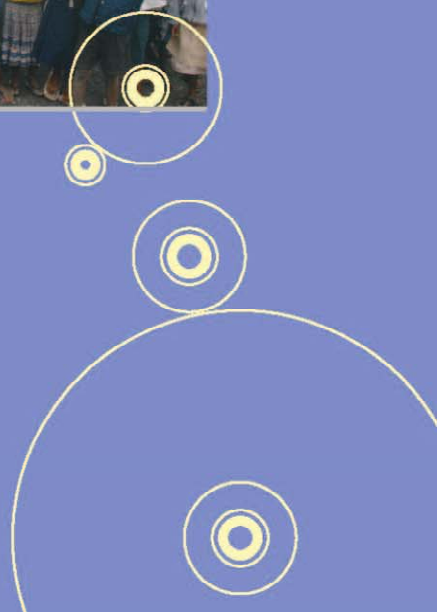


POLICY NOTE ON POPULATION GROWTH AND ITS IMPLICATIONS IN TIMOR-LESTE



The World Bank



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October 9, 2008
The World Bank
Washington, D.C.



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Executive Summary

1. Timor-Leste is a small country with the potential—if not the likelihood—of having a much larger population than it now has. Its current population puts it among the larger island countries in the world. Population density, although low for Southeast Asia and just half that of Indonesia, is about at the median for Oceania. The population is very young, with close to half younger than age 15, as contrasted with only a third in Southeast Asia as a whole. The age distribution is uneven, partly reflecting a turbulent recent history but probably a high rate of maternal mortality as well, which leads to a deficit of women at older ages.

2. High maternal mortality is partly a result of one of the highest fertility levels in the world, at 6.9 to 8.3 children per woman. High fertility is generally associated with low life expectancy, particularly for women, as well as with high infant mortality. A baby born less than 2 years after the previous one is almost four times as likely to die in infancy as one born 4 or more years later.

3. Demographic projections, calculated for this report, indicate that the Timorese population should increase by one-third by 2015 from its initial 2005 value, by four-fifths by 2025, and triple by 2050 (Figure 1.1). (These results are similar to those in earlier projections from the National Statistics Directorate.) In an alternative rapid growth scenario, the population could quadruple by 2050. In the medium scenario, annual population growth rates start at 3.3 percent and fall slowly to 2.7 percent between 2005 and 2025. This will lead Timor-Leste to equal Indonesia's current population density by 2025. The population will age, but only slightly, with 40 percent still younger than age 15 by 2025.

4. Some social sectors will be especially affected by rapid population growth. The urban population, now about one-quarter of the total, is growing much faster than the rural population. Urban growth is 4.7 percent a year and will decline only to 4.4 percent by 2025, by which time the urban population will be 2.5 times its present size (Figure 1.2). Beyond 2025, the urban population could expand even more dramatically. The rural population will grow more slowly, but will still increase 50 percent by 2025.

5. The population of secondary school age children is expected to increase 90 percent by 2025, and that of primary school age children will probably increase by 70 percent. To enroll all children of primary school age, students aged 7–12 years would have to increase 6.6 percent a year from 2005 to 2015. More

Figure 1.1. Projected percentage growth in population in Timor-Leste, 2005-2050: three scenarios

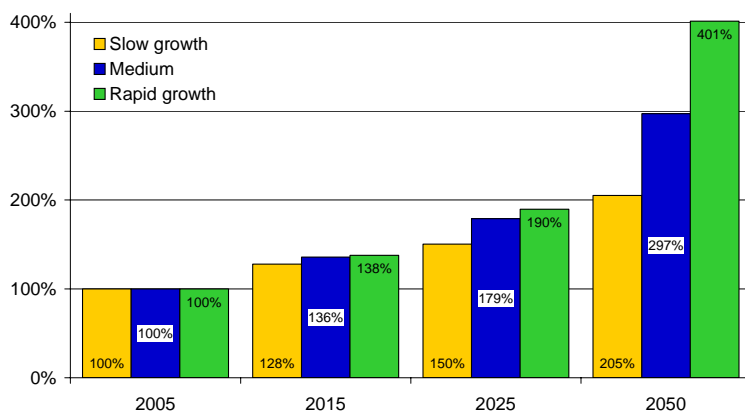
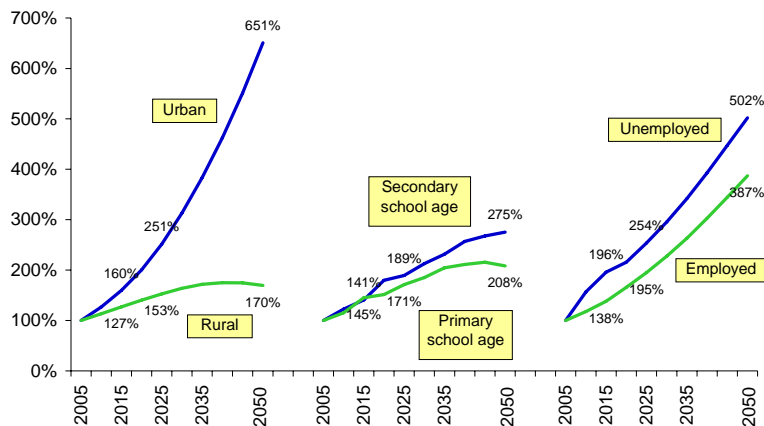


Figure 1.2. Projected percentage change in some subpopulations from 2005 to 2015, 2025, and 2050, Timor-Leste



than half of all students now have no textbooks, and only 5 percent have all the textbooks they need. Remedying such deficiencies in schooling will be complicated by the need to accommodate growing numbers of students.

6. In 2005, 80 percent of males and 55 percent of females 15 years and older were either employed or looking for work. Almost four out of five of those employed worked in agriculture, fishing, or forestry. If the proportion of the labor force employed stays the same until 2025, the number employed will double. Even if the number of available jobs doubles in a decade, the number of unemployed individuals will increase faster, by 150 percent.

7. Feeding the growing Timorese population will present problems. Of the staples of maize and rice, production of maize could stay ahead of minimal national requirements if yields increase substantially from their current low levels. But even with increases in yields, the deficit in rice production will grow. By 2025, instead of filling 70–80 percent of requirements from domestic rice production, Timor-Leste will be able to fill only one-third to one-half of its minimal requirement.

8. Pressure will grow on the environment. Deforestation rates are already among the highest in the world, and if increasing population forces an extension of cultivation to sensitive areas, the fragile soils, steep terrain, and occasional heavy rains could make expanded cultivation self-defeating in the long run.

9. Although these population projections imply rapid growth, they actually assume that growth will slow as the country enters a decades-long transition, typical of developing countries, from high to low birth rates. But Timor-Leste is not a typical developing country. Fertility levels are unusually high and homogeneous, with smaller fertility differentials between socioeconomic groups than in most societies with high fertility. Urban fertility has hardly declined, and women with some secondary education are having only marginally fewer children than other women. The desire for large families is virtually universal in Timor-Leste. Even among women with six or more children, two-thirds express no interest in stopping childbearing. Knowledge about contraception is extremely low. Only one in five women can spontaneously name a contraceptive method, and an additional one in five recognizes a method when prompted. The combined percentage knowing about contraception is the lowest recorded in any national survey in developing countries in 20 years.

10. Timor-Leste has adopted a reproductive health policy that guarantees access to family planning services. Implementing this policy and educating households and convincing them that it is in their own

best interests to reduce fertility for both health and economic reasons will be a substantial challenge. If the effort does not succeed, population could grow even faster than projected.

11. For the effort to succeed, the health sector will have to take substantial responsibility. This sector faces problems; above all, a disconnect exists between available health resources and poor health outcomes in the population. Solving this disconnect, particularly through improving access to services and creating an effective health education program, will be essential to underpin any family planning initiatives.

12. To begin to address the challenges of rapid population growth, therefore, this report recommends these initial steps:

- Systematically incorporate population considerations into national, sectoral, and environmental planning.
- Reaffirm the essentials of the reproductive health policy, including the provision of contraception, and ensure that relevant constituencies are aware of and understand the basis for the policy.
- Explore ways to communicate the benefits of smaller families—in regard to health, household finances, and national needs—to a wider and wider circle of the population.
- Strengthen the health sector and develop within it effective mechanisms for delivering and promoting contraception wherever demand could grow.

1. Introduction

1. Timor-Leste, a small country and one of the newest in the world, stands out demographically. It has a very young population, the fastest growing in Asia—and almost the fastest in the world—and faces significant demographic challenges. This report describes the country's demographic status, offers future projections, examines the obstacles posed to sustainable development, and considers what might be done about rapid population growth.

2. The report projects population to 2050, complementing earlier projections by the National Statistics Directorate (NSD) (2005). One reason for constructing new population projections is that the United Nations is projecting a somewhat different demographic future for Timor-Leste, and reexamining future prospects is useful.

3. The report offers a description of current demographics, including density, population structure, and the components of population change. It explains projection procedures and provides results, including some alternative projections. The report assesses consequences of population growth for key sectors of society such as education and employment and offers options for modifying future population trends, focusing on high fertility and the reasons behind it. A brief discussion of the health sector highlights problems of promoting family planning. Comparisons are made where appropriate with other developing countries, particularly within Southeast Asia.

2. The Current Demographic Situation

4. The enumerated population of Timor-Leste, as reported by the mid-2004 census, was 923,198. To facilitate comparisons with other countries, this is adjusted to mid-2005, using an estimate¹ of 994,500.

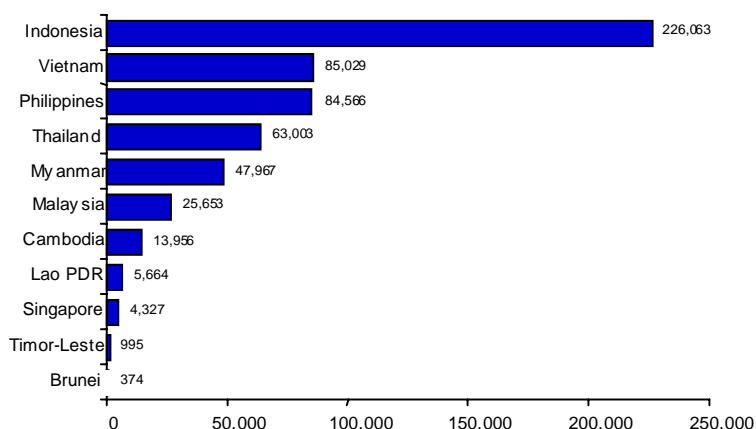
5. Whether Timor-Leste has a small or a large population depends on one's frame of reference. Within Southeast Asia, all its neighbors except Brunei dwarf Timor-Leste. The Philippines, for example, has 85 times the population of Timor Leste, and even Singapore has 4 times the population (Figure 2.1). Nevertheless, the population of Timor-Leste was larger than that of any developing country or territory in Oceania other than Papua New Guinea (Figure 2.2), and larger than that of three out of four countries in the Caribbean. Among island countries it ranked with the larger ones, with a population therefore exceeding that of a third of the world's countries. Unlike smaller countries, Timor-Leste cannot rely only on local community efforts to tackle demographic problems; rather the country needs some centralized national effort to address them.

Density

6. Although population density appears to be low, from some perspectives there may be cause for worry. Timor-Leste had 67 persons per square kilometer in 2005. Regions and districts vary, with Dili and the surrounding areas being most dense. Intermediate in density, far behind Dili, are the coffee-growing

¹ The estimate is explained below. This section uses population stock estimates for Timor-Leste as of mid-2005 and period estimates as of 2000–2005, calculated as part of the population projections to be described later. These do not precisely match estimates directly from the mid-2004 census. Demographic comparisons with other countries and territories rely on the 2006 revision of *World Population Prospects* (United Nations Population Division 2007), which covers about 200 countries and territories. Nondemographic data for comparison, such as agricultural land, are drawn from World Bank files.

Figure 2.1. Population in Southeast Asian countries, 2005
(thousands)



highlands spreading out south of Dili, the area around Baucau, and the eastern half of the Oecusse exclave (NSD 2006:26–27).

7. National average density is close to that of other smaller countries in the region (Brunei, Cambodia, Malaysia, and Myanmar), and well below that in larger countries (Indonesia, the Philippines, Thailand, and Vietnam). The Southeast Asian average, which is weighted toward the large countries, is almost twice that of Timor-Leste. Relative to island countries in Oceania, Timor-Leste has a density at the median; relative to the Caribbean, density is near the low end.

8. Population can be compared to land in alternative ways, such as comparing rural population to agricultural land. In Timor-Leste, 23 percent of land is considered agricultural, close to the regional Southeast Asian average of 26 percent. The rural population is estimated at 73.5 percent of the total (United Nations Population Division 2007), making Timor-Leste predominantly rural, more rural than any Southeast Asian country except Cambodia and Lao PDR, more than the majority of countries in Oceania, and more than all but one country in the Caribbean. Timor-Leste has 216 rural inhabitants per square kilometer, closer to the Southeast Asian average than is overall density (Figure 2.3). Whereas overall density is about half that in Indonesia, the ratio of rural population to agricultural land is 92 percent of that ratio in Indonesia.

Figure 2.2. Population in Timor-Leste and Oceania, 2005
(thousands)

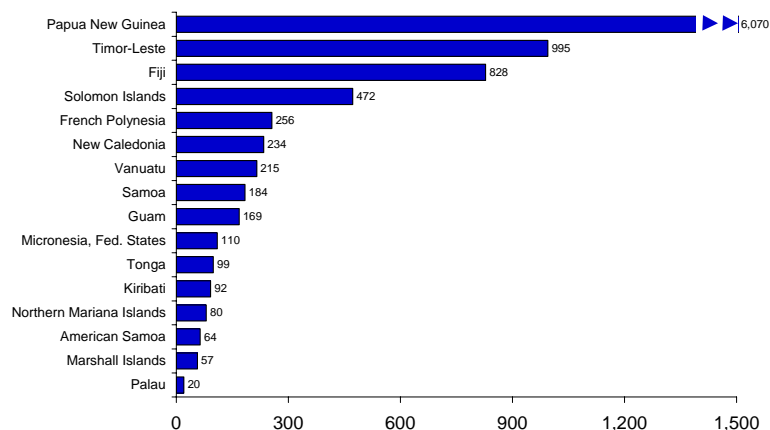
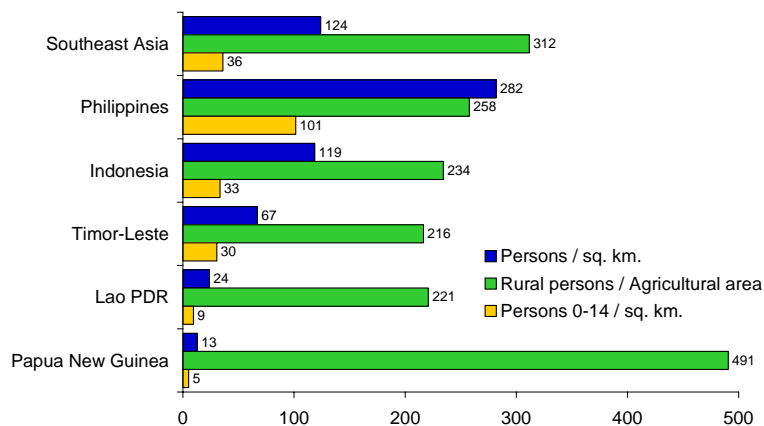


Figure 2.3. Alternative indicators of population density, Timor-Leste and selected countries, 2005



9. A hint of future densities is provided by looking at child density, the number of children aged 0–14 per square kilometer. Timor-Leste has a child density of 30.5, close to the estimates of 33 for Indonesia and 36 for Southeast Asia as a whole.

10. Relatively low population density appears to provide Timor-Leste with some breathing room. However, if one focuses on agricultural land, this advantage disappears, and if one focuses on children, the prospects for the future are somewhat clouded.

Age and Sex

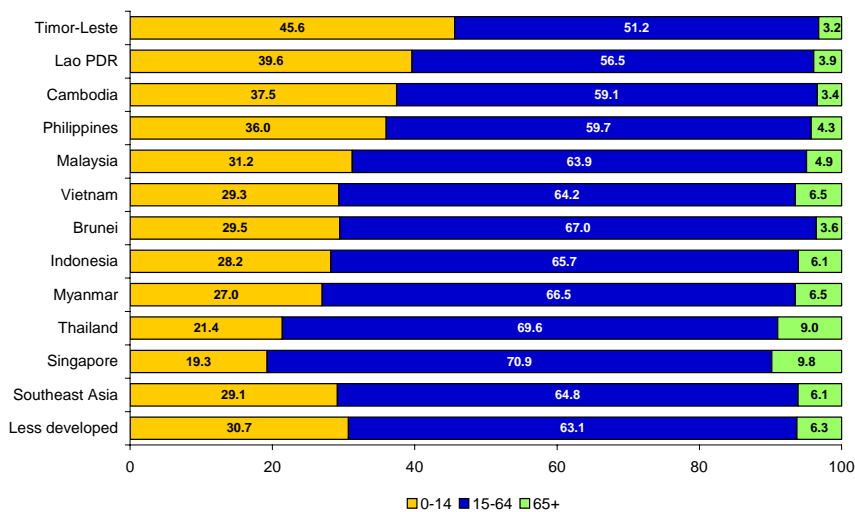
11. Child density is high because the population is young. The median age of 16.1 years² is 3 years younger than in any other Southeast Asian country and almost 10 years younger than in all developing countries combined. Only three countries, all in Sub-Saharan Africa, have a younger population than Timor-Leste. The median age is lowest in the coastal lowlands to the far east and in several parts of the coffee-growing highlands.

12. Timorese aged 0–14 years constitute 45.6 percent of the population (Figure 2.4). In Southeast Asia, as in developing countries as a whole, children and youth of this age constitute less than one-third of the total population. Timor-Leste has a correspondingly smaller population in the working ages of 15 to 64 years—51.2 percent, in contrast to 64.8 percent in Southeast Asia and 63.1 percent among developing countries generally. The working population therefore supports, at present, proportionally more dependents than in most other countries.

13. Figure 2.5 shows the Timor-Leste population distribution by age and sex in more detail. This population pyramid has a relatively wide base, reflecting the number of young people. It also fails to taper smoothly upward. For example, it has a substantial dip at ages 30–34 and a bulge at ages 35–39. Although this may reflect errors in reported ages, it could also be due to fluctuations in past patterns of births, deaths, or migrants. The small cohort at ages 30–34, for instance, would have been born between 1970 and 1975, suggesting low fertility in those years or poor infant and child survival after the Indonesian invasion in 1975.

² This estimate incorporates upward adjustments to the census population at the youngest ages because of undercounting. However, even an estimate based on uncorrected census figures—18.3 years, according to the *Atlas* (National Statistics Directorate 2006)—would still be strikingly young.

Figure 2.4. Percentage distribution of population by age, Timor-Leste and other Southeast Asian countries, 2005



14. Whatever the causes of the uneven pattern, it also affects the sex ratio, the number of males per 100 females (Figure 2.6). The sex ratio is irregular, indicating more males than expected at several ages, as among people in their thirties, and fewer than one might expect at other ages. That there are more males than females in every five-year age group from 50 years up is clearly an anomaly that begs explanation.

Components of Population Change

15. In 2000–2005, the components of population change—deaths, births, and migrants—reflected a demographic situation that was dire even by developing country standards. We consider first indices of mortality—life expectancy at birth, infant mortality, and child mortality. Life expectancy at birth in 2002 has been estimated at 57.4 years for males and 58.9 years for females. We use an estimate of 58.3 for both sexes for the period 2000–2005. At this level, life expectancy in Timor-Leste is slightly longer than in Cambodia but substantially shorter than in other Southeast Asian countries: 10 years shorter, in fact, than the regional average (Figure 2.7). Although many countries in Sub-Saharan Africa have as short or shorter life expectancies, outside that region such countries are very few.

