4	6759.9

Table A19
Population by Age and Sex, 2001 and 2006: Low Projection (in thousands)

		2001.0			2006.0	
Age group	Males	Females	Persons	Males	Females	Persons
0-4	759.6	745.1	1504.7	682.8	664.3	1347.0
5-9	767.3	756.9	1524.2	745.8	734.1	1480.0
10-14	837.5	828.2	1665.7	760.2	750.7	1510.9
15-19	831.0	824.2	1655.2	814.7	806.3	1621.0
20-24	839.0	824.1	1663.1	793.3	787.7	1581.0
25-29	735.5	721.6	1457.1	816.5	806.7	1623.2
30-34	753.5	739.4	1492.8	718.5	711.2	1429.7
35-39	729.1	733.6	1462.6	738.9	731.6	1470.5
40-44	701.4	720.5	1421.9	714.8	725.1	1439.9
45-49	583.6	605.2	1188.9	685.6	709.9	1395.5
50-54	513.4	524.4	1037.9	565.0	592.2	1157.2
55-59	370.2	382.4	752.6	490.3	508.4	998.8
60-64	298.1	303.5	601.6	345.9	365.1	711.1
65-69	238.6	247.4	486.0	267.8	281.6	549.4
70-74	186.6	193.0	379.6	201.4	217.9	419.3
75-79	116.6	122.4	238.9	141.2	154.4	295.6
80+	96.0	105.6	201.6	112.5	130.2	242.8
All	9357.0	9377.5	18734.5	9595.3	9677.5	19272.8
Median	29.4	29.9	29.6	31.3	32.0	31.7
SUMMARY						
Under	2364.4	2330.2	4694.6	2188.8	2149.1	4337.9
15-49	5173.0	5168.6	10341.6	5282.3	5278.5	10560.8
50-59	883.7	906.8	1790.5	1055.3	1100.7	2156.0
60+	935.9	971.9	1907.8	1068.9	1149.3	2218.2

Table A20
Population by Age and Sex, 2011 and 2016: Low Projection (in thousands)

		2011.0			2016.0	
Age group	Males	Females	Persons	Males	Females	Persons
0-4	639.5	621.1	1260.6	594.8	576.7	1171.5
5-9	671.3	654.5	1325.8	630.1	612.3	1242.3
10-14	739.7	728.4	1468.1	666.3	649.4	1315.7
15-19	741.1	731.0	1472.1	724.3	710.1	1434.4
20-24	782.6	773.1	1555.7	715.6	700.3	1415.9
25-29	774.0	771.8	1545.9	766.2	758.4	1524.6
30-34	800.4	796.5	1596.9	760.3	762.5	1522.8
35-39	705.6	704.0	1409.6	787.6	789.4	1577.0
40-44	725.3	723.5	1448.9	693.4	696.6	1390.1
45-49	699.4	714.8	1414.3	710.5	713.8	1424.3
50-54	664.6	695.4	1360.0	678.8	700.8	1379.6
55-59	540.3	574.9	1115.2	636.6	676.0	1312.6
60-64	459.1	486.4	945.6	506.9	551.0	1057.8
65-69	311.6	339.4	650.9	414.5	453.4	867.9
70-74	226.8	248.5	475.3	264.7	300.6	565.4
75-79	153.0	174.9	327.9	173.1	200.4	373.6
80+	135.8	163.8	299.6	153.7	194.1	347.8
All	9770.2	9902.1	19672.4	9877.5	10045.8	19923.2
Median	33.4	34.2	33.8	35.5	36.6	36.1
SUMMARY						
Under	2050.5	2004.1	4054.6	1891.2	1838.3	3729.5
15-49	5228.5	5214.8	10443.3	5157.9	5131.1	10289.0
50-59	1204.9	1270.3	2475.2	1315.4	1376.8	2692.3
60+	1286.3	1413.0	2699.3	1513.0	1699.5	3212.5

Table A21
Population by Age and Sex, 2021 and 2026: Low Projection (in thousands)

