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Making the Connection: Population Dynamics and Development in Sri Lanka

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Why Policy Planners Need To Understand Population Dynamics

Sri Lanka is currently experiencing major population dynamics including significant transformations in its age structure associated with the 'youth bulge' as well as 'population ageing'. These novel population trends create many developmental challenges as well as opportunities that have crucial implications for social, economic and environmental development. These emerging population trends shape and are shaped by public policy in the form of policies and related programmes (employment creation, poverty alleviation, social protection and pensions, health, education, housing, sanitation, water, food and energy) that are being used to balance population change, economic growth, social transformation and environmental sustainability. However, the accomplishment and sustainability of development strategies is when Sri Lanka pro-actively addresses issues, and not just simply responding to varying population dynamics. Demography alone cannot be regarded as destiny but it is essential that Sri Lanka understands the changing nature of population dynamics over the next decades, and whether these trends will become developmental challenges or help facilitate a resolution. Most importantly, all these depend on whether effective policies employed are necessarily rights-based, evidence informed and gender-responsive.

Carrying Capacity of the Sri Lankan Population: *Past and Possible Future*

The concept of carrying capacity is central to discussions of population growth. Carrying capacity is an ecological concept that expresses the relationship between a population and the natural environment in which it depends for ongoing sustenance. Carrying capacity assumes limits on the number of individuals that can be supported at a given level of consumption without degrading the environment and, therefore, reduces the future carrying capacity. Therefore, the concept of carrying capacity addresses long-term sustainability.

Historical discoveries and technological advances have, many times, elevated carrying capacity, and much western science encourages the faith that technology's potential is limitless. However, population studies in human and other animal populations constantly display that exceeding this uncertain limit, the carrying capacity, results in catastrophic change.

Recent census data suggests that Sri Lanka's population has grown exponentially until 2001 but a slight change of its speed was seen in 2012 (Figure 1). This may be the first sign that the country's population is entering into a logistic growth model by deviating from its former exponential growth pattern. It is also reasonable to argue that Sri Lanka's population has been responding to resource

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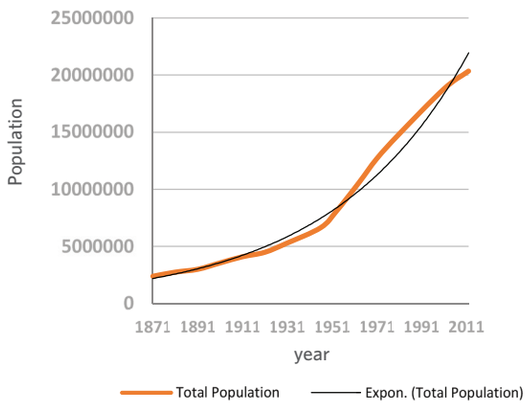
constraints in the system itself during the last few decades of the 20th century. Logistic growth assumes that systems grow exponentially until an upper limit or "carrying capacity" inherent in the system approaches, at which point the growth rate slows and eventually saturates, producing the characteristic S-shape curve (Stone, 1980).

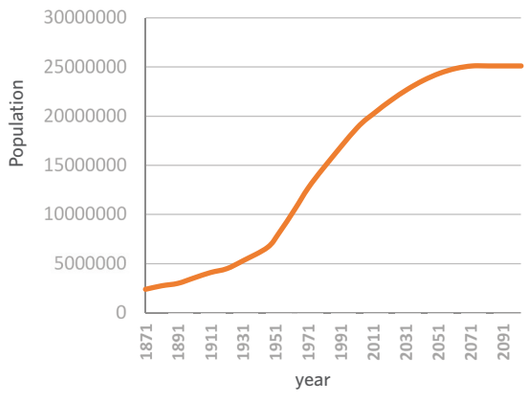
Figure 1: Total Population of Sri Lanka fitted with exponential function, 1871-2012



Source: Author's calculations with the use of data obtained from Department of Census and Statistics

As the effects of limited resources become important, the growth slows, and approaches a limiting value, the equilibrium population or carrying capacity. Carrying capacity is the maximum population size of a species that an ecosystem can support indefinitely. This natural evolution of population allows us to reasonably assume that the carrying capacity of the Sri Lankan population would be 25 million and hence the total population will stabilize at 25 million during the second half of this century (Figure 2). The predicted future population with the use of logistic function is shown in Figure 2.