Figure 2.5. Population pyramid for Timor-Leste, 2005

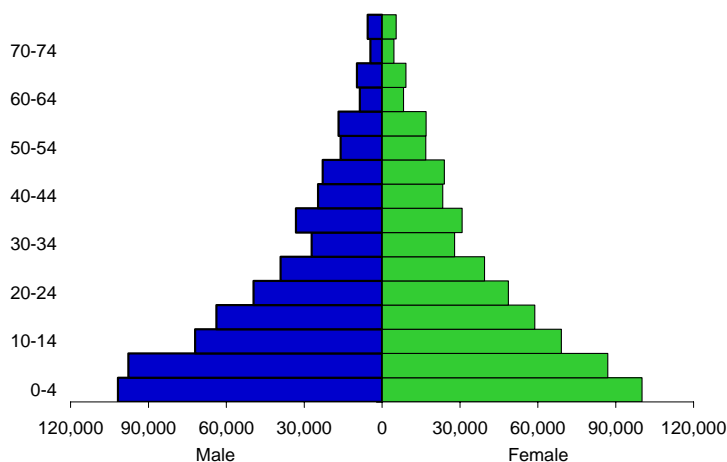
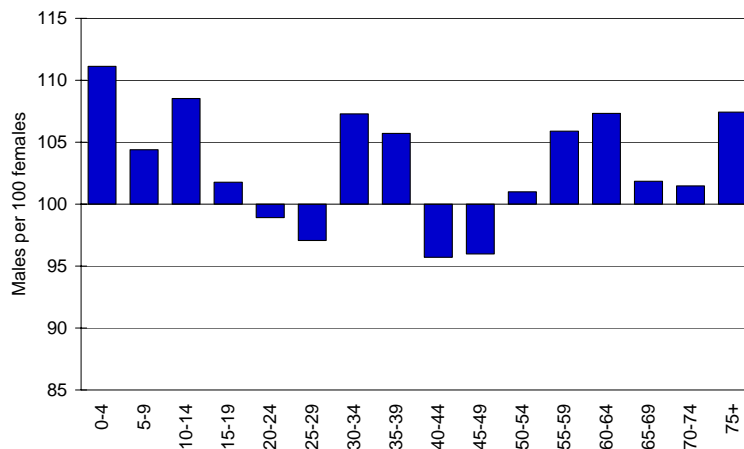


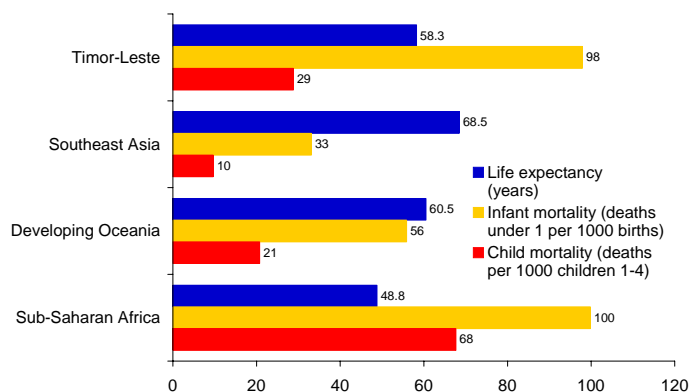
Figure 2.6. Sex ratio by age, Timor-Leste, 2005



16. The gap between female and male life expectancies at birth is also unusually small. Whereas women typically outlive men by 3.4 years in the developing world and 7.4 years in developed regions, in Timor-Leste women live only 1.5 years longer (Figure 2.8). This gap is the smallest in Southeast Asia, where the average is 5.0 years. It is smaller than in India and smaller than in the majority of Sub-Saharan African countries. The small gap may be partly responsible for the excess of men at older ages (see Figure 2.6). One cause may be the highest maternal mortality ratio in Southeast Asia, estimated at 660 maternal deaths per 100,000 births³ for 2000 (Economic and Social Commission for Asia and the Pacific 2007:148). High fertility magnifies the impact of such a ratio. The age structure irregularities suggest the possibility of other causes that deserve investigation.

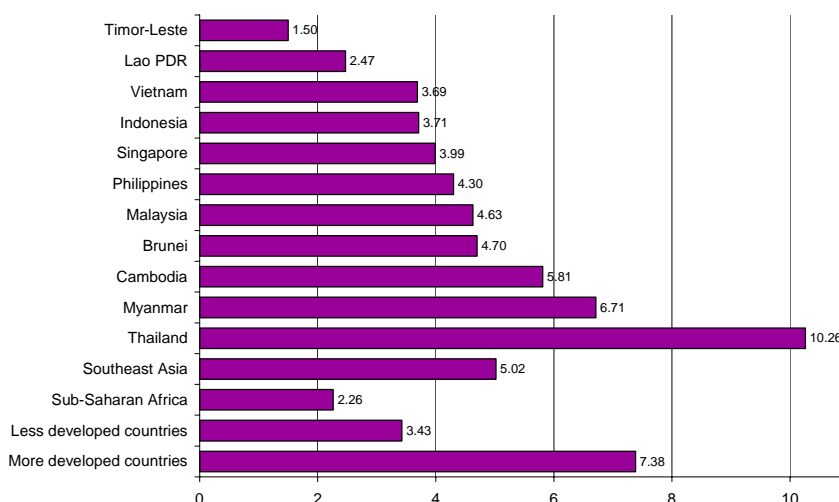
17. Life expectancies are generally estimated from limited data, particularly about probabilities of dying in infancy and childhood. We expect therefore that infant and child mortality estimates should have the same message: that mortality is high in Timor-Leste. The 2003 Timor-Leste Demographic and Health Survey (TLDHS; Ministry of Health and others 2004) and the 2004 census provide relatively recent data on infant and child mortality. These two sources are in agreement on the recent trend—downward—but differ somewhat on the levels that have been reached. (Figure 2.9). Using the census data, we adopt an infant mortality estimate of 98 deaths under 1 year per 1,000 births for 2000–2005 and a somewhat

Figure 2.7. Life expectancy and infant and child mortality: Timor-Leste and three developing regions, 2005



³ The estimate is from a model rather than direct measurement. A range between 420 and 850 is cited by UNFPA.

Figure 2.8. Gap between female and male life expectancies: Southeast Asia and selected country groups, 2000-2005 (years)

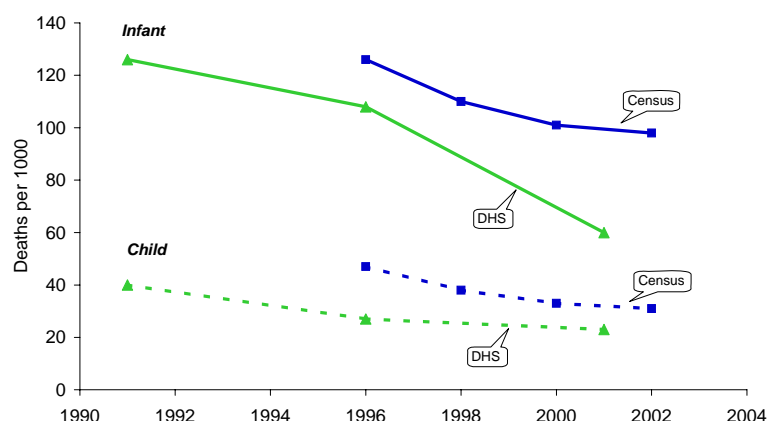


intermediate child mortality estimate of 29 deaths per 1,000 children 1-4 years old.⁴

18. This level of infant mortality is the worst in Southeast Asia, at three times the regional average. It is exceeded only in Sub-Saharan Africa. The level of child mortality is relatively better, being lower than estimates for Cambodia and Myanmar. Southeast Asia in general has relatively better child mortality rates, so that the Timor-Leste level is still three times the regional average (see Figure 2.7).

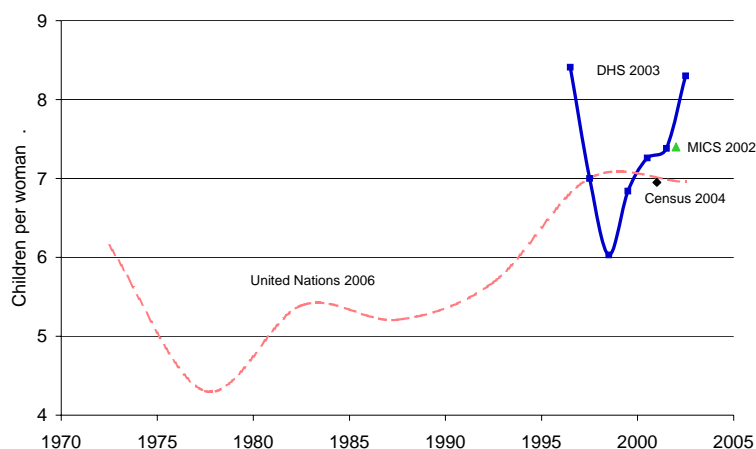
19. High infant mortality rates are usually paired with high fertility levels, as is the case in Timor-Leste. The census produced a total fertility estimate of 6.95 children per woman for 1999–2003. The 2002 Multiple Indicator Cluster Survey gave an undated estimate of 7.4 (UNICEF 2003). The TLDHS gave a higher estimate of 8.3 for 2002–2003 and suggested that, since 1998, fertility has risen substantially. This

Figure 2.9. Infant and child mortality estimates from the 2003 Demographic and Health survey and the 2004 census



⁴ The National Statistics Directorate (2005:14) contends that the TLDHS figures are underestimates, though it does not explain why. Jones (2006) summarizes under-5 mortality data, unavailable for this report, from the 2001 Living Standards Measurement Survey, which suggest an erratic trend, closer to the census estimates in the late 1990s but falling, by 2000, close to the TLDHS estimate. Jones also summarizes data, similarly unavailable, from the 2002 Multiple Indicator Cluster Survey, which are roughly intermediate between the census and the TLDHS.

Figure 2.10. Estimates of total fertility, Timor-Leste: 1970-2003

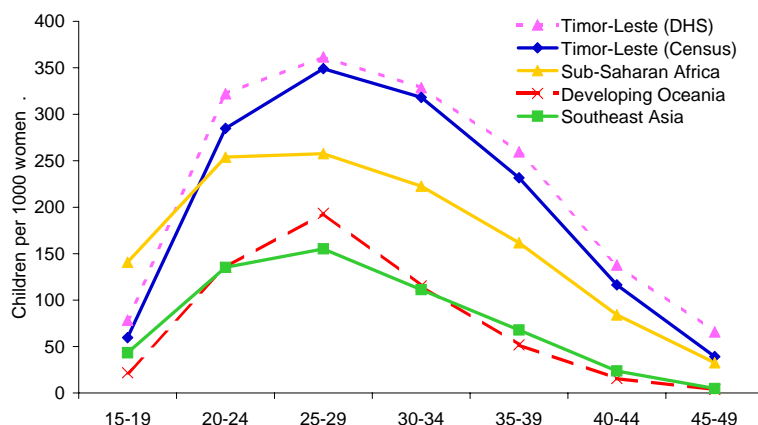


may have followed a drop over the preceding few years, though those data are partly inferred. In the longer view, the United Nations estimates a rising trend, though with some dips (Figure 2.10).

20. We assume total fertility of 7.0 in 2000–2005. At this level, fertility in Timor-Leste is nearly the highest in the world, exceeded only in Afghanistan, Niger, and Guinea-Bissau. Fertility in Timor-Leste is twice as high as in Cambodia and the Philippines, which have the next highest levels in Southeast Asia. It is also well above the average of 5.5 children per woman in Sub-Saharan Africa.

21. For women of every age group from 20 years and up, fertility in Timor-Leste is the highest or close to the highest in the world. At ages 15–19, however, Timor-Leste ranks relatively lower, particularly in comparison with Sub-Saharan African countries (Figure 2.11). This reflects a contrast in overall regional patterns, where the proportion of fertility among females under age 20 in much of Asia, except South Asia, tends to be substantially below fertility in Sub-Saharan Africa. The national census and the TLDHS offer similar results on the age pattern of fertility, reinforcing the impression of very high fertility

Figure 2.11. Age-specific fertility rates, Timor-Leste and three developing regions



after the teenage years.⁵

22. If there is one component of population change that might be considered to carry a positive message, it would be migration. Over several years, substantial numbers of people have returned to Timor-Leste from outside the country. Mass returns are not without problems, and the large numbers could themselves be a demographic burden. Nevertheless, high immigration suggests some optimism about conditions.

23. Because statistics on international immigration and emigration are not well kept, one can make only rough estimates of net numbers. By 1999, refugee agencies estimate that 250,000 people had fled Timor-Leste or been taken to the Indonesian province of Nusa Tenggara Timur. By the end of 2000, perhaps 110,000 refugees remained abroad. (The range of estimates was from 60,000 to 125,000.) Most were repatriated by the end of 2002, the numbers remaining by then having fallen to 28,000 (UNHCR 2005). Very few of these were expected to return: 99 percent registered to stay in Indonesia, and the flow of registered returnees slowed to a trickle. A much smaller number, about 1,600 asylum seekers, were still in Australia (U.S. Committee for Refugees and Immigrants 2003).

24. By rough estimate, therefore, Timor-Leste gained 82,000 net migrants in the period 2000–2005. (The United Nations rounds this up to 100,000, perhaps assuming a number of uncounted returnees, but whether uncounted others emigrated in the same period is not known.) For a country the size of Timor-Leste, this is a substantial population gain. It translates to a net migration rate of 18.2 per 1,000, one of the highest in the world for this period, exceeded only in three small states in the Persian Gulf and in Sierra Leone and the Western Sahara, two areas that have also experienced civil conflict. Although the flow of immigrants was a vote of confidence in the country, it also presented challenges of reabsorption.

25. This high number of returnees added to high population growth. In the 2000–2005 period, the annual rate of natural increase—that is, growth from the balance of fertility and mortality alone—is estimated to be 3.3 percent, more than twice the rate for Southeast Asia and third highest in the world, slightly behind Niger and the West Bank and Gaza. Including net migration, population growth was 5.2 percent, behind only Western Sahara (Figure 2.12). Whether such population growth will continue, and with what consequences, is clearly a matter of interest.

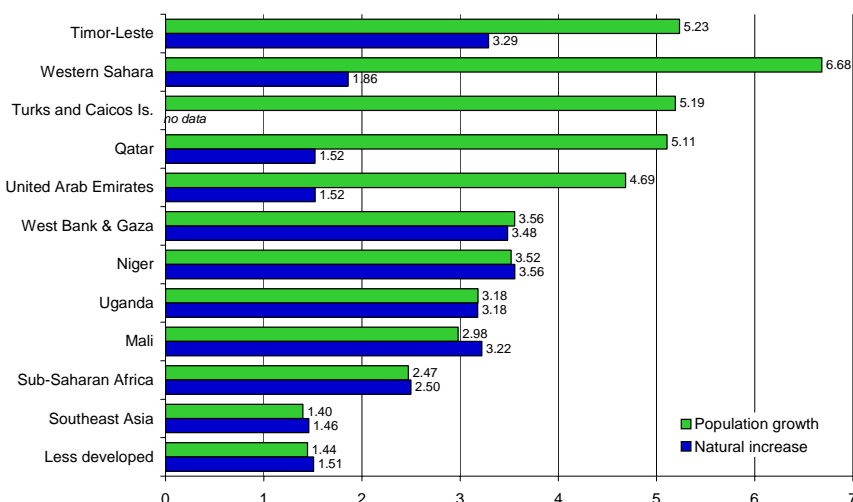
3. Population Projections

26. Separate population projections by the NSD (2005) and the United Nations (United Nations Population Division 2007) both imply rapid growth but differ, by 2025, by 270,000 people, or 15 percent. This is a larger gap than one expects to find between carefully designed projections that rely on the same data sources. Nearly half the people who would be counted in 2025 have been born already, so the scope for disagreement in projections is substantially limited. The disagreement is part of the reason for running additional projections.

27. Like the NSD and United Nations projections, the new projections in this report rely heavily on 2004 census data and use the cohort-component approach to projection. This approach takes sequential

⁵ Given relatively low teenage birth rates, why does there appear to be concern about teenage pregnancy—spotlighted in the *Atlas* (National Statistics Directorate 2006) and by Risopatron (2005)? Is such concern appropriate? These are difficult questions to answer. Cultural and religious factors may play a part both in suppressing teenage pregnancy and generating concern about it. Because some teenage pregnancy exists, there could be some basis for concern. But there is stronger justification for a broader concern about overall high fertility levels, which also take their toll on female health.

Figure 2.12. Fastest-growing populations and some regional averages, 2000-2005
(percent)



birth cohorts and follows them over time, applying components of growth to each cohort. Fertility determines the initial size of each cohort, mortality the cohort's likelihood of survival over time, and international migration the rate at which the cohort is reduced or supplemented from outside. Assumptions must be made about the initial size of each population cohort and the initial levels and subsequent trends of the components.

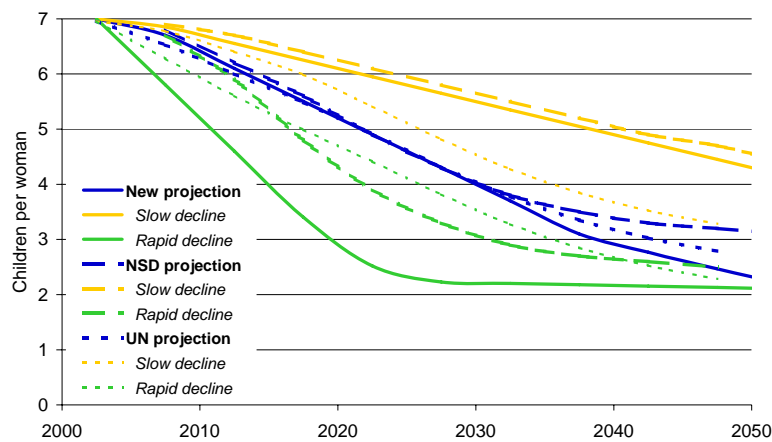
Assumptions

28. The initial population is derived from the census, which gives the population as of July 11, 2004. This population is adjusted upward for probable undercounting at the youngest ages. The NSD (2005:17) provided initial upward adjustments of 13.9 percent at ages 0–5 and 6.8 percent at ages 5–9. Females were increased slightly more than males. To be consistent with total fertility of 7.0 children per woman in 2000–2005, further upward adjustments are made of 8.1 percent for males aged 0–4 years and 2.0 percent for females of the same age. These adjustments still leave the youngest cohort, particularly the males, possibly underestimated in a normal progression of cohorts (see Figure 2.5).

29. We assume total fertility to be 7.0 children per woman for 2000–2005 and adopt, for this period, the age-specific fertility pattern from the census. These assumptions are similar to those in the other two projections. For mortality in 2000–2005, we adopt the life table constructed by the NSD (2005:12–13) from the 2004 census, which gives life expectancies of 57.4 years for men and 58.9 years for women. For international migration, we assume a net gain of 82,000 people in 2000–2005, with all of the gain occurring in the period before the census. As noted earlier, the United Nations assumes a gain of 100,000 people over the entire quinquennium. The NSD, starting from the census date, assumes no migration.

30. Future fertility trends are based on past statistical trends in developing countries. A decline in total fertility is inevitable, and we assume it will proceed at an average pace of 0.12 points a year (although only half as fast in the first quinquennium of the projection, from 2005 to 2010). Fertility at each age is reduced proportionally. As total fertility approaches replacement level—which will not occur for decades—we project fertility decline to slow. Decline could indeed be faster or slower, depending on the individual decisions and actions of hundreds of thousands of couples. The fastest fertility declines in developing countries are about twice as fast as the average. This ratio can be used as a rough guide to an

Figure 3.1. Alternative future trends in total fertility, Timor-Leste, 2005-2050



alternative rapid fertility decline path. A decline half as fast as the average is used to define as an alternative slow fertility decline path.

31. The projected medium trend resembles those in the two previous projections, at least over 25–30 years (Figure 3.1). Beyond that distant point, the new projections suggest a greater decline than in either of the previous projections. Each projection includes not only a medium trend but also rapid decline and slow decline trends. These trends are somewhat more varied. The new projection is close to the NSD projection with regard to slow fertility decline, but both are slower than United Nations projections. Where rapid fertility decline is concerned, the new projection involves lower fertility than either previous projection.

32. Parallels for the future fertility trends in the new projection can be found in the histories of Southeast Asian countries (Figure 3.2). The medium trend resembles the trend in Myanmar since around 1975. When total fertility reached three children per woman in Myanmar, it continued to decline just slightly faster than our projected medium trend, providing some validation for our choice of a slightly faster decline, at that point, than in the two previous projections. The rapid decline trend resembles the more recent experience in Lao PDR. Cambodia, which is not shown in the figure, also exhibited a similar pattern. That there are close parallels within the region seems to support our choice of a rapid decline

Figure 3.2. Projected total fertility in Timor-Leste, 2005-2050, compared with selected past trends

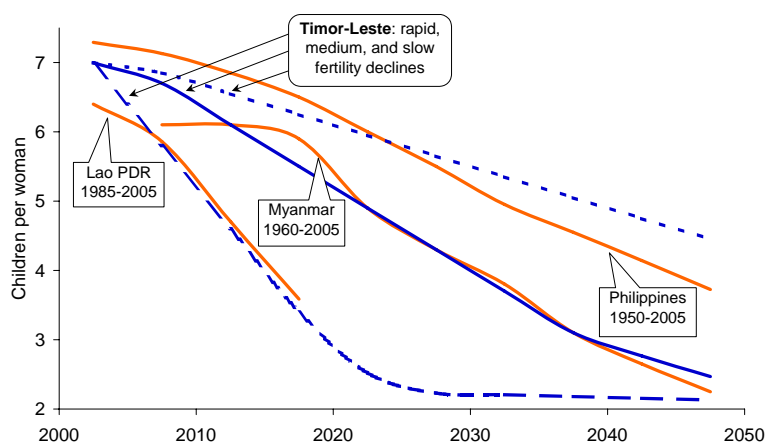
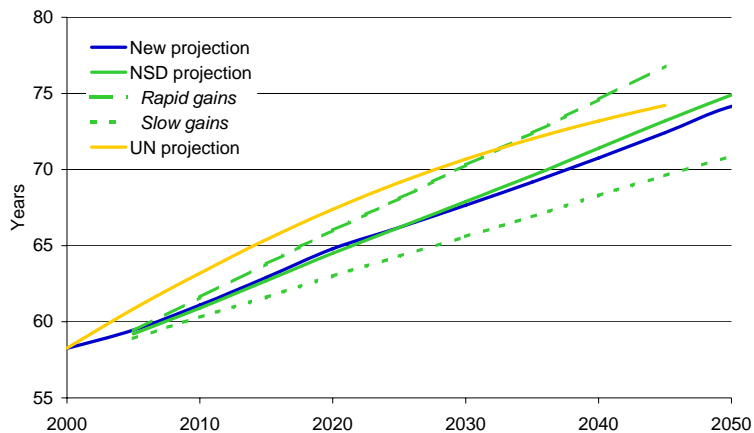


Figure 3.3. Alternative projections of life expectancy at birth, Timor-Leste, 2005-2050



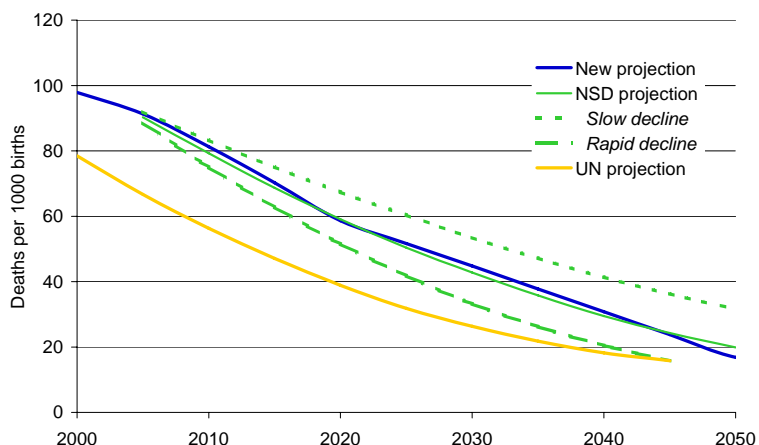
pattern that is faster than in the two previous projections. The slow decline trend somewhat resembles the long-term trend in the Philippines. It is somewhat slower because this alternative takes into account the experience of such other countries as those of Sub-Saharan Africa.

