The Future of Population in Asia

EAST-WEST CENTER

This publication was made possible by a grant from the Bill and Melinda Gates Foundation

Cover:
In nearly every Asian country, declines in mortality and fertility provide favorable conditions for social and economic development (Madras, India) © David H. Wells/Corbis

Page i:
Social, economic, and technological changes are reshaping the future of women and girls in Asia (Tokyo, Japan) © Gueorgui Pinkhassov/Magnum

ISBN 0-866338-199-6

Designed and produced by Barbara Pope Book Design
Printed in the United States of America by Hagadone Printing Company in Honolulu, Hawai'i

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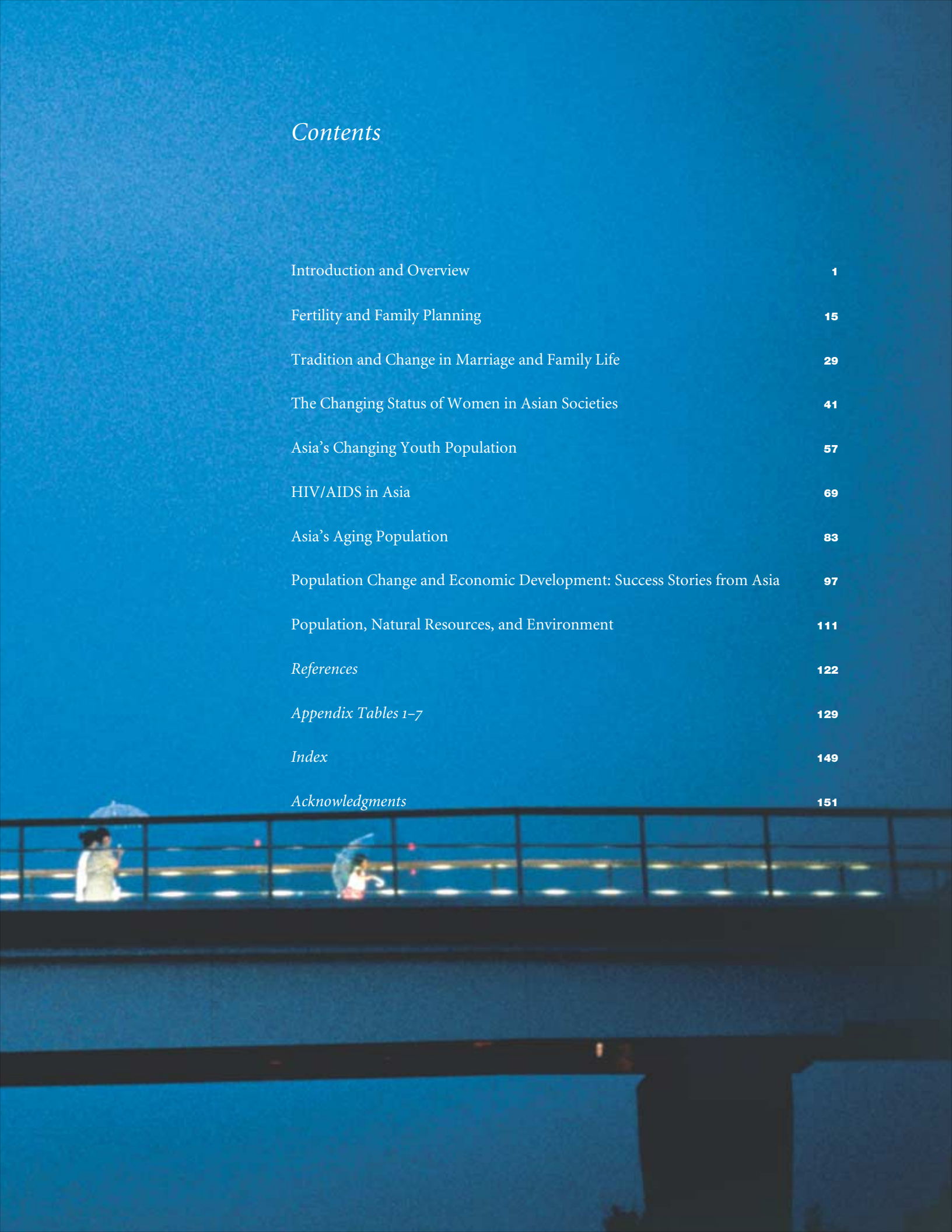


Introduction and Overview

Over the past 50 years, many Asian countries have experienced a remarkable pace of economic development and social change. Modernization has progressed most quickly in the countries of East Asia. At 81 years, Japan now has the highest life expectancy in the world. In South Korea, the average annual income rose nearly 10-fold between 1960 and 1999. In the Philippines, more than three-fourths of girls now attend secondary school, and one-third attend university. In India, fertility has dropped from about six to just over three children per woman. In five Asian countries, per capita incomes average more than US$10,000 a year (Appendix Table 1).

In most countries of Southeast Asia and South and Central Asia, the pace of change has been slower, resulting in wide diversity across the region. Afghanistan has one of the lowest life expectancies in the world— at 46 years. In Bangladesh, only 13 percent of girls attend secondary school. In Afghanistan, Pakistan, Cambodia, and Laos, women have, on average, more than five children each. In Afghanistan and Laos, more than 1 in 10 of these children die before their first birthday. In nine Asian countries, per capita incomes average less than US$500 a year.

Varying levels of social and economic development have major implications for the growth and structure of Asian populations (Kerala, India) © Steve McCurry/Magnum

These varying levels of social and economic development have major implications for the growth and structure of Asian populations. Economic transformation plus dramatic breakthroughs in health and family planning technology have been the fundamental forces driving a demographic transition. This transition—from high to low mortality and fertility—has occurred in nearly every country of the region. This demographic transition, in turn, has provided favorable conditions for social and economic development.

Before the demographic transition, both birth and death rates are high, so the total population grows slowly if at all. With modernization, death rates are the first to plummet, while birth rates remain high, so that population growth can speed up to alarming levels. Eventually, birth rates also drop, and 50 or 60 years later population numbers can be expected to stabilize or decline. Apart from population size, the demographic transition also has a dramatic effect on population age structures.

Although population growth can be expected to slow down eventually, the length of the transition phase—when death rates are low but birth rates are high—and the rate of population growth during this period determine what size a population is likely to reach before the numbers stabilize. And whether India's population, for example, eventually stabilizes at 1.3 billion (United Nations low-variant projection) or 1.9 billion (United Nations high variant)

makes a big difference in terms of pressure on national resources and the ultimate well-being of individuals and families.

The demographic transition has been more rapid and more dramatic in Asia than anywhere else in the world, particularly in East Asia. In 1950, women in South Korea could expect to bear more than five children on average. In 2000, they could expect to bear fewer than two. Over the same 50-year period, life expectancy in China increased from 41 to 71 years. Other countries, particularly in South and Central Asia, are only part way through the transition from high to low mortality and fertility. In Pakistan, for example, women can expect to bear five or six children throughout their lives, and nearly 1 in 10 of these children die before reaching age one. Yet even in the relatively poor countries of South and Central Asia, death and birth rates are going down, and population growth rates and structures are changing.

This report describes recent population trends in Asia and explores the likely course of Asian population dynamics in the future. Where data are available, the time frame is 100 years, from the second half of the 20th century through the first half of the 21st. The discussion covers the different population dynamics in Asia's three subregions—East, Southeast, and South and Central Asia—and includes examples from specific countries that illustrate regional trends.

The statistics that underlie much of this discussion are the medium-variant projections released recently by the United Nations Department of Economic and Social Affairs in *World population prospects: The 2000 revision* (see Appendix Table 2). Figure 1 is a map of the region.

Mortality, fertility, and population growth

In Asia as elsewhere in the world, economic growth and modernization caused a drop in death rates well before they had an effect on birth rates. Death rates fell especially rapidly in the decade after World War II because economic development brought in new medical and public-health technology from Europe and North America—such as vaccinations against major infectious diseases and pesticides to reduce the transmission of malaria. During the second half of the 20th century, life expectancy increased by more than 20 years in all three of Asia's subregions—from 43 to 71 years in East Asia, from 41 to 65 years in Southeast Asia, and from 39 to 62 years in South and Central Asia.

Although particularly dramatic during the 1950s, increases in life expectancy have continued, based on further advances in medicine and public health and improvements in the standard of living of many Asian populations. The rather sudden access to life-saving technology, largely imported from the West, has produced much higher rates of transitional population growth in Asia than occurred historically in Western countries.

Economic development and access to new technologies have also led to at

Figure 1. Map of Asia

Notes: Boundary representation is not necessarily authoritative. The United Nations population statistics used in this report (2001) include statistics for Taiwan together with China.

EAST ASIA

China
China, Hong Kong SAR
China, Macao SAR
Japan
Korea, Dem. Rep. (North)
Korea, Rep. (South)
Mongolia
Taiwan

SOUTHEAST ASIA

Brunei Darussalam
Cambodia
East Timor
Indonesia
Lao PDR (Laos)
Malaysia
Myanmar
Philippines
Singapore
Thailand
Vietnam

SOUTH AND CENTRAL ASIA

Afghanistan
Bangladesh
Bhutan
India
Iran (Islamic Rep.)
Kazakhstan
Kyrgyzstan
Maldives
Nepal
Pakistan
Sri Lanka
Tajikistan
Turkmenistan
Uzbekistan

least some level of fertility decline everywhere in Asia. Experience has shown that birth rates decline for three main reasons:

1. Child mortality declines so that families no longer need to produce extra children to make sure that a certain number survive. Large numbers of children also put a strain on family resources.
2. With increased opportunities for education and changes in the nature of work, children become an economic liability rather than an asset, at least until they become adults.
3. Emerging industrial economies create new material goods and new opportunities for adults that compete with children for parents' time and resources. This is especially true for women, who increasingly work outside the home.

Changes in values also play an important role in the transition to low birth rates. In pre-industrial societies, there is generally an emphasis on high fertility, which results in resistance to family planning even when it is available. This resistance is one of the major reasons why fertility decline lags behind mortality decline. As economic and social development proceeds and mortality drops, the resistance to family planning tends to collapse—often rather suddenly. Wider and wider groups within the population come to accept the idea that deliberate family limitation is morally acceptable, and fertility declines.

The change in attitudes and acceptance of family planning proceed rapidly in populations that are socially integrated, with shared values and good internal communications. These populations tend to be relatively homogeneous in terms of characteristics such as ethnicity, language, and religion. Japan, South Korea, Taiwan, and Thailand are examples of highly integrated populations where fertility has declined very rapidly over short periods.

Government and nongovernmental family planning programs can also advance the timing of fertility decline by providing accessible, low-cost family planning services and by speeding up the acceptance of birth control through public information campaigns. Fertility has fallen very quickly in countries with strong national family planning programs such as China, Thailand, Indonesia, Singapore, South Korea, and Taiwan. Fertility can decline to very low levels without strong family planning programs, however, for example in Japan.

The timing of fertility decline is a complex function of:

- Mortality rates
- Economic, social, and cultural factors at the family level relating to the costs and benefits of having children
- Economic, geographic, political, and cultural factors at the national level that influence the rate of diffusion of family planning

Fertility decline is also influenced by trends in age at marriage and migration. The timing of fertility decline results from various combinations of all these factors.

Table 1. Population trends in Asia: 1950–2050

Trend	1950	1975	2000	2025	2050
Total population (1,000s)	1,348,923	2,297,685	3,484,065	4,472,895	5,004,281
Percent of world population	54	57	58	56	54
Life expectancy at birth[a]	41.3	44.8	67.7	73.8	76.9
Total fertility rate (TFR)[a]	5.89	4.18	2.49	2.11	2.05
Crude birth rate (CBR)[a]	42.7	29.4	20.2	14.9	13.1
Crude death rate (CDR)[a]	24.0	10.5	7.7	8.1	10.2
Rate of natural increase (RNI)[a]	18.7	18.9	12.5	6.8	2.8
Percent age 0–14	36	40	30	22	19
Percent age 65+	4	4	6	10	17
Dependency ratio[b]	0.68	0.78	0.56	0.48	0.57
Percent women age 15–49	49	47	53	50	44

Source: United Nations (2001); 1998 revision for CBR, CDR, RNI, TFR, and life expectancy in 1950 and 1975.

[a] Refers to 1950–54, 1975–79, 2000–04, 2025–29, and 2045–49. CBR and CDR refer to births or deaths per 1,000 population per year.

[b] The dependency ratio is defined as the sum of the number of children age 0–14 and the number of elderly age 65+, divided by the number of working-age people age 15–64. It is interpreted as the average number of dependents that each person of working age must support.

Between 2000 and 2050, fertility in Asia as a whole—as measured by the total fertility rate, or TFR—is projected to decline from 2.7 to 2.1 children per woman (Table 1). The TFR is defined as the number of children that a woman would bear throughout her reproductive years at current age-specific fertility rates. According to these projections, fertility in Asia is expected to drop to replacement level by about 2025. This is defined as an average of about 2.1 children per woman, which includes one-tenth of a child extra to make up for the mortality of children and of women who do not reach the end of their reproductive years.

Over the same 50-year period, life expectancy at birth is projected to increase from 66 to 77 years. Another commonly used measure of mortality is the crude death rate or CDR (deaths per 1,000 population per year), also shown in Table 1. Even though life expectancy increases throughout the period until 2050, the crude death rate is also projected to begin increasing after 2015. This is because the proportion of Asia's population at the older, high-mortality ages will be increasing.

Between 2000 and 2050, Asia's population is projected to grow by 44 percent, from 3.48 to 5.00 billion (Table 1). Population will grow somewhat more slowly in Asia than in the rest of the world. As a result, Asia's share of world population is projected to decline slightly, from 58 to 54 percent, the same percentage as it was in 1950.

Another measure of population growth is the rate of natural increase, or RNI

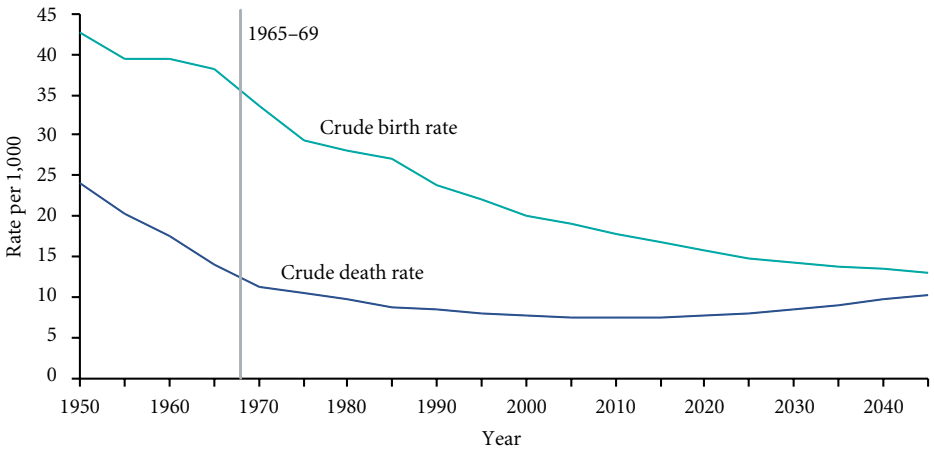
(excess of births over deaths per 1,000 population per year). This is the difference between the crude birth rate, or CBR (births per 1,000 population per year) and the crude death rate (CDR). Trends in these indicators—CBR, CDR, and RNI—reveal the progress of the demographic transition (Figure 2). The rate of natural increase, as the difference between CBR and CDR, approximately equals the annual rate of population growth if net migration is small. The rate of natural increase for Asia peaked in 1965–69, when it was 24.1 per 1,000 per year. Since then, the RNI has been declining, and it is projected to decline much more during the next 50 years. Overall, Asia's population is still growing rapidly, but the growth rate is slowing down.

Population age structure

Populations can usefully be divided into three age groups—young dependents at ages 0 to 14 years, the working-age population at ages 15 to 64, and old dependents at ages 65 and above. As mortality and fertility rates decline, the proportions in these three age groups change. Table 1 shows that the proportion of young dependents in Asia's population is projected to drop sharply, from 30 to 19 percent between 2000 and 2050, while the proportion of old dependents is projected to rise from 6 to 17 percent.

The ratio of dependents (both young and old) in a population to those of working age is called the "dependency ratio." It is an approximation of the average number of dependents that each person of working age must support. Table 1 shows that the dependency ratio in Asia is projected to fall from 0.56 to 0.48 between 2000 and 2025, reflecting the sharp decline in the proportion of young dependents. The dependency ratio is then projected to rise to 0.57 in 2050, reflecting a sharp increase in the proportion at ages 65 and above. This means that in 2025, there will be slightly more than two people of working age for every dependent in the population, while in 2050 there will be fewer than two people of working age for every dependent.

Figure 2. Crude birth rates (CBR) and crude death rates (CDR) per 1,000: Asia, 1950–2045



Source: United Nations (2001).
Note: The rate of natural increase (RNI) is the difference between the CBR and the CDR. It peaked in 1965–69.

The temporary dip in overall dependency that typically occurs during the early phase of fertility transition has been referred to as a "demographic bonus" because, during this period, money that would otherwise be spent supporting dependents can be saved and invested, providing an impetus to economic development. The boost to development is not automatic, however, because there is no guarantee that governments, institutions, or individuals will spend the savings wisely. The trend in the dependency ratio shown in Table 1 indicates that, for Asia as a whole, demographic factors will tend to accelerate economic development between 2000 and 2025.

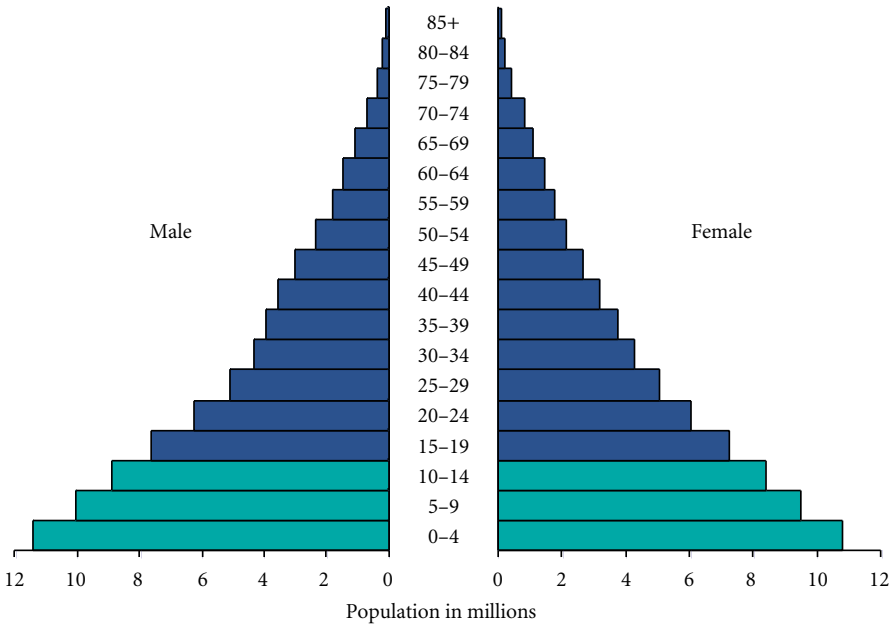
Another important aspect of population age structure is the phenomenon called "population momentum." This is a period of population growth that occurs even after fertility has fallen to the replacement level because the proportion of the population at the reproductive ages is temporarily inflated. Thus, if there is an unusually large number of women in their childbearing years (age 15 to 49), then an unusually large number of children will be born, even if these women have on average only 2.1 children each. After mortality declines, it takes a while for the population of older persons to increase, which temporarily depresses the crude death rate. This also contributes to population momentum.

Momentum-generated population growth occurs roughly in the following sequence. Fifteen years after fertility decline begins, there will be relatively few children below age 15. At the same time there will be relatively few persons over age 50, because these older age groups experienced relatively high mortality in the past. Women in the reproductive ages of 15 to 49 will constitute a relatively large group in the population because they were born before fertility started to decline but they have experienced lower mortality than their elders. The population bulge at ages 15 to 49 lasts for about four decades, and the temporary depression of crude death rates lasts even longer.

The age structure of Pakistan's population in 2000 (Figure 3) is typical of a country just entering the demographic transition from high to low fertility. There is a broad base at the bottom consisting of large numbers of children and a narrow top made up of relatively small numbers of elderly. Fertility has begun to fall in Pakistan but is still high, and the proportion of dependent children in the population is large, resulting in rapid population growth. The population of Thailand in 2000 (Figure 4) has a bulge between ages 10 and 35, reflecting a major fertility decline during the 1980s and 1990s and indicating that population momentum is accounting for a considerable amount of Thailand's current population growth.

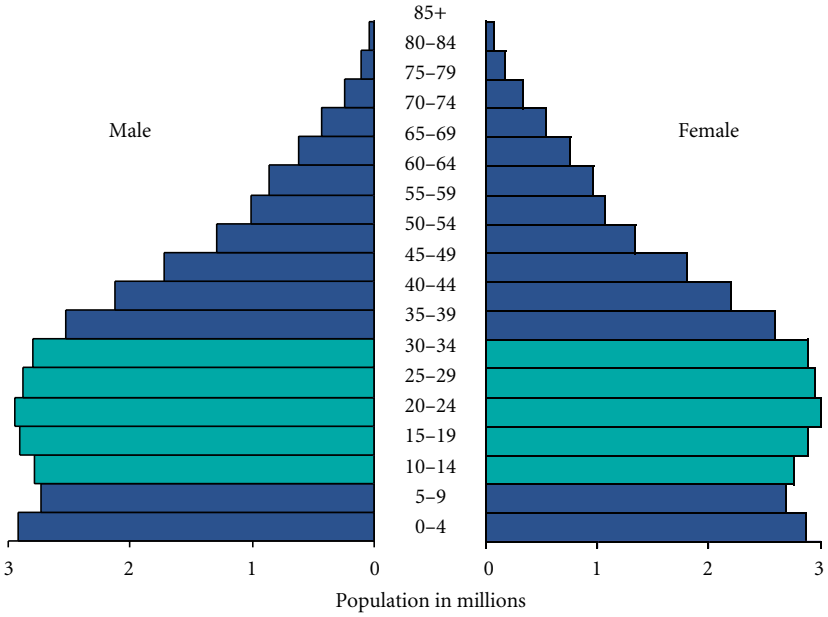
The population of Japan in 2000 (Figure 5) has a primary bulge at ages 50 to 54, corresponding to persons born in 1945–49 during Japan's brief post-World War II baby boom. Japan's fertility dropped by half during the 1950s, and this is reflected in the narrowing of the pyramid at ages 40 to 44. The secondary bulge at 25 to 29 is a generational echo—the children of the baby boomers, born on average 25 to 30 years later. In Japan, the large group at ages 50 to 54 will soon

Figure 3. Population age and sex structure for Pakistan, 2000



Source: United Nations (2001).

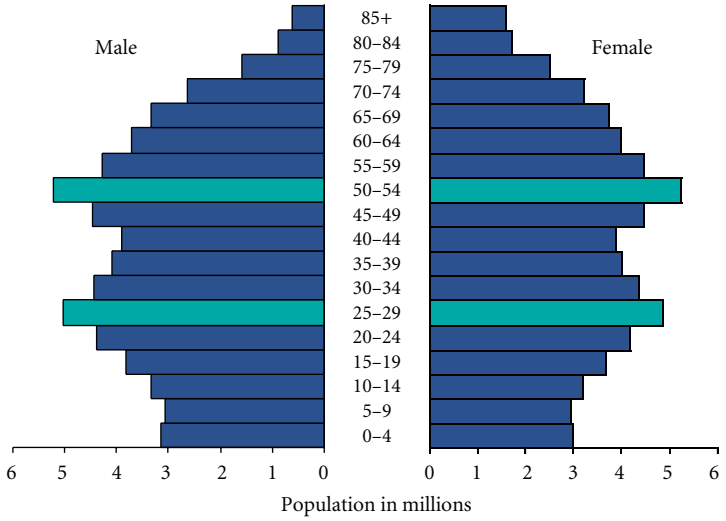
Figure 4. Population age and sex structure for Thailand, 2000



Source: United Nations (2001).

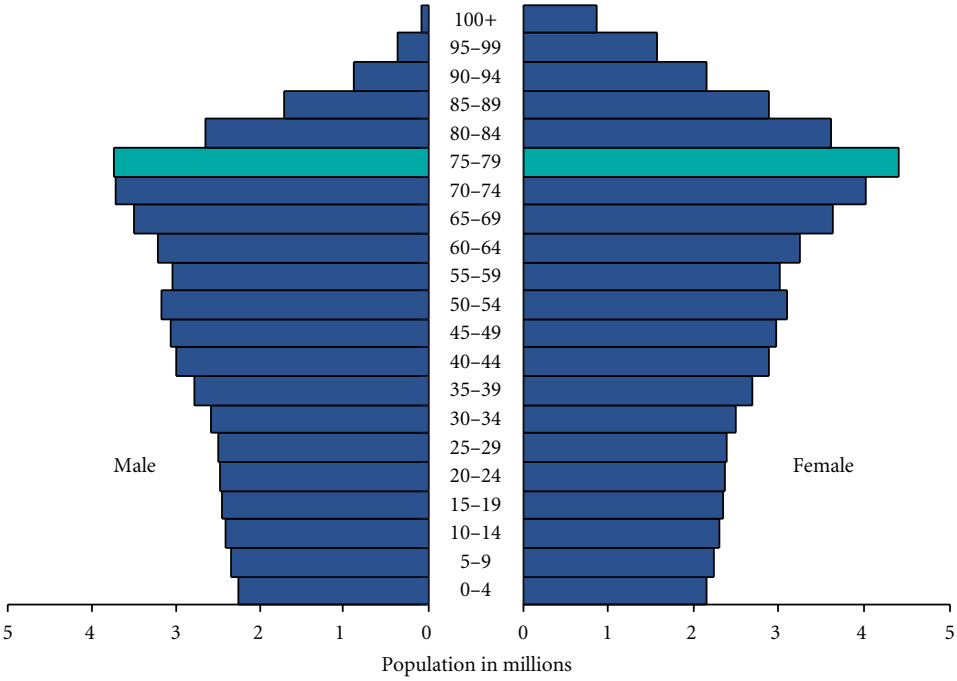
move into retirement, causing a sharp rise in Japan's dependency ratio. Indeed, the population pyramid projected for Japan in 2050 (Figure 6) shows population aging that is so extreme that the pyramid is inverted, broadening steeply through the retirement years up to ages 75 to 79 as the numbers in these older age groups increase.

Figure 5. Population age and sex structure for Japan, 2000



Source: United Nations (2001).

Figure 6. Population age and sex structure for Japan, 2050



Source: United Nations (2001).