	2021.0			2026.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	536.1	519.6	1055.7	473.3	458.8	932.1
5-9	586.5	568.7	1155.2	529.2	512.9	1042.1
10-14	625.6	607.6	1233.2	582.7	564.7	1147.4
15-19	652.6	632.7	1285.3	614.2	593.5	1207.7
20-24	701.1	682.0	1383.0	633.5	608.9	1242.4
25-29	701.0	687.0	1388.0	688.3	670.5	1358.9
30-34	753.4	749.8	1503.2	690.0	679.8	1369.8
35-39	748.7	756.0	1504.6	742.5	744.0	1486.6
40-44	774.8	781.8	1556.6	737.0	749.2	1486.2
45-49	679.7	687.7	1367.3	760.0	772.5	1532.5
50-54	690.1	700.4	1390.5	660.6	675.4	1336.0
55-59	650.9	682.0	1332.9	662.2	682.5	1344.7
60-64	597.9	649.0	1247.0	611.9	655.9	1267.8
65-69	458.4	514.7	973.1	541.4	607.8	1149.3
70-74	353.1	402.9	756.0	391.1	459.1	850.2
75-79	202.7	243.6	446.3	271.1	328.2	599.3
80+	174.8	226.8	401.6	203.4	273.8	477.1
All	9887.5	10092.0	19979.5	9792.4	10037.6	19829.9
Median	37.6	39.0	38.3	39.6	41.2	40.4
SUMMARY						
Under	1748.2	1695.8	3444.1	1585.2	1536.5	3121.7
15-49	5011.3	4976.8	9988.1	4865.5	4818.4	9684.0
50-59	1341.0	1382.4	2723.4	1322.7	1357.9	2680.7
60+	1787.0	2037.0	3824.0	2018.9	2324.7	4343.7

Table A22
Population by Age and Sex, 2031 and 2036: Low Projection (in thousands)

	2031.0			2036.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	430.9	417.2	848.0	401.2	388.8	790.0
5-9	468.1	453.0	921.1	426.8	412.7	839.5
10-14	526.3	509.5	1035.7	465.8	450.4	916.2
15-19	574.3	552.2	1126.5	520.0	499.8	1019.9
20-24	600.0	572.3	1172.3	563.6	535.9	1099.5
25-29	623.5	598.9	1222.5	591.9	564.5	1156.4
30-34	678.9	664.1	1343.0	615.8	593.8	1209.7
35-39	680.9	674.8	1355.7	670.6	659.9	1330.5
40-44	731.7	737.9	1469.6	671.4	669.8	1341.1
45-49	723.4	740.9	1464.3	718.7	730.3	1449.0
50-54	739.3	759.6	1498.9	704.2	729.3	1433.5
55-59	634.5	659.0	1293.4	710.8	742.3	1453.0
60-64	623.3	657.5	1280.8	597.9	636.0	1233.9
65-69	555.0	615.8	1170.8	566.2	618.8	1185.0
70-74	463.1	544.2	1007.2	475.7	553.3	1029.0
75-79	301.3	375.9	677.2	357.7	448.0	805.7
80+	260.9	357.7	618.6	305.6	433.2	738.8
All	9615.4	9890.3	19505.7	9363.8	9666.8	19030.7
Median	41.5	43.4	42.5	43.2	45.4	44.3
SUMMARY						
Under	1425.2	1379.6	2804.9	1293.8	1251.9	2545.7
15-49	4612.7	4541.1	9153.8	4352.0	4254.1	8606.0
50-59	1373.8	1418.6	2792.4	1415.0	1471.6	2886.6
60+	2203.7	2551.0	4754.7	2303.1	2689.3	4992.3

Table A23
Population by Age and Sex, 2041 and 2046: Low Projection (in thousands)

	2041.0			2046.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	374.3	362.6	736.9	347.2	336.5	683.7
5-9	398.3	385.5	783.8	372.4	360.4	732.8
10-14	425.2	410.8	835.9	397.2	384.2	781.4
15-19	462.0	443.3	905.3	423.5	406.2	829.7
20-24	513.3	487.9	1001.2	458.8	435.6	894.4
25-29	557.5	530.0	1087.5	509.1	483.8	992.9
30-34	585.7	560.5	1146.1	552.6	527.0	1079.6
35-39	609.0	590.5	1199.5	579.9	557.8	1137.7
40-44	661.9	655.5	1317.4	601.7	586.9	1188.6
45-49	660.1	663.4	1323.5	651.3	649.7	1301.0
50-54	700.4	719.7	1420.1	643.9	654.3	1298.2
55-59	678.0	713.6	1391.5	675.1	705.0	1380.0
60-64	671.0	717.7	1388.7	641.0	691.0	1332.0
65-69	544.4	600.1	1144.5	612.3	678.7	1291.0
70-74	487.0	558.2	1045.1	469.6	543.0	1012.6
75-79	369.3	458.1	827.5	379.8	464.3	844.1
80+	364.0	524.2	888.3	398.7	577.7	976.4
All	9061.4	9381.5	18442.9	8714.0	9042.0	17756.0
Median	44.6	47.0	45.8	45.9	48.4	47.1
SUMMARY						
Under	1197.8	1158.9	2356.7	1116.9	1081.0	2197.9
15-49	4049.5	3931.0	7980.5	3776.8	3647.0	7423.8
50-59	1378.4	1433.3	2811.6	1319.0	1359.2	2678.2
60+	2435.8	2858.4	5294.1	2501.3	2954.7	5456.0