33. Future mortality trends are projected by examining previous trends in life expectancy and assuming they will continue temporarily but gradually revert to an average trend. This average trend is not strictly linear but allows for faster improvements from lower levels of life expectancy and gradually diminishing gains. Only one trend is projected. As shown in Figure 3.3, it closely resembles the medium trend in the NSD's projections, which also included alternative rapid gain and slow gain trends.

34. The United Nations projection allows initial gains in life expectancy that are greater than in any of the other projections, including the rapid-gain NSD projections. The United Nations projects higher life expectancy because it assumes an initially lower infant mortality rate of 78 per 1,000 rather than 98 per 1,000 (Figure 3.4). Given differences in the estimates of this critical parameter (see Figure 2.9), alternative choices appear to be plausible.

35. Future international migration is difficult to project. One could argue that, once displaced persons have returned, "push" factors would be likely to make Timor-Leste into a net labor exporter. But the migrant flow would depend on what cross-national social networks develop and how migration

Figure 3.4. Alternative projections of the infant mortality rate, Timor-Leste, 2005-2050



policies evolve in potential destination countries. In the absence of established flows it is difficult to project future numbers. It is even more difficult to predict political events that could produce huge flows such as those beginning in the 1990s. For present purposes, we assume the absence of any net migration, as the NSD does in its projections. The United Nations assumes a net gain of 2,000 migrants a year through 2015, and then a loss of 1,000 migrants a year for the balance of the projection. These are small numbers, starting out as population gains of only 0.17 percent a year and turning into population losses starting at 0.06 percent a year and gradually diminishing.

Results

36. The various projections produce nine scenarios in all (Figure 3.5). The variations among them can be summarized in two key statements: (1) The new projections are close to those of the NSD except with respect to the slow population growth scenario, in which the new projections estimate slower growth. (2) The United Nations projections lead to a larger population than the other two projections, regardless of whether a rapid, medium, or slow growth scenario is the focus. In fact, the United Nations slow growth scenario shows greater growth than the medium scenarios in the other two projections. These divergences are due to variations in the assumptions just described. In particular, the slow growth scenario in the new projection is based on a more rapid fertility decline than in the other projections (see Figure 3.1), and the higher United Nations projections may be traced to lower mortality assumptions (see Figures 3.3 and 3.4). We focus mainly on the results of the new projections (and largely but not exclusively on the medium or main scenario) but also briefly note below the rapid growth scenario in the United Nations projection, thus covering the entire range of proposed alternative demographic futures.

37. The main scenario shows the Timor-Leste population reaching 1.35 million by 2015, 1.78 million by 2025, and 2.96 million by 2050. The 2005 population of 995,000, therefore, will rise 36 percent by 2015, 79 percent by 2025, and 197 percent by 2050 (Figure 3.6; numbers for each scenario appear in Annex A).

38. In the main scenario, population growth will slow from 3.05 percent annually in 2005–2015, to 2.78 percent annually in 2015–2025, and to 2.03 percent annually in 2025–2050. These growth rates are all high, which explains why substantial population growth is in prospect for decades. Whether measured up to 2025 or up to 2050, growth rates in Timor-Leste will be exceeded only in Afghanistan and in six countries in Sub-Saharan Africa. By 2050, Timor-Leste's population will overtake the populations of 14 countries. For instance, Timor-Leste in 2005 was smaller than each of the Baltic republics (Estonia,

Figure 3.5. Projected population, Timor-Leste, 2000-2050

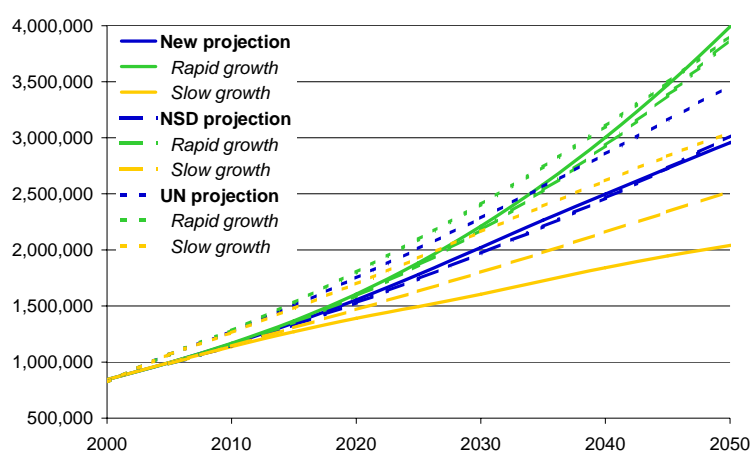
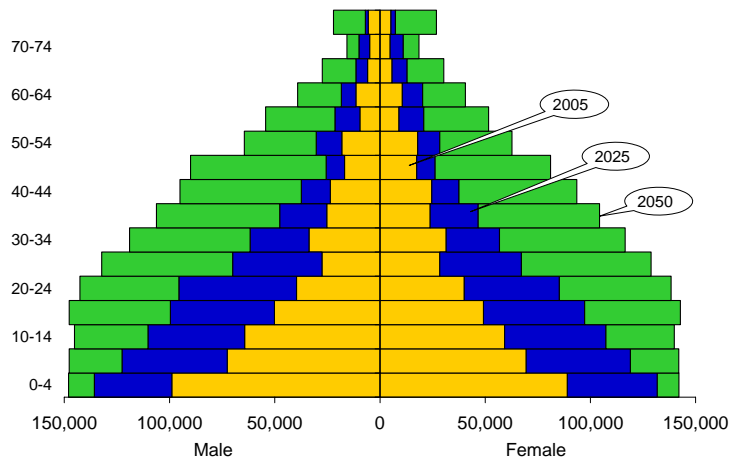


Figure 3.6. Population pyramids for Timor-Leste, 2005, 2025, 2050



Latvia, and Lithuania). By 2050, it will be larger than each of them.

39. Population density will rise from 67 persons per square kilometer in 2005 to 120 in 2025 and 199 in 2050. A useful comparison is with 2005 levels of density in other Southeast Asian countries (apart from Singapore, which as a city-state is in a class by itself). In 2005, population density in Timor-Leste was similar to that of Brunei, among the less dense in Southeast Asia (Figure 3.7). By 2010, it will rise just above 2005 density in Malaysia. By 2025, it will slightly exceed 2005 density in Indonesia, and by 2030 it will exceed 2005 density in Thailand. By 2040, density will be greater than anywhere else in Southeast Asia, as of that date, other than Vietnam, the Philippines, and Singapore. Density in Timor-Leste, instead of being similar to the average for all developing countries, as in 2005, will be more than twice the developing country average by 2050.

40. The population will not stay as young as it is, but its aging will be much slower than typical. Median age will rise 2.1 years by 2025, less than in Sub-Saharan Africa (2.6 years) and much less than in Southeast Asia (7.3 years). The gap between the young population of Timor-Leste and the older populations everywhere else in Southeast Asia will increase. Median age in Timor-Leste will not catch up with the 2005 median age in Lao PDR and Cambodia (around 20 years) until 2035, by which time median age in these two countries will be about 30 years (Figure 3.8).

Figure 3.7. Rising density in Timor-Leste, 2005-2050, compared with Southeast Asian countries (excluding Singapore)

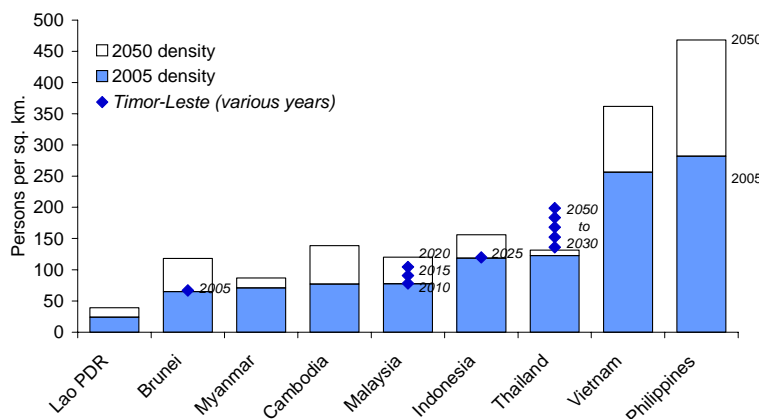
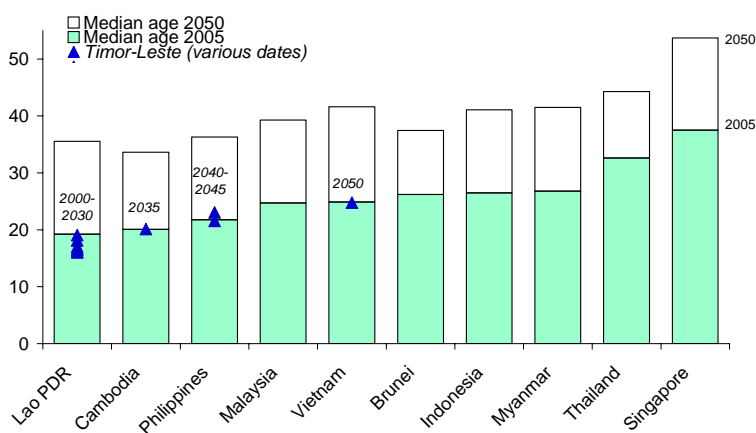


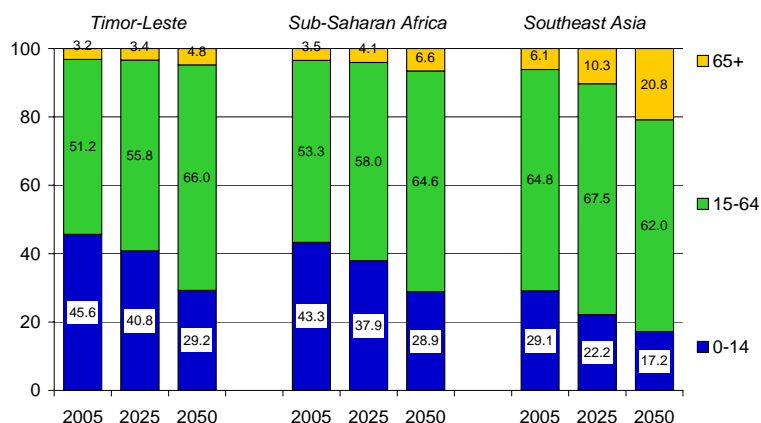
Figure 3.8. Rising median age in Timor-Leste, 2005-2050, compared with Southeast Asian countries



41. The population at ages 0–14 years, currently 45.6 percent of the total, will fall to 40.8 percent by 2025 but will not reach 29.2 percent—essentially the current proportion in Southeast Asia—until 2050. The trend will somewhat resemble that for Sub-Saharan Africa, though the population will still stay somewhat younger than the average in that region (Figure 3.9). For all those decades, the rest of Southeast Asia will have more than 60 percent of the population in the working ages of 15–64 years. Timor-Leste will struggle to reach that proportion of workers, not achieving it until 2040. By 2040, the situation will reverse, with the elderly becoming a larger group in most of Southeast Asia while the working population in Timor-Leste continues to grow proportionally. But the problems of decades of proportionally small working-age cohorts may simply overwhelm any benefits to be obtained by then.

42. The age structure is often represented by way of the dependency ratio, the ratio of the presumably dependent population younger than 15 years or 65 years and older to the population aged 15–64 years. The dependency ratio in Timor-Leste of 95.5 per 100 in 2005 will gradually fall to 79.1 in 2025 and to 51.5 in 2050, suggesting that the dependency burden on each potential worker will eventually be cut almost in half. However, the burden will be relatively high for decades. Up to 2030, it will be the highest in Southeast Asia, and in fact higher than anywhere else except Afghanistan, the West Bank and Gaza, and a few Sub-Saharan African countries. By 2035, Singapore will attain a higher dependency ratio than that in Timor-Leste, as its population ages faster than any in Southeast Asia, and some other countries

Figure 3.9. Percentage distribution of population by age, Timor-Leste and two regions, 2005, 2025, 2050



will follow subsequently.

43. One slightly brighter spot in these projections involves the sex ratio. At older ages there are more males than expected relative to females, suggesting unusually high female mortality. The sex ratio in 2005 among those 65 years and older was 103.6 males for every 100 females. Given normal mortality trends, this ratio should become more typical, reaching 90.9 by 2025 and 86.1 by 2050. This assumes that the causes of unusually high female mortality are addressed. Even with this change, the sex ratio would still fall outside the typical Southeast Asian pattern in which the sex ratio among those 65 years and older is only 80.3 in 2005 and is falling slightly.

Alternative Projections

44. These projections assume quite a substantial decline in fertility: from 7.0 children per woman in 2000–2005 to 4.9 children per woman in 2020–2025, and to only 2.5 children per woman by 2045–2050. Such reductions in such time frames have occurred in the past but have always involved some organized effort rather than arising entirely from the separate, spontaneous decisions of couples. Similarly, the projected reductions in infant, child, female, and overall mortality and the consequent gains in life expectancy assume that organized efforts will be made to improve the health of the population. If on the one hand such efforts are not made (or if they fail), or if on the other hand the efforts are extraordinary (or extraordinarily successful), population trends could be different. This is the basis for the alternative scenarios that have been constructed, leading to either faster or slower population growth.

45. As Figure 3.5 illustrated, the population in 2025 could be 16 percent lower than in the main projection or either 6 or 18 percent higher (depending on whether one chooses the rapid growth scenario in this new projection or in the United Nations projection). Relative to the main projection, population could be roughly 30–35 percent lower or higher.

46. Population growth rates in the rapid growth and slow growth scenarios bracket those in the medium scenario (Figure 3.10). All the rates trend downward, but in the rapid growth scenario they trend downward slowly and only after two decades of essential stability. The United Nations rapid growth scenario shows a different pattern, with initial substantially higher growth but then a faster decline in the growth rate.

Figure 3.10. Alternative projected population growth rates, Timor-Leste, 2005-2050 (percent)

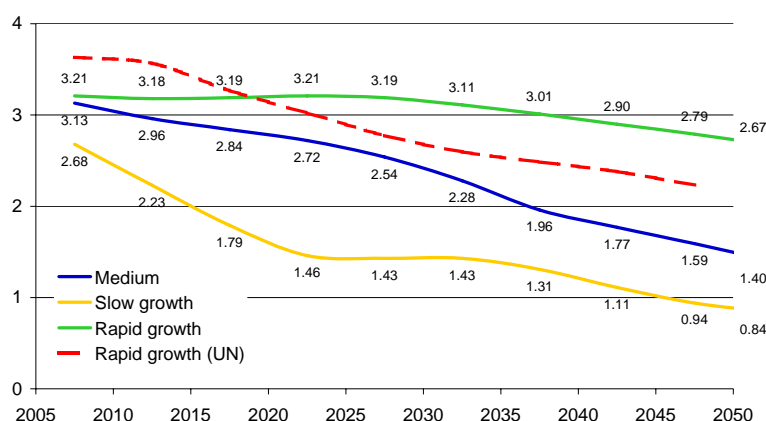
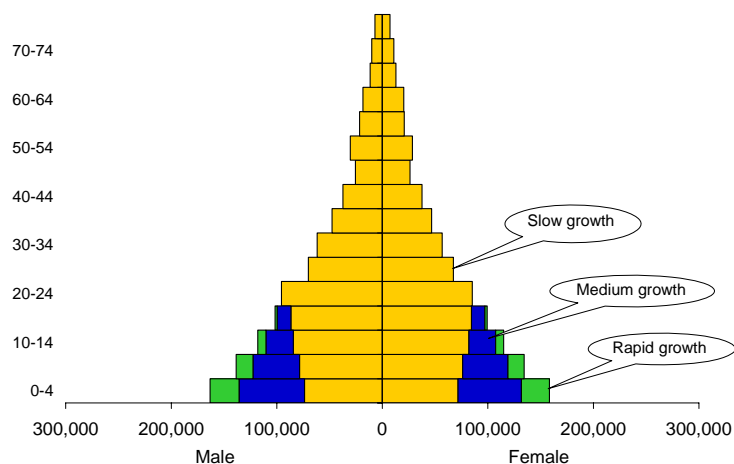


Figure 3.11. Alternative population pyramids for Timor-Leste, 2025



47. Figures 3.11 and 3.12, population pyramids drawn to the same scale, illustrate the differences by 2025 and 2050. The intermediate pyramid represents the main scenario already described, whereas the narrowest and widest pyramids represent the slow and rapid population growth scenarios. By 2025, only the numbers of young people under 20 would be affected, but the difference in their numbers could be substantial: either 10 percent higher or 28 percent lower. By 2050, cohorts up to age 44 would be affected, and the differences would be even greater.

48. The consequences for population density by 2025 would be moderate, although child density would be considerably higher or lower. By 2050, the possible overall densities would vary much more, between 141 and 268 persons per square kilometer—essentially the difference between current densities in Thailand and Vietnam (see Figure 3.7).

49. The effects on the dependency ratio would be quite substantial (Figure 3.13). Instead of 79 dependents per 100 people of working age by 2025, there are, in the alternative scenarios, either 89 dependents or only 54. Instead of 52 dependents per 100 people of working age by 2050, there could be either 76 dependents or only 44. To the extent the alternative scenarios are plausible they suggest a more strapped or a more mellow demographic future.

Figure 3.12. Alternative population pyramids for Timor-Leste, 2050

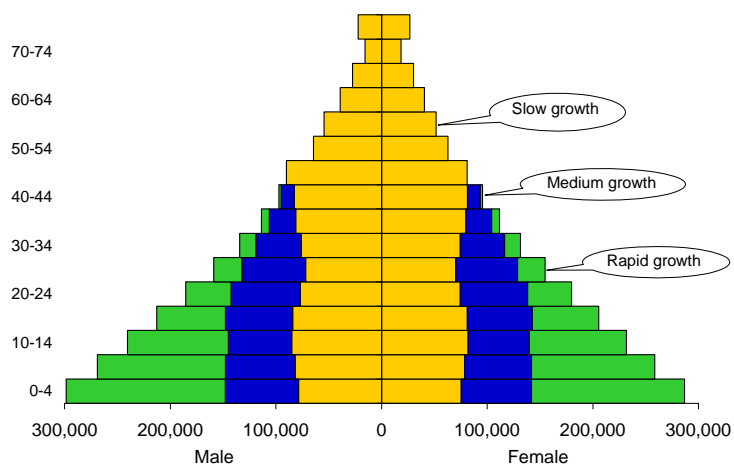
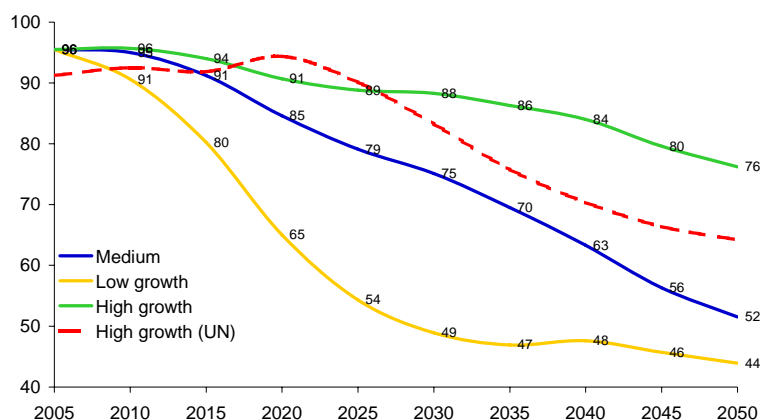


Figure 3.13. Alternative trends in the dependency ratio, Timor-Leste, 2005-2050 (dependents per 100 workers)



4. Sectoral Implications

50. Demographic change will ripple through society in different directions, with multiple consequences. This chapter examines some areas of potential impact. These areas are not meant to exhaust the range of consequences but to illustrate them. Nor is the discussion meant to be definitive, given the need for detailed study in each area, but it is meant to show how widely population growth will impact on society.