Figure 2: Predicted Future Population with the use of logistic fucntion, Sri Lanka, from 1871-2102



Source: Author's calculations with the use of data obtained from Department of Census and Statistics

In ecological terms, the carrying capacity of an ecosystem is the size of the population or community that can be supported indefinitely upon the available resources and services of that ecosystem. It is quite clear that given the current availability of resources and the ecosystem, Sri Lanka can bear only 25 million people.

Challenges

Population dynamics and environmental change are sturdily linked in various ways through diverse social and economic mechanisms, at various geographic planes in Sri Lanka like the rest of the world. The review of the Millennium Development Goal (MDG) status in Sri Lanka revealed that the country was not on track for achieving certain targets of MDG Goal 7. In terms of energy consumption, a substantial proportion of the population still depends on fuelwood and other forms of biomass for their household cooking. This trend will continue into the future until there is a substantial increase in the per capita income of the rural population and when they have access to other forms of energy at affordable prices.

Food energy availability is also critically low and dietary diversity is inadequate among the most deprived groups in the population—the poor and the rural and estate populations. Water scarcity in a number of districts seems to have a huge impact on the country's food production. Furthermore, Sri Lanka confronts poor storm water management and solid water management as two major environmental concerns. Urban areas are densely populated and generate large amount of waste which contain larger quantities of non-biodegradable components than in rural areas.

Demographic Components of Future Population Growth: *Supremacy of Fertility and Young Age Structure Remains Important*

Impending population trajectories depend on assumptions about future trends in fertility, mortality and migration. Furthermore, the current population age structure impacts future growth by essentially disturbing the overall number of births, deaths and migrations that are implied by fertility, mortality and migration rates. All four demographic components can have a noteworthy bearing, positive or negative, on future population growth.

Fertility offers a positive contribution to population growth if it is above replacement and a negative contribution to population growth if fertility is below replacement[2]. In demography, it is understood that the concept of replacement fertility is important in maintaining fertility at replacement level in the long run ending up with a stationary population and stabilization of population growth (Preston et. al., 2000). If fertility is above replacement level with constant mortality and zero migration, population will grow indefinitely. Equally, if fertility stays below replacement, population will ultimately decline to zero. It is necessary to understand that in order to achieve replacement level fertility, women, on average, need to have one surviving daughter.

The contribution of mortality to population growth will be positive if mortality is declining, and negative if mortality is increasing. Usually, life expectancy at birth is likely to continue to increase and death rates are expected to decline over all age groups. In this context, the contribution of mortality to population growth will be positive. However, in more complex cases, death rates may not decline consistently over all ages but tend to increase for some ages and decline for others, like in countries that have been severely affected by HIV/AIDS epidemics or any other epidemic situations. In these intricate cases, the contribution of mortality to population growth is not very clear. The contribution of mortality may also be linked to the interaction between age specific mortality rates and population age structure.

The contribution of migration to population growth is determined by net migration (difference between immigration and emigration). Positive net migration will contribute to population increase and negative net migration will diminish population. The population age structure at the starting point of making a population projection influences the future growth trajectory.

Although one assumes that fertility at replacement level, constant mortality, and no migration, the total population will still not necessarily remain constant. Total population could either increase or decrease before reaching a stationary population size. This occurrence is called momentum of population growth and its value is defined by the ratio of ultimate population size to current population size (Keyfitz, 1971). For example, the countries which are still in the midst of demographic transition with young age structures, the total population will continue to grow because births produced by a large number of females of reproductive age will exceed deaths, even if total fertility is at replacement level. In this situation, population momentum has a positive effect on population growth. In the countries that completed the demographic transition and with comparatively old age structures, the total population will actually decline before reaching ultimate population size. In this case, population momentum has a negative effect on population growth. Therefore, it is important to note that the population growth brought about by the population momentum can be attributed exclusively to the initial age structure of population.

