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A Mathematical model for population growth, birth and death rates of Sri Lanka

Population projections are of utmost importance for any country, in formulating comprehensive development plans and programmes. This paper proposes component and non-component models for this purpose. In the component model, birth rates and death rates are separately modeled and are used to estimate the number of births and deaths. The population figures are then adjusted for the births and deaths. In the non-component model, the population figures are directly modeled.

In reality, birth and death rates should eventually level off. However, for Sri Lanka, the present birth rates do not indicate evidence of leveling off. According to the fitted model, the leveling off can be expected around year 2025, and the asymptotic birth rate would be around 16 births per 1000 population. Unlike birth rates, death rates already show leveling off. The developed model suggested that the eventual death rate for Sri Lanka has reached in 1985 and is around 6 deaths per 1000 population.

The diagnostic and validity checks of the models suggested satisfactory fit of the models. As further assessment, we examined the applicability of the birth and death rate models for the United States. The asymptotic biarth and death rates of USA are found to be around 15 births and 9 deaths per 1000 population respectively. Further investigation suggests that the birth rates of the two countries to be not significantly different in the long run. However, the asymptotic death rate of Sri Lanka is found to be significantly lower than that of USA.