Urbanization

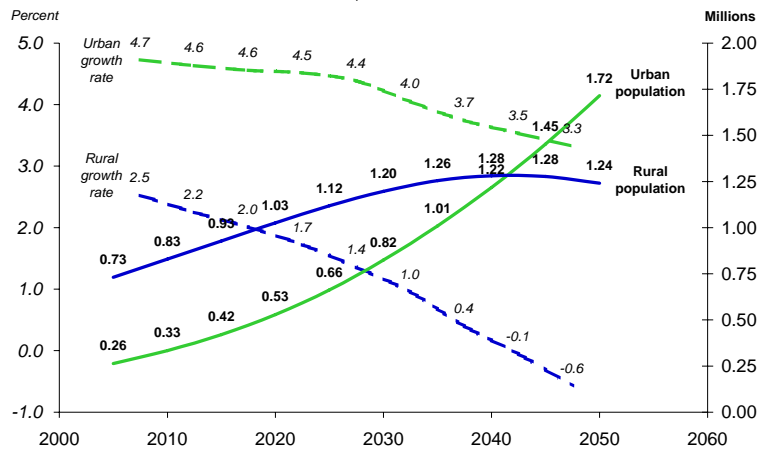
51. From the 2004 census, the NSD identified 38 out of 442 *sucos* or villages as urban. They applied the criterion that each district must have at least one urban *suco*, and added other criteria relating to population size and public facilities. Half of the urban *sucos* are in Dili. Together, all the urban *sucos* contain 26.0 percent of the household population. If the institutional population is considered entirely urban, that adds about 0.5 percent more, accounting for the estimate that 26.5 percent of the national population lives in an urban area. From this moderate (and possibly slightly overstated) level, the urban population is poised to explode in the following decades.

52. Dili, with an urban population of 151,000 in the 2004 census, had 63 percent of the total urban population. Not all of Dili is urban, however; still considered rural were 11 out of 31 *sucos*, with an additional 22,500 people (13 percent of the Dili population).

53. Outside Dili, the urban areas are strung out along the coast or located in the highlands. None of the other 12 districts has more than two urban *sucos*. The largest urban *suco* by population outside Dili (in Lautem) has a population of 12,600, though combined with an adjoining urban *suco* the area's urban population rises to 14,100. The smallest urban *suco* (in Manatuto) has only 300 people, and even with an adjoining urban *suco* the combined population only comes to 1,000.

54. The estimate of the total urban population represents a substantial increase over previous estimates. The United Nations Statistics Division (2007)—as contrasted with the Population Division, whose statistics are used in this report—still reports an urbanization estimate of 7.8 percent (equivalent to less than half the population of Dili), and the World Health Organization is still reporting 15 percent, based on a 2002 health assessment report (Ministry of Health 2002). Perceptions may take a while

Figure 4.1. Urban and rural populations and growth rates, Timor-Leste, 2005-2050



catching up with reality, and the reality is changing rapidly. The United Nations Population Division projects that the urban proportion will increase to 34 percent by 2020 and to 41 percent by 2030 (United Nations Statistics Division 2007). Projections are not made beyond that date, but an extrapolation⁶ would give 58 percent by 2050.

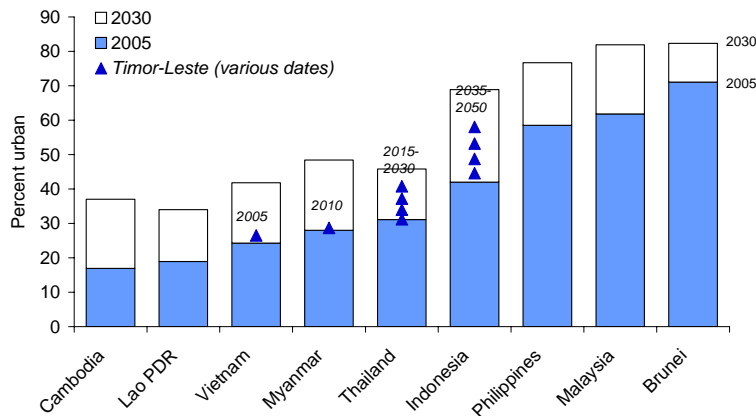
55. The urban population can therefore be projected to double by 2020, triple by 2030, and be six-and-a-half times what it currently is by 2050. Figure 4.1 shows the growth in the urban population compared with the growth in the rural population. Urban growth rates will be between 4 and 5 percent annually until 2035 and will still be well above 3 percent by 2050. In contrast, rural population growth rates are projected to drop from 2.5 percent in 2005–2010 to less than 2 percent by 2020, around 1 percent by 2030, and possibly be negative by 2040. By 2040, the urban population will catch up with the rural population and quickly thereafter exceed it.

56. Much of the urban growth will undoubtedly take place in Dili. Other urban centers should also grow, and additional sucos should become urban, but barring extraordinary events or measures, growth should be faster than average in Dili. Growth should have two sources: high urban fertility and migration from the countryside or from other urban centers, generally from smaller to larger ones. Of the population of Dili at the 2004 census, fully 46 percent were born in other districts (NSD 2006:30; cf. Republica Democratica de Timor-Leste and others 2008:25), so the flow of migrants to the capital is already well established. The only notable flow out of Dili is to the adjacent district of Aileu—a possible precursor of suburbanization. For Aileu, though, lifetime migrants toward Dili still considerably outnumber those away from it, in this case by almost two to one.

57. How extreme are these projections of urban growth? To begin with, the current level of urbanization, 26.5 percent, is relatively low, about equal to urbanization in Vietnam, greater than urbanization in Cambodia and Lao PDR (about 20 percent), but less than urbanization elsewhere in Southeast Asia. By 2010, urbanization should exceed the current level in Myanmar, by 2015 it should exceed the current level in Thailand, and by 2030 it should be close to the current level in Indonesia (Figure 4.2). If our extrapolations hold, by 2050 urbanization should be close to the current level in the Philippines. Each of these other countries will become more urban over these periods. We make comparisons with their current situations to suggest that if Timor-Leste is to have the level of urban welfare that these countries currently have—whatever it may be—Timor-Leste will need to provide

⁶ The projected trend is quite regular. A regression of percent urban on year, over the period 2005–2030, gives $y = 25238 - 25.559x + .0064762x^2$, with R^2 of 0.9999.

Figure 4.2. Rising urbanization in Timor-Leste, 2005-2050, compared to Southeast Asian countries (except Singapore)

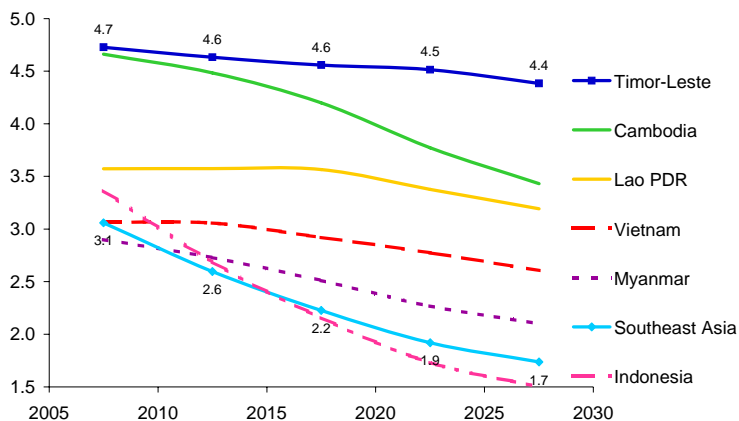


similar levels of urban facilities and services, by the specified dates, as these other countries have at present.

58. From a different perspective, the urban challenge looks even greater. If one focuses on urban population growth rates rather than on the percent urban, rates in Timor-Leste will be exceeded only by rates in Afghanistan, Nepal, and a few Sub-Saharan African countries. Within Southeast Asia, Cambodia will initially grow almost as fast, but growth will taper off much faster. Figure 4.3 compares Timor-Leste with Cambodia and the other faster-growing urban populations in the region. The regional urban population will grow 3.1 percent annually in 2005–2010, with the rate falling to 1.7 percent by 2025–2030. Timor-Leste's urban population, in contrast, is growing at 4.7 percent annually, and even by 2025–2030, the rate will still be 4.4 percent.

59. To maintain current levels of services, urban infrastructure and facilities will have to expand at 4–5 percent annually every year for decades, or achieve comparable improvements in efficiency. Where infrastructure or facilities are currently inadequate, expansion would have to be even greater. Greater expansion might also be needed if households shrink in size (with no change in the projected overall population trend), or for facilities directed at more rapidly growing population groups, such as schools.

Figure 4.3. Urban population growth rates, Timor-Leste and selected Southeast Asian countries, 2005-2030 (percent)



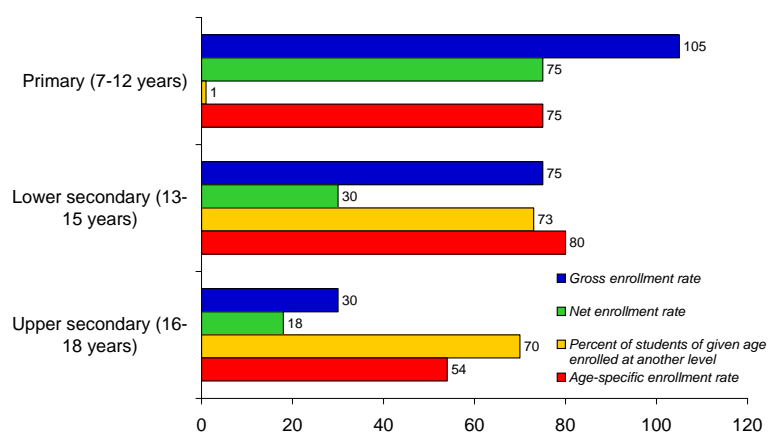
Education

60. School-age populations can be expected to increase rapidly. Children of primary school age (7–12 years old), 162,700 in 2005, should increase 71 percent by 2025, to 278,000. Youth of lower secondary school age (13–15 years old) should increase 81 percent in the same period, from 55,900 to 123,000, and youth of upper secondary school age (16–18 years old) should almost double, from 48,900 to 118,100. Providing schools and facilities for these growing cohorts will stress the educational system. Whether it will be as great a challenge as the need to improve educational quality (World Bank 2004) is difficult to say, partly because enrollment statistics are convoluted and require careful treatment.

61. Figure 4.4 provides relatively recent statistics on enrollment rates. The gross and net enrollment rates are for 2002/2003, except that the rates for upper secondary school are extrapolated from rates for the previous two years (World Bank 2004:21).⁷ Gross enrollment in primary school exceeds the number of children aged 7–12 years because some overage students are counted, but net enrollment (counting only those of the appropriate age) is only 70 percent of this group. At the secondary level, however, gross and net enrollments are both much lower, with net enrollment falling to only 18 percent in upper secondary school.

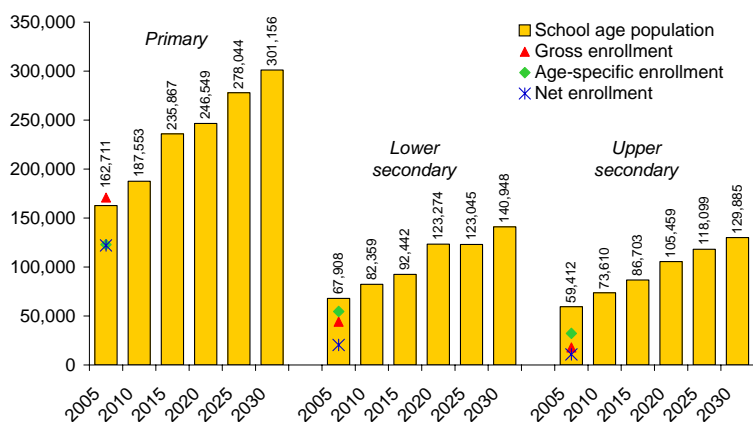
62. The gross enrollment rate can be used to represent the capacity of the school system, or the number of places available given current standards and quality, regardless of how high or low these may be. That is, future enrollment at this level does not increase crowding if facilities stay the same, though the schools may already be too crowded at this level. From this perspective, primary schools, with a gross enrollment rate above 100, have the capacity to absorb the current cohort aged 7–12 years, though only if overage students are excluded. This is not the case for secondary schools.

Figure 4.4. Estimates of enrollment by level, Timor-Leste, around 2000-2005



⁷ Later data from the *Timor-Leste Survey of Living Standards 2007* (Republica Democratica de Timor-Leste and others 2008), which were not available when the projections were done, suggest that primary enrollment fell and secondary enrollment rose by the 2006/2007 school year. This might suggest that students held back in primary school because of interruptions in schooling are finally in secondary school, which highlights the importance of estimating age-specific enrollment rates.

Figure 4.5. Projected school age population and current net and gross enrollment, Timor-Leste, 2005-2030



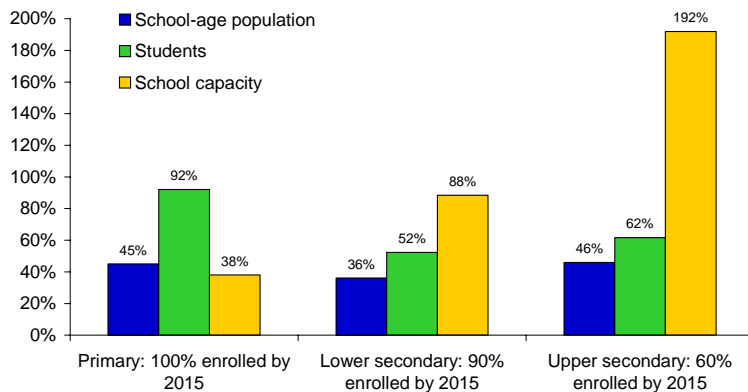
63. To estimate the number of students of each age group actually enrolled, one must add to the net enrollment ratio those students enrolled in the wrong grade. Only 1 percent of students aged 7–12 are not enrolled in primary school but in secondary school, but of the students of secondary school age, more than 70 percent are enrolled at the wrong level (see Figure 4.4). A major reason for this is the interruption in schooling around the time when Timor-Leste declared independence. Combined with the net enrollment rate, the figures allow one to estimate age-specific enrollment rates—ratios of all students of a given age, regardless of whether they are enrolled at the proper level, to the population of that age.⁸ For the secondary school age population, these rates are two to three times net enrollment rates: 80 percent of those of lower secondary school age are enrolled in any grade, and 54 percent of those of upper secondary school age are enrolled.

64. How these enrollment rates compare with actual and projected student populations is shown in Figure 4.5. The rates must rise, and we set hypothetical targets for raising them to determine what the consequences would be. By 2015, we assume the enrollment targets are 100 percent of primary school age children, 90 percent of lower secondary school age children, and 60 percent of upper secondary school age children, percentages that are somewhat or slightly above current levels. Meeting such targets will be challenging (Figure 4.6). Children aged 7–12 years, for instance, will increase 45 percent from 2005 to 2015. Getting them all enrolled would require an increase of 92 percent for students of this age. The increase in school capacity need not be as great. Because so many slots in primary school are taken up by overage students, the increase in primary school capacity would have to be only 38 percent, assuming that overage students move to their proper grade level.

65. The hypothetical enrollment goals for secondary school students appear more modest but may be more challenging. For the 2015 target of 90 percent enrollment for lower secondary school, the number enrolled of youth aged 13–15 years would have to rise 52 percent. To enroll them in lower secondary school, where they belong, school capacity at this level would have to increase substantially, by 88 percent, or possibly more were some overage students still at this level. For the target of 60 percent

⁸ Because the estimates of students enrolled in the wrong grade come from a 2001 School Mapping Survey (World Bank 2004:134), we use secondary school net enrollment ratios as of 2000/2001, which are slightly lower than those shown. For primary school, we stick with the 2002/2003 ratios. The results are reasonably consistent with estimates of age-specific enrollment rates based on the 1999 Indonesian National Socioeconomic Survey, which gives 75.6 percent for the primary school age population and 74.9 percent for the lower secondary school age population (UNICEF 2003; see also World Bank 2004:133). Note that we apply the resulting estimates and the other estimates made here to 2005 without extrapolation.

Figure 4.6. Percentage increases in school age population, 2005-2015, and in students and school capacity to meet hypothetical 2015 goals, Timor-Leste



enrollment for upper secondary school, the number enrolled of youth aged 16–18 years would have to rise 62 percent, and capacity would have to be practically tripled.

66. What an increase in school capacity entails can be illustrated with examples. The 2001 Timor-Leste Living Standards Measurement Survey reported that only 19 percent of students had a desk or chair at school (World Bank 2004:141). A zero capacity increase implies that this statistic neither rises nor falls. If one wanted to provide each student with a desk or chair, then the increases in desks or chairs would have to be about five times the indicated increases in capacity. A similar situation exists with textbooks: a little more than half of students had no textbooks, and only 5 percent had all the textbooks they needed (World Bank 2004:29, 139). If one assumes that those with some textbooks had on average half of those they needed, then to provide for every student's needs, the number of textbooks would have to increase by roughly four times the estimates of the required increases in capacity.

67. Consider, finally, the student-teacher ratio in primary school, which was 25:1 in 1999 and around 50:1 in 2001 and 2002 as students returned after resolution of the conflict (World Bank 2004:30). To get the student:teacher ratio back to 25:1 by 2015 would require double the indicated increase in capacity at the primary school level, or about an 80 percent increase in teachers. The current deficiencies suggest why improving school quality may appear more urgent than simply expanding the student body. At the same time, the pressure of rapidly rising numbers of school age children complicates any effort to improve quality and promote the type of education that leads to better employment.

Employment

68. Employment in Timor-Leste is primarily agricultural. Of 314,400 people reported employed in the 2004 census (NSD 2006:48), 78 percent of males and 80 percent of females worked in agriculture, fishing, or forestry. Among males, the next largest group was in public administration and public services, including defense (7.0 percent), followed by United Nations agencies and diplomatic missions (4.6 percent). Less than 10 percent of male employment, therefore, was in nonagricultural private business and industry. Among females, the next largest group after agriculture was in home industries (6.0 percent), followed by sales and hotels and restaurants (4.8 percent). In total, only 37,000 males and females were

employed outside of agriculture and the public sector, and this includes 14,000 in home industries or whose employment sector was not clearly identified.⁹

69. In relation to the population, the employed were 66 percent of all males and 50 percent of all females 15 years of age and older. According to the International Labour Organization (2007), 81 percent of males and 55 percent of females were economically active in 2005, including those who were unemployed. These figures are typical for Southeast Asia, where the averages are 83 and 59 percent respectively. From these figures, one can estimate that 15 percent of Timorese males and 5 percent of females are unemployed.¹⁰

70. The structure of employment does not encourage optimism about future job growth. Substantial job growth would be needed given how fast the labor force is expected to grow. The conventionally defined working age population (15–64 years) will grow by 16,000–17,000 persons a year from 2000 to 2015, and by 20,000 persons a year from 2015 to 2025. Between 2005 and 2025, this population will increase by 95 percent, an increase that will be exceeded only by a few Sub-Saharan African countries and by two or three countries outside that region.¹¹ The next largest increase in Southeast Asia will be around 60 percent in Lao PDR, and the regional average will be half or less of that.

71. The proportion economically active among those 15 years and older rose early in the decade as the country became more stable and is projected by the International Labour Organization to continue rising, though quite slowly, until 2015 and then to decline marginally to 2020. How the proportion employed will change has not been projected. We assume, for present purposes, that it stays constant for each sex, and that the proportion economically active also stays constant after 2020.

72. On these assumptions, the economically active population would increase by 170,000 persons by 2015 and by another 210,000 by 2025 (Figure 4.7), producing a doubling in 20 years. The employed would rise by 120,000 to 2015 and another 180,000 by 2025. Jobs would have to increase 3.3 percent every year to accommodate these increases.

73. This projection implies that unemployment will rise in absolute numbers, from about 54,000 in 2005 to 105,000 in 2015 and to 137,000 in 2025. Except for the first few years, the unemployment rate in this projection is largely stable, with the rate being more than twice as high among males than females.

