

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 itself 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 utilized 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 could be expected 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).