Table A24
Population by Age and Sex, 2051 and 2056: Low Projection (in thousands)

	2051.0			2056.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	321.4	313.0	634.4	295.8	288.1	583.9
5-9	345.6	336.0	681.6	320.0	312.7	632.7
10-14	371.5	360.2	731.7	344.8	335.9	680.7
15-19	395.7	383.8	779.5	370.1	359.9	730.0
20-24	420.7	405.5	826.2	393.2	383.2	776.4
25-29	455.2	434.6	889.7	417.5	404.6	822.2
30-34	504.8	482.4	987.2	451.5	433.5	885.0
35-39	547.4	525.3	1072.6	500.2	481.0	981.3
40-44	573.2	555.1	1128.3	541.3	523.0	1064.3
45-49	592.4	582.5	1174.9	564.7	551.3	1116.0
50-54	635.9	641.7	1277.6	578.9	575.8	1154.7
55-59	621.3	642.0	1263.3	614.2	630.5	1244.7
60-64	639.2	684.2	1323.3	589.1	624.3	1213.4
65-69	586.1	655.4	1241.5	585.7	650.8	1236.5
70-74	529.7	616.9	1146.6	508.6	598.5	1107.1
75-79	367.8	454.8	822.6	416.8	520.1	936.9
80+	422.9	613.8	1036.7	428.4	630.5	1058.8
All	8330.5	8687.1	17017.7	7921.1	8303.7	16224.8
Median	46.9	49.7	48.3	47.9	50.7	49.3
SUMMARY						
Under	1038.4	1009.2	2047.7	960.6	936.7	1897.3
15-49	3489.3	3369.1	6858.4	3238.7	3136.5	6375.2
50-59	1257.1	1283.7	2540.9	1193.1	1206.3	2399.4
60+	2545.7	3025.1	5570.7	2528.7	3024.2	5552.9

Table A25
Population by Age and Sex, 2061 and 2066: Low Projection (in thousands)

	2061.0			2066.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	289.1	281.5	570.6	267.1	259.9	527.0
5-9	294.7	287.9	582.5	288.1	281.2	569.4
10-14	319.3	312.6	631.9	294.1	287.7	581.8
15-19	343.6	335.6	679.2	318.3	312.3	630.6
20-24	367.9	359.4	727.3	341.7	335.1	676.8
25-29	390.4	382.5	772.9	365.4	358.7	724.1
30-34	414.4	403.7	818.1	387.6	381.6	769.3
35-39	447.7	432.4	880.0	411.0	402.7	813.7
40-44	495.0	479.1	974.1	443.2	430.6	873.8
45-49	533.7	519.6	1053.3	488.4	476.0	964.4
50-54	552.3	545.3	1097.6	522.4	514.1	1036.6
55-59	559.8	566.3	1126.1	534.7	536.6	1071.3
60-64	583.4	614.0	1197.4	532.5	552.2	1084.8
65-69	541.1	595.8	1136.9	537.0	588.1	1125.0
70-74	510.0	597.9	1107.9	472.6	551.4	1023.9
75-79	402.2	509.8	911.9	405.1	515.9	920.9
80+	467.4	697.1	1164.5	477.6	733.4	1211.0
All	7511.9	7920.3	15432.2	7086.8	7517.6	14604.4
Median	48.7	51.5	50.1	49.4	52.3	50.8
SUMMARY						
Under	903.1	881.9	1785.0	849.3	828.9	1678.2
15-49	2992.7	2912.2	5904.9	2755.6	2697.1	5452.7
50-59	1112.1	1111.6	2223.8	1057.2	1050.8	2107.9
60+	2504.0	3014.6	5518.6	2424.7	2940.9	5365.6

Table A26
Population by Age and Sex, 2071 and 2076: Low Projection (in thousands)