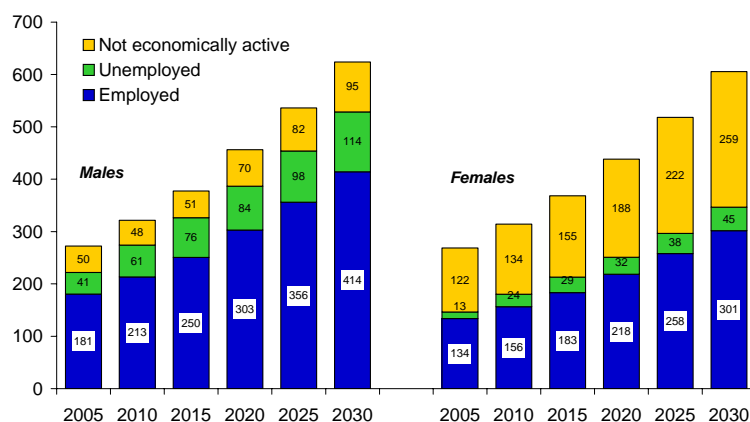
74. Many of the unemployed will be young. The number of individuals aged 15–29 years will increase very rapidly, by an average of 3.9 percent a year to 2025. In 2005, 13,000 individuals turned age 15; this number will rise gradually to 16,000 in 2015 and to 25,000 in 2025. The relatively high secondary

⁹ The proportion employed outside agriculture and the public sector appears to be falling, if one compares Living Standards Measurement Surveys of 2001 and 2007 (Republica Democratica de Timor-Leste and others 2008:138). Proportionally more women are employed in agriculture and more men in public administration, health, and education.

¹⁰ The proportion unemployed could be smaller because an estimated male labor force participation rate of 80.8 percent from the 2001 Timor-Leste Living Standards Measurement Survey, which could be part of the basis for the International Labour Organization estimates, actually applies to the age group 15–64. However, an explanation for the survey figure is not available, and a cited survey rate of 39.6 percent for females is clearly either an underestimate or outdated. (The comparable figure from the 2007 Living Standards Measurement Survey was 47.3 percent [Republic Democratic de Timor-Leste 2008:132]). We therefore follow the International Labour Organization estimates here.

¹¹ Nevertheless, Timor-Leste had a smaller proportion of the total population at ages 15–64 than most other countries in 2005 and will still have a smaller proportion than most other countries by 2025. Growth in the population younger than age 15 is so fast that it offsets rapid growth in older cohorts. Besides increasing rapidly, the working age cohorts will have a growing dependency burden.

Figure 4.7. Projected population 15 years and older by employment status, Timor-Leste, 2005-2030 (thousands)



school enrollment ratios—greater than 50 percent at present for those aged 16–18 years, with further rises possible—suggest that many youths could delay labor force entry for some years.

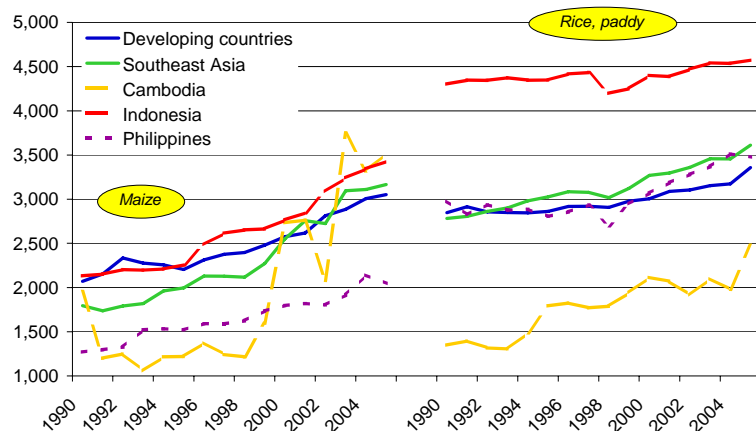
75. To help close a likely gap in youth employment, the government may wish to sponsor cash-for-work programs. Such programs could have a variety of benefits, but their reach would probably be limited. A program that was run by the Ministry of Labor and Community Reinsertion and the International Labour Organization from April to December 2006 reportedly generated 15 days of employment on average for 37,000 people, 44 percent of whom were youths (World Bank and others 2007:74). Of the labor force aged 15–29 (excluding those in school and an additional proportion similar to the proportion of adults out of the labor force), the program therefore employed about 12 percent. Since each worker was employed for roughly 7 percent of a typical work-year, the program filled about 0.8 percent of the employment needs of youth in that year. By 2025, a program of similar size and design would reach only 5 percent of the same group. Although these programs may have many beneficial effects, they are not large relative to the need. Much employment in the immediate future will have to come in the largest economic sector, agriculture.

Agriculture and Forests

76. For many years, Timor-Leste has had to import rice—one of the staples together with maize and cassava—to cover 20–30 percent of requirements. Despite being a predominantly agrarian economy with a third of households relying exclusively on subsistence farming, the country is not self-sufficient in basic foodstuffs. Even with imports, not enough cereals are available. Urban households estimate that they do not have enough rice or maize to eat, on average, for 2 months of the year, and rural households face this problem for almost 4 months (Republica Democratica de Timor-Leste and others 2008:164). Much could be done to improve agricultural productivity, but would it be enough given the pressures of population growth? With limited data (no agricultural census has been held) and fairly heroic assumptions, we attempt some hypothetical calculations focusing on rice and maize.

77. Production of maize in 2007 is estimated by the Food and Agriculture Organization (2007a) at 63,000 metric tons and production of paddy rice at 41,000 metric tons. Other estimates put maize production closer to 70,000 tons. Because of unfavorable weather, these levels are depressed relative to previous production. Over the last few years, Timor-Leste has typically produced around 100,000 metric tons of maize, and in 2003 the country produced 65,000 metric tons of paddy (which, after processing, should give about 40,000 metric tons of rice).

Figure 4.8. Trends in yield of maize and rice, selected countries and aggregates, 1990-2005 (kg/Ha)



78. On the assumption of annual minimal per capita requirements of 105 kg of maize and 90 kg of rice—sufficient to cover three months’ consumption of each (World Food Programme 2006:23)—the total national requirements in 2005 were 104,000 metric tons of maize and 90,000 metric tons of rice. Requirements will rise by 2025 to 187,000 tons of maize and 160,000 tons of rice.¹²

79. If productivity were raised to levels that are typical elsewhere in the region, yields of maize and rice could be doubled or tripled. Much Timor-Leste agriculture involves subsistence farming on small plots with minimal inputs and a range of produce. With these limitations, farmers obtain only 1,200–1,400 kg of maize per hectare, in contrast to an average of 3,200 kg per hectare in seven neighboring countries in 2005. Similarly, Timor-Leste recently produced only 1,500 kg of paddy rice per hectare, in contrast to an average of 3,600 kg in Southeast Asia (World Food Programme 2006:11; World Bank and others 2007:8; Food and Agriculture Organization 2007a).

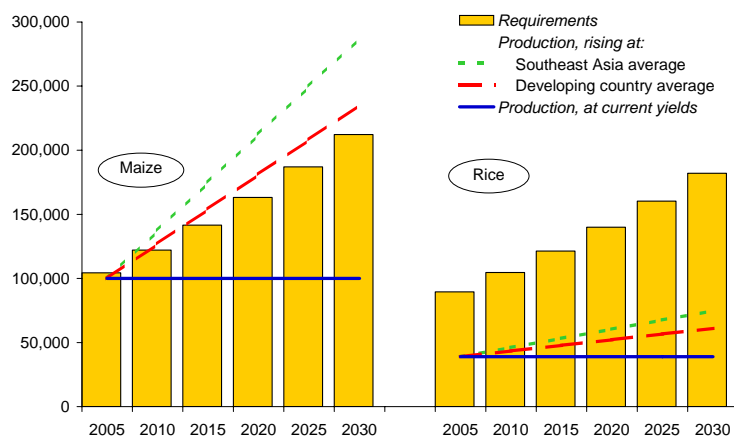
80. To attain the higher yields in the region could require decades: more than 20 years for maize and almost 40 years for rice, at average growth rates for yields for the two crops in Southeast Asia for 1990–2005 (Figure 4.8). It may in fact take longer; yields have risen faster in Southeast Asia than in developing countries as a whole. Yield gains are quite variable, however. Figure 4.8 also shows three atypical trends: Cambodia, with the fastest gains for maize in Southeast Asia but an erratic pattern; Indonesia, with limited gains for rice, perhaps because yields were already at high levels; and the Philippines, with low yields in maize and smaller gains than typical.

81. To estimate production with growing yields, we assume linear gains, which is the predominant pattern in cross-national crop data (Hafner 2003). Adopting the developing country average, we assume annual gains of 65 kg per hectare for maize and 34 kg per hectare for rice. For a more optimistic alternative, we follow the Southeast Asian average for 1990–2005, with annual gains of 90 kg per hectare for maize and 55 kg per hectare for rice.

82. Following average yield trends in developing countries, production of maize in Timor-Leste will stay just above minimal requirements, with a cushion that should eventually reach about 10 percent

¹² Cereal consumption as a proportion of the diet could decline with rising incomes. These estimates are not adjusted for such an effect, however, because they represent minimal cereal requirements, defined to cover only six months of each year. As the World Food Programme (2006:23) writes, “The remaining six months entail a need to find other food sources, such as cassava, or to reduce meals.” It is entirely possible therefore that these estimates understate future consumption.

Figure 4.9. Minimal requirements for maize and rice and production at varying yields, Timor-Leste, 2005-2050 (metric tons)



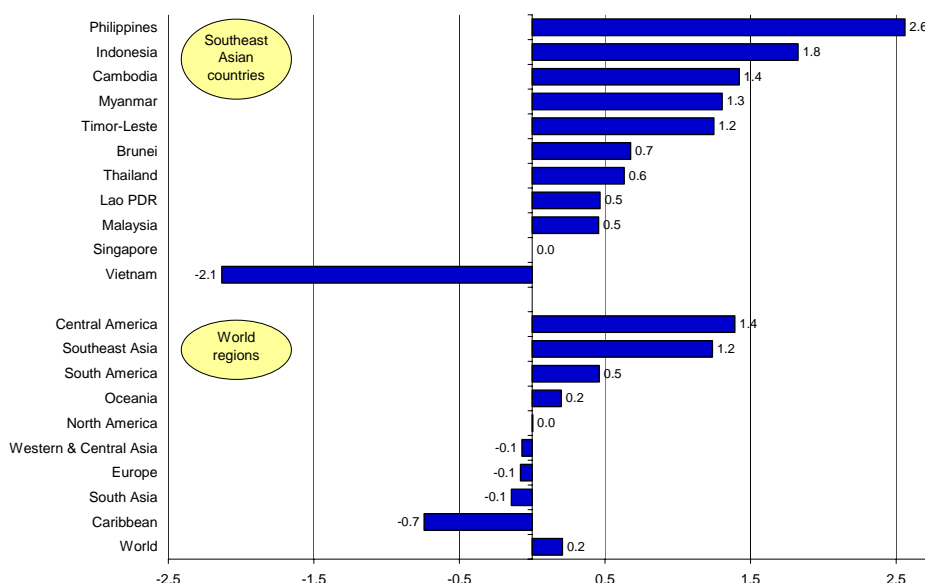
(Figure 4.9). By 2025, production will be 208,000 metric tons, above the minimal requirement of 187,000 metric tons. However, the production of 57,000 metric tons of rice in 2025 will be small relative to the minimal requirement of 160,000 metric tons. If yield trends follow the Southeast Asian pattern, a more comfortable cushion will develop for maize, but the rice deficit will still be more than half the minimal requirement. By 2025 in this more optimistic scenario, production of maize will exceed requirements by 63,000 metric tons, but production of rice will fall short of requirements by 93,000 metric tons. Local production of maize and rice combined would cover the minimal requirement for only 5.2 months of the year by 2020.

83. Yields will undoubtedly fluctuate, and whether the climate could become less favorable and more variable is also a factor. We assume that recent production figures represent unfavorable short-term weather conditions. If these are instead considered typical, even maize production could be problematic. We have not attempted to assess the ecological setting, the necessary inputs, and the demands on human capital, so these estimates are not meant as specific predictions but as illustrative of the possible future situation. A fuller picture would also require attention to cassava and, at least as important, to cash crops.

84. Agricultural production might also increase by expanding the area under cultivation, but land is already under considerable pressure. Up to 44 percent of the land has a slope of more than 40 percent and is unsuitable for cultivation (Ministry of Agriculture, Forestry and Fisheries 2007). Arable land made up 8.2 percent of total area in 2005, and land under permanent crops constituted an additional 14.7 percent, for a total agricultural area of 22.9 percent (Food and Agriculture Organization 2007a). Yet a World Bank (2005) report suggests that “only 13 percent of the land area is suitable for agriculture.” Relative to neighboring islands derived from volcanic rock, Timor-Leste has low-fertility, fragile soils that easily erode in periodic rainstorms (Ministry of Agriculture, Forestry and Fisheries 2007). Another assessment found that “one-third of the land area is partially to severely degraded due to a combination of poor soil, deforestation, overgrazing (by goats), and slash-and-burn agriculture” (World Bank and others 2007).

85. One probable consequence of expanding cultivation would be deforestation. An estimated 98 percent of households use firewood for fuel, which contributes to this problem though it may be less of a factor than expanding cultivation. The rate of deforestation, at 1.2 percent annually from 1990 to 2005, is more than double that in Brazil and among the highest in the world—at the 90th percentile across countries—although this rate is average for Southeast Asia (Figure 4.10). (Southeast Asia has at least double the rate of deforestation of any other world region except Central America.)

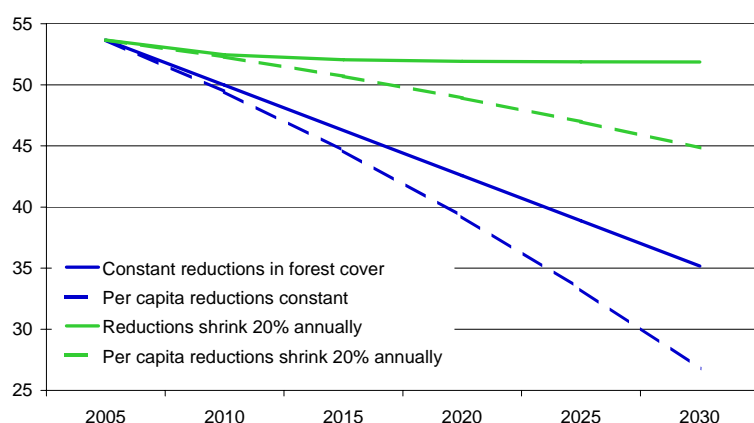
Figure 4.10. Annual rates of deforestation, Southeast Asian countries and world regions, 1990-2005



86. Deforestation is not inevitable in developing countries, as statistics for Vietnam and the regions of South Asia and the Caribbean indicate. Given the pressures of rapid population growth, however, deforestation may be difficult to avoid in Timor-Leste in the immediate future. According to the Food and Agriculture Organization (2007b), approximately 110 square kilometers were being deforested annually, leaving 53.7 percent of the land forested as of 2005. If the area being deforested could be held constant every year, forest cover would decline to 39 percent by 2025. If however deforestation rises proportionally to the rural population, the loss would be 126 square kilometers annually in 2005–2010 and 143 square kilometers annually in 2010–2015. Forest cover would decline to only 33 percent of land area by 2025 (Figure 4.11).

87. Sharp reductions in net deforestation are needed if forest cover is to be maintained above 50 percent. Reductions of 20 percent in the area being deforested annually would accomplish this, leading to zero deforestation round 2020. However, if instead of 20 percent reductions in the area being deforested, one assumes 20 percent reductions per capita (in relation to the rural population), then forest cover would

Figure 4.11. Percent of land forested under varying assumptions regarding the pace of deforestation, Timor-Leste, 2005-2030



still decline, reaching 47 percent by 2025. If population size exerts pressure on forests, even fairly substantial changes in individual behavior will not be enough to counter deforestation.

5. Managing Demographic Change

88. In a few decades, Timor-Leste will be more populated, more urban, and much busier. Whether it will be a calm, organized, progressive, optimistic place, or one with an increasing number of problems and potential conflicts, may depend on what preparations are made for the burgeoning generations to come. Planning is essential for the growth in urban and school populations, for the increasing numbers to be fed, housed, and employed, for the increasing demands on the environment.

89. Efforts to directly address the demographic roots of rapid population growth are also highly desirable. The best way to ensure that population does not follow the main paths sketched in this report is to do nothing. In that case, population growth could be closer to the rapid growth scenario, 10 percent higher than projected by 2025 and 33 percent higher by 2050. The projections assume particular trends in the components of population growth. Ensuring these trends materialize—especially the decline in fertility—will require sustained commitment.

Modifying Trends

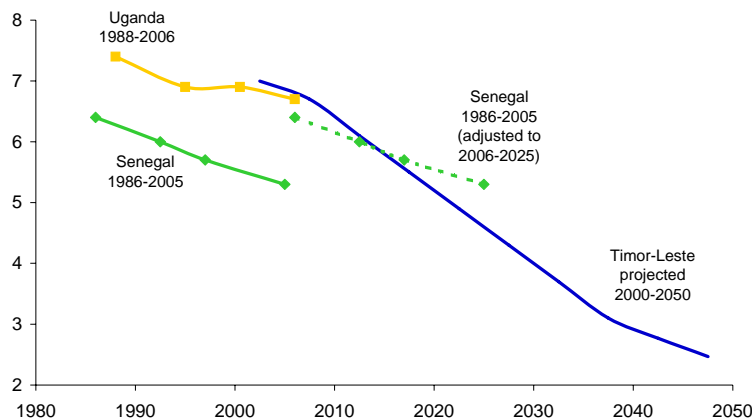
90. Mortality is assumed to decline in the future, adding to rates of population growth. It is not appropriate to attempt to slow or reverse this. The point of any demographic intervention should be to improve welfare, a key aspect of which is longer survival. Ensuring that mortality declines and that population health improves should be a societal goal.

91. For immigration and emigration, the assumed trend involves no net gain or loss. One could seek to encourage emigration to relieve population pressure, but even if national authorities were to countenance such a scheme, overseas outlets for substantial excess population have increasingly narrowed or disappeared.

92. The fertility trend is potentially more malleable. We assume fertility will decline, leading in the long run to a closer balance between fertility and mortality and to slowing population growth. But this assumption, though based on the virtually universal decline in fertility in the developing world, runs up against quite adverse conditions in Timor-Leste. Whether the timing and pace of fertility decline will match the typical patterns that have been assumed needs to be examined.

93. We review a number of fertility-related indicators and draw comparisons with other countries, but not within the region. Timor-Leste has exceptional fertility for Southeast Asia. Total fertility in Cambodia and Lao PDR has been well below six children per woman since 1990, and none of the other countries in the region has been at that level since at least 1975. We therefore draw on the experience of two Sub-Saharan countries, Uganda and Senegal. Although culturally different from Timor-Leste, these two countries have recently had similar fertility levels. From these levels, they have each demonstrated some fertility decline, which could suggest some conditions necessary for such decline in Timor-Leste. Each country also has essential data from a series of surveys covering the relevant period.

Figure 5.1. Projected total fertility in Timor-Leste compared with similar levels and trends from surveys in Uganda and Senegal



94. Fertility trends for these two countries, as determined from four surveys each, are compared with the projected trend in Timor-Leste in Figure 5.1.¹³ Uganda in 1988 had slightly higher fertility than in Timor-Leste in 2003. From around 2000, the trend appears to closely match the projected trend for Timor-Leste. The trend in Senegal covers the period 1986–2005 and began at a slightly lower level. If one adjusts the dates 20 years forward, the trend is slightly slower than that projected for Timor-Leste.

Fertility and Family Size Preferences

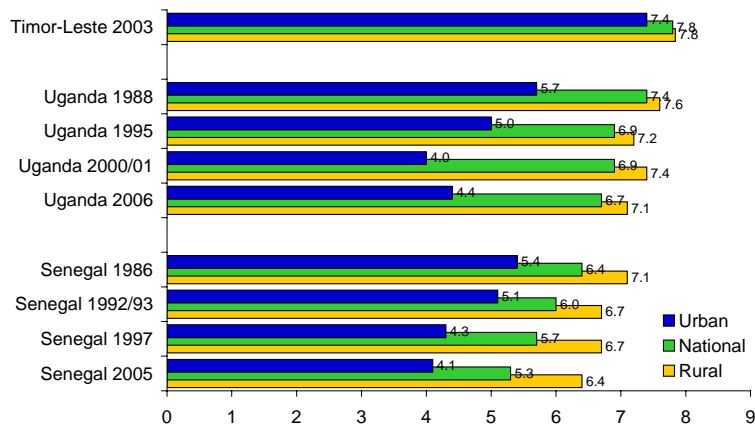
95. Uganda in 1988 and Senegal in 1986 each had an advantage over Timor-Leste in 2003. In both countries, some social groups already had slightly lower fertility than the national levels. In Uganda in 1988, urban women had total fertility of 5.7 children per woman, substantially below the national level of 7.4. In Senegal in 1986, urban women had total fertility of 5.4, well below to the national level of 6.4. In the 2003 TLDHS, urban fertility at 7.4 was only slightly lower than national total fertility of 7.8 (Figure 5.2). The gap of 0.4 points is the smallest such gap across all 37 Demographic and Health Surveys where national total fertility was at least 6.0.