Population momentum will account for much of Asia's population growth over the next 50 years. Fertility is projected to fall to the replacement level of 2.1 children per woman by 2025 and to change little between 2025 and 2050, yet population is projected to grow between 2025 and 2050 from 4.5 to 5.0 billion. Population momentum will account for virtually all of the growth during this 25-year period.

Table 2. Population trends in East, Southeast, and South and Central Asia: 1950–2050

Trend	1950	1975	2000	2025	2050
East Asia					
Total population (1,000s)	672,483	1,096,726	1,481,075	1,685,206	1,665,197
Percent of Asia's population	50	48	43	38	33
Crude birth rate (CBR)[a]	40.8	21.0	13.9	11.0	10.5
Crude death rate (CDR)[a]	23.3	6.6	7.1	9.4	13.0
Rate of natural increase (RNI)[a]	17.5	14.3	6.8	1.6	–2.5
Total fertility rate (TFR)[a]	5.71	3.13	1.76	1.89	1.90
Life expectancy[a]	42.9	46.7	72.3	77.3	79.7
Percent age 0–14	34	38	24	18	16
Percent age 65+	4	5	8	14	24
Dependency ratio[b]	0.63	0.74	0.46	0.48	0.66
Percent of women age 15–49	50	47	55	44	39
Southeast Asia					
Total population (1,000s)	178,073	321,268	522,121	692,228	800,302
Percent of Asia's population	13	14	15	15	16
Crude birth rate (CBR)[a]	44.3	35.3	21.4	15.6	13.6
Crude death rate (CDR)[a]	24.7	13.1	7.0	7.1	9.3
Rate of natural increase (RNI)[a]	19.6	22.2	14.4	8.5	4.3
Total fertility rate (TFR)[a]	6.03	4.81	2.52	2.09	2.08
Life expectancy[a]	40.5	43.6	67.0	74.0	77.3
Percent age 0–14	39	42	32	23	20
Percent age 65+	4	4	5	8	16
Dependency ratio[b]	0.74	0.84	0.59	0.47	0.56
Percent of women age 15–49	48	46	54	52	44
South and Central Asia					
Total population (1,000s)	498,367	879,691	1,480,868	2,095,462	2,538,781
Percent of Asia's population	37	38	43	47	51
Crude birth rate (CBR)[a]	44.66	37.42	25.82	17.65	14.6
Crude death rate (CDR)[a]	24.75	14.32	8.51	7.38	8.7
Rate of natural increase (RNI)[a]	19.9	23.1	17.3	10.3	5.9
Total fertility rate (TFR)[a]	6.08	5.24	3.25	2.24	2.12
Life expectancy[a]	39.3	42.8	63.3	70.9	74.9
Percent age 0–14	39	41	35	26	21
Percent age 65+	4	4	5	7	13
Dependency ratio[b]	0.73	0.80	0.66	0.49	0.51
Percent of women age 15–49	48	47	51	53	47

Source: United Nations (2001); 1998 revision for CBR, CDR, RNI, TFR, and life expectancy in 1950 and 1975.

[a] Refers to 1950–54, 1975–79, 2000–04, 2025–29, and 2045–49. CBR and CDR refer to births or deaths per 1,000 population per year.

[b] The dependency ratio is defined as the sum of the number of children age 0–14 and the number of elderly age 65+, divided by the number of working-age people age 15–64. It is interpreted as the average number of dependents that each person of working age must support.

Projections for the three subregions of Asia

There are large differences among the populations of East, Southeast, and South and Central Asia. The demographic transition is most advanced in East Asia and least advanced in South and Central Asia, with Southeast Asia in between (Table 2).

In all three subregions, life expectancy is projected to increase between 2000 and 2050. The crude death rate (CDR) is also projected to increase over the full 50-year period in East and Southeast Asia and between 2025 and 2050 in South and Central Asia. This occurs because growing proportions of these populations are in the old-age group.

In East Asia, the total fertility rate (TFR) was already below replacement in 2000, at 1.8 children per woman. According to United Nations medium-variant projections, fertility in this subregion will increase slightly—to 1.9 in 2050. At the other end of the spectrum, fertility in South and Central Asia is projected to decline from 3.3 to 2.1 children per woman. In Southeast Asia, fertility is projected to decline from 2.8 to 2.1.

Because fertility is much lower in East Asia, population will grow more slowly there than in the other two subregions. As a result, East Asia's proportion of the region's total population is projected to decline from 43 to 33 percent between 2000 and 2050. The proportion in South and Central Asia is projected to increase from 43 to 51 percent, and the proportion in Southeast Asia is projected to increase slightly from 15 to 16 percent.

By 2050, population aging will have progressed much further in East Asia than in the other two subregions. In East Asia, 24 percent of the population will be age 65 and above, compared with 16 percent in Southeast Asia, and 13 percent

In Asia as a whole, there are fewer than two people of working age for each dependent person in the population (Chengdu, China)
© Keren Su/Corbis

In most of Asia, the population will continue growing for 50 years or more because of the large proportion of women at childbearing ages (Gujarat, India) © Ian Berry/Magnum

in South and Central Asia. Indeed, the proportion of elderly in East Asia's population will be one of the highest of any region in the world.

Largely because of greater population aging, the dependency ratio in 2050 will be highest in East Asia, at 0.66 dependents for every individual of working age, compared with 0.56 in Southeast Asia and 0.51 in South and Central Asia. There is no dip in the dependency ratio between 2000 and 2050 in East Asia, because most countries in East Asia have already experienced the bulk of their "demographic bonus." In contrast, there is a big dip in the dependency ratio between 2000 and 2050 in Southeast and South and Central Asia, indicating that these two subregions will experience favorable demographic conditions for economic growth. It remains to be seen, however, how well countries in these subregions will take advantage of the demographic bonus to boost their economic growth rates.

By 2050, the percentage of women at the reproductive ages of 15 to 49 will be substantially lower in East Asia (39 percent) than in Southeast Asia (44 percent) or in South and Central Asia (47 percent). These percentages indicate that by 2050, population momentum will have mostly dissipated in East Asia but not in the other two subregions. South and Central Asia and Southeast Asia will still

Table 3. Countries that will contribute most to Asia's population growth between 2000 and 2050 and contributions of other countries by subregion

Country, subregion, or region	Population increment (1,000s)	Percent contribution to Asia's growth	Cumulative percentage
India	563,117	37.0	37.0
Pakistan	202,914	13.3	50.4
China	186,925	12.3	62.7
Bangladesh	127,993	8.4	71.1
Indonesia	99,243	6.5	77.6
Philippines	52,730	3.5	81.1
Other East Asia	–2,803	–0.2	80.9
Other Southeast Asia	126,208	8.3	89.2
Other South and Central Asia	163,889	10.8	100.0
All Asia	1,520,216	100.0	100.0

Source: United Nations (2001).

have some potential for population growth inherent in the age structures of their populations because of unusually large proportions of women in the reproductive age groups.

Contributions to Asia's future population growth

South and Central Asia will contribute 70 percent of Asia's population growth between 2000 and 2050, Southeast Asia will contribute 18 percent, and East Asia will contribute 12 percent. The contribution of East Asia minus China (Japan, North and South Korea, and Mongolia) is –0.2 percent, indicating that the total population in these countries is projected to decline slightly during the 50-year period.

Six countries—India, Pakistan, China, Bangladesh, Indonesia, and the Philippines—are projected to contribute 81 percent of Asia's population growth between 2000 and 2050 (Table 3). India alone will contribute 37 percent, and India and Pakistan together will contribute 50 percent. China will contribute another 12 percent, which stems entirely from population momentum. Bangladesh and Indonesia will contribute 8 and 7 percent, respectively, and the Philippines will contribute 4 percent.

India is projected to surpass China in total population between 2035 and 2040. By 2050, India's population will be 1.57 billion, and China's population will be 1.46 billion. In 2050, India will account for 31 percent of Asia's population, and China for 29 percent. Thus, together, these two countries will account for 60 percent of Asia's population.


GOLF

Fertility and Family Planning

Perhaps more than any other demographic indicator, fertility trends illustrate the similarity and the diversity of Asia's populations. Fertility has declined over the past 50 years in every major country of the region. Although the trend has been consistent, the rate of fertility decline has varied, so that fertility levels in Asia today are widely diverse.

Fertility is generally expressed as a total fertility rate (TFR), which indicates the average number of children that a woman would bear, at current age-specific fertility rates, throughout her reproductive years. Replacement-level fertility is defined as a TFR of 2.1 children per woman, which includes one-tenth of a child extra to make up for the mortality of children and of women who do not reach the end of their reproductive years.

In 2000–04, fertility in Asia's major countries ranges from a low of 1.3 children per woman in Japan to a high of 6.8 children per woman in Afghanistan according to the United Nations medium-variant projections (Appendix Table 2). Fertility levels are generally lowest in East Asia, are highest in South and Central Asia, and vary widely in Southeast Asia between the two extremes. Fertility is at replacement level or lower in all countries of East Asia except Mongolia. In China, the largest country of the subregion, the TFR is 1.8. In Southeast Asia, fertility ranges from 1.5 children per woman in Singapore to 4.8 in Laos (Lao People's Democratic Republic) and Cambodia. In South and Central Asia, fertility ranges from 2.0 in Kazakhstan to 6.8 in Afghanistan. The total fertility rate in India, the largest country of the subregion, is 3.0.

Fertility has declined across Asia, but the rate of decline has varied, so that fertility levels today are widely diverse (Bangkok, Thailand) © Martin Parr/ Magnum

Other sources may estimate fertility levels rather differently. The Population Reference Bureau (2000), for example, estimates total fertility in 2000 at 3.3 for India, 6.1 for Afghanistan, 5.6 for Laos, and 1.7 for Kazakhstan. Comparisons among countries and trends over time are similar, however.

According to the United Nations medium-variant projections, all East Asian countries will reach replacement-level fertility or lower by 2010. In South and Southeast Asia, Indonesia and Vietnam are projected to reach replacement-level fertility by 2010; India, Malaysia, Myanmar, and the Philippines by 2020; Bangladesh by 2030; and Nepal and Pakistan by 2040. Afghanistan is the only country not projected to reach replacement-level fertility by 2050. Once these countries reach replacement level, the projections assume in most cases that fertility will stabilize at 2.1.

Although most countries in Asia are projected to reach replacement-level fertility over the next 20 years, their populations will continue to grow substantially for several decades. For example, China's fertility has been at replacement

level or below since the early 1990s, but the Chinese population is projected to grow from 1.27 billion in 2000 to 1.46 billion in 2050—an increase of 15 percent over the 50-year period. India is projected to reach replacement-level fertility by 2020, but its population is projected to grow by 22 percent (from 1.29 to 1.57 billion) over the 30-year period between 2020 and 2050. As of 2050, national populations will still be growing in every country of Asia except China, Japan, South Korea, Singapore, and Sri Lanka.

Populations continue to grow after fertility reaches replacement level because of a temporary imbalance in age structure. When fertility declines from high to low levels, populations are characterized—about 15 to 20 years later—by an unusually large proportion of men and women in their reproductive years. The age structure of South Korea's population in 1995 illustrates this pattern (Figure 1). Large numbers of reproductive-age adults lead to large numbers of births, even when fertility rates are low. For this reason, the population continues to grow, a phenomenon that demographers call "population momentum." At the same time, the proportion of elderly in the population is not as large as it will ultimately become as a result of lower mortality and fertility. For this reason, the annual number of deaths is temporarily depressed, which also contributes to population momentum. Every country in Asia has recently experienced population momentum, is experiencing it now, or is projected to experience it in the next 20 to 30 years. Japan, for example, reached replacement-level fertility in 1957, but because of population momentum, the Japanese population is projected to keep growing until 2006.

And what happens to fertility once it reaches replacement level? For most countries in Asia where fertility is now below replacement, the United Nations projects that the rate of childbearing will increase. Between 2000 and 2050,

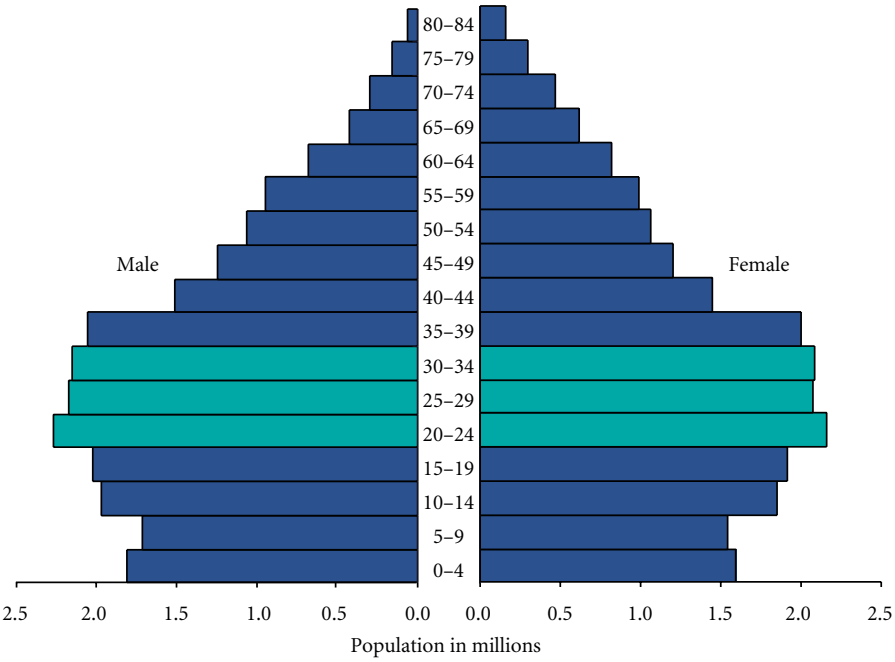


Figure 1. Age and sex structure of South Korea's population in 1995, showing a temporary "population bulge" of young adults at the prime reproductive ages of 20 to 34

Source: United Nations (2001).

Table 1. Fertility assumptions for Asia's 10 most populous countries: Medium-variant United Nations projections, 2000–44

Country	Time period				
	2000–04	2010–14	2020–24	2030–34	2040–44
China	1.80	1.90	1.90	1.90	1.90
India	2.97	2.27	2.10	2.10	2.10
Indonesia	2.27	2.10	2.10	2.10	2.10
Pakistan	5.08	4.16	3.25	2.33	2.10
Bangladesh	3.56	2.90	2.32	2.10	2.10
Japan	1.33	1.43	1.53	1.63	1.73
Vietnam	2.25	2.10	2.10	2.10	2.10
Philippines	3.24	2.33	2.10	2.10	2.10
Iran	2.76	2.10	2.10	2.10	2.10
Thailand	2.00	1.85	1.88	1.90	1.90

Source: United Nations (2001).
Note: Countries are ordered from highest to lowest population size in 2000.

projections are that fertility will increase from 1.3 to 1.7 children per woman in Japan, from 1.8 to 1.9 in China (Table 1), and from 1.5 to 2.1 in South Korea (not shown). Only in Thailand, where fertility in 2000 was 2.0, does the United Nations project a further decrease—to 1.9 in 2050.

The United Nations projections may err on the high side for many countries. Japan, Singapore, South Korea, and China all reached 2.1 children per woman before 1995, and in each of these countries, fertility continued to decline to levels below 2.1 by 2000. So far, there is no indication that fertility will increase in these or other low-fertility countries in the future. The experience of Japan is illustrative. Japan reached a fertility level of 2.1 children per woman in 1957. Fertility remained close to replacement level until 1973 and then gradually declined further, dropping to 1.3 in 2000. In the 43 years since fertility reached replacement level, there has been no sign of a significant increase. There may be an upturn during the next 50 years, but it may not be as large as the United Nations has projected (see box on Japan).

Likewise, in countries where fertility is currently above the replacement level, there is no evidence to suggest that fertility will stop declining at 2.1 children per woman. In India, for example, some states have already achieved or are very close to achieving fertility rates of 2.1 despite low levels of economic and social development. As development proceeds in these states, it seems likely that fertility will decline even further (see box on India).

China is a special case. Fertility has been brought down to a considerable extent by the strict enforcement of government policies rather than by individual

preferences. Now that fertility is well below replacement level and the government is facing the prospect of extremely rapid population aging, the one-child family policy may be abandoned, and fertility may increase to some extent. In the case of China, therefore, the modest fertility increases that the United Nations has projected seem reasonable (see box on China).

Family planning

National levels of contraceptive use tend to parallel levels of fertility. Table 2 shows contraceptive use rates in nine of Asia's 10 most populous countries. Japan is not included because the available data on contraceptive use in Japan are not comparable with data from other countries. The overall rate of contraceptive use, as measured by the proportion of currently married women age 15 to 49 who are currently using any method, ranges from 84 percent in China to 18 percent in Pakistan. Specific contraceptive methods are grouped in the table under sterilization (male or female), any modern temporary method (mainly pill, condom, intrauterine device—IUD, or injectable), and any traditional method (mainly rhythm or withdrawal).

There is considerable variation among countries in their emphasis on specific contraceptive methods. The proportion of all contraceptive users who are sterilized ranges from 75 percent in India to only 6 percent in Indonesia (Figure 2).

Table 2. Current contraceptive use in nine of Asia's most populous countries: Percentage of currently married women age 15 to 49 using a method

Country and year	Any method	Sterilization	Any modern temporary method	Any traditional method
China 1997	84	41	42	1
India 1998/99	48	36	7	5
Indonesia 1997	57	3	51	3
Pakistan 1994/95	18	5	8	5
Bangladesh 1999/2000	54	7	36	10
Vietnam 1994	65	4	39	21
Philippines 1998	47	10	18	18
Iran 1992[a]	65	9	37	20
Thailand 1993[a]	74	23	50	2

Sources: United Nations (2001); Jiang (1999); IIPS and ORC Macro (2000); Central Bureau of Statistics [Indonesia] et al. (1998); National Statistics Office [Philippines] and Macro International Inc. (1999); NIPORT, Mitra and Associates, and ORC Macro (2001).
Notes: Japan is omitted because data are not comparable. Countries are ordered from highest to lowest population size in 2000. The total contraceptive use rate is defined as the percentage of currently married women age 15 to 49 who are currently using any method of contraception, whether modern or traditional. Sterilization includes both female and male sterilization (i.e., a woman is counted as sterilized if her husband is sterilized). Modern temporary methods include condom, oral contraceptive pill, IUD, and injectables. Traditional methods include withdrawal and the rhythm method.
[a] Reproductive age is defined as 15 to 44.

IN JAPAN, LOW FERTILITY WILL SOON HALT POPULATION GROWTH

Japan has been in the vanguard of fertility decline in Asia. The Japanese experience is of particular interest because a number of other East Asian countries, such as South Korea, appear to be following in Japan's demographic footsteps. Unlike other Asian countries, however, Japan has reduced its fertility without a national family planning program. It is convenient to classify Japan's fertility decline since 1950 into three periods: (1) 1950–57, during which fertility declined by half to the replacement level of 2.1 children per woman; (2) 1957–73, during which fertility did not change much; and (3) 1973–present, a period of renewed fertility decline, during which fertility fell to 1.3 children per woman in 2000.

A fundamental force explaining fertility decline in Japan is the changing status of women. The proportion of Japanese women who go on to college or university after completing secondary school rose from 5 to 49 percent between 1955 and 2000 and is now about the same as for men. In addition, 99 percent of Japanese women now work before they get married. These single working women typically live at home with their parents, have plenty of spending money because they pay little or no rent, and feel little pressure to rush into marriage. Currently, the average age at marriage in Japan is about 28 for women and 31 for men. The rising average age at marriage accounts for about half of Japan's fertility decline since 1975.

When Japanese women finally do marry, they are increasingly likely to continue working—in most cases outside the home. Currently, about one-quarter of reproductive-age married women work full-time, and another quarter work part-time. Women's work duties tend to conflict with child-drearing responsibilities, and such conflicts may reduce fertility. Another factor acting to reduce fertility is falling expectations of old-age support from children. The proportion of currently married women age 15 to 49 who have at least one child and who expect to be supported by their children in old age fell from 65 percent in 1951 to 11 percent in 2000.

As the increase in age at marriage levels off, some women may "catch up" on childbearing, resulting in a modest increase in fertility. On the other hand, Japanese women report that their ideal family size is about 2.5 children—more than one child higher than their actual current fertility. If women's ideal family size were to drop to two children, as seems likely, then their actual fertility could fall even lower. The United Nations projects that Japan's fertility will increase from 1.3 in 2000–04 to 1.8 in 2050. As yet, however, there is little sign of a fertility upturn.

Japan's population is projected to start declining in 2006, when the effect of population momentum will have dissipated. The rate of population decline could be quite rapid if fertility remains as low as 1.3 children per woman. At this level of fertility, each woman replaces herself with about two-thirds of a girl child on average (1.3/2 = 0.65), implying that, once the age structure of the population stabilizes, the total population will decline by about one-third in a single generation, or about 30 years.

About half of Japanese women of childbearing age work outside the home (Tokyo, Japan) © Chris Steele-Perkins/ Corbis

IN INDIA, FERTILITY DECLINES, BUT AT VARYING RATES

Fertility has declined to low levels in several of India's southern states (Tamil Nadu, India) © David H. Wells/Corbis

Fertility in India declined from 5.2 to 3.2 children per woman between 1971 and 1998 and is projected to reach replacement level sometime between 2015 and 2020. This overall trend masks considerable diversity among states. Fertility is falling in all the states of India but tends to be lowest in the south.

According to India's Sample Registration System, TFRs in 1998 ranged from 1.8 children per woman in the southern state of Kerala (population 32 million in 2001) to 4.6 in the northern state of Uttar Pradesh (population 166 million).

Fertility is already at or near replacement level in several southern states, despite a rather low level of economic and social development. In Tamil Nadu, for example, fertility was 2.0 children per woman in 1999, even though only 52 percent of ever-married women age 15 to 49 were literate and only 34 percent of houses had a toilet or latrine (IIPS and ORC Macro 2000).

If replacement-level fertility can be achieved at this level of development, what will be the future course of fertility as living standards rise, child survival improves, and women become more educated and more likely to work outside the home? India's economy has grown by about 6 percent a year over the past decade, suggesting that these changes are occurring. The experience of countries in East Asia and the West suggests that if India achieves replacement-level fertility during 2015–20, as projected, its fertility will probably keep falling to below-replacement levels as development continues. If so, the United Nations medium-variant population projections for India, which assume that fertility will level off at 2.1 children per woman after 2020, may prove to be somewhat on the high side.

IN CHINA, FERTILITY TRENDS MAY LEAD TO A CHANGE OF POLICY

In the 1970s, the Chinese government identified population growth as a major obstacle to economic development and undertook its "later-longer-fewer" campaign (later marriage, longer birth intervals, fewer children). This was followed by the more coercive one-child family policy, which was promulgated in 1979. The one-child policy not only established various administrative rewards for couples who willingly had only one child, but also implemented financial penalties and mandatory abortions for couples having unauthorized births.

Enforcement of the one-child policy has been more effective in urban areas than in the countryside, where fertility tends to be higher and there are fewer means of administrative control. Nevertheless—in terms of reducing fertility—the government's policy has been spectacularly successful. Fertility fell from 6.1 children per woman in 1965–69 to 1.9 in 1993 and further down to 1.8 in 1995–99. As a result, projected population growth in China between 2000 and 2050 (from 1.28 billion to 1.46 billion, a 15-percent increase) will result entirely from population momentum.

Although the one-child policy continues, enforcement is gradually weakening, and the policy is likely to be abandoned over the next decade. At the time it was established, the one-child policy was intended to last one generation, or approximately 30 years, which will be up in 2009. Today there is concern in government circles that the one-child policy, if continued for another generation, will cause a future crisis in care of the elderly as a consequence of extreme population aging.

The national government in China needs the cooperation of localities (which now elect their own local governments) to achieve its ambitious development goals, and this is contributing to a more client-oriented approach to family planning. In addition, with rapid economic growth and social development, couples are reducing their desired family size to levels that are close to the goals of the government program (Merli, Qian, and Smith 2002).

The United Nations projects that China's fertility will increase from 1.8 to 1.9 between 2000–04 and 2040–44. This seems reasonable in view of the various economic, social, and political changes that are occurring.

Fertility has fallen so quickly in China that today's young adults will have few grown children to look after them in their old age (Fujian, China)
© Dean Conger/Corbis

Conversely, the proportion of all users who use a modern temporary method ranges from 89 percent in Indonesia to 15 percent in India. The proportion of all contraceptive users who use a traditional method ranges from 39 percent in the Philippines to less than 1 percent in China.

India's family planning program places by far the greatest emphasis on sterilization—female sterilization accounts for 71 percent, and male sterilization accounts for 4 percent of all contraceptive use. The Indian government is currently expanding the availability of modern temporary methods, however. This shift toward temporary family planning methods will allow women to use contraception to postpone and space births and will help maintain the downward trend in fertility (see box).

The emphasis among modern temporary methods also varies widely by country (Figure 3). In China, for example, 87 percent of all currently married women who use any modern temporary method use an IUD. In Indonesia, there is a greater emphasis on injectable contraceptives (40 percent of all women who use a modern temporary method) and on implants (12 percent). In Japan, condoms account for about three-quarters of all contraceptive use. The proportion using condoms is far greater in Japan than in any other country, partly because the contraceptive pill was illegal in Japan until very recently.

Such variations in emphasis on specific contraceptive methods sometimes reflect national-level differences in the legal status of particular methods, as in Japan. More often, however, they reflect differences in what methods have been promoted most vigorously by national family planning programs, as in India.