2 The average number of children born per woman—at which a population exactly replaces itself from one generation to the next, without migration. This rate is roughly 2.1 children per woman for most countries, although it may modestly vary with mortality rates

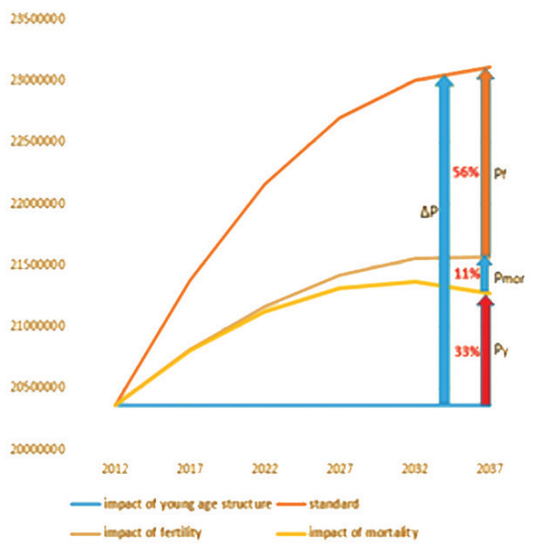
The contribution of each of these demographic factors to future population growth can be estimated with a series of projections. The series of projections starts with a Standard population projection, which incorporates effects of all four demographic components.

The effect of migration is estimated by constructing a Natural population projection variant, which is derived from the Standard variant by setting net migration to zero (see Dissanayake, 2016). Population growth in this case is driven only by natural increase based on assumptions about future fertility and mortality and by the initial age distribution. The difference in total population between the Standard and Natural variants shows the effect of net migration on future population growth. The effect of fertility is estimated by a Replacement projection variant, which is derived from the Natural variant by setting total fertility at the replacement level for each five-year projection periods. The difference between the Natural and Replacement projection variants shows the effect of total fertility, above or below replacement level, on the overall population growth. The last projection variant, Momentum, is constructed by using as of 2012 constant mortality rates, constant fertility at the replacement level and by setting net migration at zero. Computing the difference in total population between the Replacement and Momentum variants shows the effect of anticipated mortality decline on future population size. Finally, the difference between the starting total population in 2012 and the Momentum variant is attributable to the initial age structure of a population. If fertility declines immediately to the replacement level as in the Momentum variant, population does not immediately stabilize; instead, population may still continue to increase or decrease for a few decades before it eventually tapers off and reaches the ultimate stationary level.

Challenges

Figure 3 shows the components of population growth for Sri Lanka's population. By 2037, total population is expected to increase from 20.4 million people in 2012 to 23.1 million by 2037 so the increase during the 25 year period would be about 2.7 million (blue arrow labeled " P"; the numbers may not sum up exactly due to rounding). With negligible net migration for Sri Lanka during this period, the Natural projection variant is the same as the Standard variant and, obviously, the effect of migration on population growth is zero. If total fertility is maintained at replacement level and mortality is declining, total population will reach 21.6 million people in 2037 (Replacement variant). The difference between the Natural and Replacement variants, 1.2 million people, is the contribution of fertility above replacement to future population growth (arrow labeled "Pf"). In the Momentum variant, total population continues to grow for approximately five decades before it stabilizes at an ultimate population size of 21.3 million people. The difference between the Replacement and Momentum variants, 0.3 million people in 2037, is due to reductions in adult mortality over the projection period (arrow labeled "Pmor"). Lastly, the difference of 0.9 million people between the starting population in 2012 and the ultimate population size of the Momentum variant, is due to the young age structure of Sri Lanka's population in 2037 (arrow labeled "Py").

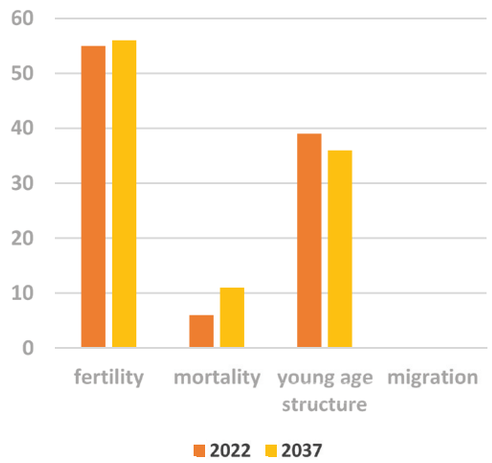
Figure 3: Decomposition of population growth, Sri Lanka



Source: Author's calculations

In sum, out of the total growth in Sri Lanka's population of 2.7 million people between 2012 and 2037, 1.2 million is due to fertility that is above replacement level, 0.9 million people is due to a young age structure in 2012, and 0.3 million is due to further reductions in mortality. Expressed as a proportion of the total population increase, the contributions are 56 per cent from above-replacement fertility levels, 33 percent from population momentum, and 29 per cent from mortality reductions.