96. This is not simply a matter of how urban areas are defined because a similar situation exists across education groups. Total fertility in Uganda in 1988 was 1.6 points lower among those with secondary education than among those with primary education. In Senegal in 1996, the gap was 1.7 points. In Timor-Leste in 2003, the gap was only 0.4 points (Figure 5.3). Slightly lower overall fertility in Uganda and Senegal is not the explanation; the education gaps seem to have grown as fertility declined, but only marginally and somewhat inconsistently. The absence of a demographically progressive elite in Timor-Leste that could lead the way to lower fertility suggests that fertility decline could be delayed.

97. Intervals between successive births in Timor-Leste are relatively short. The median for births over the five years preceding the TLDHS is 28.9 months, well below the Southeast Asian average of around 40 months. Interbirth intervals in Timor-Leste are as short as in Uganda in 1988 and 2 months shorter than in Senegal in 1986. Even shorter is the median interval in urban areas of 27.5 months, slightly below the urban medians in Uganda and Senegal and below those in all but 2 percent of Demographic and

¹³ These comparisons, and most of those in this section, rely on data from the Demographic and Health Surveys (ORC Macro 2007). Timor-Leste data are from the 2003 TLDHS and may therefore not precisely match census estimates used earlier in this report.

Figure 5.2. Total fertility nationally and in rural and urban areas, Timor-Leste, Uganda, and Senegal



Health Surveys worldwide. Similarly, the median interval for women with secondary or higher education, at 27.3 months, is among the shortest 5 percent of survey estimates worldwide.

98. Short birth intervals matter not only for fertility but also for child health. Of every thousand children in Timor-Leste born after an interbirth interval of less than 24 months, 112 die before age 1, in contrast to 71 of a thousand born after an interval of 2–3 years, 54 of a thousand born after an interval of 3–4 years, and 29 of a thousand born after an interval of 4 years or longer (TLDHS 2004:134). This pattern is not unusual but has been widely observed in the developing world.

99. One reason why intervals are so short for urban and more educated women, and why the differentials between their fertility and that of other groups is so small, is that all these groups differ little in their family size preferences. In the 2003 TLDHS, the average ideal family size for rural women was 5.7 children, whereas among urban women it was 5.6 children, a minuscule gap of 0.1 children. This contrasts with gaps between rural and urban ideals of about one child in Uganda and closer to two children in Senegal (Figures 5.4 and 5.5).

100. The data on ideal family size seem to suggest that family size preferences in Timor-Leste are below the initial peaks in Uganda and Senegal. However, an alternative measure more directly relevant to behavior than ideal family size does not support the idea that Timorese women want slightly fewer

Figure 5.3. Total fertility by education level, Timor-Leste, Uganda, and Senegal

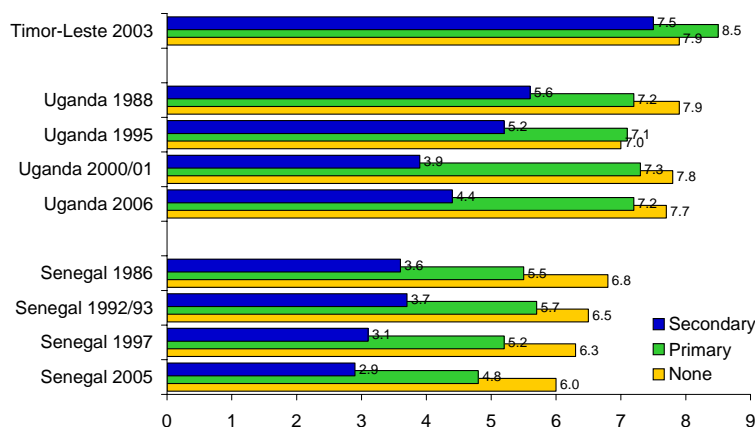
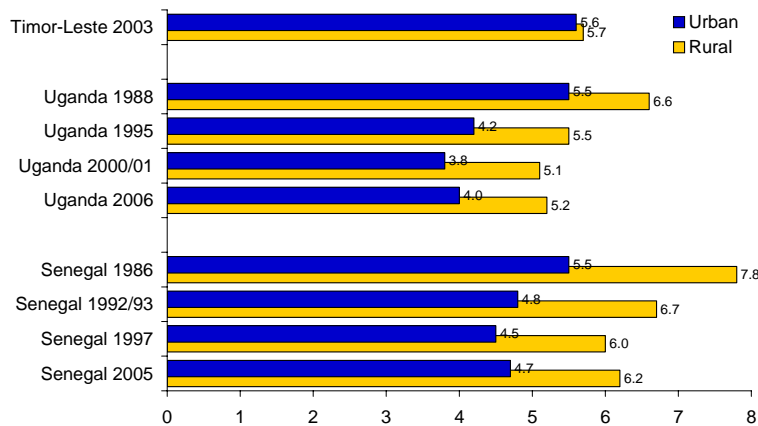


Figure 5.4. Ideal family size among urban and rural women, Timor-Leste, Uganda, and Senegal



children. Figure 5.6 compares the proportion of women who want to stop childbearing, considered in relation to the number of children a woman already has, across countries, showing only the first and last surveys for Uganda and Senegal. Timorese women with 0–4 living children are about as likely to express a desire to stop childbearing as are women in the other two countries. At five children, there was still little difference between Timorese women and Senegalese women, though somewhat more Ugandan women wanted to stop childbearing. At six or more children, however, only 34 percent of women in Timor-Leste wanted to stop childbearing, as opposed to 53 percent in Uganda in 1988 and 61 percent in Senegal in 1986. It is not clear, therefore, whether family size preferences in Timor-Leste are lower, in any relevant sense, than they were initially in the other two cases, and they may in fact be higher.

101. Figure 5.6 also suggests that, over the course of these surveys, the proportion of women wanting to stop childbearing rose sharply in Uganda but hardly at all in Senegal. Clearly, other factors were also involved in declining fertility. Particularly important may have been the availability of the means to control fertility. Marriage and breastfeeding could also have had an effect, regardless of what was happening with family size preferences. We consider these factors for their roles in Uganda and Senegal and their potential contribution to fertility change in Timor-Leste.

Figure 5.5. Ideal family size among women by education level, Timor-Leste, Uganda, and Senegal

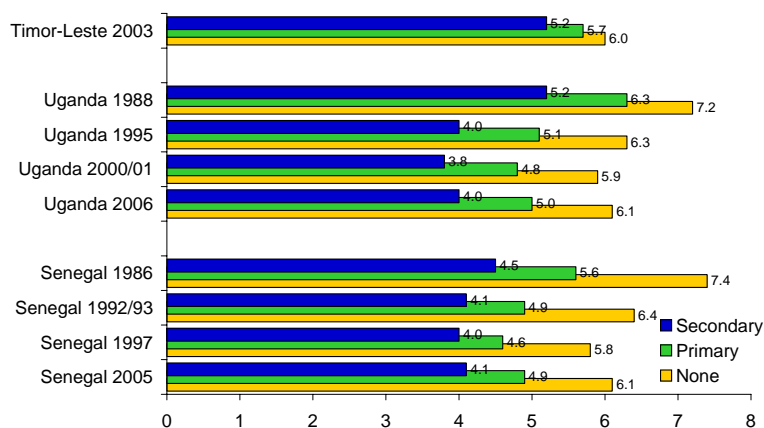
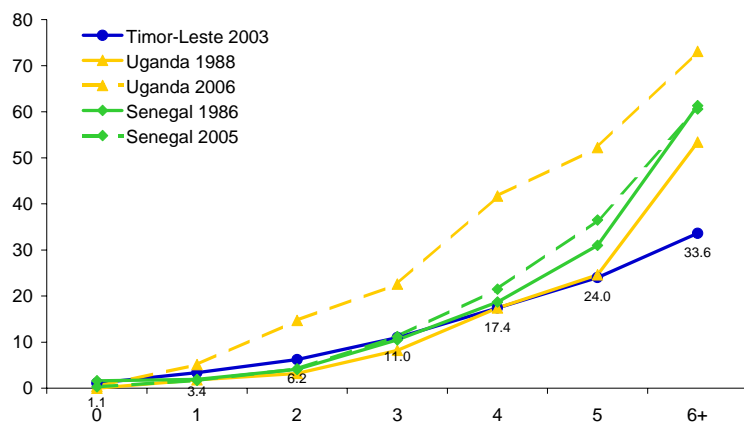


Figure 5.6. Percent wanting no more children, by number of living children, Timor-Leste, Uganda, and Senegal



Marriage, Breastfeeding, and Fertility

102. Fertility could decline with no change in family size preferences if fewer women marry or fewer stay married throughout their reproductive lives, if those who do marry postpone the event, or if mothers breastfeed longer. Later marriage and fewer marriages reduce typical lifetime exposure to the risk of pregnancy, and longer breastfeeding without supplementation lengthens the period of postpartum insusceptibility, when a woman is not susceptible to conception after a pregnancy. However, these factors often have opposite effects during fertility transition, with women marrying later but postpartum insusceptibility declining, so that the combined effect is small. This appears to have occurred in Uganda and Senegal, where trends in marriage and postpartum insusceptibility worked against each other.

103. Whether the same will hold true in Timor-Leste is difficult to determine because marriage patterns in Timor-Leste are unusual and distinctive. The proportion currently married among women of reproductive age (74 percent) is higher than in any other recent Southeast Asian Demographic and Health Survey (Figure 5.7). The proportion never-married among women 40–49 years old is almost zero, and the proportion divorced or separated (0.6 percent) is the lowest recorded figure in any Demographic and Health Survey anywhere.

Figure 5.7. Percentage distribution of women of reproductive age by marital status, Timor-Leste and selected other countries

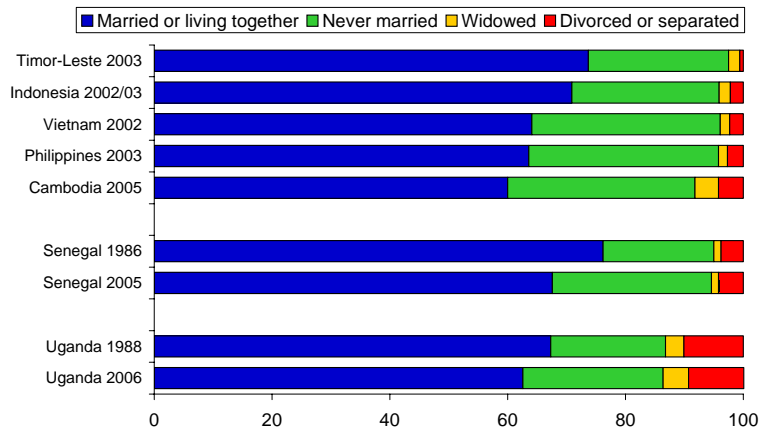
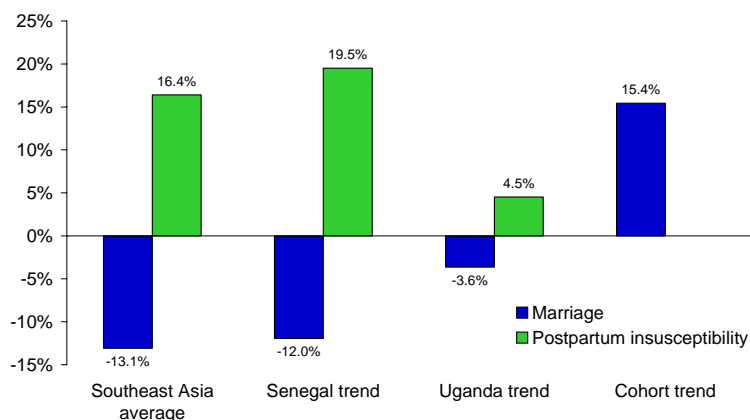


Figure 5.8. Potential effects on Timor-Leste fertility from changes in marriage and postpartum infecundability to match certain patterns or trends



104. A high proportion of women are currently married despite the median marriage age being 21.4 years, which is relatively late, later than in other surveyed Southeast Asian countries except the Philippines. Marriage age appears to be declining, from a median of 23.8 years among women aged 45–49 years to 20.6 years among women aged 25–29 years. This could mean rising fertility, although the apparent decline could also be a survey artifact, given the complicated marriage pattern in which customary marriage precedes a church marriage and civil registration by many years, if the couple proceed to those steps. (See Annex B for further discussion.)

105. The period of postpartum insusceptibility, at 11.5 months, is atypical for Southeast Asia. This is 60 percent longer than the average in recent surveys in the region, though it is at the lower end in comparison to recent estimates for Sub-Saharan Africa.

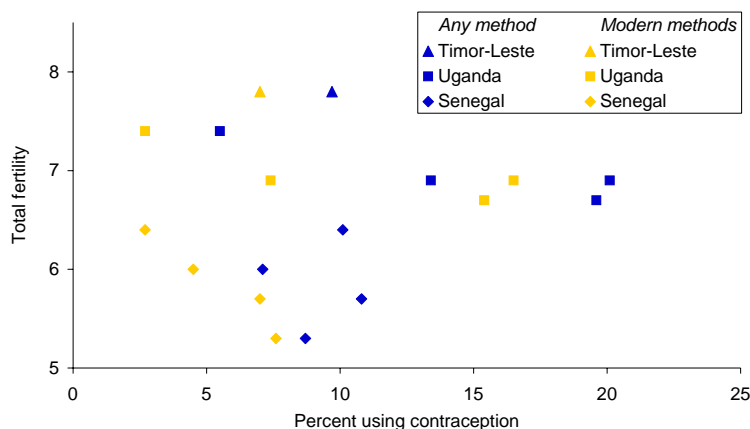
106. These patterns of marriage and postpartum insusceptibility could remain distinctive and produce no fertility change. Or they could over time approximate typical Southeast Asian patterns, or follow trends in other countries with very high fertility, particularly Uganda and Senegal. Or they could become even more distinctive: if age at marriage is indeed declining and continues to decline at its apparent pace, it could fall to 18.2 years in two decades.

107. The fertility consequences of such alternative trends are shown in Figure 5.8. (Calculations are explained in Annex B.) Approximating the pattern elsewhere in Southeast Asia or following trends in Uganda or Senegal would produce offsetting effects on fertility, with net increases of 1 to 8 percent. A much larger increase would be likely if marriage age declines—though whether this is likely is in question. In any case it appears improbable that changes in marriage and breastfeeding together would produce any substantial fertility decline.

Controlling Fertility

108. Fertility can be reduced through contraception, which includes both modern and “natural” methods, and abortion. Abortion is illegal in Timor-Leste, and when it occurs is likely to be clandestine or self-induced. Given the lack of information about it, we focus on contraception. Contraceptive prevalence was very low in the 2003 TLDHS, at only 9.7 percent of ever-married women (about half of what it was toward the end of administration by Indonesia). More than half of contraceptive users (5.5 percent of currently married women) use injectables—probably a carryover from administration by Indonesia, where almost half of contraceptive users relied on this method in 2002/2003. The next highest percentage is 1.6

Figure 5.9. Current contraceptive use and total fertility: Timor-Leste, Uganda, and Senegal, various survey years



percent using the lactational amenorrhea method (LAM).¹⁴ Contraceptive prevalence in Timor-Leste is far below that in Indonesia, which had 60 percent prevalence among currently married women in 2002/2003. It is comparable instead to prevalence in Uganda and Senegal (Figure 5.9).

109. Contraceptive use appears to have risen. The Living Standards Measurement Survey reported a prevalence rate among currently married women in 2001 of 8.0 percent and raised the rate for 2007 to 19.8 percent—roughly back to pre-independence levels (Republic Democratica de Timor-Leste and others 2008:116). How fertility was affected by this rise of 11.8 percentage points in 6 years is undetermined because fertility estimates were not produced. Assuming a typical relationship between contraceptive prevalence and total fertility, the pace of increase in contraceptive use should have produced, for that period, something between the projected medium fertility decline and slow fertility decline.¹⁵

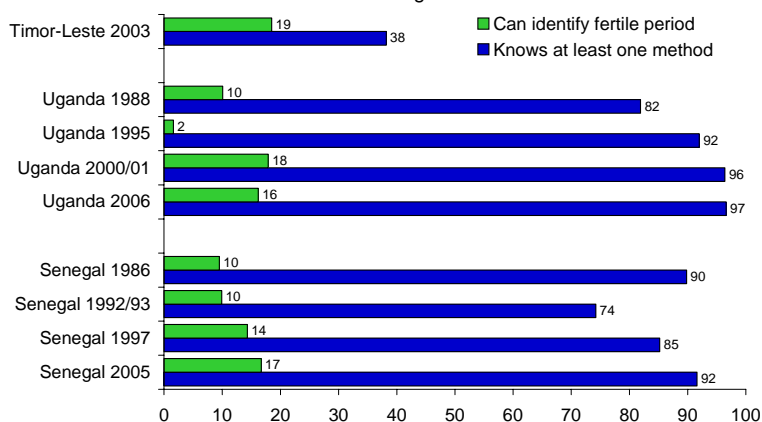
110. As with fertility and family size preferences, the gaps in contraceptive use between urban and rural women and among women with different levels of education are relatively small in Timor-Leste. Urban contraceptive prevalence is 14.5 percent in the 2003 TLDHS, not far above rural prevalence of 8.2 percent, and among education groups, those with secondary education top out at 13.1 percent.

111. Contraceptive prevalence may be low because of the strong desire for large families. But information about and the availability of contraception may also play a part. Only 20 percent of women can spontaneously name any contraceptive method; an additional 18 percent recognize a method when it is named and briefly described. The total of these two figures, 38 percent, is well below estimates around 90 percent in Uganda and Senegal in the late 1980s (Figure 5.10). It is in fact lower than the percentage in any of the 164 other developing-country Demographic and Health Surveys that have been conducted since 1985. Women in Timor-Leste are not entirely uninformed about the facts of life. The proportion who can identify a woman's fertile period is quite low at 19 percent but still somewhat higher than in any of the

¹⁴ Since breastfeeding is not listed separately in the survey, whether all in this small group in fact meet the specific requirements for LAM—such as not being more than six months postpartum—is unclear. LAM is a modern method but may also be considered “natural.”

¹⁵ Across all Demographic and Health Surveys, every 10-point increase in contraceptive prevalence is associated with a 0.59-point fall in total fertility. Across only Southeast Asian surveys, the corresponding fertility decline is 0.40 points. In each case, the relationship is linear and strong, and the same whether one focuses on use of any contraceptive method or use of modern methods only. The rise in prevalence in Timor-Leste between 2001 and 2007 is equivalent to a 5-year rise of 9.8 points, which translates to a 5-year change in total fertility of either –0.12 points or –0.08 points. These are close to the assumed changes in total fertility from 2005 to 2010 of –0.12 points in the medium projection and –0.06 points in the scenario with slow fertility decline, respectively.

Figure 5.10. Percent of women knowing the fertile period and knowing at least one contraceptive method, Timor-Leste, Uganda, and Senegal



surveys for Uganda and Senegal (see Figure 5.10). This could suggest that the lack of information is specific to contraception rather than being more general.

112. Contraceptive knowledge is one area where differentials—between urban and rural women and among education groups—are greater in Timor-Leste than they were in Uganda and Senegal (Figure 5.11). This is because knowledge was so widespread in the other countries that most women knew at least one contraceptive method. In Timor-Leste, the proportion with such knowledge is not much more than half even among urban women and among women with secondary education.

113. With contraceptive use so low and knowledge so limited, one might suspect that some unmet need exists—some women who want to avoid or postpone childbearing but are not contracepting. However, the proportion with unmet need, 3.8 percent in all, is very small by any comparison. It is much smaller than in Uganda and Senegal (Figure 5.12) and less than half the rate in any Demographic and Health Survey since 1985. To all appearances, the low level of contraceptive use is largely consistent with widespread preferences for large families.