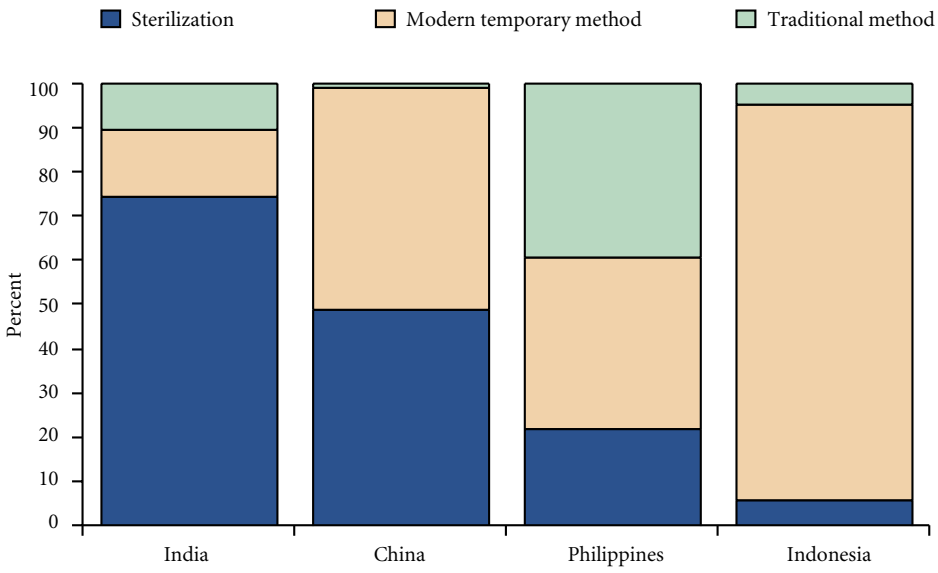
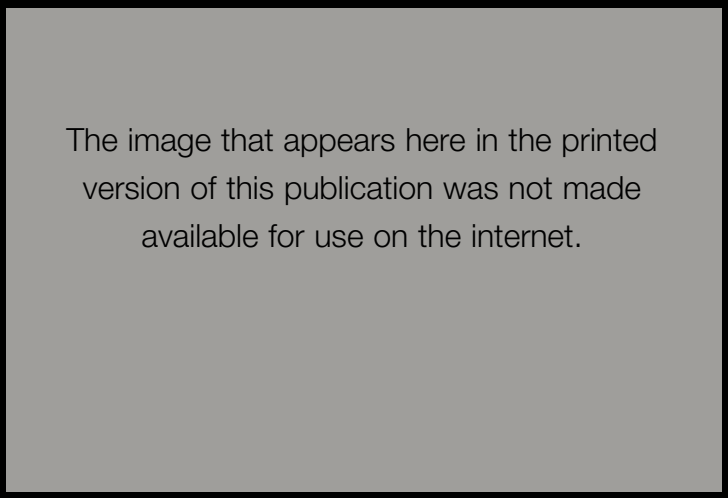


Figure 2. Proportions of all married women of reproductive age currently using any contraception who are sterilized, use a modern temporary method (such as pill, condom, or IUD), or use a traditional method (such as rhythm or withdrawal): India (1998–99), China (1997), Philippines (1998), and Indonesia (1997)

Sources: Jiang (1999); IIPS and ORC Macro (2000); National Statistics Office [Philippines] and Macro International Inc. (1999); and Central Bureau of Statistics [Indonesia] et al. (1998).

ACHIEVING FURTHER FERTILITY DECLINE IN INDIA WILL REQUIRE MORE THAN STERILIZATION



In India, it will be difficult to bring fertility down much further with the current heavy reliance on sterilization (Rajasthan, India) © David Cumming; Eye Ubiquitous/Corbis

For decades, the Indian family welfare program has been dominated by an emphasis on female sterilization. The widespread use of sterilization has enabled India to achieve considerable fertility reduction—from 6.0 children per woman in 1950 to 3.2 in 1998. Analysis of data from the 1992–93 National Family Health Survey (NFHS), however, suggests that it may be difficult to achieve further reductions in fertility by such a heavy reliance on sterilization alone.

Because sterilization is irreversible, women are unlikely to be sterilized until they are certain that they do not want any more children. And in a country such as India where infant and child mortality are high, women who already have children may wish to keep the option open to have more until they feel confident that the children they already have will survive. Indeed, NFHS results show that Indian women do not undergo sterilization until they already have relatively large families. Women who had been sterilized had 4.0 children on average, compared with 2.6 children for women using a modern temporary method and 3.1 children for all currently married women of reproductive age (Pathak, Feeney, and Luther 1998). In every age group, sterilized women had substantially more children than women who were using temporary methods.

NFHS results suggest that many women were using temporary contraceptive methods to stop childbearing: Nearly two-thirds (64 percent) of women who were using a temporary method said that they did not want any more children. In addition to these women, some of the women who use temporary methods to delay childbearing change their minds later and have no more children.

Clearly, efforts to reduce fertility below current levels will have to reach women before they have four children. NFHS results show a strong demand for temporary methods among women who are not using any contraception. This is further evidence that temporary methods can play an important role in achieving national population goals and helping women achieve their objectives for completed family size.

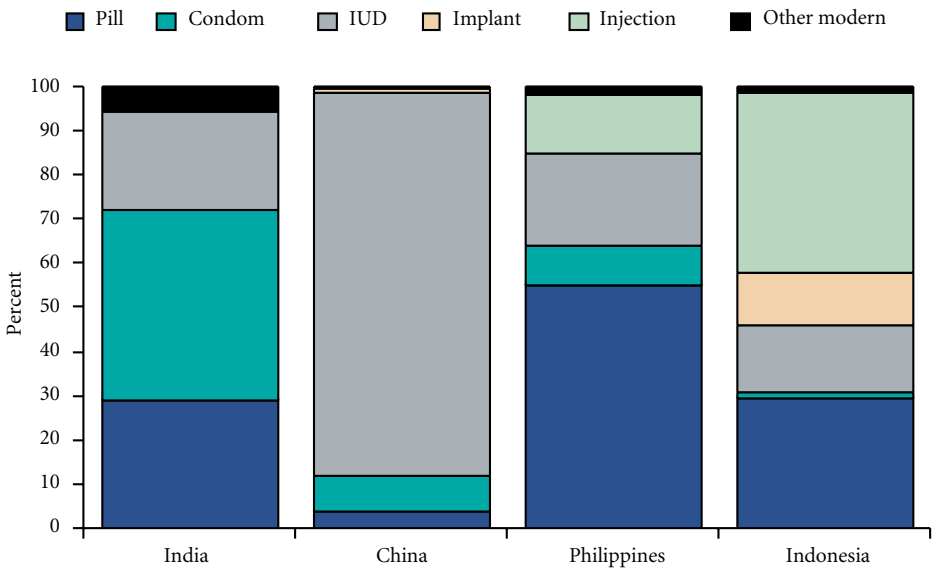


Figure 3. Proportions of all married women of reproductive age currently using a modern temporary contraceptive who use specific methods: India (1998–99), China (1997), Philippines (1998), and Indonesia (1997)

Sources: For India, IIPS and ORC Macro (2000); for China, Jiang (1999); for the Philippines, National Statistics Office [Philippines] and Macro International Inc. (1999); and for Indonesia, Central Bureau of Statistics [Indonesia] et al. (1998).

In some cases, the methods promoted by family planning programs today still reflect the preferences of foreign donor agencies during the early stages of program development.

Variations in emphasis on particular methods suggest that there is no unique combination of methods associated with fertility decline. Most countries have been moving toward offering a wide range of methods and letting couples decide which method to use. This "cafeteria approach" generally appears to be the most effective policy for lowering fertility.

In addition to offering a choice of contraceptive methods, family planning programs that have been particularly successful exhibit some common features. South Korea, Taiwan, Singapore, Thailand, and Indonesia offer a striking example. Starting in the 1960s, the governments of these countries became increasingly committed to population goals. Key political and religious groups were persuaded of the importance of slowing population growth, and governments adopted national development plans with specific growth-reduction targets. They initiated public campaigns to persuade couples of the benefits of small families and started education programs in communities and schools to inform their citizens about modern contraceptive methods. Family planning clinics and distribution systems, many of them heavily subsidized, were established to increase the availability of contraceptive supplies and services.

Beginning in the 1970s, some governments also implemented economic incentives and other policies to accelerate the transition to low fertility. In South Korea, for example, legislative action addressed gender bias in the hope that reducing couples' preference for sons would lead to lower birth rates (Kwon 2001). None

of these countries initiated coercive programs, however, such as China's one-child policy or India's ill-fated sterilization campaign of the mid-1970s.

The family planning programs initiated in the 1960s and 1970s in South Korea, Taiwan, Singapore, Thailand, and Indonesia were possibly the best run of any in the world. In a short time, they greatly expanded the supply of modern contraceptive services at relatively modest cost. Programs in Taiwan, South Korea, and Thailand have served as models for many other countries. Tsui (2001) attributes their success to four factors:

1. Despite the governments' primary objective of curbing rapid population growth, programs and policies in these countries emphasized both family planning and health objectives.
2. Neither religious leaders nor other politically powerful groups mounted strong opposition to the programs. Even in Indonesia, the largest Islamic nation in the world, religious leaders did not actively oppose President Soeharto's decision to promote family planning.
3. The governments maintained a strong and sustained effort, which included significant financial support. This was possible because all five countries enjoyed a considerable degree of political stability, allowing their governments to pursue long-term goals. Even in Thailand, which experienced repeated changes in government, the monarchy provided continuity and a stabilizing influence, and political transitions were often relatively peaceful and unaccompanied by wrenching policy changes.
4. The governments willingly and successfully worked with nongovernmental entities. Nongovernmental family planning organizations such as the Population and Community Development Association of Thailand, the Indonesian Planned Parenthood Foundation, and the Planned Parenthood Federation of Korea played a particularly important role.

Although external funding for family planning programs was important at the beginning, reliance on external financial resources declined as economic conditions improved, and family planning programs were increasingly financed by governments and users. The best available information suggests that annual per capita funding for family planning in the mid-1970s ranged from US$0.08 in Thailand to US$.0.32 in Singapore (Tsui 2001). By the early 1990s, annual per capita funding ranged from US$0.32 in Thailand and Singapore to US$0.75 in Taiwan. The bulk of this funding was provided by national governments.

In South Korea, Taiwan, Singapore, Thailand, and Indonesia, women reduced, or are reducing, their fertility to replacement level in a single generation. Singapore completed the transition to low fertility in only 22 years, South Korea in 24, Taiwan in 26, and Thailand in 28 years, and Indonesia is expected to complete the transition in 33 years. By contrast, the developed countries of Europe and North America completed a similar fertility transition much more slowly. Countries such as India and the Philippines are projected to take as long as 60 years.

The accelerated demographic transition in South Korea, Taiwan, Singapore, Indonesia, and Thailand was a product both of rapid socioeconomic change and of deliberate population policy. A national commitment to slower population growth, combined with support for voluntary family planning programs, contributed to a policy environment that proved to be remarkably successful. In all five countries, the resulting rapid fertility decline has had a significant impact on economic growth and standards of living.

In several Asian countries, fertility decline has boosted both family well-being and national economic growth (Chiangmai, Thailand) © Wisut Jaijagcome/East-West Center

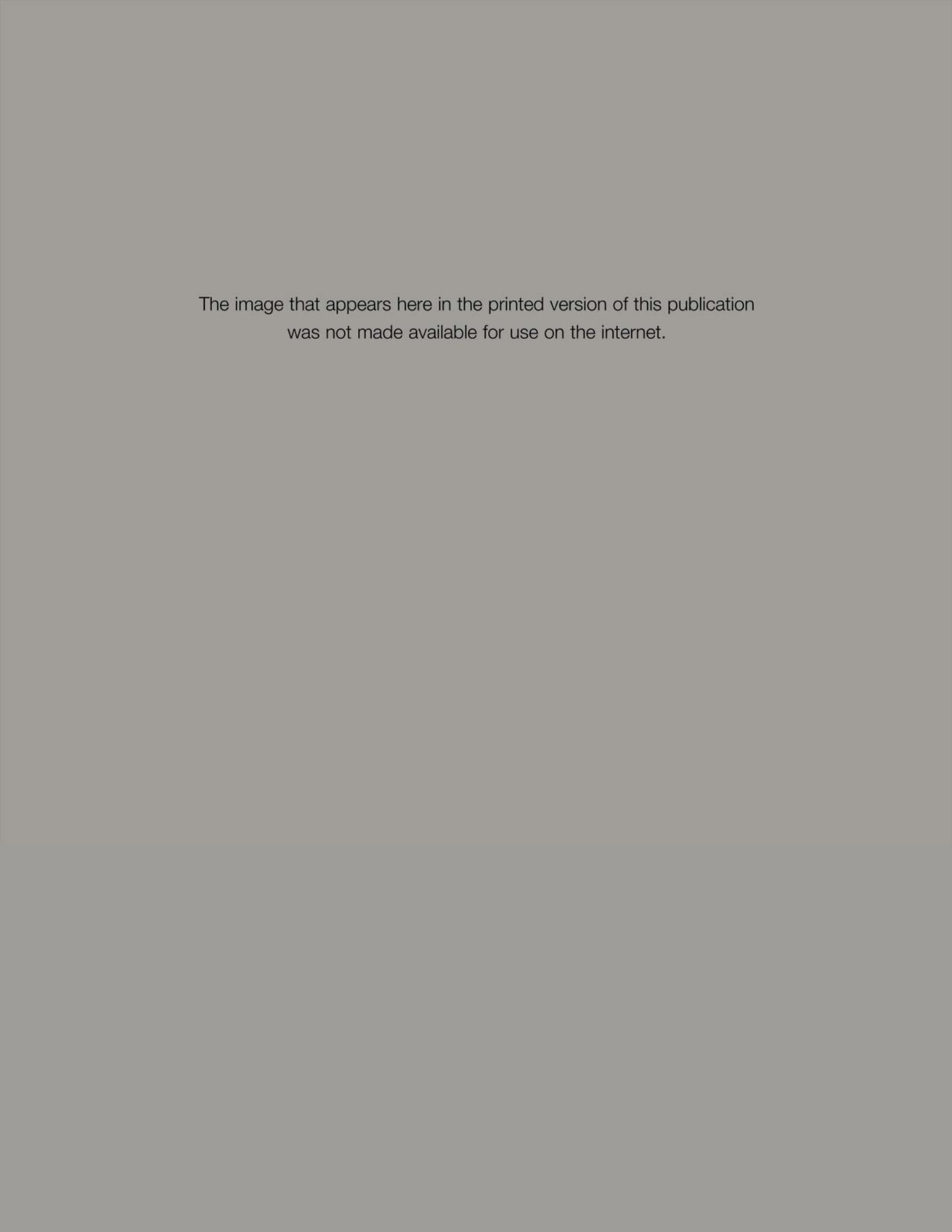
Fertility is falling everywhere in Asia, but the pace of change has been much slower in many other countries of the region. The effect of delayed fertility decline on ultimate population size is magnified by population momentum, which produces continued population growth for many years after replacement-level fertility is achieved. This effect can be seen in the United Nations high- and low-variant population projections, which are based primarily on differing assumptions concerning the timing, speed, and extent of fertility decline (Table 3). For Asia as a whole, the difference between the high- and low-variant projections for 2050 is 1.8 billion people.

How quickly will Asia's high-fertility countries reach replacement-level fertility? The answer has enormous implications for the ultimate size of Asia's population and the potential strain on the region's resource base. Because Asia is already so densely populated, projected increases in population—whether low-, medium-, or high-variant—combined with economic development and rising living standards, will place enormous strains on infrastructure, natural resources, and the environment.

Table 3. Population projections for Asia, three subregions, and seven high-fertility countries in 2050: United Nations low- and high-variant projections and difference between these projections

Region, subregion, or country	Population in 2050 (1,000s)		
	Low-variant projection	High-variant projection	Difference
Asia	4,167,524	5,935,278	1,767,754
East Asia	1,422,695	1,914,625	491,930
Southeast Asia	647,200	975,091	327,891
South and Central Asia	2,097,629	3,045,562	947,933
Afghanistan	63,565	81,059	17,494
Bangladesh	202,949	341,045	138,096
Cambodia	24,521	35,941	11,420
India	1,297,992	1,887,966	589,974
Laos	9,988	13,614	3,626
Pakistan	296,658	395,295	98,637
Philippines	102,664	157,923	55,259

Source: United Nations (2001).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Tradition and Change in Marriage and Family Life

Throughout Asia, marriage behavior and family life are changing. Young people are waiting later to marry, couples are having fewer children, and more married women are working outside the home (Leete 1994; Retherford, Ogawa, and Matsukura 2001; Tsuya and Bumpass forthcoming a). Within the region, such trends were observed first in Japan and more recently in South Korea, Taiwan, and Singapore. Similar patterns are starting to emerge in other Asian countries.

Trends such as later marriage, lower marital fertility, and greater participation of married women in the labor force are similar to changes that took place earlier in the industrialized societies of Europe and North America. Yet other aspects of family life in Asia are still quite different from the way family institutions have developed in the West. Fewer Asian couples live together outside marriage, and childbearing outside marriage is extremely rare. Marriage is generally viewed as a permanent arrangement, and divorce rates, although rising, are still quite low in most Asian societies.

Couples in Asia's wealthiest countries are waiting until their late 20s and 30s to marry, sparking concern that some may not marry at all (Singapore) © Jack Hollingsworth/ Corbis

Marriage traditions

Asia's three subregions all have distinct traditional family structures. In East Asia, including China, North and South Korea, Japan, Hong Kong, and Taiwan, traditional families are strongly male-dominated. A woman leaves her parents at marriage and often lives with her husband's parents if he is a first son. Women traditionally have little independence within the family, at least until they are past their childbearing years. With economic development and modernization, however, women in most East Asian countries now enjoy a great deal more autonomy than they did in the past. China stands out as having experienced a series of radically differing social and political systems during the 20th century that have greatly changed family life and the position of women in society.

The traditional family structures of Southeast Asia are more varied. Among the large lowland populations of Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, young couples typically establish their own independent households, or a man may move in with his wife's parents, at least for a while. At marriage, the husband's family often makes a gift to the family of the wife. Although most young couples establish a home of their own, a youngest daughter and her husband may stay with her parents to look after them in their old age and eventually inherit their property. Family patterns of ethnic Chinese populations in Singapore and other Southeast Asian countries offer a contrast, resembling the traditional family structures of East Asia.

In South Asian countries, such as Bangladesh, India, Nepal, and Pakistan, a strong male-dominated family system prevails. Families in Sri Lanka tend to be somewhat less patriarchal. As in East Asia, young women in most South Asian countries have little independence. Traditionally, when a woman marries, she leaves her parents and goes to live with her husband's family. In many parts of South Asia, the bride's parents pay a dowry to her husband's family, which may be substantial. The burden of dowry payments often puts considerable economic pressure on the parents of daughters and contributes in many families to a preference for sons.

Changes in marriage patterns

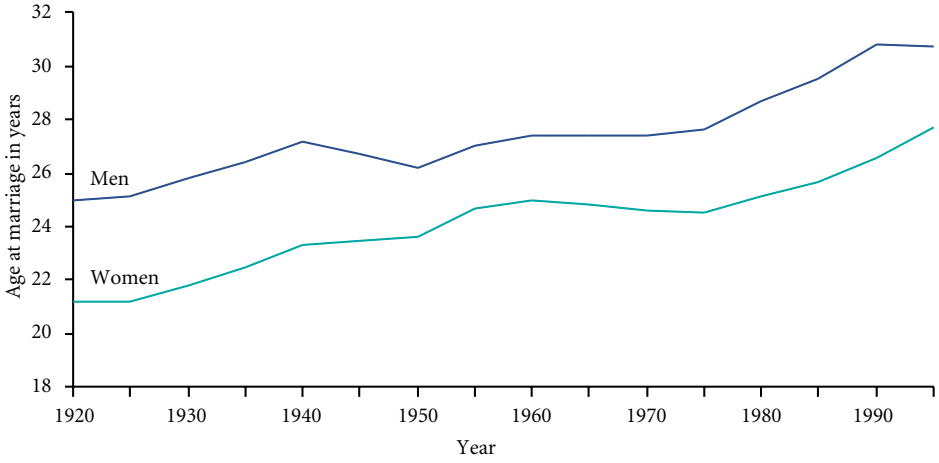
In every country of Asia, both men and women are marrying later than they did in the past. Where records are available, as in India and Japan, a consistent trend can be traced back nearly 100 years. Between 1975 and 1995, the average age at first marriage in Japan increased from 24 to 28 years for women and from 28 to 31 years for men, making Japan one of the latest-marrying populations in the world. The average age at first marriage is higher for men in South Korea than in the United States (at 30 compared with 28 years) and the same for women (at 26 years in both countries).

This trend toward late marriage tends to occur in two phases tied in with levels of economic development. At early stages of development, rural populations tend to expand until all suitable land is brought under cultivation. Once this happens, families that have many surviving children are faced with a dilemma: Either they must subdivide their landholdings into smaller and smaller parcels or they must leave their land to one sibling (often the eldest son) and leave the other children landless. Either option potentially lowers the standard of living of future generations. In the Philippines, one response to this dilemma has been to leave land to sons but to provide education—and thus enhanced employment opportunities—to daughters. The result has been high levels of educational attainment for young women.

Other responses to reduced landholdings include delayed marriage, nonmarriage (i.e., a higher proportion never marrying), reduced fertility within marriage, and migration to urban areas or overseas. In Asia's rural areas, age at marriage has been gradually increasing, and there has been some outmigration—to the Middle East, for example. Marriage patterns may not be affected to the same extent if landless siblings can readily find jobs in urban areas so that they, too, can afford to marry. In Japan, the average age at marriage for women actually went down slightly between 1960 and 1975 when the country was urbanizing at a very rapid rate and the economy was booming (Figure 1).

At later stages of economic development, longer schooling tends to delay marriage for both men and women. For young women, paid employment also provides a measure of financial independence that reduces the pressure to

Figure 1. Average age (in years) at first marriage for men and women in Japan: 1920–95



Source: National census data.

marry early. Education and employment tend to expand women's horizons and provide them with previously unavailable opportunities and lifestyles that compete with marriage.

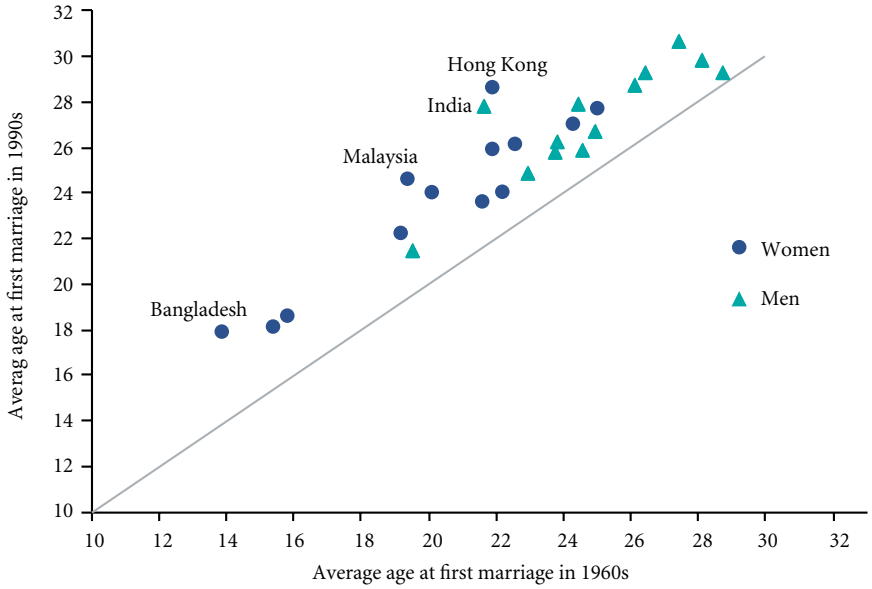
With further modernization, a major expansion of the service sector brings structural changes in the labor market, creating large numbers of jobs that are compatible with traditional female roles. The result is a massive shift of women into paid employment outside the home. Young unmarried women usually predominate during the initial stages of this shift, followed later by married women. These changes have already taken place in Western Europe and North America. They are occurring now in many Asian countries, especially in East and Southeast Asia, generally at a faster pace than occurred in the West.

The narrowing education gap between women and men also brings a gradual narrowing of the wage gap between the sexes. This may lead women who work before marriage to attach more value to their careers and less value to their roles as housewives and mothers. Even delayed marriage itself may cause further marriage delay because, as the average age at marriage rises, single men and women have less reason to be concerned that their marriage chances will be reduced if they wait even longer to marry.

A comparison of data from the 1960s and the 1990s reveals a broad pattern of increasing age at first marriage for both men and women, as shown in Figure 2 for 13 Asian countries. The average age at marriage is increasing in countries where it was already high in the 1960s (right side of figure) as well as in countries where it was low (on the left). The rise in age at marriage tends to be larger for women than for men. It is particularly striking for women in Bangladesh, Malaysia, and Hong Kong and for men in India.

By the 1990s, most women in Hong Kong, Japan, South Korea, Taiwan, and Singapore were marrying at age 26 or older. Most women in China, Pakistan, Sri Lanka, Indonesia, Malaysia, Myanmar, the Philippines, and Thailand were

Figure 2. Comparison of average age at first marriage in the 1960s and 1990s for women and men in 13 Asian countries



Source: National census data, various countries.

marrying at age 20 to 25. In Bangladesh, India, and Nepal, most were still marrying before age 20, but even in these countries the average age at marriage had risen substantially over what it was a few decades earlier.

The decision to marry and the choice of whom to marry are likely to be quite different for young adults with education and work experience than for teenagers who are still dependent on their families. Thus, an important aspect of the shift toward later marriage in many countries has been a sharp decline in arranged marriages. In Japan, the proportion of marriages that are arranged fell from 63 percent in 1955 to 7 percent in 1998.

The collapse of arranged marriages has not been fully balanced, however, by an emergence of social networks where single men and women can meet prospective marriage partners. In Singapore, where the government has been concerned about low marriage and fertility rates since the early 1980s, a Social Development Unit organizes dances, workshops, and holiday trips for single university graduates and runs a computerized matchmaking service.

These programs in Singapore reflect a concern that men and women in Asia may increasingly choose not to marry at all. In Japan, for example, it is already possible to predict that by 2010 at least 10 percent of women and about 20 percent of men age 50 will never have married. The proportions never marrying, although low, are rising in other Asian countries as well, particularly in the region's major cities. In 1990, for example, the proportion of women age 45 to 49 who had never married was 5 percent in Thailand as a whole, but 11 percent in Bangkok.

In Asia's most modern societies, young people may find marriage less important because premarital sex is becoming increasingly acceptable. In Japan, about

half of single women age 18 to 34 report that they are currently using contraception. Japan is quite different from late-marrying societies in Europe and North America, however, in that there is much less "living together" than in the West and almost no childbearing outside of marriage. In 1997, only 5 percent of single women age 25 to 29 and 8 percent of single women age 30 to 34 had ever cohabited with a sexual partner. As of 1999, only 2 percent of births occurred outside of marriage, compared with about one-third of births in the United States (Tsuya and Bumpass forthcoming a). Indeed, Japan has the lowest proportion of births outside of marriage of any industrial nation (Figure 3).