Figure 4: Percentage Contribution to Population Growth by Component, 2022 and 2037



Source: Author's calculations

Figure 4 reveals that future population of Sri Lanka will still be mainly determined by the high fertility arising from above replacement level fertility at least until 2022 as mentioned earlier and population growth momentum generated by its young age structure although its effect is slightly diminishing over time.

It was mentioned earlier in this analysis that fertility increase of the older women in the reproductive age span to a greater extent and increase of fertility among teenage girls to a lesser extent has contributed to the recent increase in Total Fertility Rate in the country. Therefore, it is quite obvious that these two categories will contribute to keep the fertility above replacement level at least until 2022. Resultant population growth momentum will further accrue more women in the reproductive age span in the future to make fertility to be still the major positive contributor for future population growth in Sri Lanka. This strongly suggests that Sri Lanka's current fertility policies have to seriously address issues related teenage as well as older women's (aged 35-49 years of age) fertility.

Typically, women above the age of 35 years or those who are in the second part of their childbearing years are left out of discussions on contraceptive use (OlaOlorun, 2013). Most women in the latter part of the childbearing appear to perceive that they are at a minimum risk of conception because of infrequent sex, and perhaps they are infertile at those ages. However, these women are still sexually active and they are close to their menopausal stage so they continue to be at a risk of pregnancy although their fecundity declines as age increases.

Similarly, the increase of fertility among teenagers (even to a lesser extent) is not a healthy sign for a country which started its fertility transition in the 1960s. It appears that country's reproductive health programmes concentrate more on the married women who are in the first half of childbearing ages, by assuming that it is married women who desire reproductive health assistance in order to complete their childbearing before reaching the second part of childbearing age span, after achieving their desired family size. Therefore, the lack of inclusive reproductive health education becomes a matter of serious concern. Some observed complications for pregnant teenagers, particularly those who are younger than age 15 and those who don't receive prenatal care, include anemia, high blood pressure and preterm labor. Babies born to teen-mothers are more likely to be born prematurely and have a low birth weight . It is therefore, necessary to understand that young women irrespective of marital status, desire adequate information about reproductive and health issues including sexual intercourse, contraception, sexually transmitted infections, pregnancy and childbirth.

Recommendations

Recommendation 1:

Policy planners must accommodate population evolution into their policy planning, especially within the context of medium and long-term policy perspectives. Sri Lanka's carrying capacity of 25 million people are a creative resource, and this creativity is an asset societies must utilize to its maximum potential. To nurture and enhance that asset, people's physical well-being must be improved through better nutrition, health care, and so on. Education polices must be put forward to help them become more capable and innovative, skilful, and productive. At the same time, these have to be achieved through access to and participation in the processes of sustainable development as envisioned by the UN Sustainable Development Goals (SDGs).

Recommendation 2:

Sri Lanka must continue to recognize the strong link that exists between population and environment in the country in order to strengthen its carrying capacity. This requires a careful evaluation of very important relationships of population with emissions, climate change, food security, freshwater, waste management, health impact, coastal management, gender and environment, climate-induced population mobility, land-use, war and deforestation. Consequently, such analysis needs to be integrated into government's policy agenda in order to ensure long-term sustainable development of the country. Furthermore, Sri Lanka needs to change the current environmentally harmful material consumption patterns. This requires policies to improve efficiency in the areas of energy consumption, food production systems, inland transport system, and reduction in high pollution industries through efficient use of appropriate technologies and infrastructures. Moreover, a methodical deviation of economic activities merely concentrating on growth needs to be geared to lessen the environmental impact of the consumption patterns of the population.

Recommendation 3:

Fertility policies in Sri Lanka must seriously address adolescent pregnancy and childbearing. Lack of awareness on sexuality and reproductive health matters in Sri Lanka has exposed youth to relatively high reproductive health risks. The consequences of adolescent pregnancy and childbearing are serious and numerous: Pregnant teenagers are more likely than women who delay childbearing to experience maternal illness, miscarriage, stillbirth, and neonatal death; Teen mothers are less likely to continue education and more likely than their peers who delay childbearing to live in poverty; The children of teenage mothers are often born at low birth weight, experience health and developmental problems, and are frequently poor, abused, and/or neglected. It is important that there should be programmes to help teens delay having sexual intercourse, but it is also essential that policymakers must accept the fact that teens engage in sexual behavior. A substantial gap exists among the adolescents and youth due to lack of the knowledge on sexuality and reproductive health issues including service delivery even though there have been various programmes directed towards reproductive health matters of adolescents and youth through peer-education, school-based health education, and various non-governmental sector organizations. An additional significant strategy would involve mothers (as the most trusted person to talk personal matters), and incorporate a systematically designed programme directed at educating mothers on ASRH.