Figure 5.11. Percent knowing at least one contraceptive method, by residence and by education, Timor-Leste, Uganda, and Senegal

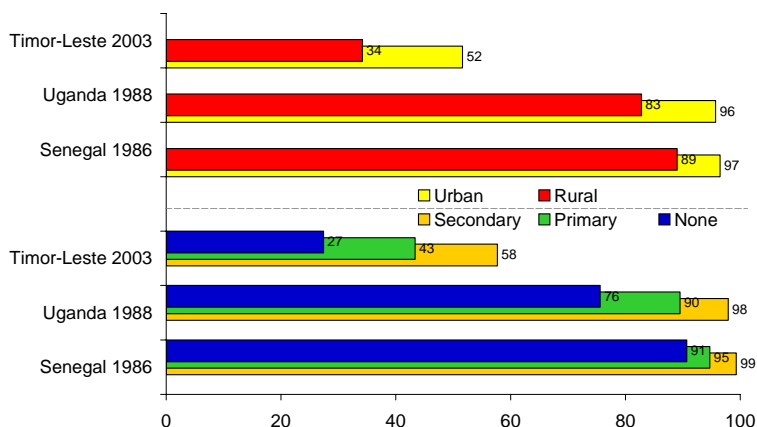
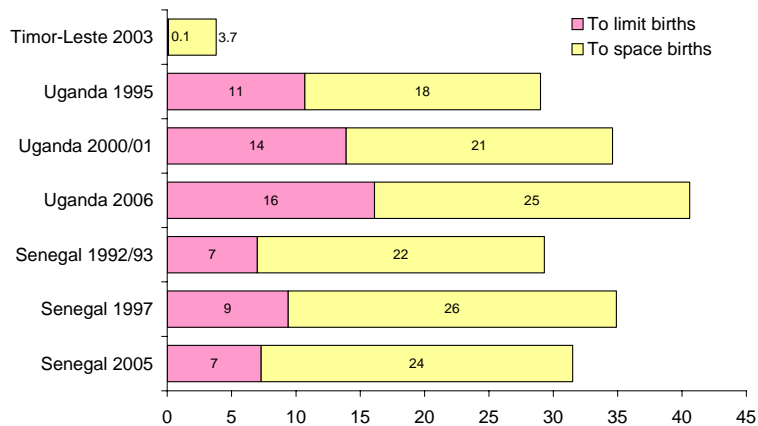


Figure 5.12. Percent with unmet need for contraception to limit or space births, Timor-Leste, Uganda, and Senegal

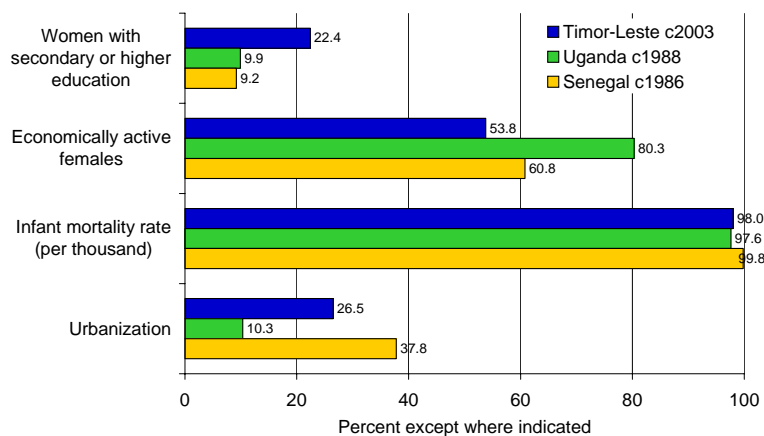


Prognosis

114. The fertility situation in Timor-Leste compares unfavorably with the initial situation, at roughly comparable fertility levels just before fertility transition, in Uganda and Senegal. Family-size preferences are universally high, so that even after bearing six or more children, only one-third of women are ready to stop. Differences among social groups are unusually small, so that the beginnings of fertility decline are virtually undetectable in any group. Contraceptive use is low and, given fertility levels, probably often ineffective. Knowledge of contraception is also unusually limited, although this is arguably at least as much a function of lack of motivation as of the absence of public information and sources of supply.

115. We do not know precisely the reasons for such conditions so unfavorable to fertility decline. One broad explanation might be poor socioeconomic conditions, which could lead both to higher family size preferences and less access to contraception. However, comparisons of a few indicators suggest that Timor-Leste is not consistently worse off than Uganda or Senegal at a comparable stage of fertility transition (Figure 5.13). Proportionally fewer women in Timor-Leste are economically active (in International Labour Organization statistics); however, the proportion of women with some secondary education is twice as high in Timor-Leste as it was in Uganda or Senegal. Infant mortality rates are similar, or possibly lower in Timor-Leste if one adopts the survey estimate. And the level of urbanization

Figure 5.13. Some socioeconomic indicators for Timor-Leste, Uganda, and Senegal before or in early-stage fertility transition



(in United Nations estimates) is intermediate between the levels in Uganda and Senegal.

116. One may speculate about other explanations, which may lead to different approaches to fertility reduction. First, fertility may be on the rebound in what is still a postconflict situation. With economic activity revived and household life returning to normal, it may take a while for households to focus on their long-term needs and recalibrate their expectations regarding family size. A correction may be setting in, which is what the 2007 Living Standards Measurement Survey results seem to imply. This may be enough to meet immediate fertility projections or may fall short, but in either case needs to be sustained and built upon. Second, perhaps the territory has lost through migration a small group of people, perhaps more oriented toward Indonesia, who were in the early vanguard leading to lower fertility. There may be no alternative to developing a new vanguard through essentially missionary work for family planning. Third, cultural and religious factors may be dominant, leading to strong pronatalist feeling. In 1990, 88 percent of the population considered themselves Catholic; this figure rose to 98 percent in the 2003 TLDHS. Popular reaction against programs from the period of Indonesian administration could also play a part. If these are crucial factors, it is important to recognize them and craft approaches to reproductive health that take them into account.

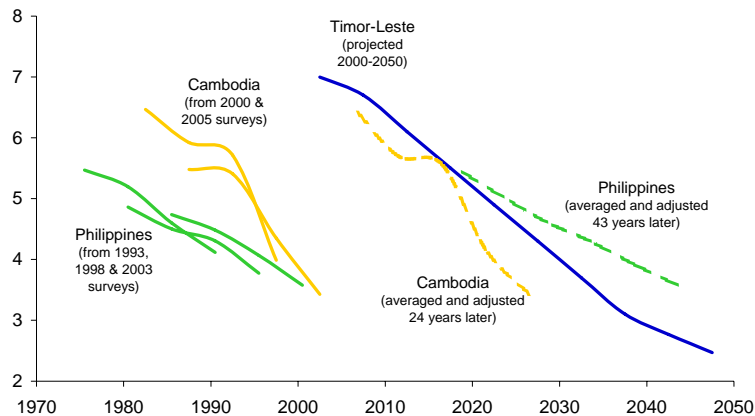
117. Dealing with unfavorable initial conditions lays the groundwork for sustained fertility decline. To prime a decline in Senegal required supportive reproductive health policies and programs. In 1980, Senegal repealed pronatalist measures dating to the French colonial period. In 1988, it became the first francophone country in the region to adopt an official population policy, explicitly calling for a lower birth rate. Two years later, it launched a national family planning program. Fertility decline started in the late 1980s.

118. Uganda also adopted superficially similar policies, but had to wait a decade or more to see some effect. The Family Planning Association of Uganda was founded in 1957. Government got involved with supportive legislation in the 1970s, introduced direct support for family planning around 1976, and adopted a national population policy, including demographic targets, by 1995 (Uganda and Macro International 1996). However, actual government support over the decades was tepid. A 1993 evaluation made the judgment that government policy “lags far behind other [Sub-Saharan African] countries in encouraging its citizens to have small, manageable families and informing them of methods of doing this” (Kapoor 1993:143). Fertility levels in Uganda began to decline in the late 1980s, albeit from very high levels, and are not much lower than levels in Timor-Leste.

119. In 2004, the Timor-Leste Council of Ministers approved a reproductive health policy that guarantees access to family planning services. Whether this will have a proximate impact on fertility, as it did in Senegal, or whether fertility decline will be considerably delayed, as it was in Uganda, will depend on the seriousness of family planning effort and the effectiveness of implementation. In the strongly pronatalist climate, convincing households of the need to space births and limit their number will be critical.

120. Good reasons for government to seek to promote smaller families are evident in the pressure that high fertility and rapid population growth exert on various sectors of society. Households also have strong personal reasons for having fewer children. High fertility takes a toll on a woman’s health, as evident in unbalanced sex ratios at older ages. It contributes to high infant mortality. Evidence of deforestation suggests that some households are crowded off better land to land that is not optimal for sustained cultivation. Whether such arguments can be communicated with sufficient force and enough subtlety to overcome religious objections and concerns about the health consequences of family planning may determine the course of fertility.

Figure 5.14. Projected total fertility in Timor-Leste compared with trends from surveys in the Philippines and Cambodia



121. If the arguments are not adequately made, fertility could decline slower than projected, instead following the path taken in the Philippines, the only other Catholic country in Asia. Figure 5.14 shows Philippine fertility trends from the Demographic and Health Surveys and how they compare with the projected Timor-Leste trend. Following the Philippine path would be essentially equivalent to our projection scenario for rapid population growth, leading to even higher population numbers than those on which we have focused.¹⁶

122. A more optimistic possibility is that Timor-Leste will learn from the experience of other countries that have gone through the fertility transition or are going through it now, and find ways not only to match the projected fertility decline but to accelerate it. More recent fertility declines have sometimes been more rapid than earlier ones. Cambodia is a case in point, with an average fertility decline, once it started, twice as fast as in the Philippines. Learning from others and adapting their experiences to local conditions could lead to a more manageable trend in population growth or at least ensure that population growth is no faster than projected.

Health Sector Capacity

123. The health sector has primary responsibility for national reproductive health and should have primary (though not exclusive) responsibility for promoting family planning as a means of seeking as moderate a population growth path as possible. In relation to national health plans, health resources do not appear particularly stretched or under any imminent threat due to population growth. Despite modest progress in reducing mortality and morbidity, their effectiveness for family planning raises questions.

124. In the independence struggle, Timor-Leste lost 80 percent of its health service infrastructure, as well as most of its physicians and health system managers. A health plan was devised after independence including 5 hospitals, 69 health centers, and 85 health posts. By 2005, this limited network had been

¹⁶ The Philippine pattern of contraceptive use is notable within Southeast Asia for including a large proportion of users on "natural" methods—LAM, breastfeeding, periodic abstinence, and long-term abstinence. Since the 1990s, the proportion has been between 14 and 22 percent of users, second in Southeast Asia only to Timor-Leste, with 27 percent. In general these methods are less efficacious than hormonal methods or sterilization (Trussell 2004), raising the question whether the pattern contributes to slower fertility decline. Annex C provides some cross-national evidence, suggesting that these methods can contribute to lower fertility—and should therefore be part of a broad menu for contraceptive choice—though they do not contribute as much as other methods.

largely completed, with 64 of the 69 planned health centers and one more hospital than planned. However, the number of health posts had reached 191, more than double the plan requirements.¹⁷

125. By the standards adopted by the Ministry of Health, these facilities were more than adequately staffed (except with midwives, whose quota of 324 outside the hospitals was only two-thirds filled). The 90 physicians available were an adequate number, but they nevertheless doubled toward the end of 2005 with an influx of temporarily posted Cuban doctors. A follow-on agreement with Cuba has increased the number even more, to over 300, and more than 600 Timorese, receiving medical training in Cuba, are due to begin returning in 2010. Assuming the number of other staff does not lag too far behind, health staff and facilities appear likely to be able to keep pace with population growth, at least according to the standards of the postindependence health plan.

126. However, this relative bounty of health resources has not yet been sufficiently translated into improved health outcomes. Mortality is unusually high, particularly among infants and pregnant women. Available indicators of morbidity are also unfavorable. For instance, among adults covered in the TLDHS, 6–7 percent reported at least two of three typical symptoms of tuberculosis (persistent cough, coughing blood, and weight loss) in the preceding month. Malnutrition is also a serious issue. Among children younger than 5 years of age in the same survey, two-thirds were underweight for their age and 14 percent were severely underweight.

127. Such problems antedate the recent surge in health facilities and staff. Nevertheless, they at least partly reflect a similar health service situation, because before 1999, health facilities were 50 percent more numerous than in 2005. The implication is that a quantitative look at health services clarifies little, and that qualitative changes may be necessary to maintain and improve the national health profile in the face of rapid population growth.

128. The disconnect between health services and health outcomes suggests potential obstacles to an effective family planning program. This disconnect is partly due to poor quality services. For instance, only one-third of women who received antenatal care (in the 5 years before the TLDHS) had their blood pressure measured, and only one-fourth were counseled to watch out for pregnancy complications. A more pervasive factor in the disconnect, however, is limited use of the services that exist. Only 61 percent of women in the TLDHS received antenatal care from a medical professional,¹⁸ and, in the 2007 Living Standards Measurements Survey, only 41 percent delivered with a trained attendant.

129. Limited use of health services is partly a matter of access. The most common reason that households give for not using the nearest health facility, even in urban areas, is that it is too far or too difficult to reach. Of those who visit a facility, 60 percent live within an hour of it; attendance drops as distance increases. The postindependence health plan called for facilities to be located within 2 hours' distance for 80 percent of the population, but this requirement may not be stringent enough relative to actual health-seeking behavior.

130. Another important reason why Timorese may not use health services is that they have a limited appreciation of the need for medical care. Most often, Timorese explain why they do not seek treatment by minimizing the severity of their health complaints. How severe particular complaints are was not determined in the Living Standards Measurement Survey, but some severe complaints do go untreated.

¹⁷ These statistics and those in the following paragraphs are from the *Timor-Leste Health Sector Review* (World Bank 2007), which draws heavily on the TLDHS (Ministry of Health and others 2004) for morbidity and service utilization data.

¹⁸ The 2007 Living Standards Measurement Survey gives 80 percent receiving antenatal care, but 40 percent of these saw a traditional birth attendant. Because multiple responses were tabulated regarding who provided antenatal care, it is not possible to determine how many saw a medical professional, but this proportion may not have changed much.

For instance, presumptive treatment of fever with antimalarial drugs is recommended in malaria endemic areas such as Timor-Leste, but (in some calculations at least) only a minority of children younger than 5 years with fever are treated.

131. In its earlier phases, a family planning program is typically underutilized, because access is initially limited and people do not perceive a need for the services. Demand for contraception is weak and contraceptives are an unfamiliar product; they need to be assertively marketed to those who would benefit from their use, rather than providers waiting for clients to request the products. That limited access and limited awareness of appropriate services already characterize health services in general suggests some immediate obstacles that a new family planning program needs to overcome.

132. To address limited access in the health sector as a whole, the *Timor-Leste Health Sector Review* (World Bank 2007) recommends several possible options to consider in each region separately. Adding facilities is one possibility but not necessarily the best one, given costs and staffing needs and low utilization of facilities. Alternatives may include increasing outreach activities from existing facilities, instituting a community health worker program, and improving transportation options or reducing transport costs for those who need care. Combinations of these options appropriate for each region will be needed for a family planning program. One additional requirement is to attend to the shortage of midwives. Even for general health issues, women often rely on midwives rather than other health professionals for advice and treatment.

133. To address perceptions that medical help is not necessary, the Health Sector Review recommends making “households more active and better informed participants through health education” (World Bank 2007:117). A major effort to reach households with health-related messages could incorporate essential information about family size and family planning. A Health Seeking Behavior Study is underway in 2008 (with AusAID funding) to shed light on the factors influencing demand for curative and preventive health services.

134. The disconnect between the availability of health resources and achieving health outcomes is not unusual in developing countries. Bridging it by making medical care accessible and promoting its use is essential to lay the groundwork for an effective family planning program that may eventually moderate population growth.

Policy Options

135. Some demographic problems presented in this report are current and others are long term. The current problems can be addressed and ameliorated over time. The long-term problems will require a durable commitment to devising solutions and continual informed experimentation with policies and programs.

136. The current demographic problems are reabsorbing return migrants and reducing high levels of mortality, especially infant and maternal mortality. The process of migrant reabsorption, an immediate and politically potent issue, has not been examined here. High mortality is a more difficult and durable problem. Health system reform could make a difference, given the health resources that appear to be available. Bridging the disconnect between resources and outcomes will however require considerable commitment, ingenuity, and effort, and the results will require continued monitoring.

137. Longer-term demographic problems are tied to exceptionally high rates of population growth. An obvious requirement is to:

- Systematically incorporate population considerations into national, sectoral, and environmental planning.

With population likely to grow to 1.8 million by 2025 from less than 1 million at the last census, ignoring the demographic impact in planning at any level cannot be an option.

138. This projected growth of 80 percent is estimated on the assumption that fertility will decline. This is not inevitable, and there is no indication so far that fertility is falling. Ensuring that fertility does decline is therefore imperative if even more rapid population growth is to be averted. The first step is to

- Reaffirm the essentials of the reproductive health policy, including the provision of contraception, and ensure that relevant constituencies are aware of and understand the basis for the policy.

Which constituencies are key, and what to do to coopt them, or at least neutralize any possible opposition, are matters this report has not addressed. This is likely to be a sensitive political issue, requiring not bureaucratic fiat but careful handling by properly situated individuals and groups.

139. The reproductive health policy may have to be revisited, partly because of wording but also with regard to the spirit with which it is implemented. The policy emphasizes the need for "a secure supply and the widest possible range of contraceptives" and requires that each contraceptive service point should "offer a choice of at least three different modern methods of contraception" and have a "referral system to family planning services for methods not available on-site" (Ministry of Health 2004:15-16). Nevertheless, it restricts such services as insertion of intrauterine devices to higher-level community health centers. More seriously, it is nuanced in its support for family planning. It targets the ability of providers to convey information and services, a passive focus that, given the strong public preference for large families, is likely to yield few results.

140. Implementing a more proactive reproductive health policy will not be simple. There are no effective road maps for the Timor-Leste situation, where fertility is so high and the desire for large families universal and unconstrained. No other Southeast Asian country has been in such a situation for decades. Back when family planning began to be introduced elsewhere in the region, some demand for smaller families had already emerged on its own, at least among a few social groups. Waiting for this to happen is hardly an option today. One must try to

- Explore ways to communicate the benefits of smaller families—in regard to health, household finances, and national needs—to a wider and wider circle of the population.

141. It will be important in the process to develop a deeper understanding of why family size preferences are universally so high; what roles religion, traditional practices, and nationalism play; and what appeals are likely to resonate with women and men. Also crucial will be developing advocates both inside and outside government, such as women's groups, health-related nongovernmental organizations, and academic institutions. Indirect ways to nurture the demand for smaller families, such as microlending programs to empower women, also deserve attention. An effective health education program within the health sector could take the lead, but other institutions need to be coopted as well.

142. While public education and advocacy proceed, a start must be made at establishing structures to fill the need for family planning as it develops, as well as demonstrating that it is a viable and acceptable option for families. This means that one must

- Reform the health sector and develop within it effective mechanisms for delivering and promoting contraception wherever demand could grow.

How to create effective mechanisms within the health system without compromising its broader focus and overall goals will be a challenge. Improving general access to health services and building public understanding of health issues, to remedy the disconnect between health resources and health outcomes, will be needed to underpin this effort.

143. These prescriptions are initial steps toward the goal of moderating population growth and are not precise. This is where experimentation is needed, to fill in the blanks in what should be a dynamic national dialogue about population and an eventual movement toward smaller families. Political sensitivity, good timing, and continual reassessment will all be needed to assure appropriate progress.