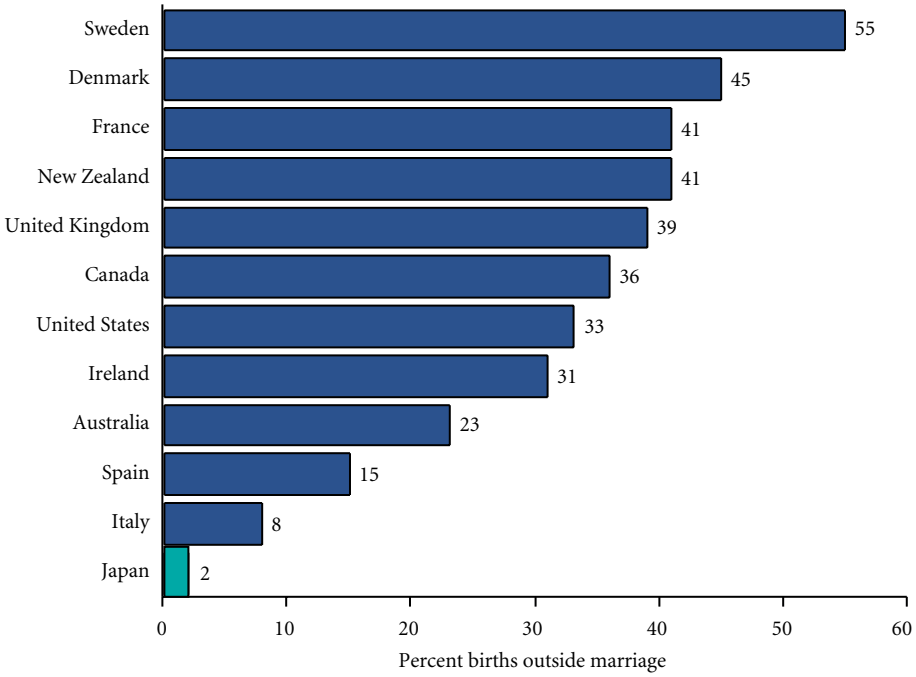
Rising divorce rates may also reduce the attractiveness of marriage. In the traditional societies of South Asia, divorce is still rare, but in East Asia, divorce rates—while lower than in the United States or most countries of Western Europe—are rising. Although comprehensive information on divorce is difficult to obtain, it is estimated that one in five marriages in Japan, South Korea, and China will end in divorce. In these societies, awareness of the risk of divorce may strengthen the motivation of unmarried women to obtain good educations and good jobs.

East Asia: Women balance marriage and work

Despite economic and social modernization, women's roles in East Asian societies continue to be defined primarily within the household. When women marry, their lives are expected to change drastically in terms of employment opportunities, housework, the obligation to bear and raise children, and eventually a duty to care for their parents and parents-in-law.

Most young women in East Asia work before marriage. Until very recently,

Figure 3. Percentage of births outside marriage in selected industrial countries: mid- to late-1990s



Sources: For Japan and the United States, Tsuya and Bumpass (forthcoming a); for other countries, Doyle (2002).

however, most of these women dropped out of the labor market when they had their first child and remained out of the labor force during their prime childbearing and childrearing years. Recently, more Asian women have continued to hold down full- or part-time jobs while looking after a household and raising children. In 1994, 57 percent of married women in Japan and 27 percent of married women in South Korea worked full- or part-time outside the home, compared with 66 percent of married women in the United States.

Although expanded opportunities to pursue a career may be viewed as a favorable development, balancing work and family obligations may be an even greater strain for women in East Asia than in Europe or the United States. This is because housework patterns are quite different in East Asia than in the West. Married men in the United States spend more time on such household chores as cleaning, cooking, doing laundry, and grocery shopping than married men in Japan or South Korea. Asian wives who work full-time outside the home reduce their housework hours somewhat, but elderly parents tend to fill in the missing hours of housework, rather than husbands (Tsuya and Bumpass forthcoming b). In 1994, married women in Japan who worked 35 or more hours per week outside the home spent another 30 hours on housework, compared with three hours contributed by their husbands. In 1987–88, the equivalent figures in the United States were 26 hours of housework for wives working full-time and nine hours for their husbands.

Household obligations may come as a particular shock to young married women in East Asia because very few live on their own before marriage. Most live with their parents well into adulthood (87 percent of single Japanese women age 20 to 27 in 1994) and contribute little to housework or to household expenses.

One important aspect of the marriage burden for women in Japan and South Korea is the system of highly competitive school entrance examinations. Gaining entrance to a good university or secondary school depends on performance in an entry examination of a do-or-die nature, and the competitive admission process is reaching down to primary school and even kindergarten. In families where fathers rarely come home in time to see their children before bedtime, mothers must spend hours every week helping their children with schoolwork.

This situation has led to an explosion of expensive private cram schools (called *juku* in Japan and *kwa-woe* in South Korea) and private tutoring, which take place after normal school hours, on weekends, and during vacations. In 1991, 48 percent of Japanese sixth-graders and 58 percent of ninth-graders attended *juku*. Among pupils in government high schools in Japan, spending on private education now exceeds normal school expenses. Many married women go back to work primarily to pay for cram schools and other private education expenses.

Not surprisingly, a study comparing views on marriage among young adults in Japan and the United States (Mason and Tsuya forthcoming) found that single Japanese women hold more negative views on marriage than do single

Japanese men or single American women (see box). Married women in Japan and South Korea are also much less likely than married women in the United States to have a positive attitude about their marriages. These negative attitudes are probably an important reason why women in Japan are postponing marriage or even choosing not to marry at all.

Policy issues. In any society, traditional roles within marriage are likely to change more slowly than other aspects of women's lives such as schooling or employment opportunities. As long as women who are educated and have worked outside the home are expected to shoulder all the traditional housewifely duties when they become wives, it should come as no surprise that many are reluctant to marry.

Women's changing views and behavior have profound implications for government policy in areas such as health, family planning, labor, and support systems for the elderly. For one thing, postponement of marriage has been an important factor bringing birth rates to unprecedented low levels in countries such as Japan, South Korea, Taiwan, and Singapore. These low birth rates raise serious concerns about population aging and the size of the future workforce.

Policymakers in Asian countries faced with low marriage and birth rates need to make it less burdensome for women to marry, raise a family, and continue their careers. For instance, employers can be encouraged to provide part-time positions with employee benefits, and governments and employers can initiate or expand high-quality childcare programs for working mothers. Policymakers also need to help families provide financial support and care for the elderly. The Japanese government has initiated a number of policies in these areas, but their effects may not be consistent (see box).

Southeast Asia: Traditional meets modern

Traditional marriage in Southeast Asia often occurs in phases, with a young couple living with the bride's parents for a period and then establishing a home of their own. The 1994 Young Adult Fertility and Sexuality Study (YAFS-II) shows how these traditions are evolving in the Philippines. YAFS-II found that young couples tend to pass through a continuum of increasing commitment, starting with dating and usually leading to some form of traditional or formally sanctioned marriage.

Among women who described themselves as married, 73 percent were married in a church or civil ceremony. More than half of these women mentioned that they had passed through other stages in their relationship with their husbands before formal marriage. The other 27 percent of women who described themselves as married reported that they were currently living with a partner (in Tagalog, *kasalukuyang may kinakasama*). Although not sanctioned by a formal ceremony, "living with a partner" usually describes a traditional Filipino

EAST ASIANS EXPRESS NEGATIVE ATTITUDES TOWARD MARRIAGE

Percentages of husbands and wives in Japan, South Korea, and the United States with a positive attitude about their marriages

	Husbands	Wives
Japan	44	43
South Korea	69	58
U.S.	86	86

Is the increasing age at marriage observed everywhere in Asia strictly a function of rising educational attainment and women's participation in the workforce? Or, in some countries at least, could negative attitudes or ambivalence about marriage also play a role? Collaborative studies at the East-West Center (Mason and Tsuya forthcoming) have found more negative and ambivalent attitudes toward marriage among young single people in Japan than in the United States. In Japan, 20 percent of never-married women and men age 20 to 27 said that they were uncertain whether they ever wanted to marry. Among never-married young Americans who were not living with a partner, 5 percent said they never wanted to marry, and another 5 percent were undecided.

Surveys also asked married respondents about the quality of their marriages (Bumpass and Choe 1996). Both husbands and wives are more likely to have a positive attitude about their marriages in the United States than in Japan or South Korea (see table), possibly because Americans who become unhappy with their marriages are more likely to divorce. In Japan and the United States, men and women are equally satisfied (or dissatisfied) with their marriages, but South Korean women tend to be much less satisfied than men. Overall, marital satisfaction is lowest in Japan, which may help explain why young people in Japan express such a high degree of uncertainty about marriage.

JAPANESE POLICYMAKERS STRUGGLE TO REVERSE MARRIAGE TRENDS

The Japanese government has been increasingly concerned about the trends toward late marriage and less marriage, especially because these trends are a major cause contributing to Japan's very low fertility. But the government's actions have been inconsistent. On the one hand, policymakers have tried to reduce strains on families by expanding day-care facilities, establishing parental leave with job-return rights after a birth, and reducing working hours in large companies. On the other hand, they have sought to reduce strains on the social security system—caused by rapid population aging—by trying to shift some of the costs of caring for the elderly back to families. They have also done little to mitigate the "examination hell" that childrearing currently entails. On balance, the government's actions so far appear to have resulted in little alleviation of the strains on mothers (especially working mothers) that contribute to the rising trend in the age at marriage and proportions never marrying.

marriage form in which commitment is public and life-long, rather than delimited or conceived as a trial arrangement.

Elopement (*tanan*) is another widely recognized marriage institution in the Philippines, most common among low-income families but recognized and practiced across all social classes. A couple typically elopes because their parents are opposed to their marriage. They disappear for a short time, perhaps a few days, and then return to seek their parents' approval. Under the threat of public embarrassment, the parents are likely to accept the situation. After a couple elopes, they may live together for a period of time or indefinitely. In some cases the elopement is followed immediately by formal marriage in a church or civil ceremony.

Survey questions on dating and sex show a pattern of sexual activity beginning at some point on this continuum of commitment leading to marriage. Most of the sexual activity reported by young men and virtually all of the activity reported by young women occur within such a committed relationship. "Casual" sex in the Philippines is rare among women, and far from universal among men. Ethnographic studies have shown similar patterns in Indonesia and Thailand.

Policy issues. When marriage occurs more as a process than as a specific event, "marital status" becomes a rather poor basis for deciding whether to provide or withhold family planning and reproductive health services. Today, governments in many Asian countries are increasingly questioning policies that restrict services to clients who are married. The Philippine government's current family planning strategy, for example, promises reproductive health information and services for all, regardless of marital status.

By reducing the likelihood of accidental pregnancy, broadening access to reproductive health services will allow young people to move through the process toward formal marriage more thoughtfully and with greater volition. The resulting increase in personal control will be especially important for young women.

The risk of HIV/AIDS and other sexually transmitted infections (STIs) raises another policy concern. By making condoms and counseling on disease risk available without restriction, government programs will provide life-saving benefits to young people who are sexually active and to their current and future partners.

South Asia: Persistence of traditional marriage patterns

In South Asia, even today, nearly every woman marries. Surveys conducted in the 1990s found that 99 percent of women marry in India and Bangladesh, and 98 percent marry in Pakistan (IIPS and ORC Macro 2000; Islam, Mamun, and Bairagi 1996; Ahmed and Ali 1992). Men tend to marry at somewhat older ages than women, but marriage is also virtually universal for men.

Although the average age at marriage is rising, many women in South Asia still marry while in their teens. In India, the average age at marriage for women rose from 16 years in 1961 to 19 years in 1991. In Bangladesh, the rise was from 14 to 18 years over the same 30-year period. In Nepal, the average age at marriage rose from 15 to 18 years, and in Pakistan, it rose from 18 to 22 years.

Most women in South Asia have their first child shortly after marriage. In India, among women age 25 to 49, the median age at first birth is 19 years (IIPS and ORC Macro 2000). This means that half of all women have their first child at age 19 or earlier. In rural Nepal, 41 percent of women have a child by age 20, and 17 percent have a child by age 18 (Choe, Thapa, and Achmad 2001).

Early childbirth is a serious health concern. In Nepal, infant mortality is 50 percent higher for children whose mothers are in their teens than for children of mothers in their 20s. In India, it is 60 percent higher.

Research on family decision-making in South Asia's strongly patriarchal societies has also revealed patterns that are seriously detrimental to women's and children's health. One study in two communities of rural Bangladesh found that women were extremely restricted in terms of decision-making on health issues and associated physical mobility (Balk 1997). Three-fourths of married women had little or no say in deciding whether to see a doctor when they became ill or whether to buy medicine for a sick child. Nearly two-thirds could take a sick child to a hospital outside their village "only in an emergency" or "almost never."

Women in these communities who were educated had greater decision-making authority within their families than uneducated women but less freedom to move outside the household. Wealthy women had both less authority and less freedom than poor women. Clearly, in a patriarchal society, wealthy households can afford to keep women in seclusion, while poverty forces women into contact with the outside world. Thus an individual woman's education and economic status may not necessarily improve her position in a male-dominated society—such factors may even diminish a woman's position if social expectations remain unchanged.

Patterns of household decision-making that are detrimental to women's health and well-being are not confined to rural Bangladesh. Only 28 percent of married women in India report that they decide on their own whether to seek healthcare for themselves (IIPS and ORC Macro 2000). Another 23 percent participate in such decisions, but nearly half have no say at all in whether they should seek healthcare. Even among women with high school education or above, 39 percent have no say in decisions concerning their own healthcare.

A comparative study of women's roles in family economic decision-making further highlights restrictions on women's independence and authority in the patriarchal families of South Asia. Among five Asian countries, women in Pakistan report the lowest levels of economic power, with Indian women a close second. Women in Thailand and the Philippines report the highest levels, and

Malaysian women are in an intermediate position (Mason 1996). Women who are educated, who own land, or who participate in paid work outside the family tend to have more authority within the home, but community and national-level differences—reflecting traditional attitudes and expectations—are also extremely important.

Policy issues. Several governments in South Asia have raised the minimum legal marriage age for women, but experience suggests that it is difficult for lawmakers to influence age at marriage and childbearing directly. In Nepal, the legal age at marriage for women is 16, but one in four rural women marries below this age. What types of policies and programs might be effective? Survey results from South Asia show women's education is the only factor consistently associated with an increase in the age of marriage and childbearing.

Although the effects of primary education are small, early marriage and childbearing drop steeply among women with junior high or higher education. Clearly, providing all women with education at this level is a long-term goal for most South Asian governments, but one benefit of such a strategy would be to reduce the number of women marrying and giving birth while still in their teens.

Information programs that emphasize the health advantages of delayed marriage and childbirth could also be beneficial. The special challenge is to reach young women with low levels of education and little access to mass media. Community-level programs might usefully target the parents, husbands, and parents-in-law of such young women as well as the women themselves.

School curricula might also place more emphasis on reproductive-health topics, including the benefits of postponing marriage and childbearing. Reproductive-health education needs to be introduced in the last years of primary school because—for now—few women go on to higher education, particularly in rural areas.

Finally, service-delivery programs could place greater emphasis on the needs of young married women. In India and Nepal, where family planning services emphasize sterilization, programs that offer temporary contraceptive methods could help young women delay and space births. For women who still go on to give birth in their teens, targeted maternal and child health programs could help address the special risks to mothers and their children.

Research showing that wealth and education may not necessarily improve the position of women within the family also has practical policy implications. The importance of community attitudes suggests that policies targeting village-level institutions and influential community members might be an effective avenue for improving the status of women in patriarchal societies. Recent legislation in India, for example, requires that one-third of the positions on local councils (*panchayat*) be filled by women. Programs aimed only at individual women—such as providing schooling or jobs—are likely to fall short of their goals in the absence of efforts to change broader institutions and attitudes.

The Changing Status of Women in Asian Societies

Economic, social, and political developments in Asia have brought with them profound changes in the status of women. In general, women's conditions have improved with economic development and social and political change that favors equality and individual rights. At the same time, cultural traditions, especially those related to family life, continue to have a strong influence on the status of women in the region.

Until recently in most Asian countries, few women attended secondary school or university, and few worked outside the home. Over the past 50 years, larger and larger proportions of women have completed primary and secondary school. The proportion of women attending university, although much smaller, is also growing. More recently, women have started taking up paid employment in greater numbers, particularly in the manufacturing, clerical, and service sectors. Over the past 50 years, women's life expectancy has improved across the region, overtaking men's life expectancy in nearly all countries. Yet during early childhood, girls are still more likely to die than boys in some Asian countries, while in other countries, unusual birth rates for boys and girls in recent years point to the prevalence of sex-selective abortion.

Education levels improving

Primary school education is nearly universal in many countries of East and Southeast Asia—both for boys and for girls. Women's enrollment in secondary school has increased dramatically since the 1960s throughout the region, and, in many countries, the traditional gender gap in secondary school enrollment is gradually disappearing.

Rates of change have varied, but education and employment opportunities have improved for women and girls across the region (Kuala Lumpur, Malaysia) © Stuart Franklin/Magnum

In Asia as a whole, 14 percent of girls age 15 to 19 were enrolled in school in 1950; by 1990, this proportion had risen to 26 percent (Xenos, Kabamalan, and Westley 1999). East Asia had the highest levels of school enrollment for this age group and the greatest increase over the 40-year period—from 36 percent in 1950 to 74 percent in 1990. In Southeast Asia, the enrollment rate for girls age 15 to 19 increased from 12 percent in 1950 to 34 percent in 1990. In South Asia, enrollment rates have been much lower, but the trend is similar—from 8 percent in 1950 to 16 percent in 1990.

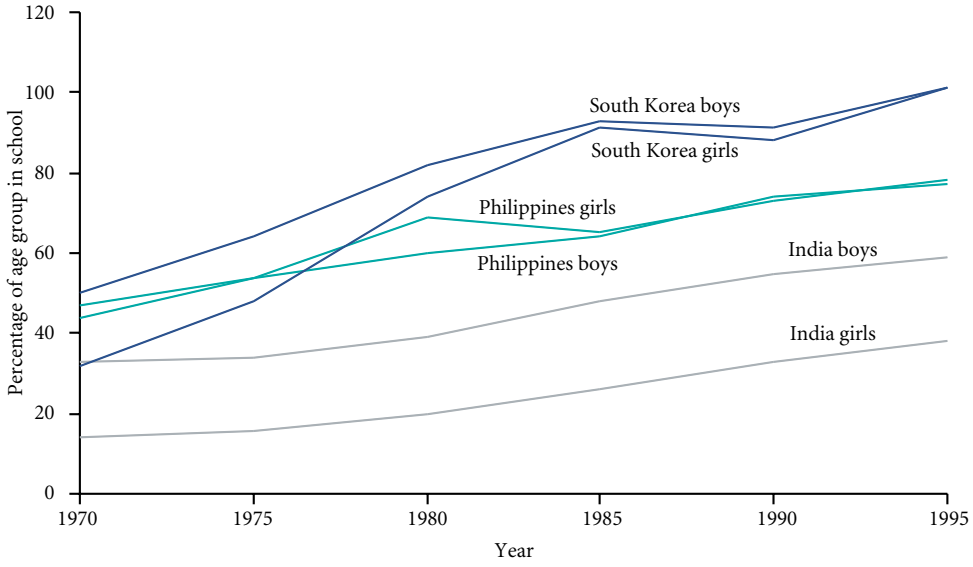
Table 1 shows trends in female secondary and tertiary school enrollment from 1975 to 1995 for 20 Asian countries. By the mid-1990s, more than 60 percent of girls of secondary-school age were attending school in all East Asian countries plus Malaysia, the Philippines, and Singapore in Southeast Asia and

Sri Lanka in South Asia; 30 to 60 percent were attending secondary school in India, Indonesia, Myanmar, Nepal, Thailand, and Vietnam; and fewer than 30 percent were attending secondary school in Cambodia, Laos, Afghanistan, Bangladesh, and Pakistan (UNESCO 1999).

In some Asian countries, women's secondary-school enrollment is steadily catching up with enrollment levels for men. In South Korea, Thailand, and Hong Kong, secondary-school enrollment is nearly the same for both sexes, while in the Philippines enrollment is slightly higher for women. Yet in many countries, substantial gender gaps remain, especially in South Asia. Figure 1 shows trends in three countries that exemplify these patterns—South Korea, the Philippines, and India.

Women are much less likely to attend college or university than they are to attend secondary school (Table 1). In most Asian countries, they are also much less likely to attend college or university than are men (UNESCO 1999). In South Korea, for example, 38 percent of women in the appropriate age group were enrolled in university in 1995, compared with 66 percent of men. In India, 5 percent of university-age women were enrolled, compared with 8 percent of men. Thailand and the Philippines are exceptions with unusually high university enrollment rates for women. In Thailand, 20 percent of university-age women were enrolled in 1992, compared with 17 percent of men. In the Philippines, 33 percent of women were enrolled in 1995, compared with 25 percent of men.

Figure 1. Percentage of all girls and boys at secondary-school age enrolled in secondary school: South Korea, Philippines, and India, 1970–95



Source: UNESCO (1999).
Note: The percentage enrolled can be more than 100 if girls and boys outside the normal age range are also enrolled in school.

Table 1. Trends in female secondary and tertiary enrollment in 19 Asian countries and Hong Kong: Percentage of girls in the appropriate age groups who were enrolled in 1975, 1985, and 1995

	1975		1985		1995	
Country	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary
East Asia						
China	38	0	33	2	62	4
Hong Kong SAR	47	5	73	NA	76	20
Japan	92	17	96	20	104	36
Mongolia	83	8	95	28	68	21
South Korea	48	5	91	21	101	38
Southeast Asia						
Cambodia	5	NA	19	NA	20	1
Indonesia	15	NA	35	NA	48	8
Laos	5	NA	19	1	21	2
Malaysia	39	NA	53	5	63	NA
Myanmar	20	NA	22	5	30	7
Philippines	54	19	65	26	78	33
Singapore	53	7	61	10	70	31
Thailand	22	3	28	NA	37	20
Vietnam	41	1	41	NA	46	NA
South Asia						
Afghanistan	2	0	5	NA	11	NA
Bangladesh	NA	1	11	2	13	1
India	16	2	26	4	38	5
Nepal	4	NA	12	1	30	3
Pakistan	7	1	10	1	17	2
Sri Lanka	49	NA	66	3	78	4

Source: UNESCO (1999).
Notes: Reference years for individual countries may vary slightly from those indicated. The percentage enrolled can be more than 100 if girls outside the normal age range are also enrolled in school.
NA: Data not available.

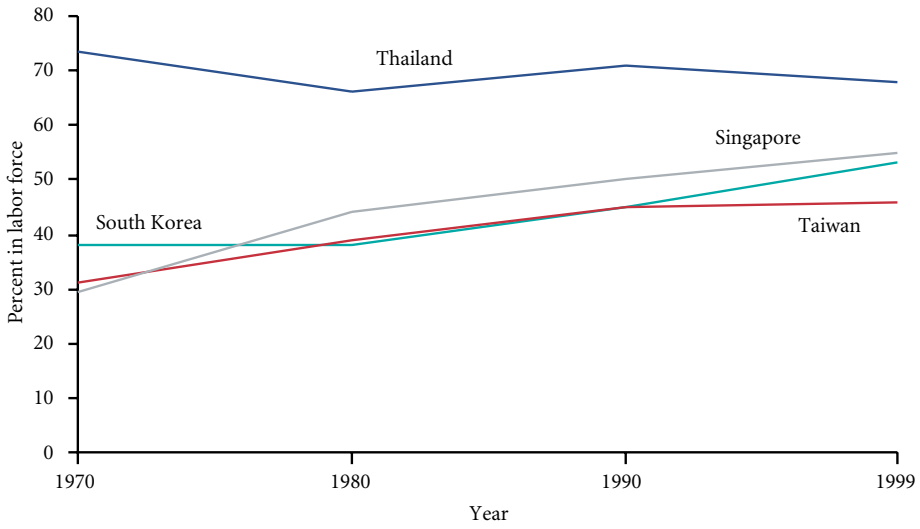
Better employment opportunities

Over the past half-century, women's participation in the labor force has increased steadily in many Asian countries, particularly in the rapidly growing economies of East and Southeast Asia (Figure 2). Singapore is a clear example. There, rapid industrialization generated a strong demand for labor, but few could be drawn from the countryside because the agricultural sector was already small. Thus economic growth relied in large measure on women's movement into the labor force. About 22 percent of women age 15 to 64 were employed in 1957 (Bauer 2001), rising to 55 percent by 1999 (ADB 2001). In Thailand at the beginning of industrialization, women were already widely employed in agriculture, so their overall employment rates have not gone up. However, many have moved from agriculture into other sectors of the economy. In South Korea, women's employment levels have gone up steadily since about 1980, while in Taiwan, women's employment stagnated during the 1990s with economic setbacks in Asia.

In 1999, half or more of women age 15 to 64 were employed in all sectors, including agriculture, in nine Asian countries (ADB 2001). These were:

- East Asia: China (74 percent), Mongolia (66 percent), and South Korea (53 percent)
- Southeast Asia: Cambodia (65 percent), the Philippines (53 percent), Singapore (55 percent), and Thailand (68 percent)
- South Asia: Bangladesh (56 percent) and Pakistan (86 percent)

Figure 2. Labor force participation rates (percent) for women age 15 to 64 years: Thailand, Singapore, South Korea, and Taiwan, 1970–99



Source: Bauer (2001) and ADB (2001).
Note: Reference years for individual countries may vary slightly from those indicated.

In addition to women's traditional employment in agriculture, some have argued that Asia's labor-intensive, export-led industrialization drives would not have been possible without the participation of women.

In developing countries, it is common for women to work as unpaid family labor with little or no direct income or other benefits of employment. Mason (1995) considers this a form of employment "that is least likely to yield power or control over resources." In many Asian countries, economic development and gains in education have increased opportunities for women seeking paid employment outside the home. Although direct information on women's control over their earnings is rarely available, the expansion of opportunities to earn wages outside the family environment can probably be viewed as a gain in women's status.

The distribution of workers in three employment categories—paid employee, self-employed, and family worker—provides an indication of what types of employment opportunities are available for women. In Japan, more than eight out of 10 women who work are employed for wages, while only one out of 10 works as unpaid family labor (Figure 3). In Bangladesh, by contrast, fewer than one in 10 women works for wages, and nearly eight out of 10 work as unpaid family labor. Women's employment status in South Korea and Sri Lanka falls in between these two extremes. In all four countries, men are much less likely than women to be employed as unpaid family labor. The distribution of women's and men's employment between these three categories in more- and less-advanced economies suggests a decline, but not a disappearance, of gender inequality in Asia's labor markets.