	2071.0			2076.0		
Age group	Males	Females	Persons	Males	Females	Persons
0-4	253.9	246.9	500.8	253.8	246.7	500.5
5-9	266.3	259.7	526.0	253.1	246.7	499.8
10-14	287.6	281.1	568.7	265.8	259.6	525.4
15-19	293.2	287.5	580.7	286.8	280.9	567.7
20-24	316.6	311.9	628.5	291.7	287.2	578.9
25-29	339.5	334.6	674.1	314.7	311.4	626.1
30-34	363.0	357.9	720.9	337.3	333.9	671.2
35-39	384.6	380.6	765.3	360.3	357.0	717.3
40-44	407.1	401.1	808.2	381.2	379.1	760.3
45-49	437.6	427.9	865.5	402.2	398.6	800.8
50-54	478.4	471.2	949.7	429.0	423.7	852.8
55-59	506.4	506.3	1012.7	464.3	464.3	928.6
60-64	509.5	524.0	1033.4	483.2	495.0	978.2
65-69	491.3	530.7	1022.0	471.1	505.3	976.4
70-74	470.5	548.2	1018.8	432.0	498.4	930.4
75-79	377.2	481.9	859.1	377.5	485.2	862.7
80+	487.8	768.5	1256.3	477.0	771.9	1248.9
All	6670.4	7120.0	13790.5	6281.2	6744.8	13025.9
Median	49.8	52.9	51.4	49.9	53.2	51.6
SUMMARY						
Under	807.8	787.7	1595.4	772.8	753.0	1525.8
15-49	2541.6	2501.5	5043.1	2374.2	2348.1	4722.3
50-59	984.8	977.5	1962.3	893.3	888.0	1781.3
60+	2336.3	2853.3	5189.6	2240.8	2755.7	4996.5

Table A19
Population by Age and Sex, 2001 and 2006: Low Projection (in thousands)

Age group	Males	2081.0 Females	Persons
0-4	237.3	230.6	467.8
5-9	253.1	246.5	499.7
10-14	252.8	246.6	499.3
15-19	265.1	259.4	524.5
20-24	285.4	280.6	566.0
25-29	290.1	286.7	576.8
30-34	312.8	310.8	623.6
35-39	335.0	333.0	668.0
40-44	357.3	355.7	712.9
45-49	376.8	376.9	753.7
50-54	394.7	394.8	789.5
55-59	416.8	417.8	834.6
60-64	443.8	454.5	898.3
65-69	447.9	478.9	926.7
70-74	415.6	477.6	893.2
75-79	348.4	445.9	794.3
80+	476.5	788.0	1264.5
All	5909.3	6384.2	12293.5
Median	49.9	53.4	51.6
SUMMARY			
Under	743.2	723.6	1466.8
15-49	2222.5	2203.0	4425.5
50-59	811.5	812.6	1624.1
60+	2132.1	2644.9	4777.1

Appendix B:
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.

$$P^{t+5}_{x+5} = P^{t}_{x}\, S^{t+2.5}_{x,\text{to } x+5}$$

where P_x, 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 give 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:

$$P^{t+5}_{x+5} = (P^{t}_{x}\, S^{t+2.5}_{x,\text{to } x+5}) + NM^{t,t+5}_{x+5}$$

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, 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) M, defined as;

$$M^{t+2.5}_{x} = NM^{t,t+5}_{x} / 0.5(P^{t}_{x} + P^{t+5}_{x})$$

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. 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.

$$NM^{t,t+5}{}_x = M^{t+2.5}{}_x [0.5(P^t{}_x + P^{t+5}{}_x)$$

which is equal to;

$$= M^{t+5}{}_x [0.5(P^t{}_x + P^t{}_{x-5}\, S^{t+2.5}{}_{x-5})]/(1-0.5M^{t+2.5}{}_x)$$

In order to obtain the population aged 0+4 at a time 1+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;

$$TB^{t,t+5} = S^7{}_{i=1} [0.5(FP^t{}_i + FP^{t+5}{}_i)\, f^{t+2.5}{}_i .5]$$

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+15 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 is 1.08 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 than obtained as the survivors of the projected births plus or minus net migrants. The formula used is;

$$P = {}^{t+5}{}_{0-4} = (B^{t,t+5}\, S^{t+2.5}{}_{B \text{ to } 0-4}) +- NM^{t,t+5}{}_{0-4}$$

PEOPLE recognizes that some users of population 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. The 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 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.

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