Annex A. Population Projections

Table A1. Projected population by age group, dependency ratio, and density, Timor-Leste, 2005-2050: three scenarios

| Year | Population | | | | Depen- dency ratio (per 100 workers) | Density (persons per sq. km.) | School-age cohorts | | |
|-----------------------|------------|-----------|-----------|---------|--|--|--------------------|---------|---------|
| | Total | 0–14 | 15–64 | 65+ | | | 7–12 | 13–15 | 16–18 |
| Medium projection | | | | | | | | | |
| 2005 | 994,532 | 453,695 | 508,785 | 32,053 | 95.5 | 67 | 162,711 | 67,908 | 59,412 |
| 2010 | 1,163,204 | 527,668 | 596,636 | 38,903 | 95.0 | 78 | 187,553 | 82,359 | 73,610 |
| 2015 | 1,348,891 | 603,457 | 705,470 | 39,964 | 91.2 | 91 | 235,867 | 92,442 | 86,703 |
| 2020 | 1,554,667 | 659,993 | 842,151 | 52,523 | 84.6 | 105 | 246,549 | 123,274 | 105,459 |
| 2025 | 1,780,752 | 726,793 | 994,235 | 59,727 | 79.1 | 120 | 278,044 | 123,045 | 118,099 |
| 2030 | 2,021,516 | 792,119 | 1,154,487 | 74,911 | 75.1 | 136 | 301,156 | 140,948 | 129,885 |
| 2035 | 2,265,082 | 842,211 | 1,336,471 | 86,400 | 69.5 | 152 | 332,990 | 150,849 | 143,811 |
| 2040 | 2,497,950 | 861,882 | 1,529,399 | 106,668 | 63.3 | 168 | 343,649 | 168,535 | 158,242 |
| 2045 | 2,729,643 | 867,478 | 1,746,032 | 116,134 | 56.3 | 184 | 350,870 | 171,584 | 169,285 |
| 2050 | 2,955,993 | 864,529 | 1,950,777 | 140,687 | 51.5 | 199 | 339,116 | 176,444 | 174,212 |
| Rapid growth scenario | | | | | | | | | |
| 2005 | 994,532 | 453,694 | 508,784 | 32,054 | 95.5 | 67 | 162,711 | 67,908 | 59,412 |
| 2010 | 1,167,574 | 532,037 | 596,634 | 38,903 | 95.7 | 79 | 187,553 | 82,359 | 73,610 |
| 2015 | 1,368,867 | 623,432 | 705,471 | 39,964 | 94.0 | 92 | 237,407 | 92,442 | 86,703 |
| 2020 | 1,605,857 | 711,183 | 842,150 | 52,524 | 90.7 | 108 | 257,803 | 123,953 | 105,459 |
| 2025 | 1,885,573 | 827,353 | 998,493 | 59,727 | 88.8 | 127 | 305,533 | 129,127 | 120,650 |
| 2030 | 2,211,307 | 962,328 | 1,174,068 | 74,911 | 88.3 | 149 | 350,795 | 155,450 | 139,088 |
| 2035 | 2,583,212 | 1,109,986 | 1,386,826 | 86,400 | 86.3 | 174 | 414,966 | 176,591 | 162,349 |
| 2040 | 3,003,292 | 1,263,998 | 1,632,626 | 106,668 | 84.0 | 202 | 469,871 | 210,969 | 190,155 |
| 2045 | 3,471,873 | 1,422,583 | 1,933,156 | 116,134 | 79.6 | 233 | 538,636 | 236,601 | 219,981 |
| 2050 | 3,991,060 | 1,585,507 | 2,264,865 | 140,688 | 76.2 | 268 | 596,760 | 273,124 | 250,962 |
| Slow growth scenario | | | | | | | | | |
| 2005 | 994,532 | 453,694 | 508,784 | 32,054 | 95.5 | 67 | 162,711 | 67,908 | 59,412 |
| 2010 | 1,136,923 | 501,387 | 596,634 | 38,902 | 90.6 | 76 | 187,553 | 82,359 | 73,610 |
| 2015 | 1,270,951 | 525,517 | 705,471 | 39,963 | 80.2 | 85 | 226,607 | 92,442 | 86,703 |
| 2020 | 1,389,706 | 495,032 | 842,150 | 52,524 | 65.0 | 93 | 196,800 | 119,193 | 105,459 |
| 2025 | 1,494,739 | 466,401 | 968,612 | 59,726 | 54.3 | 101 | 197,578 | 96,041 | 102,760 |
| 2030 | 1,605,378 | 452,401 | 1,078,066 | 74,911 | 48.9 | 108 | 173,879 | 99,430 | 99,305 |
| 2035 | 1,724,683 | 464,022 | 1,174,262 | 86,399 | 46.9 | 116 | 178,724 | 84,437 | 92,028 |
| 2040 | 1,841,540 | 486,954 | 1,247,918 | 106,668 | 47.6 | 124 | 189,533 | 89,898 | 86,029 |
| 2045 | 1,946,641 | 494,348 | 1,336,159 | 116,134 | 45.7 | 131 | 204,524 | 94,844 | 91,214 |
| 2050 | 2,040,271 | 481,446 | 1,418,137 | 140,688 | 43.9 | 137 | 195,086 | 103,740 | 99,174 |

Table A2. Projected growth, birth, and death rates, Timor-Leste, 2005–2050: three scenarios

| Period | Annual growth rate (percent) | Crude birth rate (per 1000) | Crude death rate (per 1000) | Total fertility (per woman) | Life expectancy at birth (years) | | | Infant mortality (per 1000) | Under-5 mortality (per 1000) |
|-----------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------------|-------|---------|-----------------------------|------------------------------|
| | | | | | Both | Males | Females | | |
| Medium projection | | | | | | | | | |
| 2005–2010 | 3.13 | 41.9 | 10.6 | 6.70 | 59.5 | 58.6 | 60.4 | 91.3 | 116.9 |
| 2010–2015 | 2.96 | 38.9 | 9.3 | 6.10 | 61.1 | 60.1 | 62.2 | 81.3 | 102.7 |
| 2015–2020 | 2.84 | 36.5 | 8.1 | 5.50 | 62.9 | 61.7 | 64.2 | 70.3 | 86.8 |
| 2020–2025 | 2.72 | 34.4 | 7.2 | 4.90 | 64.8 | 63.5 | 66.2 | 58.7 | 70.1 |
| 2025–2030 | 2.54 | 31.9 | 6.6 | 4.30 | 66.2 | 64.8 | 67.7 | 51.7 | 61.9 |
| 2030–2035 | 2.28 | 28.9 | 6.1 | 3.70 | 67.7 | 66.2 | 69.2 | 44.8 | 53.7 |
| 2035–2040 | 1.96 | 25.2 | 5.6 | 3.10 | 69.2 | 67.6 | 70.9 | 37.8 | 45.5 |
| 2040–2045 | 1.77 | 23.1 | 5.3 | 2.77 | 70.8 | 69.0 | 72.6 | 30.8 | 37.3 |
| 2045–2050 | 1.59 | 21.0 | 5.0 | 2.47 | 72.4 | 70.5 | 74.4 | 23.8 | 29.0 |
| Rapid growth scenario | | | | | | | | | |
| 2005–2010 | 3.21 | 42.7 | 10.7 | 6.85 | 59.5 | 58.6 | 60.4 | 91.3 | 116.9 |
| 2010–2015 | 3.18 | 41.2 | 9.4 | 6.55 | 61.1 | 60.1 | 62.2 | 81.3 | 102.7 |
| 2015–2020 | 3.19 | 40.2 | 8.3 | 6.25 | 62.9 | 61.7 | 64.2 | 70.3 | 86.8 |
| 2020–2025 | 3.21 | 39.5 | 7.4 | 5.95 | 64.8 | 63.5 | 66.2 | 58.7 | 70.1 |
| 2025–2030 | 3.19 | 38.5 | 6.7 | 5.65 | 66.2 | 64.8 | 67.7 | 51.7 | 61.9 |
| 2030–2035 | 3.11 | 37.2 | 6.1 | 5.35 | 67.7 | 66.2 | 69.2 | 44.8 | 53.7 |
| 2035–2040 | 3.01 | 35.6 | 5.5 | 5.05 | 69.2 | 67.6 | 70.9 | 37.8 | 45.5 |
| 2040–2045 | 2.90 | 33.9 | 5.0 | 4.75 | 70.8 | 69.0 | 72.6 | 30.8 | 37.3 |
| 2045–2050 | 2.79 | 32.3 | 4.4 | 4.45 | 72.4 | 70.5 | 74.4 | 23.8 | 29.0 |
| Slow growth scenario | | | | | | | | | |
| 2005–2010 | 2.68 | 36.9 | 10.1 | 5.80 | 59.5 | 58.6 | 60.4 | 91.3 | 116.9 |
| 2010–2015 | 2.23 | 31.0 | 8.7 | 4.60 | 61.1 | 60.1 | 62.2 | 81.3 | 102.7 |
| 2015–2020 | 1.79 | 25.5 | 7.6 | 3.40 | 62.9 | 61.7 | 64.2 | 70.3 | 86.8 |
| 2020–2025 | 1.46 | 21.6 | 7.0 | 2.52 | 64.8 | 63.5 | 66.2 | 58.7 | 70.1 |
| 2025–2030 | 1.43 | 21.1 | 6.8 | 2.23 | 66.2 | 64.8 | 67.7 | 51.7 | 61.9 |
| 2030–2035 | 1.43 | 21.1 | 6.8 | 2.21 | 67.7 | 66.2 | 69.2 | 44.8 | 53.7 |
| 2035–2040 | 1.31 | 19.7 | 6.6 | 2.18 | 69.2 | 67.6 | 70.9 | 37.8 | 45.5 |
| 2040–2045 | 1.11 | 17.6 | 6.5 | 2.16 | 70.8 | 69.0 | 72.6 | 30.8 | 37.3 |
| 2045–2050 | 0.94 | 15.9 | 6.5 | 2.13 | 72.4 | 70.5 | 74.4 | 23.8 | 29.0 |

Annex B. Effects of Changes in Marriage and Breastfeeding

1. The proportion married among women of reproductive age in the 2003 TLDHS is at the high end across developing countries, at 74 percent. This is the highest in recent Southeast Asian Demographic and Health Surveys and higher than in four out of five recent surveys worldwide (see Figure 5.7). This contributes to high fertility. In considering how it is likely to change, and with what effect on fertility, we discuss underlying patterns first and then possible directions of change.

2. The proportion married is high because the never-married are very few among women in their forties, at only 0.2–0.3 percent the lowest in Southeast Asia and comparable worldwide only to Bangladesh and some Sub-Saharan African countries. In addition, the proportion of women of any age divorced or separated is very low—0.6 percent, smaller than in any other Demographic and Health Survey. Even the Philippines, another predominantly Catholic country, has four-and-a-half times this proportion either divorced or separated.

3. In apparent contradiction to these patterns, marriage age is typically late. The median of 21.4 years is later than in nine out of ten recent Demographic and Health Surveys. Unusually also, marriage age appears to have declined, as indicated by comparing cohorts of women. Median marriage age among those 45–49 years old was 23.8 years, whereas among those 25–29 years old it was 20.6 years. In Uganda and Senegal, as in four out of five Demographic and Health Surveys overall, marriage is instead later for younger women. In the few surveys with declining marriage age, the next largest decline between these two age groups is only 1.3 years.

4. Marriage could be earlier for younger women because of the cessation of hostilities with the coming of independence. However, the decline in marriage age is progressive across cohorts rather than discontinuous, suggesting that such historical events cannot be the complete explanation. There may in fact be an explanation that does not involve earlier marriage. Marriage is not a single event in Timor-Leste. A customary union, marked only by consummation, usually precedes a church ceremony, and civil registration is rare. A couple may have children and even grandchildren before they formalize their union in church. Delay in formalization is often associated with settling the bride price, or *barlaque*, together with the minor gifts the bride's family provides. All of these are negotiated by the families rather than the couple, because marriage is important in forming alliances (Ministry of Health and others 2004; Diamond 2004; Molnar 2005). This marriage pattern suggests the possibility that settlement of the bride price could have become more expeditious over time, without any actual change in the consummation of unions. Alternatively, some older women may be more likely than younger women to focus on their church weddings, whereas younger women, still unmarried in church, may emphasize their customary unions.

5. Whatever the explanation, whether marriage age will decline in the future is uncertain. Proportions married among females 12 years and older appear to have declined marginally between 2001 and 2007 (Republica Democratica de Timor-Leste and others 2008:18), hinting at the possibility of the reverse trend, more in line with typical patterns. We consider therefore two possibilities: that marriage patterns will increasingly resemble the average in Southeast Asia and that marriage will be progressively delayed, as it was in other countries with very high fertility, specifically Uganda and Senegal. We do not entirely exclude the opposite trend, however, and also consider the implications should the decline in marriage age be real and continue into the future.

6. To produce a Southeast Asian model for the future of marriage in Timor-Leste, we average the percentage distribution of women by marital status and 5-year age groups across recent (2002–2005) Demographic and Health Surveys in Cambodia, Indonesia, the Philippines, and Vietnam. The 2003 Timor-Leste marital status distribution reflects substantially lower proportions of women never married

and widowed or separated. We therefore estimate the effects of raising the proportion in each of these two groups separately to Southeast Asian averages, in each case taking the relevant proportion out of those currently married.

7. For instance, the effect of raising the proportion never-married is estimated by multiplying the average Southeast Asian proportion never-married in each 5-year age group by the age distribution in the 2003 Timor-Leste survey. This gives a concomitant reduction in the proportion currently married, from which C_m can be estimated. C_m is the marriage coefficient used in estimating proximate determinant effects on fertility (Bongaarts 1982). It ranges from 0, if no woman ever entered a sexual union, to 1, if all reproductive-age women were continuously in sexual unions. Because the effect of C_m on total fertility is multiplicative, a percentage change in C_m translates into a similar percentage change in total fertility. C_m changes from 0.74 to 0.68 if the proportion never married in Timor-Leste rises to the Southeast Asian average. Therefore, total fertility would fall 8 percent. These calculations are summarized in Table B1.

Table B1. Effect of change from current marital status distribution in Timor-Leste to average Southeast Asia distribution

| Southeast Asia distribution | | <i>C_m, given age distribution from:</i> | |
|------------------------------|---|--|---|
| | <i>Percent of women of reproductive age</i> | <i>2003 DHS</i> | <i>2005 or 2025 estimates^a</i> |
| Never married | | | |
| Timor-Leste | 23.7 | 0.738 | 0.690 |
| Southeast Asia average | 29.5 | 0.680 | 0.618 |
| Change | | -7.8% | -10.4% |
| Divorced or separated | | | |
| Timor-Leste | 0.6 | 0.738 | 0.738 |
| Southeast Asia average | 2.9 | 0.715 | 0.718 |
| Change | | -3.0% | -2.7% |
| Currently married | | | |
| Timor-Leste | 73.8 | 0.738 | 0.691 |
| Southeast Asia average | 65.6 | 0.656 | 0.600 |
| Change | | -11.1% | -13.1% |

Note: See text for explanation of comparisons shown here.

^a2005 is used for the first estimate, 2025 for the second, in order to show the joint effect of changes in marital status distribution and age structure.

8. One complication involves what age structure to use in the calculation. Assuming it takes 20 years or so for the marriage status distribution to change fully, one might apply the 2025 age distribution instead of the 2003 age distribution. However, the 2003 distribution varies from both the 2000 and 2005 distributions estimated in this report. At least part of the reason is sampling variation, but the 2003 TLDHS also focused on the household population, possibly undercounting younger urban women in less conventional households. A comparison of 2025 with 2003 would introduce additional complications. Instead we compare 2025 with 2005, examining the implied change in total fertility with the 2003 Timor-Leste marital status distribution matched with the 2005 age distribution and the Southeast Asian marital status distribution matched with the 2025 age distribution. Table B1 indicates that the fertility change would then be a 10 percent reduction.

9. Another perspective from which Timor-Leste marriage patterns could come to resemble Southeast Asian average patterns is if age at marriage were to fall. The effect is difficult to estimate using the procedure just discussed because we lack data on the distribution of marriage age within cohorts. We use a different approach instead. Across all Demographic and Health Surveys, C_m has a linear relationship

to median age at marriage, falling by 0.036 points for every one-year rise in marriage age. (The cross-national regression equation is $C_m = 1.3165 - 0.0355 \times \text{marriage age}$, $R^2 = 0.60$.) Using this relationship, we infer a probable rise in C_m from 0.74 to 0.77 if marriage age falls from 21.4 years to the Southeast Asian average of 20.6 years (Table B2).

Table B2. Effect of change in age at marriage

| | <i>Median age at marriage</i> | <i>Implied change in C_m^a</i> | C_m | <i>Change relative to base</i> |
|---|-----------------------------------|---|-------|--|
| Timor-Leste 2003 (base) | 21.4 | — | 0.737 | — |
| With 11.6% rise as in Senegal | 23.9 | −0.088 | 0.649 | −12.0% |
| With 3.5% rise as in Uganda | 22.2 | −0.027 | 0.710 | −3.6% |
| Southeast Asia average | 20.6 | 0.028 | 0.765 | 3.9% |
| With continuation of decline across cohorts | 18.2 | 0.114 | 0.851 | 15.4% |

^aObtained by multiplying the difference between median age at marriage and the base median age by -0.0355 , a coefficient from a regression of C_m on median age across all Demographic and Health Surveys.

10. In surveys covering almost two decades, age at marriage rose 3.5 percent in Uganda and 11.6 percent in Senegal. This was from considerably lower levels than in Timor-Leste, but if we apply these percentage increases nevertheless, they would imply declines in fertility of 4 and 12 percent, respectively.

11. Consider finally the decline in marriage age across cohorts in Timor-Leste, from 23.8 years among those aged 45–49 years to 20.6 years among those aged 20–24 years. If overall median age at marriage follows a similar decline (a rather strong assumption, but we make it nevertheless to indicate the limits of possible outcomes), it would be at 18.2 years after two decades. This implies a rise in fertility of 15 percent.

12. Where breastfeeding is concerned, we know that appropriate practice can extend the period of postpartum amenorrhea. Postpartum amenorrhea, together with abstinence, which plays a lesser role in reducing the likelihood of conception, leads to a period of postpartum insusceptibility to conception. The statistical relationship between breastfeeding and insusceptibility can be complicated, and we focus instead directly on the insusceptible period.

13. This period has a median of 11.5 months in Timor-Leste, longer than the Southeast Asian average, from recent surveys, of 7.3 months. There is no difference in the length of this period between Timorese women 30 years and older or younger than 30. In both Uganda and Senegal, postpartum insusceptibility declined in surveys across two decades. The decline in these two countries was faster than the average decline across all countries with multiple Demographic and Health Surveys.

Table B3. Effect of change in postpartum insusceptibility

| | <i>Median months of postpartum insusceptibility</i> | C_i | <i>Change relative to base</i> |
|------------------------|---|-------|------------------------------------|
| Timor-Leste (base) | 11.5 | 0.667 | |
| With average trend | 10.3 | 0.694 | 4.0% |
| With Uganda trend | 10.2 | 0.697 | 4.5% |
| Southeast Asia average | 7.3 | 0.776 | 16.4% |
| With Senegal trend | 6.6 | 0.797 | 19.5% |

14. From these comparisons, we make up Table B3, which shows how long postpartum insusceptibility would be if it moved to the Southeast Asian average or if it declined at the annual rates implied in surveys for Uganda, Senegal, or all countries with available data. C_i , the coefficient for the effect of insusceptibility on fertility that parallels C_m , when calculated in each case, implies that fertility would rise anywhere from 4 to 20 percent given these possible trends.

Annex C. “Natural” Family Planning and Fertility

15. In the 2003 TLDHS, 1.1 percent of currently married women reported using periodic abstinence (or rhythm), and 1.6 percent reported the lactational amenorrhea method (LAM). The latter group may include women who were breastfeeding with contraceptive intent without specifically following LAM procedures, a group not separately reported. Together these groups make up 27 percent of contraceptive users, a high proportion. These methods—LAM, breastfeeding, and periodic abstinence—together with long-term abstinence, which was not reported either, make up what are considered by some to be “natural” family planning methods. Such methods generally are less effective than the leading modern methods. Whereas individual users may face higher risk of method failure, at the societal level the fertility effect is negligible because contraceptive use overall is so low.

16. As contraceptive use rises, could substantial dependence on natural methods reduce the fertility impact? Within Southeast Asia, the Philippines has the next highest proportion of contraceptive users dependent on natural methods. This proportion was 18 percent in 1993, 22 percent in 1998, and 14 percent in 2003; over this decade, contraceptive prevalence rose from 40 to 49 percent. The Philippines has had slower fertility decline than other countries in Southeast Asia, where the proportion of users on natural methods ranges from 1 to 12 percent.

17. To determine whether the Philippine pattern is an anomaly or represents a pattern that Timor-Leste is likely to follow, we examine data from all Demographic and Health Surveys, which date from 1985 to the present. We run regressions to predict total fertility among women aged 15–49 from the prevalence of three groups of contraceptive methods: natural methods, as defined above; other modern methods, and other traditional or folk methods.

18. Table C1 shows that, across all surveys, a 10 percentage point increase in prevalence of natural methods was associated with a fall of 0.3 points in total fertility. However, a similar increase in prevalence of other modern methods was associated with twice as large a fall in total fertility. Although methods and family planning programs have changed over time, limiting the regression to surveys since 2000 leaves these effects unchanged. However, the effect of natural methods is no longer significant. If the regression is limited to Southeast Asian surveys, the effect of other modern methods is reduced, but the effect of natural methods is an increase rather than a decrease in total fertility, because of the Philippine surveys.

Table C1. Cross-national regressions for the effect on total fertility of prevalence of three types of contraceptive methods

| Type of method | All surveys | | Surveys since 2000 | | Southeast Asia surveys | |
|---|-------------|----------|--------------------|----------|------------------------|---------|
| | B | (t) | B | (t) | B | (t) |
| Initial regressions | | | | | | |
| Natural methods ^a | –0.029 | (–2.88) | –0.025 | (–1.35) | 0.090 | (2.08) |
| Other modern methods | –0.057 | (–21.42) | –0.053 | (–12.02) | –0.037 | (–8.05) |
| Other traditional methods | –0.090 | (–8.97) | –0.105 | (–8.02) | –0.088 | (–3.11) |
| Constant | 6.639 | (60.47) | 6.480 | (34.16) | 4.753 | (19.39) |
| R ² (n) | 0.783 | (172) | 0.781 | (65) | 0.938 | (13) |
| Excluding outliers on withdrawal^b | | | | | | |
| Natural methods ^a | –0.038 | (–3.67) | –0.042 | (–2.07) | 0.054 | (1.17) |
| Other modern methods | –0.060 | (–21.89) | –0.056 | (–11.9) | –0.032 | (–5.94) |
| Other traditional methods | –0.011 | (–0.45) | –0.018 | (–0.41) | –0.031 | (–0.70) |
| Constant | 6.529 | (57.90) | 6.371 | (31.86) | 4.459 | (14.45) |
| R ² (n) | 0.769 | (164) | 0.734 | (60) | 0.928 | (11) |

a Considered natural were LAM, breastfeeding, and periodic and long-term abstinence.

b Excluded are surveys for Armenia, Azerbaijan, Moldova, Turkey, and Vietnam.

19. The third effect in these regressions is unexpected. Prevalence of other traditional or folk methods is related to a greater decrease in total fertility than prevalence of other modern methods. Examination of the data suggests that this is mainly due to a few outliers: countries now at low fertility levels and with unusually high prevalence of withdrawal, by far the most common of these methods. In Armenia, Azerbaijan, Moldova, and Turkey, prevalence of withdrawal ranges from 20 to 33 percent, and in Vietnam it has ranged from 12 to 14 percent. The next highest value in Demographic and Health Surveys is 9 percent, and the overall median is only 1.9 percent. Excluding these outlying countries (in the lower panel of Table C1) reduces the effect considerably and leaves it nonsignificant.

20. To infer from the smaller effect of natural methods that they should not be part of a family planning program would be wrong. Individuals need a choice of contraceptive methods, and given the relative popularity of these methods, information on them needs to be readily available. However, making them the exclusive focus of a family planning program could considerably dilute the potential fertility impact.

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