In the rapidly growing economies of East Asia, the most dramatic change in women's employment has been the decline in agricultural employment and the

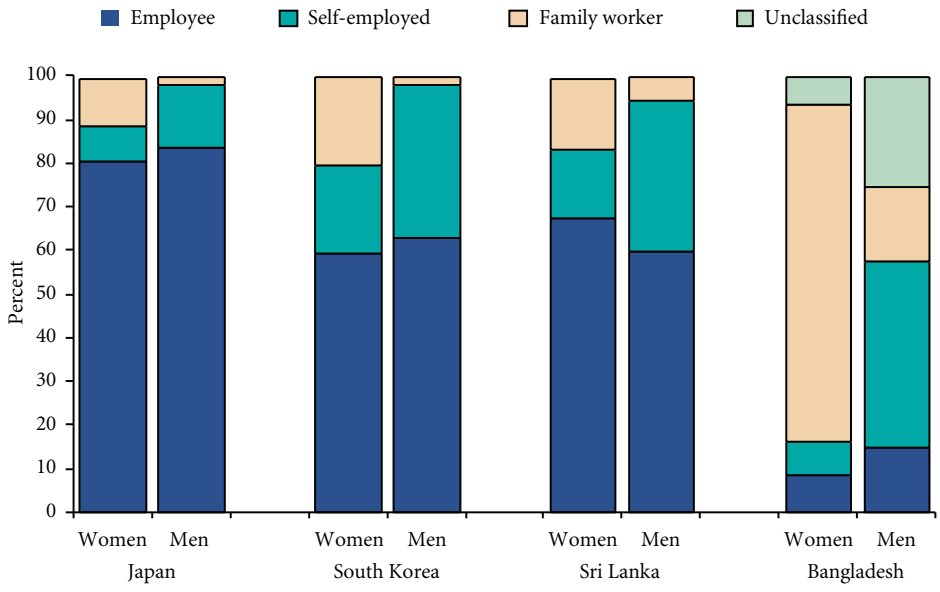
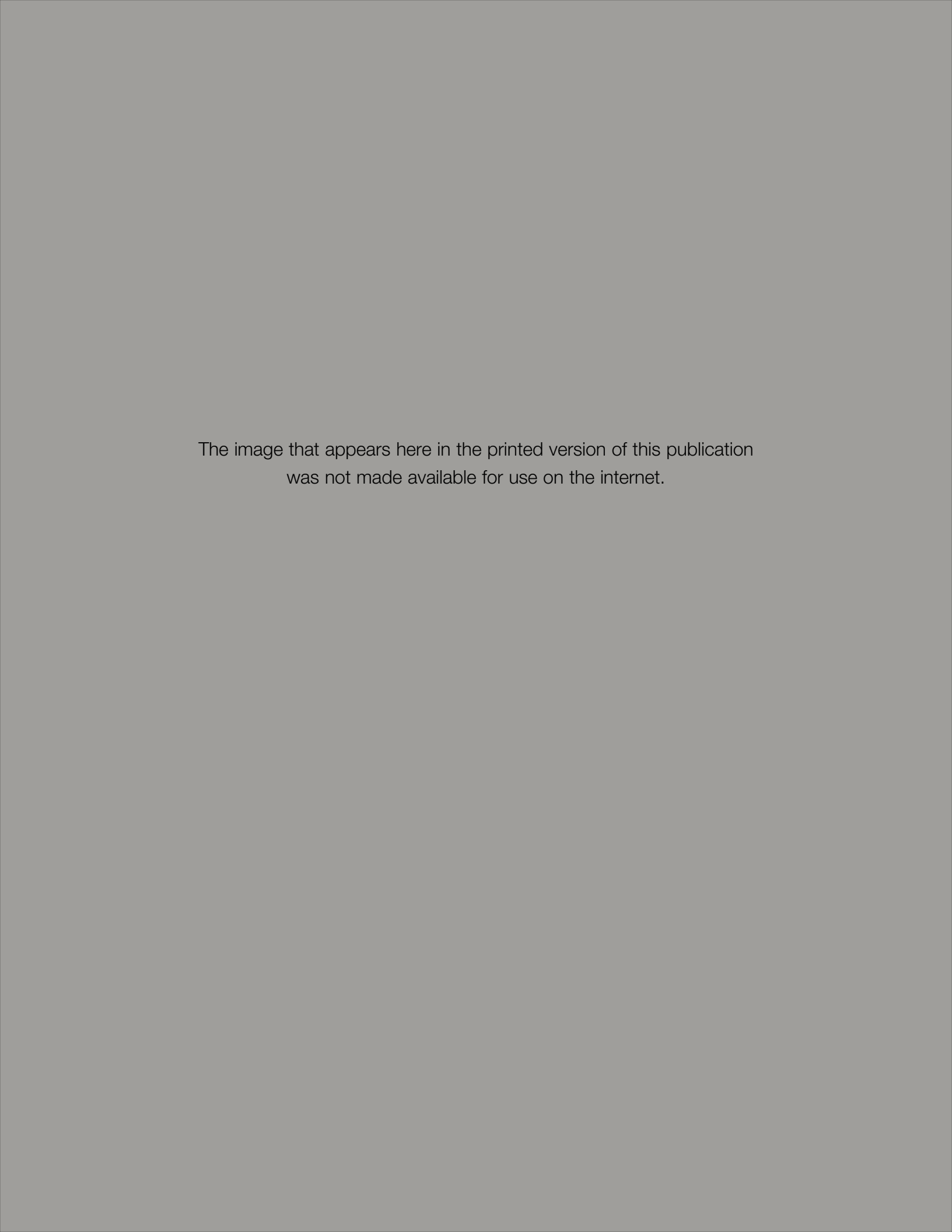


Figure 3. Percentage of economically active women and men who are paid employees, self-employed, and unpaid family workers: Japan (1999), South Korea (1999), Sri Lanka (1995), and Bangladesh (1996)

Source: ILO (2000).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was not made available for use on the internet.

Table 2. Percentage of employed women by occupational category: Japan, Taiwan, South Korea, Singapore, and Thailand, various years

Country and year	Agriculture	Clerical	Industrial	Sales/ Service	Professional/ Managerial
Japan					
1960	43	10	21	21	5
1970	26	18	25	24	7
1980	14	24	25	27	11
1990	8	27	26	26	12
1999	6	29	22	26	15
Taiwan					
1980	18	17	38	21	6
1990	10	23	31	27	9
South Korea					
1970	60	3	15	20	0
1980	46	9	20	22	4
1990	27	16	21	28	9
1999[a]	12	8	26	49	4
Singapore					
1957	12	6	25	45	10
1970	3	17	31	34	15
1980	1	27	35	24	12
1990	0	27	26	29	16
1999	0	19	26	40	14
Thailand					
1960	86	0	4	8	1
1970	84	1	5	9	2
1980	73	1	8	11	3
1990	65	3	12	16	4

Sources: ILO, *Yearbook of labor statistics*, various years; ILO (1990); Bureau of Statistics [Republic of China] (1991).

[a] ILO statistics for South Korea were revised on the basis of the 1995 population census.

Changes in the types of positions open to women suggest a decline, but not a disappearance, of gender inequality in Asia's labor markets (Phnom Penh, Cambodia)
© Kevin R. Morris/Corbis

rise in office and clerical positions. In Japan, for example, the proportion of working women engaged in agriculture dropped from 43 percent in 1960 to only 6 percent in 1999 (Table 2). Over the same period, the proportion engaged in clerical work rose from 10 to 29 percent. While the proportion of working women who hold professional and managerial positions has increased in recent decades, it is still quite low. Between 1960 and 1999, the proportion of working women holding such relatively well-paid positions rose from 5 to 15 percent in Japan, for example, and from 0 to 4 percent in South Korea.

Women in an economically advanced economy such as South Korea tend to be heavily employed in the clerical, sales, and service sectors and in manufacturing (Figure 4). By contrast, women's employment in Bangladesh is overwhelmingly in the agricultural sector. Even in South Korea, however, women's employment in the most highly paid professional and managerial category is small, at only 4 percent. The Philippines is exceptional, with 12 percent of economically active women in the professional and managerial category as well as large proportions in clerical, sales, and service (50 percent) and in industry (11 percent). This pattern undoubtedly reflects the relatively low levels of discrimination against women in the Philippines.

Within the manufacturing sector, women have been heavily concentrated in

Some have argued that Asia's labor-intensive industrialization would not have been possible without the participation of women (South Korea)

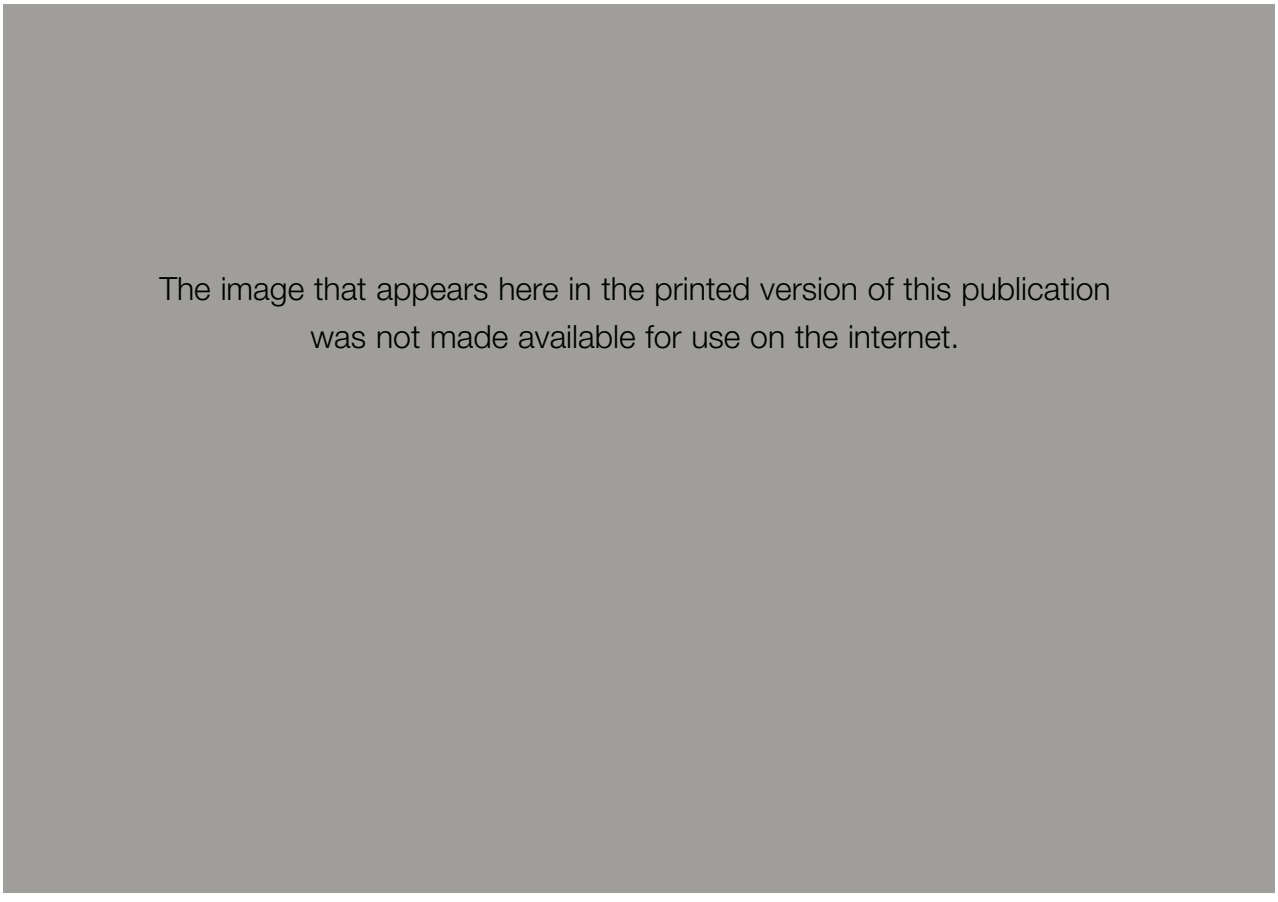
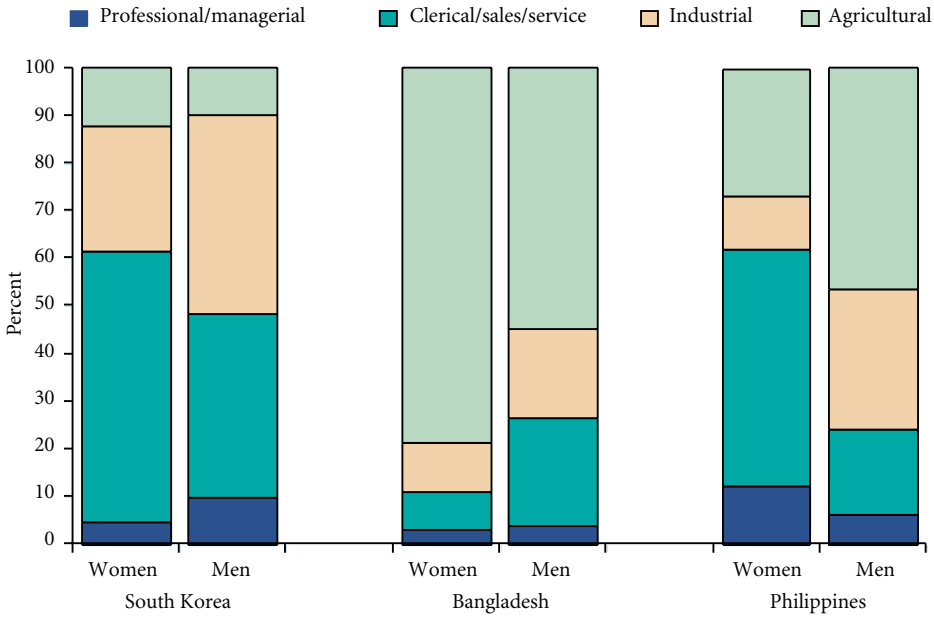


Figure 4. Percentage of economically active women and men working in the professional/managerial, clerical/sales/service, industrial, and agricultural sectors: South Korea (1999), Bangladesh (1996), and the Philippines (1999)



Source: ILO (2000).

low-wage, labor-intensive industries. In 1999, wages for Japanese women employed in manufacturing were on average 58 percent of the wages for men (ILO 2000), up from 42 percent in 1989. In South Korea, women in manufacturing earned 55 percent of men's wages (up from 51 percent in 1989). In Southeast Asia during the late 1990s, women's wages were 74 percent of men's in the Philippines, 68 percent in Thailand, 63 percent in Malaysia, and 59 percent in Singapore. Although the wage gap is narrowing in some countries, there is no consistent trend.

During the industrial restructuring of the 1980s, women suffered disproportionately from losses in manufacturing jobs. In Taiwan, for example, manufacturing employment declined by 364,000 jobs between 1987 and 1990, and 58 percent of the workers who lost their jobs were women. The question arises whether women will be similarly disadvantaged in future periods of economic readjustment.

Improving life expectancy

Life expectancy at birth is one of the most basic indicators of health and well-being (Mason 1995). Although life expectancy does not capture all aspects of health, it is a widely available measure that makes it possible to compare the health status of various groups (in this case, women and men) across countries and time periods.

Life expectancies are improving all across Asia, but longevity still varies widely between subregions and countries (Appendix Table 3). Survival is generally

lowest in South Asia and highest in East Asia, particularly in the region's most advanced economies. In most countries, the gains over the past 50 years have been greater for women than for men, as indicated by the female-male differences at the right of Appendix Table 3. By 2000, women could expect to live longer than men, on average, in every major country of the region except Nepal and Pakistan.

In East Asia, where the risks of dying in infancy and childhood have been low for some time, women's gains in life expectancy are associated with population aging and the greater inherent frailty of men (Mason 1995). In South Asia and parts of Southeast Asia, by contrast, women's gains in life expectancy most likely represent real improvements in nutrition and healthcare for women and girls.

In societies where women live longer than men, improvements in women's life expectancy come at a cost, however. As women survive their husbands and live into old age as widows, issues of financial support, medical care, and companionship become critical for families and national governments alike. As a recent report from the United States Census Bureau points out, ". . . Women are expected to make up the majority of the world's elderly population (particularly at the oldest ages) well into the next century. Continuing or growing disparities in sex ratios mean that many of the challenges and problems faced by the elderly of today and tomorrow are, in essence, challenges and problems faced by older women" (Kinsella and Velkoff 2001). Nowhere is this more true than in Asia.

Persistent high mortality for young girls

Despite improvements in life expectancy for adult women, in some South and East Asian countries girls are more likely to die than boys between the ages of 1 and 4 years. Among children in this age group, mortality is normally slightly higher for boys. In Bangladesh, India, and Nepal, however, girls age 1 to 4 years are much more likely to die than boys (Figure 5). This unusual mortality pattern reflects a preference for sons within some Asian families.

During the 1990s in India, mortality rates at ages 1 to 4 years were nearly 50 percent higher for girls than for boys (IIPS and ORC Marco 2000). In northern India, where son preference is particularly strong, girls in this age group are 74 percent more likely to die than boys (Arnold, Choe, and Roy 1998). More than 10 years of demographic data from Bangladesh's Matlab region show that mortality at ages 1 to 4 years is strongly affected by a child's sex and the sex of older siblings: The highest death rates are for girls with older sisters. In South Asian countries, son preference may not only increase death rates for girls but may also impede national efforts to lower fertility (see box).

How does son preference result in higher mortality for girls? Among South Asian families with limited resources, boys may receive more food than girls, better care to prevent diseases and accidents, and better treatment when they

IS SON PREFERENCE SLOWING DOWN INDIA'S TRANSITION TO LOW FERTILITY?

Fertility in India would decrease by an estimated 8 percent in the absence of gender preference, which is most often a preference for sons (Delhi, India) © David Cumming; Eye Ubiquitous/Corbis

Early observers predicted that son preference would impede efforts to slow down population growth because couples would keep having children until they obtained the desired number of boys. In fact, several studies have shown a relationship between son preference and contraceptive use. For example, among South Korean women with two children, one study found that the probability of having a third child was 12 percent if the woman already had at least one son and 54 percent if the woman had only daughters (Choe et al. 1998). Among women with three children in Bangladesh, the probability of having a fourth was 10 percent for women with two sons and one daughter (the preferred combination) and 17 percent for women with only daughters.

Arnold (1985) has developed a method to estimate the influence of gender preference on fertility levels in quantitative terms. First, women with a specific number of children are grouped according to their children's sex. The influence of gender preference is then estimated by identifying the group of women least likely to have another child. The assumption is that if there were no gender preference, all women would be just as likely to have another child as this group. The difference between this—lowest—percentage having another child and the percentage of all women having another child is taken as a measure of the "extra" fertility that is due to gender preference. Estimates for India based on data from the first National Family Health Survey (NFHS) of 1992 to 1993 suggest that fertility at the national level would decrease by about 8 percent in the absence of gender preference, which is most often a preference for sons (Mutharayapa et al. 1997). A decline of this magnitude would have a substantial impact on India's population growth rate.

Women in India who are literate tend to have fewer children than illiterate women. Yet the influence of son preference on fertility is actually higher among literate women. This suggests that women who are literate may want to have small families and may be well equipped to stop childbearing when they choose, but literacy does not necessarily change a woman's attitude concerning the importance of having sons. Such findings indicate that reducing son preference will require specific policies and programs—the problem will not necessarily disappear automatically with gains in education for women.

do become ill. In India, boys are breastfed slightly longer than girls, and they are slightly more likely to be fully vaccinated (Mutharayappa et al. 1997). Girls are less likely than boys to be reported as ill, possibly because their illnesses receive less serious attention, and when they become ill they are less likely to be taken to a health facility for treatment. Indian girls are also more likely than boys to be severely undernourished.

Even in countries where child health is generally good, death rates may be higher for girls than for boys. In the late 1980s, Chinese families enjoyed nearly universal access to healthcare, and mortality among children age 1 to 4 years was less than 25 per 1,000. Among first-born children, child mortality was similar for girls and boys, but among second-born and subsequent children, child mortality was 15 percent higher for girls (see Figure 5) (Choe, Hao, and Wang 1995). In other countries of East Asia, such as South Korea, high incomes and low fertility now allow parents to provide good nutrition and high-quality care to both sons and daughters. As Figure 5 illustrates, however, excess female mortality has not disappeared entirely even in South Korea (Choe et al. 1998).

Selective abortion of female fetuses

In societies that prefer sons, several practices may lead to abnormally high ratios of boys to girls at birth. The birth of baby girls may not be reported, or girls may not be counted in census enumerations. In some cases, families may even resort to female infanticide. In China during the 1980s, couples who wanted sons but faced harsh penalties if they had too many children sometimes gave baby girls away for adoption without registering their births.

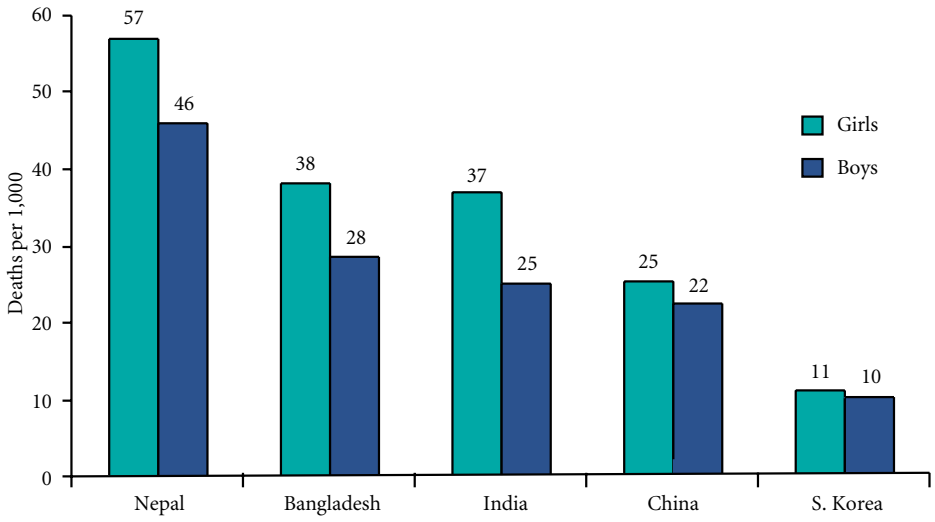
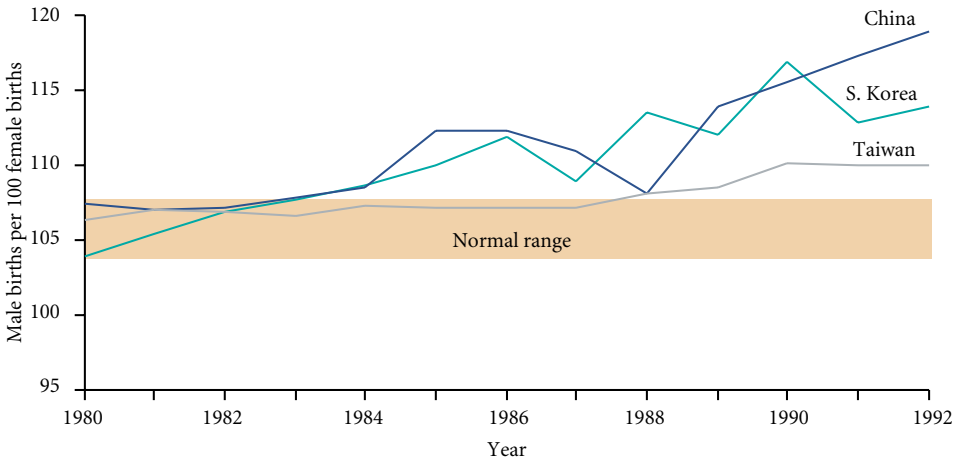


Figure 5. Child mortality (deaths at ages 1–4 years per 1,000 children surviving to age 1): Nepal (1987–96), Bangladesh (1990–99), India (1989–98), China (1965–87), and South Korea (1981–85)

Source: For Nepal, Pradhan et al. (1997); for Bangladesh, NIPORT, Mitra and Associates, and ORC Macro (2000); for India, IIPS and ORC Macro (2000); for China, Choe, Hao, and Wang (1995); and for South Korea, Choe et al. (1998).
Note: Mortality rates for China are for second-born and subsequent children.

Figure 6. Sex ratios at birth for China, South Korea, and Taiwan, 1980–92



Source: For China and Taiwan, UNFPA and Republic of Korea (1994); for South Korea, Park and Cho (1995).

More recently in Korea, China, and Taiwan, the introduction of technologies to determine the sex of unborn fetuses combined with the widespread availability of abortion has led to a record preponderance of male births, suggesting that couples are selectively aborting female fetuses. The normal sex ratio at birth is 104 to 107 males for every 100 females born. Sex ratios in China, Taiwan, and South Korea began to rise abruptly above this biological norm in the 1980s (Figure 6). The 1992 figures were 119 boys for every 100 girls in China, 114 in South Korea, and 110 in Taiwan.

Evidence is accumulating that sex-selective abortion is also occurring in India. During the 1990s, 104 to 105 boys were born for every 100 girls in the southern states of Tamil Nadu, Kerala, and Karnataka, where son preference is low. By contrast, 110 to 120 boys were born for every 100 girls in Punjab, Rajasthan, and Haryana, where son preference is high (IIPS and ORC Macro 2000).

In South Korea, a conservative estimate suggests that more than 30,000 fetuses were screened in 1990 alone, at a total cost to couples of approximately US$3 million. In discussing amniocentesis with a weekly news magazine, one Korean obstetrician estimated that 90 percent of all requests for fetal screening were for sex determination, rather than to detect genetic disorders. The 1990 census suggests that nearly 80,000 female fetuses were aborted between 1986 and 1990 for purposes of sex selection, a number equivalent to about 5 percent of all female births.

The Korean government banned tests to determine the sex of fetuses in 1987 and increased the penalties for sex screening in 1990 and again in 1994. By the late 1990s, these policies, together with changing attitudes, began to bring sex ratios at birth closer to the normal range. Today, in South Korea's urban areas, sex ratios at birth have returned to normal (NSO 2001). In regions of the country where traditional attitudes still prevail, however, the return to normal sex ratios at birth has been much slower.

There is also evidence from China that current high sex ratios may be temporary. Ratios are low in the least developed rural provinces, high in more developed provinces, and low in the relatively modern cities of Shanghai and Beijing. The trend in these large cities may represent the future for China as a whole.

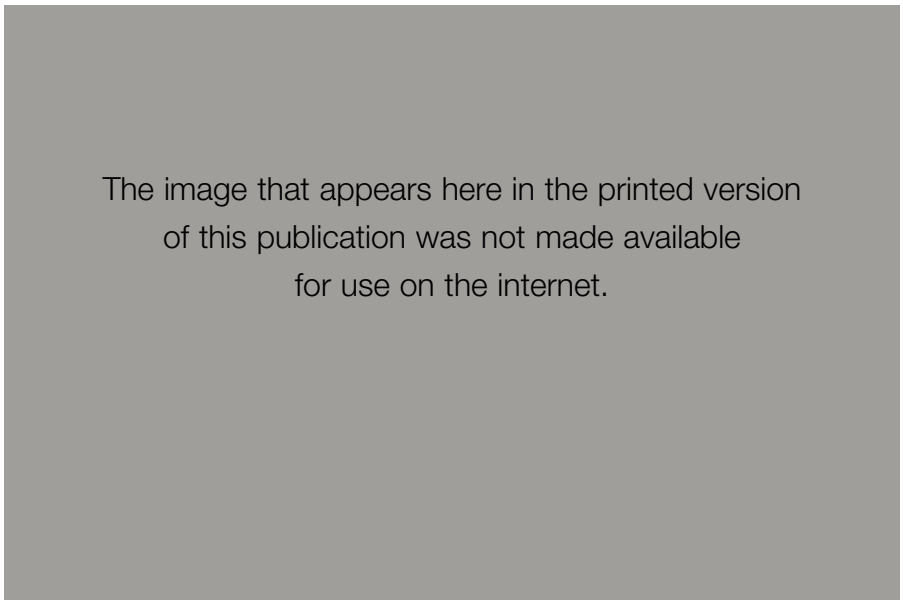
Conclusions

On balance, economic development and social modernization have benefited women in Asia. Shrinking gender gaps in schooling and employment in many countries suggest that the status of women is improving. Women's increasing life expectancy at birth also points to advances in nutrition and heathcare.