Recommendation 4:

Reproductive health programmes in Sri Lanka must address the neglect of contraceptive use of the older women in the reproductive age span, especially for women who have achieved their desired family size. At the household level and individual level, lack of awareness on reproductive matters will surely generate unwanted high fertility. High fertility does not simply mean a large number of births but also characteristically a high incidence of pregnancies, of unUplanned and unwanted pregnancies, and of closely-

spaced pregnancies, all of which can influence household and individual wellbeing. In such cases, it is essential to improve access to reproductive health facilities including family planning. It is important to note that those who have passed the age of 35 and achieved desired family size still need contraceptive information and services because age alone cannot be regarded as an effective contraception although these older women are less likely to get pregnant. However, it appears that family planning programmes have concentrated more on the younger women and perhaps because of the country's fertility norm is two and thus they have neglected the contraceptive needs of older women.

Recommendation 5:

Policy planners must adjust their socio-economic policies and plans by deviating from their previous positions in order to contain the additional number of people produced by the sudden increase of fertility.
It was shown earlier in this policy brief that fertility as well as the young age structure will contribute the most to the population growth in Sri Lanka between 2012 and 2037. Hence, increase of TFR observed in the country produces extra number of births which are of policy concern and hence appropriate policies should be adopted to accommodate needs and aspiration of this additional birth cohort because they are basically belonged to the new millennium, which can be quite distinct to previous generations. Therefore, policy planners need to answer number of questions: How do you adjust your educational policies to accommodate these extra number of children?; How do you adjust investment in children's education?, especially in relation to cost of school uniforms, cost of school books, school transport facilities, children's health and other welfare facilities and additional places in universities/vocational training and other higher educational institutes and thus government bursaries etc. Gradually, these extra number of children will be entering labour force ages very soon. Accordingly, Sri Lanka has to seriously think how employment policies to be espoused to accommodate these additional workers and hence what type of changes are necessary to create more jobs (skill and decent jobs). Since the country is expected reach its TFR to replacement level of fertility in 2022, it is advisable to adjust polices to accommodate this additional number of people because its effects will have great impact on the country's socio-economic policies for at least during the first half of this century.

Recommendation 6:

Sri Lanka needs to address the unmet need for family planning by adopting rights-based approaches which can lead to greater equity, equality and nondiscrimination.
Unmet need for family planning prevents women and men from exercising their reproductive rights, including their right to health. This is most effectively attained through the primary health-care system and expansion of its coverage, with particular attention on equitable services for rural and remote areas and marginalized population groups, regardless of age or marital status. It is widely accepted and proven that family planning will lead to improvements in health of mothers and children, promotes gender equality, increased access to education, permits economies to be strengthened by the involvement of younger people who abundantly contribute their time and efforts in their own communities to diminish poverty. Therefore it is imperative that this must be completely integrated into all current and future development initiatives. It is possible to reduce unmet need for family planning with carefully chosen and well implemented interventions.

Recommendation 7:

Policy planners must seriously consider age structure changes taking place in Sri Lanka when development plans are formulated.
Population growth would continue in Sri Lanka because of the accumulation of higher proportion of women at the reproductive ages which will ensure higher birth rates. It is very clear that the momentum from a young age-structure created by the historical high fertility in Sri Lanka, significantly accounts for future growth of the population. Furthermore, it is evident that

both recent high fertility (above replacement level fertility) and young age structure together contributes to the future population in Sri Lanka. Controlling current fertility alone will not suppress the population growth of the countries with high fertility because young age structure generated from current fertility will extend the duration of high population growth further. Sri Lanka has entered into the first demographic dividend stage since the percentage of population below 15 years of age are lower than 30 percent and proportion of elderly population who are aged 65 years and above are still less than 15 percent. However, high fertility is usually entwined with relatively high poverty status by jeopardizing economic development.

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'Population Matters' is a series of analytical policy briefs on Sri Lanka's emerging social development issues.

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