Yet significant improvements in women's status require changes in attitudes that are embedded in centuries of traditional culture. Detailed studies often show that high levels of education and household income do not necessarily assure women's status in societies with strong traditions of male domination. In fact, relatively wealthy, educated women may be more restricted within the household than poor, uneducated women who are forced to play a stronger, more independent role by economic necessity. In Japan, married women with a college education are less likely to be employed outside the home than are less-educated women (Choe, Bumpass, and Tsuya forthcoming). In India, the influence of son prefer-

Financial support and care for the elderly will be important women's issues in the future (Chiangmai, Thailand) © Wisut Jaijagcome/ East-West Center

Many women in East Asia are balancing work and family responsibilities, and help from husbands is more the exception than the rule (Seoul, South Korea) © Alain Le Garsmeur/Corbis



ence on fertility is stronger among women who are literate and who live in urban areas than among other women (Mutharayappa et al. 1997).

What does the future hold? Advances in women's education can be expected to continue, although in some countries the pace of change is slow. A shrinking proportion of working-age men in some Asian populations combined with continuing reductions in hours worked will exert pressure on employers to hire women and to encourage women to remain in the workforce. In the process, employers will have to accommodate women's needs to manage both work and family responsibilities, and husbands will have to provide more help at home.

Lingering problems of son preference and the advent of sex-selective abortion pose a dilemma for Asian policymakers. Evidence suggests that social and economic development alone may not fully counteract these manifestations of women's low status in a patriarchal society—at least not right away. As one South Korean observer remarked, "Given the existing gender differences in earnings in the marketplace, parents or parents-in-law may perceive long-run returns from sons to be substantially higher than from daughters."

Social development for men and women—in the form of education, media exposure, and opportunities to work outside the home—can provide access to new ideas and, with time, a transformation of cultural values. In Asia's developing countries and advanced economies alike, hiring practices and employment conditions need to be reviewed to reduce gender discrimination and to make it easier for parents—both men and women—to balance work and family obligations. Although it has proven difficult to end gender discrimination by government legislation alone, specific issues—such as sex-selective abortion and care and support for elderly women—require immediate policy attention.


GORILLA

Asia's Changing Youth Population

In recent years, policymakers and program managers in many Asian countries have turned increasing attention to youth—the special needs of adolescents and young adults in today's world and the special challenges of reaching young people with information and services. One reason for the current focus on youth is the large number of adolescents and young adults in many Asian societies.

In 1960, there were 284 million people in Asia between the ages of 15 and 24; in 2000, there were 615 million (Appendix Table 4). This expansion of the region's youth population reflects an underlying 1.6 percent annual growth rate.

Asia's adolescents and young adults may be increasingly prone to various types of risk behavior (Tokyo, Japan)
© Chris Steele-Perkins/Magnum

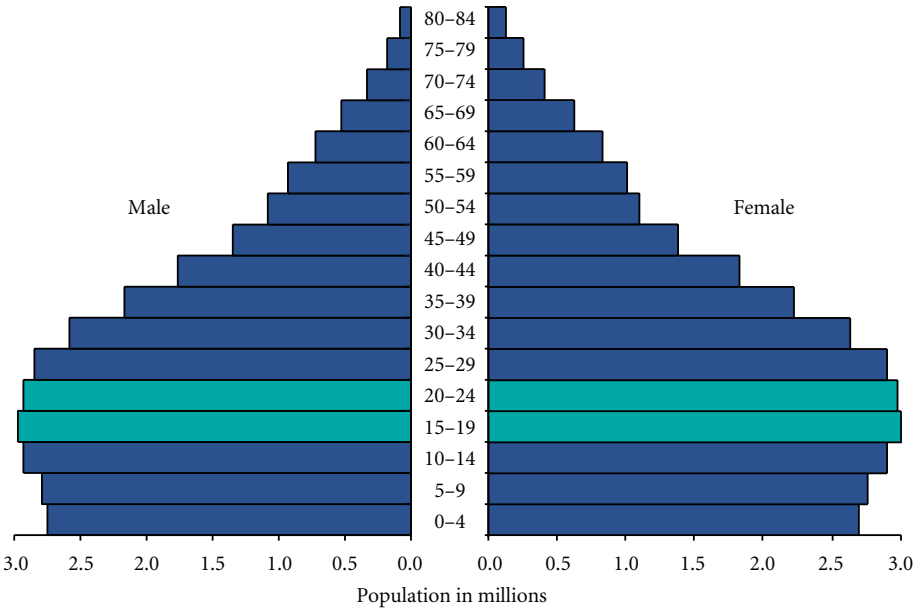
Between 1960 and 2000, the number of adolescents and young adults doubled or more than doubled in nearly every country of Asia. The only exceptions were China, Japan, North Korea, and Kazakhstan. The rapid growth of youth populations has created pressure to expand education, health, and employment programs aimed at this age group. Policymakers must keep in mind, however, that the period of expansion is short. Between 2000 and 2040, the number of young people in Asia will grow much more slowly—from 615 million to 658 million, at a rate of only 0.2 percent a year. In some countries of Southeast and South and Central Asia and in nearly all the countries of East Asia, the period of rapid expansion is already over.

In addition to absolute numbers, the proportion of young people in the total population creates policy concerns. Over the past 40 years, the proportion of Asia's population in the 15–24-year age bracket increased and then declined—from 17 percent in 1960 to 21 percent in 1985 (data not shown) and then to 18 percent in 2000. It will decline further, to a projected 14 percent, by 2040. This temporary increase in the proportion of young people in a population is called a "youth bulge." It is the result of a transition from high to low fertility about 15 years earlier. The youth bulge consists of large numbers of adolescents and young adults who were born when fertility was high followed by declining numbers of children born after fertility declined. The age structure of Thailand's population in 1995 (Figure 1) illustrates this pattern.

Some scholars have described a youth bulge as a situation in which 20 percent or more of a population is in the age group 15 to 24 years (see, for example, Huntington 1996). Some have speculated that societies with such large proportions of young people may be subject to dynamic, and potentially disruptive, political and social movements. At the other extreme, populations with less than 15 percent adolescents and young adults are described as having a "youth deficit." This situation also creates problems, such as too few new entrants into the labor force.

In addition to expanding services and facilities to cope with large numbers of

Figure 1. Age and sex structure of Thailand's population in 1995



Source: United Nations (2001).

young people, the growth of Asia's youth population, although temporary, raises two important policy concerns. The first stems from the fact that adolescents and young adults are about to enter or are already in their prime reproductive years. Unusually large numbers in this age group will lead to unusually large numbers of births, even when fertility is low. The potential for population growth resulting from this temporary imbalance in the age structure is a phenomenon that demographers call "population momentum." Thus, although fertility has declined throughout Asia, because of population momentum, national populations are expected to grow well into this century.

Government policymakers and others are also concerned because adolescents and young adults are particularly prone to various types of risk behavior. In many Asian societies, the shift from traditional agriculture toward an industrial, export-based economy has brought about dramatic changes in young people's lives. Youth surveys and other measures indicate rising levels of smoking, drinking, drug use, and unprotected sex. Evidence of high-risk sexual behavior is particularly worrying given the rising prevalence of HIV/AIDS and other sexually transmitted infections (STIs) in some Asian countries. Yet few countries have adequate programs in place to help young people avoid such risks.

How important is the youth bulge?

The size and duration of the youth bulge differ among Asian countries because of variation in the timing and magnitude of the preceding fertility decline. The youth bulge can also be affected by migration because migrant populations

typically include large numbers of young adults. Fertility first declined in the 1950s and early 1960s in Japan, Singapore, and Hong Kong. In Japan, the youth bulge occurred in the 1960s, and in Singapore and Hong Kong in the 1970s, with the absolute number of young people peaking by 1980. By contrast, in countries such as Nepal and Pakistan that are only now beginning to experience fertility decline, the number of young people will not peak until around 2040.

The youth bulge as a proportion of total population tends to be large in countries where fertility drops quickly from a very high to a very low level, for instance in China, South Korea, Singapore, and Thailand. The duration of the youth bulge also varies widely—from less than 20 years in Japan, South Korea, and Singapore to around 40 years in the Philippines.

A rapid transition can be disruptive in the short run because both the absolute number of young people and the youth share of the total population rise quickly to high levels. But this situation is temporary. A slower transition may be easier to deal with in some respects, but the total size of the youth population can become very large.

For example, in China where the transition was rapid, the youth population not quite doubled (from 106 to 199 million) between 1960 and 2000. In the Philippines, where the transition has been slower, the youth population grew three times (from 5 to 15 million) over the same period. Given population momentum, such large increases in the number of young people have important implications for future population growth.

Characteristics of Asia's youth

Marrying later. Policymakers have advanced various proposals to mitigate the effects of the youth bulge on population growth. One suggestion is that delaying childbearing will slow down population growth even if total fertility remains the same. Many governments have raised the legal age of marriage, and policymakers have encouraged young people to marry later, to lengthen the interval between marriage and first birth, and to extend intervals between births.

Government intervention may not always be necessary, however, because young people in most Asian societies are already waiting later to marry. Yet delays in marriage have produced another situation that policymakers may view as problematic—the creation of a "young singles" population unheard-of a few decades ago.

In 1950, 34 percent of Asian women age 15 to 24 were single; by 1990, this proportion had risen to 62 percent (Appendix Table 5). Although less dramatic, the proportion of young men who were single also increased. This rise in the proportion of young men and women who are single has occurred in every country of the region. It is of concern because many of these young people are subject to well-known precursors of risk behavior such as disturbed family backgrounds, living away from parents, and unsupervised migration from rural to urban areas.

East Asia has led the trend in proportions of young people who are single. In this subregion (excluding China), the proportion of women age 15 to 24 who were single rose from 70 percent in 1950 to 91 percent in 1990. Among men in this age group, the proportion single rose from 87 to 96 percent. In South Asia, the absolute levels were much lower, but the changes were even more dramatic: The proportion single rose from 18 to 42 percent for young women and from 56 to 77 percent for young men. The trend in Southeast Asia has been intermediate. Projections from national census data across Asia suggest that the proportion of young people who are single will continue to rise in the future (Xenos and Kabamalan 1998).

It is important to appreciate the significance of this trend in terms of absolute numbers. Between 1950 and 1990, the number of single young women in Asia rose nearly fourfold—from 22 to 82 million. Somewhat less than half of this increase was due to population growth; more than half was due to the trend toward delayed marriage.

Staying longer in school. As with percentages single, school enrollment has increased throughout the region (Appendix Table 5). In Asia as a whole, the proportion of women age 15 to 24 who were enrolled in school doubled—from 6 to 12 percent—between 1950 and 1990. For young men, the proportion also doubled—from 9 to 18 percent.

Within this age group, the rise in enrollment was much larger for adolescents than for young adults. In 1990, 26 percent of girls and 39 percent of boys age 15 to 19 were enrolled in school. Among young adults age 20 to 24, 6 percent of women and 12 percent of men were enrolled.

East Asia has the highest levels of school enrollment, while Southeast Asia had the largest percentage increases between 1950 and 1990. In both regions, enrollment rates for young women are approaching the levels for young men. In South Asia, school enrollment is considerably lower, and enrollment rates are still much lower for women than for men.

Again, it is important to consider what this means in absolute numbers. In South Korea, for example, the total number of young people age 15 to 24 more than doubled between 1950 and 2000, rising from 3.8 million to 7.7 million. Over the same period, the number of young people enrolled in school increased more than 10-fold, from 0.5 to 5.4 million (NSO 2001). This explosion in school enrollment has placed heavy demands on South Korea's education system.

The total youth population of South Korea is projected to drop by about 30 percent by 2025. Thus, although the proportion of young people in school may rise a bit higher, the absolute number in school will drop considerably because of the decline in the youth population. The situation in South Korea is more extreme than in most other countries of Asia, but the same pattern of rise and fall in the numbers in school has already occurred or can be anticipated in every country of the region.

More or less likely to have a job. In most Asian countries, employment rates are much higher for men than for women. For young men, labor force participation has declined steadily throughout the region (Appendix Table 5), undoubtedly reflecting the steady rise in school enrollment.

For women, the pattern is more complex and much harder to measure, clearly affected by cultural factors as well as levels of economic development. Even countries in the same subregion show contrasting patterns. Women age 20 to 24 who are not in school, for example, are likely to be working in Thailand, but unlikely to be working in Indonesia, where early marriage is much more common.

Levels of risk behavior

Sexual risk taking. Youth surveys in several Asian countries have found that sexual risk taking is much higher among young men than young women. There is some evidence—from Taiwan for example—that levels of risk taking are rising for both men and women, however.

A comparative analysis of survey results from Thailand, Taiwan, and the Philippines shows that young men's first sexual experience occurs most often outside of marriage (Choe et al. 2001b). Among men age 15 to 24 who have experienced sex, 93 percent in Thailand, 92 percent in Taiwan, and 87 percent in the Philippines had their first sex outside of marriage. The patterns for women, by contrast, differ broadly. In Taiwan, 70 percent of women age 15 to 24 who have experienced sex had their first sex outside of marriage, compared with only 30 percent in the Philippines and Thailand.

In all three countries, women who leave their parents' home or leave school at an early age are more likely than other women to have their first sexual experience outside of marriage. In Thailand and the Philippines, young women who have some college education or who plan to go to college are less likely than other women to have their first sex outside of marriage.

The relationship between college education and first sexual experience is just the opposite in Taiwan. Taiwanese women who attend college or plan to attend college are more likely than other women to have their first sex outside of marriage. Thus, sexual experience outside of marriage is not only more common among women in Taiwan than in the other two countries, but it is also more common among Taiwanese women with higher education. Because development is generally more advanced in Taiwan than in Thailand or the Philippines, the patterns revealed by these surveys suggest that—for women—sex outside of marriage is likely to increase with economic development and social modernization.

Although sexual activity outside of marriage is less common in the Philippines than in Taiwan, the 1994 Young Adult Fertility and Sexuality Study (YAFS-II) found considerable evidence of risk-taking behavior—among

young men—that could lead to unwanted pregnancy and the spread of HIV and other STIs. By the time they reach age 24, almost 40 percent of Filipino men have had sex with at least one partner other than their wives or future wives (Raymundo, Xenos, and Domingo 1999). Almost 10 percent have visited a sex worker, and 3 percent have had five or more sexual partners. By contrast, only 2 percent of single young women have ever had sex, and virtually all of these have had only one sexual partner.

Modeling studies have shown that the patterns of male sexual activity documented in the Philippines can greatly accelerate the spread of HIV and other STIs. This is particularly true when men have sex with sex workers and also with other partners. The situation is especially worrying because so few young Filipino men use condoms. Only 23 percent of sexually active young men reported that they had ever used a condom, and far fewer (4 percent) reported having used a condom during their most recent sexual encounter. Half of young men who recently visited a sex worker said that they never use condoms at all.

Studies conducted in 1994 in Thailand and Taiwan also found that levels of condom use were disturbingly low. Among young Thai men who had had sex and whose first sexual experience was outside of marriage, one-half to two-thirds reported that they did not use any contraception during their first sexual encounter. Among young men and women who had had sex in Taiwan, one-third to one-half reported that they never used contraceptives or used them only "once in a while."

The good news, as demonstrated by more recent experience in Thailand, is that sexual risk-taking can be greatly diminished by comprehensive, well-designed national programs. In Thailand, condom use in sex work went from less than 30 percent in 1990 to more than 90 percent in 1997. During the 1990s, the percentage of men using sex services declined by half, and STI levels fell by more than 90 percent.

Available statistics do not allow a precise identification of young people most in need of health and family planning services (Shanghai, China) © Gueorgui Pinkhassov/ Magnum

Smoking, drinking, and drug use. Youth surveys in several Asian countries show significant levels of smoking and drinking. Drug use is much less common, but it is not negligible, particularly considering that it is likely to be underreported in these surveys. Young men are much more likely than young women to drink, smoke, or use drugs (Table 1). They are also likely to start these risk behaviors at younger ages than women.

Figure 2 compares teenage smoking rates in nine Asian countries and the United States. Among boys age 15 to 19, smoking is most common in Indonesia (at 38 percent) and China (36 percent) and least common in Nepal (12 percent). Among girls, smoking is most common in the United States (35 percent) and Japan (12 percent) and least common in Indonesia and China (1 percent). The countries are listed in the figure according to gross domestic product (GDP) per capita. This arrangement shows some increase in girls' smoking in wealthier countries, although there is considerable variation.

Table 1. Percentage of boys and girls age 15–19 who currently drink, smoke, or use drugs: Various countries in Asia

Country and year	Drink		Smoke		Use drugs	
	Boys	Girls	Boys	Girls	Boys	Girls
China 2000	37	9	36	1	NA	NA
India 1998/99	2	1	14[a]	2[a]	NA	NA
Indonesia 1988	2	0	38	1	1	0
Japan 2000[b]	39	31	26	12	NA	NA
Nepal 2000	21	11	12	4	NA	NA
Philippines 1994	47	12	28	3	2	0
South Korea 2000	46	51	21	11	3	3
Taiwan 1994	NA	NA	30	5	NA	NA
Thailand 1994	43	16	33	2	6	1

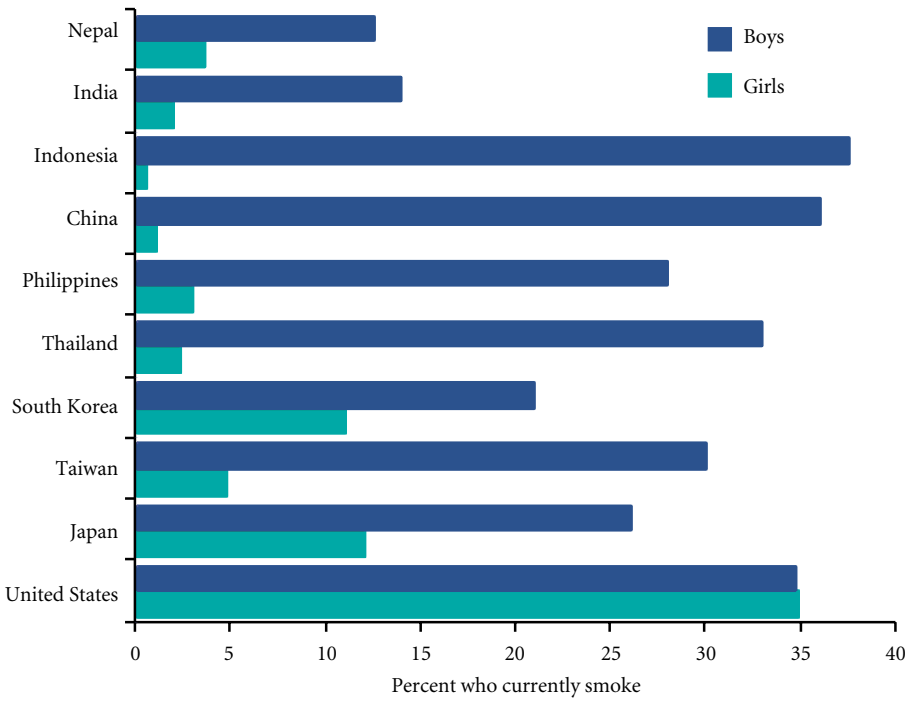
Sources: For China, State Family Planning Commission of China; for India, IIPS and ORC Macro (2000); for Indonesia, Demographic Institute, Faculty of Economics, University of Indonesia (1999); for Japan, National Institute of Public Health (2000); for Nepal, Choe et al. (2001a); for the Philippines, Raymundo, Xenos, and Domingo (1999); for South Korea, Han et al. (2000); for Taiwan, Choe et al. (2001a); for Thailand, Podhisita and Pattaravanich (1995).
NA: Information not available.
[a] Includes chewing tobacco.
[b] For ages 15–18 only.

In Thailand and the Philippines, drinking is much more common than smoking. Nearly half of adolescent boys in both countries drink, while around one-third smoke. In Indonesia, by contrast, drinking is rare, while smoking is particularly common among boys but not among girls. The low level of drinking in Indonesia is, no doubt, related to the Islamic prohibition of alcohol.

Although data are limited, parents' attitudes appear to have a strong influence on whether or not their children drink, smoke, or use drugs. Parents in Asia tend to be much more permissive with their sons than with their daughters, which no doubt helps explain why risk behavior is so much more common among boys than among girls.

It is interesting to compare findings from Asia with results from the 1999 Youth Risk Behavior Surveillance coordinated by the Center for Disease Control and Prevention in the United States. Among American high-school students (grades 9 to 12), 50 percent had drunk alcohol in the 30 days before the survey, 33 percent had smoked, 27 percent had used marijuana, and 4 percent had used cocaine. Thus Asian boys—at least in the countries where data are available—are about as likely to drink or smoke as American adolescents but are much less likely to use drugs. In contrast to the situation in Asia, adolescent drinking, smoking, and drug-use rates in the United States are similar for boys and for girls.

Figure 2. Percentage of boys and girls age 15–19 years who currently smoke in nine countries of Asia and the United States



Sources Choe et al. 2001a.

Early childbearing. Although the average age at marriage is going up everywhere in Asia, many women in South Asia and parts of Southeast Asia marry and have their first child while still in their teens. In Bangladesh, Nepal, and India, half or more of young women are married by age 18 (Table 2). Most of these young women give birth within the first two years of marriage.

This is a serious health concern. Studies all over the world have shown that health and mortality risks are significantly higher when women this young give birth, both for the women themselves and for their children (Table 3). Apart from biological factors, early marriage and childbirth often mean the early termination of a woman's formal education. Women who marry at very young ages also tend to have limited access to mass media and other sources of information. As a result, these women have limited knowledge of reproductive health, and they are less likely to use maternal and child-health services than women who wait until a later age to marry and give birth.

Identifying youth at risk

Available statistics do not allow a precise identification of young people most in need of health and other services. It would be useful, for instance, to identify young people who are single, out of school, out of work, living away from their families, and engaging in risk behavior.

Table 2. Percentage of women age 20–24 who were married or in union before age 18 and percentage of women who gave birth by age 20: Various countries in Asia

Country and year	Percent women age 20–24 married or in union before age 18		Percent woman who gave birth by age 20	
	Fewer than 7 years of schooling	7 or more years of schooling	Current age 20–24	Current age 40–44
Bangladesh 1996/97	79	36	63	84
China 1992	8	2	14	22
India 1998/1999	64[a]	17[b]	47	58
Indonesia 1997	45	13	31	45
Nepal 1996	68	26	52	53
Pakistan 1990/1991	38	7	31	38
Philippines 1998	36	10	20	26
Sri Lanka 1987	NA	NA	16	31
Thailand 1987	25	8	24	28

Source: For China, Alan Guttmacher Institute (1995); for all other countries, ORC Marco, Demographic and Health Surveys, various years.
NA: Data not available.
[a] Fewer than eight years of schooling.
[b] Eight years or more of schooling.

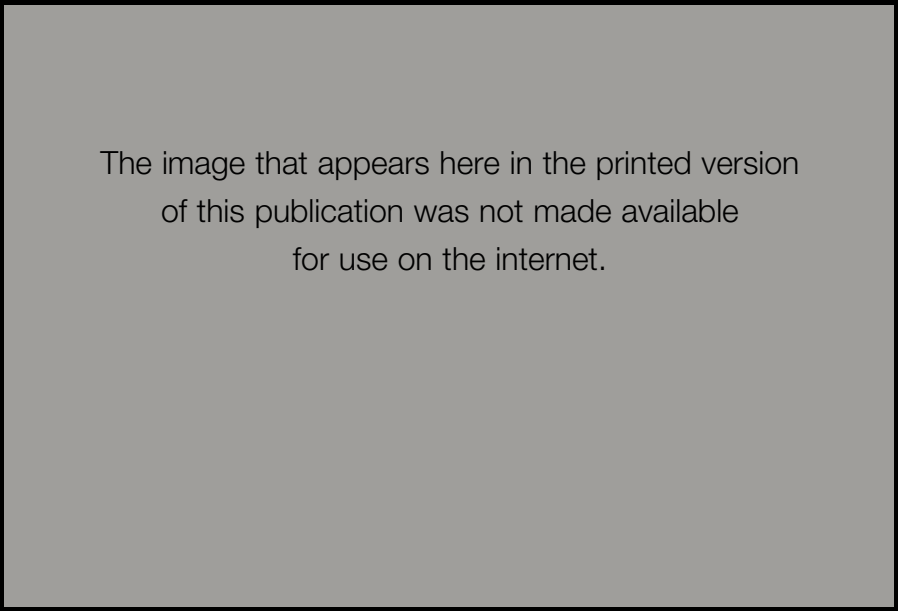
Table 3. Infant mortality (deaths per 1,000 live births) for children of mothers under age 20 compared with children of mothers age 20–29: Various countries in Asia

Country and year	Deaths per 1,000 live births	
	Mother less than 20	Mother 20–29
Bangladesh 1999/2000	103	70
India 1998/99	93	63
Indonesia 1997	63	47
Nepal 1996	120	80
Pakistan 1990/91	121	91
Philippines 1998	41	33
Sri Lanka 1987	35	33
Thailand 1987	41	34
Vietnam 1997	46	34

Source: ORC Macro, Demographic and Health Surveys, various years.
Notes: Infant mortality is expressed as the number of deaths before age 1 year per 1,000 live births. Women who give birth in their teens are likely to come disproportionately from disadvantaged socioeconomic groups where infant mortality tends to be high for a variety of reasons. Yet the relationship between mother's age at birth and infant mortality holds up even after controlling for relevant socioeconomic variables.

KEEPING TEENAGERS CONNECTED MAY REDUCE RISK

Programs that help young working people feel more connected to their communities may reduce risk behavior (Mindanao, Philippines)
© David H. Wells/Corbis



Studies suggest that closeness to parents provides some degree of protection against adolescent risk behavior. Teachers and schoolmates also appear to have a positive influence—young people who are out of school or whose schooling has been interrupted are more likely than others to engage in risk behavior.

Findings from Thailand, the Philippines, and Indonesia suggest that teenagers who do not live with their parents and do not attend school are at particularly high risk of drinking, smoking, or using drugs. Programs targeting such young people might usefully include efforts to make them feel more connected to adults and to the community in general, possibly through neighborhood clubs or young persons' groups at the workplace. Programs that feature adult mentoring may give teenagers who are away from home and out of school some of the same kinds of support that other young people receive from their parents and teachers.

Mass media campaigns targeting young people with information about risk behavior may also be effective. One encouraging sign has been the decrease in teenage smoking in Thailand where a strong anti-tobacco campaign was aimed at adolescents.

Information on the number of young people who are single has important implications for health policy and programs because single people may be particularly likely to engage in high-risk behavior. Survey data from the Philippines suggest that "the longer men remain single, the greater their risk of exposure to HIV infection" (Balk et al. 1997). Single women, who may be living away from their parents to pursue education or a career, also have important reproductive health needs.

Young people who are both single and out of school (Appendix Table 5) are one of the most difficult groups to reach with information and services. This group has grown wherever the shift toward later marriage has outpaced the rise in school enrollment. Between 1950 and 1990, the percentage of young women single and out of school rose in every major country of Asia except Japan, Taiwan, Thailand, and the Philippines.

Trends for young men have been quite different. Up to 1990, only two of the countries covered in Appendix Table 5 had major increases in the percentage of young men single and out of school—India and Pakistan. Several other countries had decreases, with the upward movement of enrollment rates easily outpacing male marriage delay.

Despite strenuous government efforts to expand educational facilities, the proportion of young women single and out of school is projected to increase still further in all but the most economically advanced countries of Asia. Government and nongovernmental programs need to be redesigned or expanded to meet the needs of this burgeoning population group (see box).

Policymakers could also make use of additional information to identify more specific segments of youth populations. Certainly a more detailed examination of urban youth would be useful, particularly of young people who have recently migrated to urban areas and are living apart from their families.

HIV/AIDS in Asia

Thailand has taken the lead in programs for people affected by HIV, including grandparents left to support and care for their grandchildren (Chiangmai, Thailand) © Wisut Jaijagcome/East-West Center

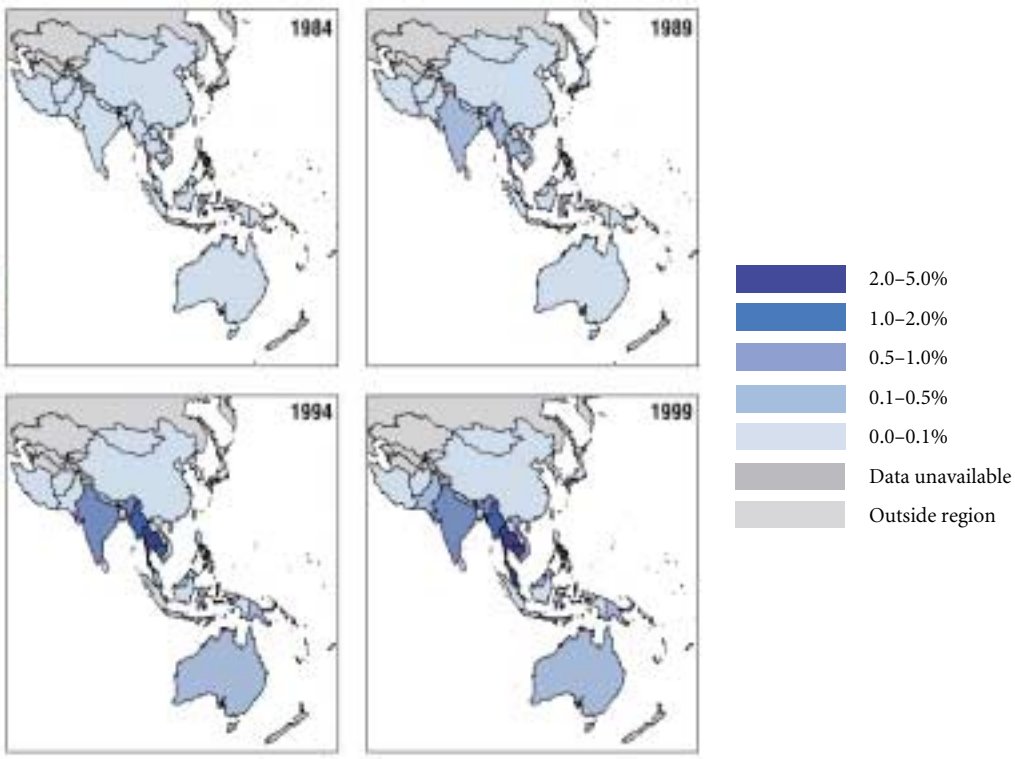
The HIV/AIDS epidemic began relatively late in Asia, and up until now, HIV infections have not reached the high levels observed in some other parts of the world. Yet behavioral patterns that increase the risk of HIV transmission—such as unprotected sex with multiple partners and needle sharing among injecting drug users—are not uncommon in many Asian societies. Without interventions to modify high-risk behavior, current infection levels may rise rapidly in many Asian countries over the next few years.

Many of the earliest cases of HIV/AIDS in Asia—reported in 1984 and 1985—were among men having sex with men. Then in 1986, an epidemic among male clients and female sex workers was detected in parts of India. By the late 1980s, significant outbreaks were reported among injecting drug users in Thailand, India's Manipur State, and Yunnan Province in China. The heterosexual epidemic exploded in Thailand in late 1988, marking the first extensive spread of HIV in a general population in Asia. This was soon followed by heterosexual epidemics in Cambodia and Myanmar. Figure 1 illustrates the spread of HIV throughout Asia over the past two decades. Appendix Table 6 gives national-level statistics on HIV prevalence in adult populations.

Infection levels among pregnant women are often used as a proxy for the extent of HIV in a general population. Based on this indicator, three countries in Southeast Asia and several states in India now have serious epidemics. In Thailand, prevalence among pregnant women peaked at just above 2 percent before aggressive prevention efforts slowed the number of new infections. Prevalence among pregnant women reached a peak of more than 3 percent in Cambodia and then began to fall as a result of prevention programs. High prevalence levels have also been detected in Myanmar, and recent data show that more than 1 percent of pregnant women are infected in parts of India.

Prevalence among pregnant women has not reached these levels in other countries of the region. In Bangladesh, Hong Kong, Laos, the Philippines, and South Korea, HIV levels in 1999 were still low in virtually all population groups, although this does not guarantee that they will remain low. China, Indonesia, Iran, Japan, Nepal, and Vietnam appear to be in a transitional phase, with recent evidence of rapidly growing HIV prevalence in particular population groups and geographic regions following more than a decade of low infection levels.

Figure 1. Rise in national-level prevalence of HIV/AIDS in Asia: 1984–99



Source: Joint United Nations Program on HIV/AIDS (UNAIDS).

Patterns of epidemic growth

Although the magnitude and timing of the spread of HIV has varied, the epidemic seems to follow similar patterns in most Asian countries. HIV appears initially as "sub-epidemics" in specific population groups and then spreads among these groups and to the general population through complex behavioral interactions. Such sub-epidemics have been described among: (1) men having sex with men; (2) injecting drug users; (3) sex workers and their clients; and (4) the wives and girlfriends of the clients and their children.

Many of the earliest AIDS cases in Asia were among men who have sex with men, and there is strong evidence of extensive spread of HIV in this group. In 2000, studies found 14 percent infection levels among men who have sex with men in Cambodia, and similar levels have been observed among male sex workers in Thailand. Small surveys in Malaysia and Myanmar have reported even higher levels, and in the past year, the number of AIDS cases among men having sex with men sharply increased in Japan. Yet policymakers and program designers have tended to neglect this group since the late 1980s when attention shifted to heterosexual transmission.

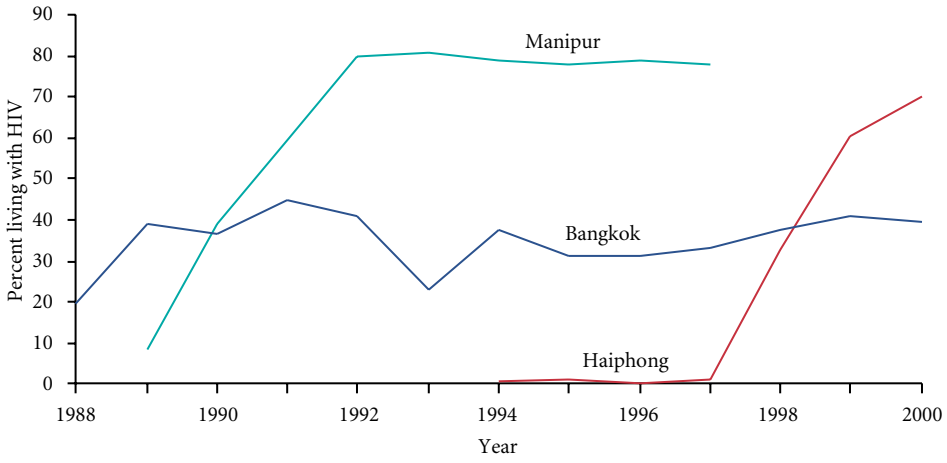
In many Asian countries, HIV also began spreading early and rapidly among injecting drug users (Figure 2). Although the virus can spread very quickly

through needle sharing, there has been little prevention work among drug users, and restrictive policies across the region work against effective prevention programs. In Manipur State, Yunnan Province, Myikyina (in northern Myanmar), and several urban areas of Thailand, HIV infection levels of 40 to 80 percent have been recorded among injecting drug users for several years. In 1999, surveys in 19 cities of Nepal found that 40 percent of injecting drug users were infected. By 2001, the infection rate in this group was also 40 percent in Jakarta, Indonesia.

HIV is emerging as a major threat among sex workers and their clients. In societies where men have greater latitude in sexual behavior than women, as in much of Asia, there is a strong demand for sex services. With a significant fraction of the adult male population using sex services, both clients and sex workers tend to have large numbers of sex partners. This results in extensive spread of sexually transmitted infections (STIs) such as syphilis, herpes, and gonorrhea. These STIs, in turn, greatly increase rates of HIV transmission. Early studies in Thailand, where sex workers had high STI levels, estimated that one in 10 sex-work contacts with an infected partner resulted in HIV transmission. Prevalence levels have risen rapidly among sex workers in urban areas of India, Indonesia, and Vietnam, as well as in Cambodia and Thailand where prevalence was eventually reduced through prevention efforts (Figure 3). Recent surveys have also shown rising infection levels among sex workers in China. Although few studies cover the clients of sex workers directly, most men seeking treatment for STIs have visited sex workers, and HIV infection levels among male STI patients have risen along with levels among sex workers.

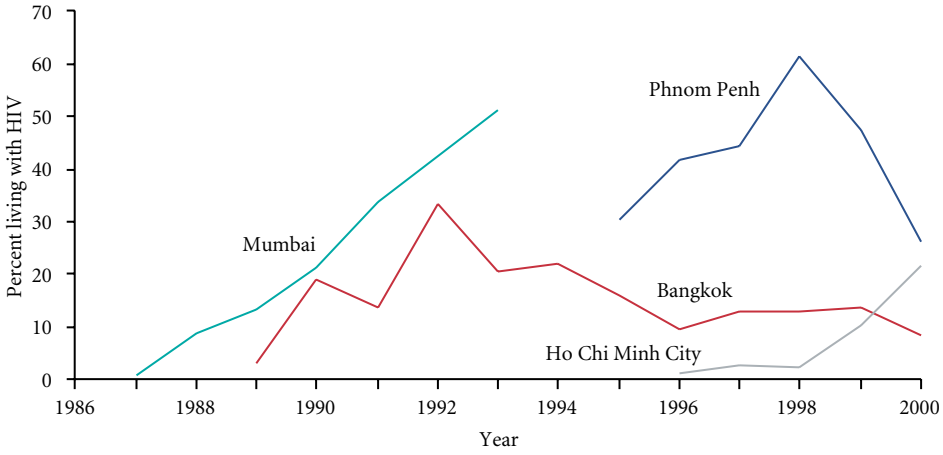
Behavioral studies have shown clear links among these three sub-epidemics. Many men who have sex with men also have female partners, many injecting drug users visit sex workers, some sex workers inject drugs, and most clients of sex workers have other partners. One study in Cambodia found that 40 percent

Figure 2. Percentage of injecting drug users living with HIV in Manipur State, India; Bangkok, Thailand; and Haiphong, Vietnam: 1988–2000



Source: National surveillance systems in India, Thailand, and Vietnam.

Figure 3. Percentage of sex workers living with HIV in Mumbai, India; Ho Chi Minh City, Vietnam; Phnom Penh, Cambodia; and Bangkok, Thailand: 1987–2000



Source: National surveillance systems in India, Cambodia, Thailand, and Vietnam.

of men having sex with men had both male and female partners in the previous month (Pisani 2001). Many of the female partners were sex workers who, presumably, went on to have sex with other clients. Similarly, a study by SHARAN (the Society for Service to Urban Poverty, a nongovernmental organization (NGO) in Delhi, India) found that up to one-third of injecting drug users had visited sex workers in the previous month. In Hanoi, one-quarter of sex workers inject drugs.

The first stages of the epidemic in Thailand provide further evidence of the behavioral linkages between these groups. Initially, different subtypes of the HIV virus were found in people infected through heterosexual contact and people infected through drug use. Over time, the subtypes converged, demonstrating the interactions between these two groups.

There is an obvious relationship between HIV sub-epidemics in sex workers and their clients, the wives and girlfriends of the clients, and their children. Studies have shown, however, that transmission from husbands to wives occurs slowly. In several states of India, the average lag between the start of an HIV epidemic in sex workers and the rise of infection levels among pregnant women has been about five years. Transmission from pregnant women to their children occurs in one-quarter to one-third of births unless antiretroviral therapies are provided during the pregnancy. And in most of Asia these therapies are yet not widely available.

The potential scale of the epidemic in Asia

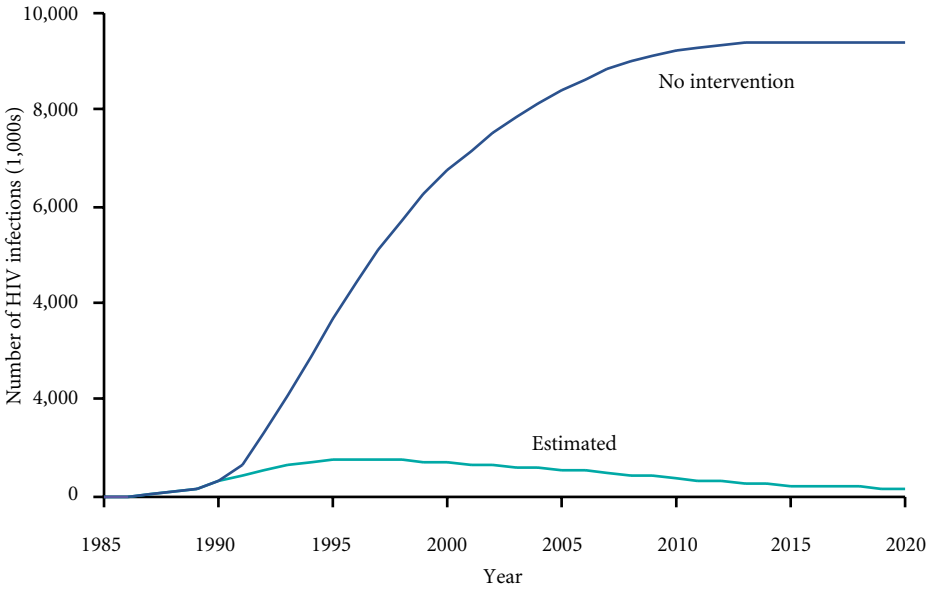
HIV infection levels in pregnant women have not yet gone above 3 to 4 percent nationally in any Asian country, but the epidemic has the potential to become much larger. In northern Thailand, for example, HIV was first reported in sex workers and their clients in 1988, when STI levels were high and few men used condoms. By the mid-1990s, more than one-fourth of young men and one-tenth

of pregnant women in the most heavily affected provinces were infected with HIV. Fortunately, Thailand had already launched an aggressive prevention program, and behavioral patterns were changing. Condom use was rising, and fewer men were using sex services. As a consequence, the number of new infections dropped quickly, and the epidemic was contained at lower levels in the rest of the country.

Yet the potential existed for a national epidemic of similar magnitude to that in the north. A large proportion of men were using sex services everywhere in Thailand—not just in the northern region. Models based on behavioral patterns at the time indicate that HIV levels among sex workers could potentially have risen to more than 70 percent, placing all sex-work clients at high risk and creating extensive HIV spread in the general population. Without Thailand's vigorous prevention programs, national HIV levels would have reached 10 to 15 percent of the adult population instead of the current level of roughly 2 percent. These prevention programs averted more than 5 million additional HIV infections (see Figure 4).

What are the risks in other countries of the region? Data from behavioral studies suggest that anywhere from 5 to 20 percent of adult men in Asia visit sex workers at least once a year, ranging from 7 percent in the Philippines to about 11 percent in Japan to 15–20 percent in Cambodia. In Thailand, the corresponding figure was about 20 percent in 1990 but fell to 10 percent in 1993 in response to prevention campaigns. Clearly, the potential exists for substantial expansion of the HIV epidemic in many Asian societies.

Figure 4. Estimated number (1,000s) of current HIV infections in Thailand and the number that would have occurred without behavioral change



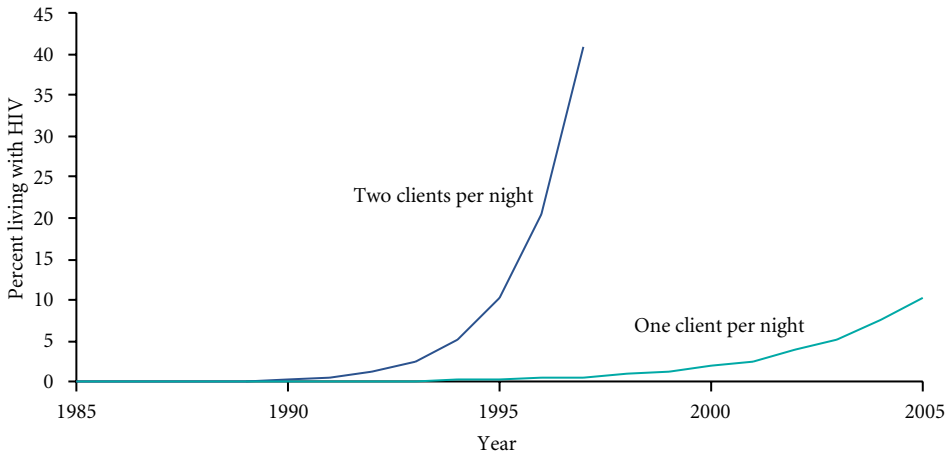
Source: Thai Working Group on HIV/AIDS Projection.
Note: Prevention programs in Thailand have averted almost 5 million infections. The lower line shows the current number of people living with HIV. The upper line shows what would have happened had behavior remained unchanged since 1990.

But while the potential exists, it is difficult to predict if and when the HIV/AIDS epidemic will begin to expand in specific Asian countries or how quickly infection levels will rise. Several factors influence the timing of sub-epidemics in specific population groups and how these sub-epidemics interact to produce an epidemic in the general population. Injecting drug use and anal sex between men can spread HIV very efficiently, raising infection levels in the affected group from zero to 20–40 percent in as little as one year. The spread of HIV among sex workers and their clients is strongly influenced by the number of clients who typically visit a sex worker each night. The epidemic can expand rapidly in this population group or can remain at low levels for a decade or more before entering a phase of rapid growth. As illustrated in Figure 5, HIV will spread much more quickly in a community where sex workers have two clients per night than in one where they only have one.

Even when substantial levels of risk behavior exist in a country, HIV takes time to reach at-risk populations. Thus, infection levels often remain low for years and then suddenly explode. In Katmandu, Nepal, for example, high levels of needle sharing were documented in 1990, but HIV prevalence among injecting drug users remained virtually at zero until six or seven years later when it shot up, reaching 50 percent in 1997. In Thailand, HIV transmission between men and women was documented as early as 1985, along with substantial levels of risk behavior and high prevalence of STIs. Yet the heterosexual epidemic did not take off until 1989.

Once an HIV epidemic takes off, how high are infection levels likely to go? Current understanding of the complex factors involved does not allow precise predictions, but large proportions of Asian men are sex-work clients, and this

Figure 5. Hypothetical effect of number of clients per night on the prevalence of HIV among sex workers: Percentage of sex workers living with HIV



Note: Results from models show that the HIV epidemic will grow much more quickly in a society where sex workers have two clients per night than where they have only one. This may be a major factor explaining the variation in rates of epidemic growth seen in Asian countries.

situation provides HIV with access to a significant proportion of the general population. Given strong behavioral linkages among the various sub-epidemics, an indication of an upswing in infection levels in any group after a long period of low prevalence should raise serious concerns.

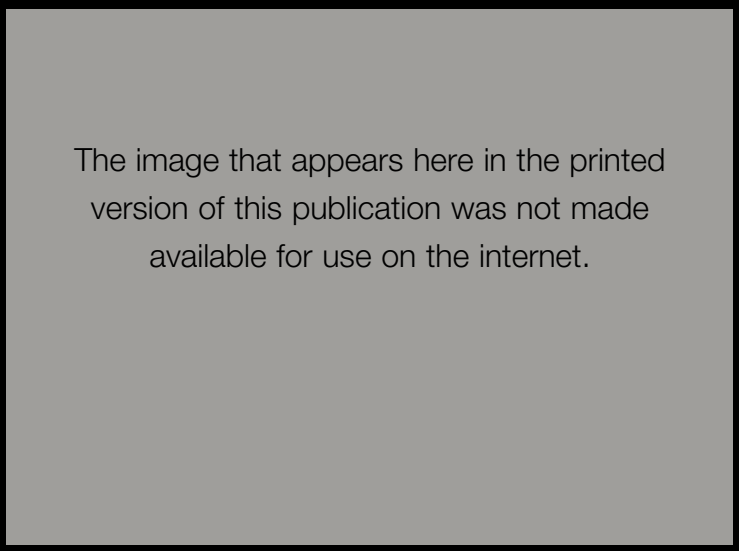
Such upswings have recently been observed in several countries. In China, little or no infection was detected among sex workers throughout the 1990s except in Yunnan Province. Now the most recent surveillance rounds have detected 10 percent prevalence levels among sex workers in neighboring Guangxi and 3 percent in Guangdong to the south. HIV levels among male STI patients are also rising rapidly in many provinces. In Indonesia, HIV levels among sex workers and injecting drug users were undetectable throughout the 1990s, but prevalence has now risen to 6 percent or higher among sex workers and 20 percent or higher among injecting drug users in several cities. Over the past two years, prevalence levels among blood donors in Jakarta, albeit at a low level, have also started to rise. In Vietnam, prevalence levels among sex workers and male STI patients in Hanoi and Ho Chi Minh City have risen rapidly over the past two to three years. Although prevalence will certainly not reach the levels found in sub-Saharan Africa, there is a clear potential for extensive spread of HIV throughout the region.

There is some good news, however, for countries facing the possibility of an HIV epidemic. Most early HIV transmission in Asia occurs in very specific groups, through needle sharing, anal sex, or sex work. Experience in Thailand and Cambodia (see box) has shown that it is possible to lower HIV transmission rates by aggressive prevention programs targeting these groups (Phoolcharoen et al. 1998; Phalla et al. 1998). By reducing needle sharing, promoting condom use, and improving STI care, it should be possible to limit the spread of HIV in other countries of the region.

Policy recommendations

Successful efforts in Thailand and Cambodia send a message that HIV prevention is both achievable and affordable. Although many countries in Asia have been slow to initiate effective prevention programs, the region has substantial advantages in addressing the epidemic. For one thing, Asian governments have seen the impact of HIV in sub-Saharan Africa. While the epidemic will probably never reach such high levels in Asia, there is substantial evidence that leaders cannot afford to be complacent.

Given prevailing patterns of HIV spread in Asia, prevention programs focusing on specific population groups can be extremely effective. In addition, many countries in the region have high literacy rates and broad-reaching mass media, facilitating efforts to raise awareness in the general population. Many Asian governments are quite stable, and some have very strong central infrastructures that can implement policy or program changes rapidly and effectively. Most



Vigorous prevention programs that target at-risk groups as well as the broader population can substantially reduce the risk of HIV (Bangkok, Thailand) © Kevin R. Morris/Corbis

Thailand and Cambodia represent two of the world's few HIV-prevention success stories. Under very different resource constraints but using similar combinations of focused prevention and broad-based social involvement, both countries have managed to reverse the course of the epidemic.

In Thailand, prevention programs for sex workers and their clients, in combination with heightened public awareness, had a quick and dramatic impact on risk behavior. After the heterosexual outbreak in 1989, condom use in sex work increased from less than 30 percent in 1990 to more than 90 percent in 1997. Between 1990 and 1993, the percentage of men using sex services declined by half. As a result, STI levels fell by more than 90 percent during the 1990s. HIV prevalence among young men peaked at 4 percent in 1993 and then declined steadily, falling below 1 percent in 2000. In pregnant women, HIV peaked at 2.4 percent in 1995 and fell to 1.1 percent in 2001.

In Cambodia, both the epidemic and the response began somewhat later. High HIV prevalence was detected among sex workers in the early 1990s, but political instability and resource constraints limited the response. As the magnitude of the problem became apparent, however, the government took a leadership role in initiating prevention activities and coordinating external donor assistance. By 1997, condom use in sex work had

reached 70 to 90 percent. Today, many men are so concerned about avoiding HIV infection that they "double bag"—that is, use two condoms when visiting a sex worker. HIV levels among pregnant women peaked in 1997—at 3.2 percent—and then declined for four straight years, reaching 2.3 percent in 2000.

In both countries, successful HIV prevention required strong political will and substantial financial resources. In 1991, Thailand's Prime Minister, Anand Panyarachun, made HIV a top national priority. He personally took the helm of the National AIDS Committee and instructed all his cabinet ministers to develop AIDS plans for their own sectors. He encouraged networking and coordination with NGOs and the private sector and authorized a budget of more than US$10 million. Subsequent Thai administrations continued this support, so that by 1996—before the Asian financial crisis—the AIDS budget had grown to almost US$90 million with more than 90 percent provided directly by the Thai government.

Similar steps were taken in Cambodia, although most of the financial support had to be mobilized from external sources. After 1995, when the first national surveillance showed high HIV prevalence, the First Prime Minister assumed the chairmanship of a reorganized National AIDS Committee. The government promoted a multisectoral approach similar to Thailand's and turned to the international donor community for support. Despite ongoing political instability and financial limitations, Cambodia initiated and sustained an effective, large-scale prevention program.

These responses shared several common features. Both governments were open about the HIV problem, widely publicizing the results of surveillance surveys, raising public awareness, and making sure that everyone knew how to prevent infection. They implemented programs that involved multiple organizations in a variety of activities targeting both sex workers and their current and future clients. They achieved good coverage—an essential factor in mounting an effective response—reaching the majority of sex workers and clients with prevention messages and ensuring wide access to condoms. They were pragmatic, recognizing that governments have to address the problem of HIV transmission in partnership with people involved in sex work rather than simply imposing ineffective legal sanctions.

But while Cambodia and Thailand have effectively addressed HIV transmission within sex work, their responses have significant gaps. Neither country has mounted any substantial effort to address risk among men who have sex with men. There have been limited efforts within this community and a few government programs in Thailand at the local level, but there is no strategic plan or significant financial support in either country for addressing this type of risk. Yet surveys among Thai male sex workers in several cities show a high rate of new HIV infections, and a survey in Phnom Penh, Cambodia, found that 14 percent of men who have sex with men are infected with HIV.

Programs in Thailand for injecting drug users have also been far too limited to produce significant results. The Thai government initiated programs for drug users in the mid-1980s when HIV prevalence started rising in this population group, but once transmission in sex work became more important, effective programs for drug users were not sustained. As a consequence, studies consistently document high rates of new infections among drug users, and almost one-fifth of all new infections are from needle sharing.

Finally, the Thai program has been slow to adapt to changing transmission patterns. The effectiveness of HIV prevention in sex work means that today half of all new infections come from spouse-to-spouse transmission. Yet the national program has placed little emphasis on this aspect of the epidemic.

have access to the resources necessary to combat the epidemic, either from their own economies or from international sources.

Careful analysis of successful prevention programs in Thailand and Cambodia points to several recommendations for other Asian governments.

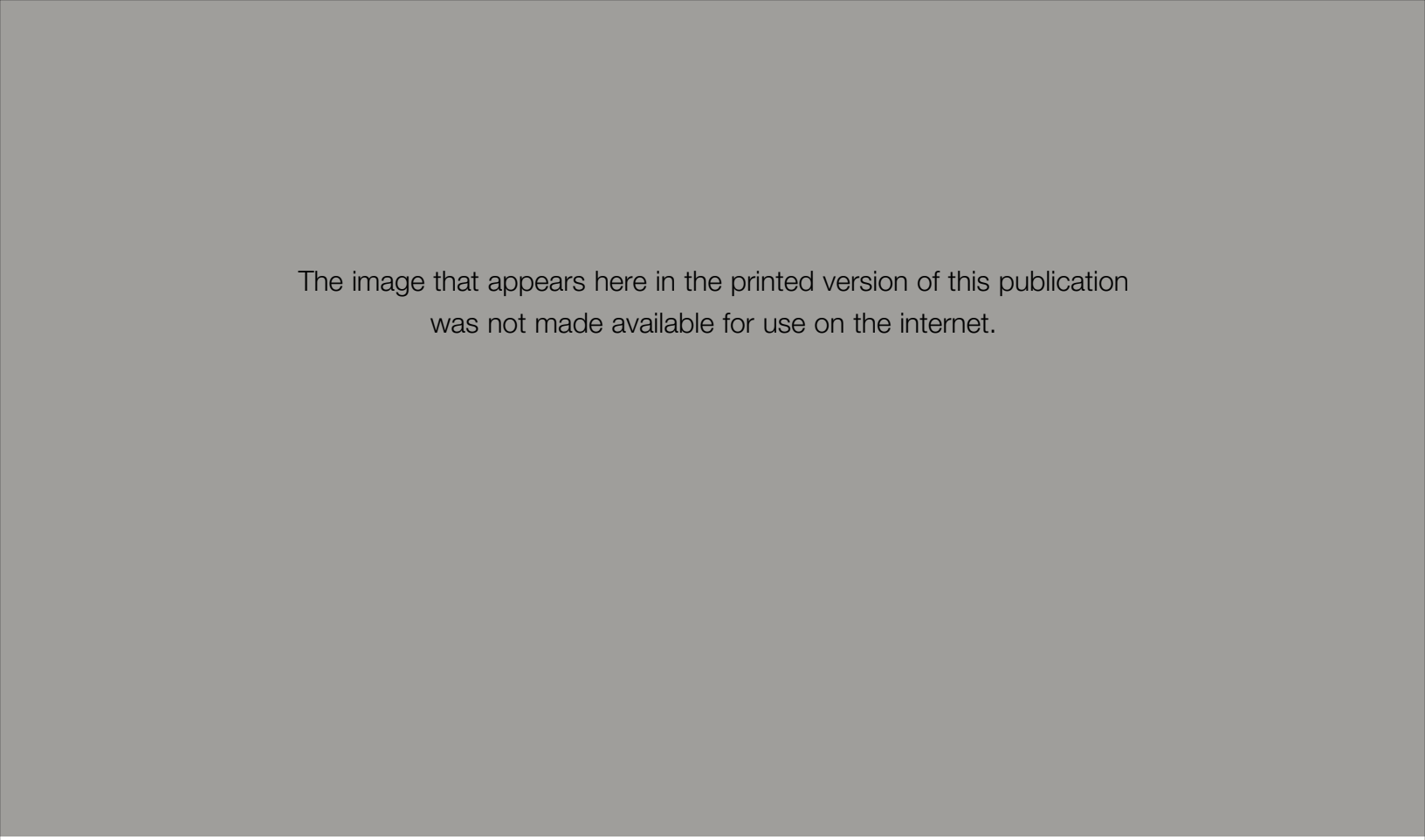
Obtain accurate information on HIV prevalence and risk behavior. Both Cambodia and Thailand reached high HIV prevalence levels quickly, as docmented by extensive surveillance systems. In some other countries of the region, information on the extent of the epidemic is inadequate because national surveillance systems are limited or flawed. In large countries, such as China, India, and Indonesia, surveillance systems still only cover a small portion of the population, resources for surveillance are limited, and data quality is often an issue.

In some countries, policymakers have also been unwilling to collect data on risk behavior. Some insist on removing all "sensitive" questions from studies on sexual behavior or refuse to support behavioral studies in the general population at all. Some focus exclusively on one aspect of the epidemic, such as injecting drug use, while downplaying other modes of transmission. This ignores the complex nature of HIV epidemics in the real world and leads to misdirected and ineffective prevention efforts. An accurate assessment of HIV risk requires constantly improving surveillance systems, expanding behavioral studies, and regular analysis of available information.

Target policymakers and leaders for sustained commitment. Perhaps the foremost barrier to HIV prevention is the tendency among many high-level policymakers to deny the existence of risk. Yet the risk of sexual and drug-related HIV transmission exists in every country of Asia. Policymakers are the gatekeepers of political will and financial resources, and it is critical that they overcome their tendency to deny the HIV threat and accept how much risk exists in their own populations.

Without the support of policymakers at the highest levels, HIV prevention cannot be put into place on a meaningful scale. Researchers and advocates must make sure that policymakers have a realistic understanding of the behavioral situation in their countries and an appreciation of the dynamics of HIV epidemics. They must convince policymakers of the importance of initiating prevention programs quickly, before an epidemic reaches the stage of rapid expansion. They must also convince policymakers to sustain these focused efforts and expand long-term support for broader prevention programs.

Provide the public with full and accurate information. A clear understanding of HIV risk and prevention strategies requires the steady dissemination of survey findings and other information. In both Thailand and Cambodia, extensive efforts were made to inform the public about the seriousness of the epidemic and the need to take preventive measures. A major component of this effort



Tomorrow's young adults must be convinced to avoid behavior that increases the risk of HIV (Rattanakiri, Cambodia) © Kevin R. Morris/Corbis

was high-quality information about HIV levels, the behavioral patterns that were contributing to the epidemic, and the means of prevention. HIV prevalence numbers were regularly presented to policymakers and the media, behavioral studies were used to demonstrate the magnitude of the problem and the need for a broad-based response, and prevention messages were distributed through multiple channels. The result was a public well aware of the magnitude of the problem and policymakers who understood that addressing the issue was in the national interest.

In many other Asian countries, HIV prevention messages have still not reached the vast majority of people. According to the 1998–99 National Family Health Survey (NFHS-2), only 40 percent of ever-married women in India have even heard of AIDS, much less know how to prevent it. Doubtless similar knowledge gaps are common in many of the predominantly rural areas of Asia. In addition, policymakers in some countries have been unwilling to support prevention messages that are too "explicit" or too direct in addressing risk. Such attitudes keep condom use low and needle sharing high, allowing HIV to spread unchecked.

Move quickly to provide effective coverage of groups most at risk. Focused prevention efforts can only work if they achieve substantial coverage among key population groups—sex workers and their clients, injecting drug users, men who have sex with men, and people living with HIV and AIDS. The dynamics

of the epidemic in several countries show the importance of acting quickly, while prevalence levels are still low. Yet the association of HIV in the early stages of the epidemic with stigmatized population groups has slowed down political and financial support for prevention programs. Even in Thailand and Cambodia, if the governments had acted two years earlier, hundreds of thousands of HIV infections would have been averted. The number of lives that can be saved by early action is even higher in populous countries such as China, India, and Indonesia.

Sustain and expand prevention activities. In addition to an early focus on groups particularly at risk, it is important to prepare for the future by convincing the larger population to reduce risk behavior. As good coverage is sought in the most critical populations, an ever-expanding set of programs needs to be initiated at the same time, addressing the multitude of social, economic, and cultural factors that contribute to HIV risk.

Government, NGO, and private-sector agencies need to work together to implement a mix of mass-media campaigns, workplace programs, and developmental activities at both national and local levels. Young people, in particular, must be convinced to adopt behavioral patterns that reduce the risk of HIV transmission. And programs must be national in focus. In the past, rural areas in many Asian countries remained somewhat isolated from outside contact, but this is changing quickly as economic growth brings rural people into urban centers and international labor migration and business travel expand. With increased mobility comes increased risk of HIV.

Convince lawmakers and local authorities to take a pragmatic approach. Sex work, while supported by traditional culture, is illegal and publicly deplored in most Asian societies. Drug use is almost universally condemned. Yet strict enforcement of laws against sex work and drugs is unlikely to alter behavior sufficiently to prevent the spread of HIV. Examples include the "Social Evils" campaigns in Vietnam and attempts to "shut down" sex work in other countries. Often, such policies just force "illegal" activities underground and make prevention efforts more difficult. Today, national drug policies are probably the primary barrier slowing down HIV prevention among injecting drug users in Asia.

Although sex work is illegal in Thailand and Cambodia, both governments took a pragmatic approach and enlisted the participation of sex workers, brothel owners, local health authorities, police, NGOs, and other partners to ensure that sex-work clients used condoms. This pragmatic approach was an important component in the success of HIV prevention programs in these countries.

Ensure the active involvement of key communities. Effective HIV prevention programs often need to work with communities, such as sex workers and

injecting drug users, whose behavior goes against official policy or law. The only way to ensure that programs actually meet the needs of the people most at risk is to involve these very people in planning, implementing, and evaluating program activities.

In addition to accurate information and access to condoms and clean needles, effective HIV prevention must address the social, economic, political, and cultural factors that create risk and vulnerability. Yet government health personnel are generally ill equipped to communicate or collaborate with sex workers, men who have sex with men, or injecting drug users. In addition, discrimination makes it difficult for such groups to be accepted as important partners in prevention efforts. One of the key lessons from two decades of HIV prevention is that it is essential to secure the active involvement of people who are most at risk. In some places local NGOs have experience in working with such groups, but in other places there are no NGOs to play this role, and at-risk populations remain largely inaccessible.

The stigma associated with HIV itself and discrimination against those living with HIV and AIDS also impede the development of effective prevention and care programs. Without accessible care and programs to address discrimination, it is difficult to recruit people living with HIV and AIDS to help with prevention efforts. This is a major limitation because experience has shown that such people are among the most effective prevention workers and spokespersons and have the best understanding of the types of program needed. Information campaigns are essential to bring people together, break down stereotypes, foster realistic images in the media, and encourage support for those at greatest risk.

Put an end to complacency. Complacency has consistently been a key factor in the spread of the HIV epidemic, and nowhere else in the world has there been more complacency than in Asia. Yet every country of the region faces the risk of a substantial rise in HIV infection levels. Whether or not the epidemic actually expands is entirely in the hands of the people of the region and their leaders.

Cambodia and Thailand have shown that HIV can be contained with good epidemiological and behavioral information, strong political will, a pragmatic approach, and effective mobilization of resources. The Philippines and India have taken the first steps toward putting effective national programs in place. The other countries of Asia have an unprecedented opportunity to avert a disaster by acting before it is too late.

Asia's Aging Population

Over the next 50 years, the number of elderly men and women in Asia will more than triple (Chiangmai, Thailand) © Wisut Jaijagcome/ East-West Center

All across Asia, the number of people age 65 and above is expected to grow dramatically over the next 50 years. For the region as a whole, the population in this age group will increase by 314 percent—from 207 million in 2000 to 857 million in 2050 (Table 1). Facing an unprecedented pace of population aging, Asian governments must tackle important policy challenges. How best can the needs of the elderly be met? Will current approaches to support the elderly place an undue burden on the younger generation? And are there dangers that programs for the elderly will undermine economic growth? These issues are also being confronted in the West where population aging is more advanced. But the process of population aging is occurring much more rapidly in Asia than it did in Western countries, and it will occur in some Asian countries at a much earlier stage of economic development.

In 2000, the average age in Asia was 29 years. An estimated 6 percent of the region's total population were age 65 and older, 30 percent were under age 15, and 64 percent were in the working-age group of 15 to 64 years (United Nations 2001). Appendix Table 7 gives the proportions in these age groups for Asia's subregions and countries. United Nations medium projections estimate that the proportion in the working-age group will be the same in 2050, at 64 percent, but there will be a dramatic shift in the proportion of children and the elderly (Figure 1). The proportion under age 15 will drop to 19 percent, and the proportion 65 and older will rise to 18 percent. The average age in Asia will be 40 years.

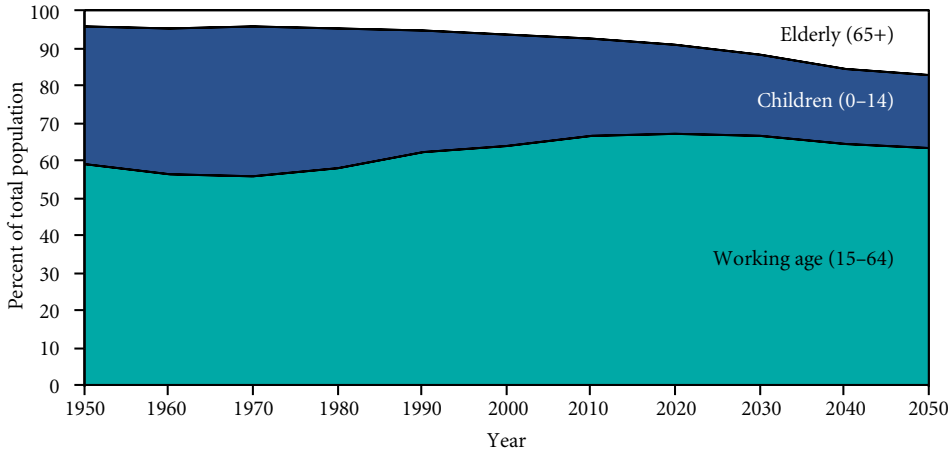
In general, the countries of East Asia are furthest along in the population-aging process, followed by Southeast Asia and then South Asia (Appendix

Table 1. Projected growth of Asia's elderly population

Region or subregion	Number of people age 65 and above (1,000s)			Percent increase
	2000	2025	2050	2000–2050
Asia	206,822	456,303	857,040	314
East Asia	114,729	244,082	393,802	243
Southeast Asia	24,335	57,836	128,958	430
South Asia	67,758	154,385	334,280	393

Source: United Nations (2001).
Notes: All data are based on the United Nations medium fertility variant. The analysis includes Taiwan.

Figure 1. Asia's age transition: Proportions of working-age adults (age 15–64 years), children (age 0–14 years), and elderly (age 65+ years), 1950–2050



Source: United Nations (2001).

Table 7). The exceptions are Singapore in Southeast Asia and Sri Lanka in South Asia, where relatively large proportions of the population are elderly, and Mongolia in East Asia, where the proportion elderly is still small.

Japan has the oldest population in Asia, with 17 percent age 65 and older, and the most rapidly aging population in the world. The United Nations medium scenario anticipates that 29 percent of Japanese will be 65 or older by 2025 and 36 percent will be 65 or older by 2050. Bangladesh, by contrast, has the youngest population of any major country in the region, with 3 percent 65 or older in 2000. But even Bangladesh and Asia's other young populations will experience rapid population aging during the coming decades. Bangladesh's 65-and-older population is projected to rise to 5 percent in 2025 and 11 percent in 2050.

Future trends for Asia's elderly

More will be in the oldest age groups. Today, Asia's elderly are concentrated primarily in the younger segments of the old-age population group. Over time, however, the greatest increases in population will occur in the oldest age groups. Of all Asians age 55 and older, roughly one-half are now between the ages of 55 and 64, about one-third are between 65 and 74, and not quite one-sixth are 75 and above. These proportions will remain fairly stable over the next 25 years, but over the following 25-year period the proportion in the oldest age group (75 and above) is expected to increase substantially—from 15 percent in 2000 to 17 percent in 2025 and then up to 27 percent in 2050.

Most will be women. In most countries of Asia, as in the rest of the world, older women outnumber older men, particularly in the oldest age groups. Today, among the population age 55 and above, there are about 90 men in Asia for every 100 women. Among those age 75 and above, there are only about 70 men

for every 100 women. This is a persistent feature of Asia's population that is not expected to change much over the next 50 years.

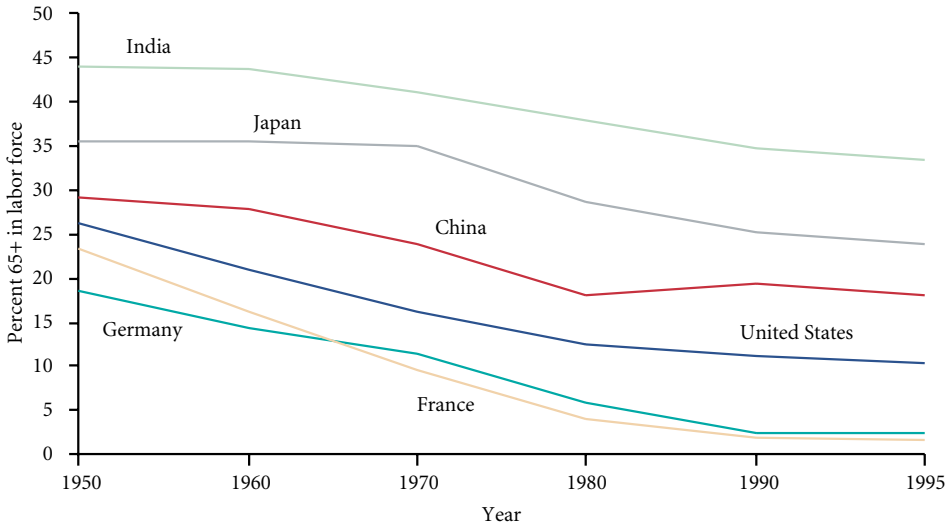
Fewer will be widowed. Traditionally, nearly everyone in Asia has married, and very few have divorced. Thus, most of the elderly are living with a spouse or are widowed. As life expectancies rise, the proportion of the elderly who are widowed at any given age will decline sharply. Women will be especially affected because they are much more likely than men to be widowed. Today, for example, just over one-half (52 percent) of all South Korean women age 65 to 69 are widows. This proportion is expected to drop to 17 percent in 2050. In Thailand, 32 percent of women in this age group are widowed today, also projected to drop to 17 percent in 2050. Among men age 65 to 69, only 8 percent are widowers in South Korea and only 10 percent in Thailand. Because the proportions of men widowed are already low, the decline will be more modest for men than for women.

They will have fewer adult children. In many Asian countries, the elderly have more surviving adult children today than at any time in history, a consequence of previous declines in infant and child mortality. In 1990, Korean women in their sixties, for example, had 4.4 surviving children on average. With the decline in childbearing, however, elderly parents will be increasingly dependent on only one or two adult children. Women in Japan who turned 65 between 1995 and 2000 were the first Japanese women in the 20th century to have an average of only two surviving children (Feeney and Mason 2001). Given low levels of childbearing in China (including Hong Kong), Japan, Singapore, South Korea, Taiwan, and Thailand, many elderly women in the future will have even fewer than two surviving children. The illness, death, or estrangement of even a single adult child will threaten the viability of the traditional family support system for the elderly.

They will retire earlier. With economic development, workers everywhere in the world tend to retire at younger ages (Figure 2). In part, this reflects the greater wealth of older workers. But it also reflects larger numbers who are subject to mandatory retirement ages or retirement plans that penalize those who continue to work. Although older adults are much more likely to work in Asia than in Europe or the United States, the proportion of all Asian elderly in the labor force has already declined and is projected to decline further—from 38 percent of the population 65 and above in 1950 to 25 percent in 2000 and 22 percent in 2010. The estimated median retirement age for men dropped from 67 in 1960 to 63 in 2000.

Labor-force participation varies widely among specific subregions and countries. Forty-one percent of Japanese men age 55 and above were still working in 2000, projected to drop to 29 percent in 2050. Labor-force participation

Figure 2. Trend toward early retirement (percent of age 65+ in labor force): India, Japan, China, Germany, France and the United States, 1950–95



Source: International Labor Office (1995).

is higher for Indian men in this age group and is projected to decline much less—from 46 percent in 2000 to 41 percent in 2050.

Older women in Asia are much less likely to work than older men. In 2000, there were about 150 working men age 55 and above for every 100 working women. The preponderance of men in the work force is even larger in the oldest age groups. Among those 65 and above, there are 250 men in the labor force for every 100 women.

Policy options for an aging region

Efforts to assure adequate support for Asia's expanding elderly population focus on four approaches. These are: (1) policies and program that enhance traditional Asian systems of family support; (2) policy reform that encourages the elderly who are still capable to remain in the work force; (3) institutions and systems that support high levels of personal saving; and (4) public programs, including pension schemes and national healthcare systems.

Family support systems. In most traditional Asian societies, the elderly live in extended, multigenerational households and rely on their adult children, their spouses, and other family members for material needs and personal care. During the 1980s, more than three-quarters of the elderly in Asia were living with children or family (World Bank 1994). During the 1990s, about two-thirds were living with their adult children, ranging from about one-half in Kazakhstan to more than four-fifths in Pakistan and Bangladesh (Bongaarts and Zimmer 2001).

Today, the traditional family support system is under pressure from demo-

graphic, social, and economic change. In countries where fertility has been low for decades, the elderly have few adult children to provide support, and many of these children have moved away from their family homes. Marriage rates have dropped sharply in some countries, and women are entering the work force in increasing numbers. Middle-aged women, the traditional caregivers, are likely to have less time than they did in the past to care for elderly family members. Increasing exposure to the West may also be introducing new ideas about marriage, family, and individualism—ideas that clash with the traditional sense of responsibility for the elderly.

It is not clear how quickly or to what extent these pressures will undermine traditional family support systems. Family support for the elderly is already on the decline in some of Asia's most economically advanced countries. The proportion of Japanese elderly living with their children dropped from 80 percent in 1950 to 50 percent in 1990 (Ogawa and Retherford 1997). In South Korea, the proportion of elderly women living with their children declined from 78 percent in 1984 to 47 percent in 1994. In Taiwan, the proportion of elderly parents living with a married son declined from 82 percent in 1973 to 70 percent in 1986 (Weinstein et al. 1994).

The expectations and preferences of today's working-age adults suggest that even fewer of the elderly will live with their children in the future. In 1997, only 8 percent of South Korean women of childbearing age indicated that they wished to live with their children when they grow old (Lee 1998). Although the actual proportion of elderly living with their children has not gone down in the Philippines, fewer working-age adults wish to live with their children in the future (Natividad and Cruz 1997).

The changes in living arrangements probably indicate a broader decline in family support. In 1996, only 15 percent of elderly men and women in Japan mentioned children as a source of income, down from 30 percent in 1981 (Ogawa and Retherford 1997).

Even if the elderly wish to rely on their children, the family support system will become less effective as people have fewer children and live longer. Lee and others (2000) show that by 2050 a fully functioning family support system will be able to meet only about one-half of the retirement needs of the elderly in East Asia's low-fertility countries. To meet their retirement needs fully, the elderly will have to work longer, save more, or rely on substantially enhanced public programs.

The challenge for public policy is to assess the viability of family support systems and to devise programs that will be supportive or complementary. Several governments have adopted such policies. In Singapore, children are now legally responsible for the support of their elderly parents. Many East and Southeast Asian countries are providing adult day care and other support services aimed at helping adult children care for their elderly parents. Malaysia and Singapore have revised their public housing policies to accommodate

multigenerational living arrangements, and Malaysia also provides families with tax incentives for elderly care (World Bank 1994).

Greater employment opportunities. For many Asians, early retirement is a welcome component of general improvements in the standard of living. Yet policies that specifically promote—or dictate—early retirement are damaging in several ways. First, older workers who are not yet financially prepared for retirement are forced to accept a lower standard of living during their retirement years. Second, economic growth is reduced by the loss of human capital. Despite claims to the contrary, there is no convincing evidence that encouraging early retirement increases job opportunities for the young. Third, the fiscal viability of public pension and healthcare programs is threatened by the decline in the number of earners and taxpayers relative to the number of beneficiaries. These issues are particularly salient in aging societies, but eliminating work disincentives and labor market impediments is sound economic policy under any circumstance.

Today, mandatory retirement ages range from a high of 65 in Japan to a low of 55 in India, Indonesia, and Singapore (Table 2). China, Vietnam, Pakistan, and Sri Lanka impose a lower retirement age for women than for men, despite the fact that women generally live longer than men and may spend many years in old age without employment or a spouse to provide financial support. One policy option is to raise these mandatory retirement ages or to eliminate them altogether.

With fewer adult children to provide support, many men and women in Asia will be forced to continue working into old age (Nepal)
© Ann Sturley/East-West Center

A second policy option is to encourage firms to retain older workers by making employment conditions more flexible. Because wage systems in many Asian countries are based on seniority, employers may believe that older workers are receiving wages and benefits that are too high relative to their productivity. Many firms also have inflexible rules about work hours that make it impossible for older workers to retire gradually by working part time.

Employers will be more willing to hire and retain older employees if they have the flexibility to hire them on a part-time basis, to modify their responsibilities as their capabilities change, and to pay them a wage commensurate with productivity rather than seniority. Such flexible employment options will become increasingly attractive to Asian employers as the growth of the labor force slows down.

Flexible and part-time employment options may be especially attractive to women, who make up a majority of the elderly but a minority of the elderly work force. Occupational retraining programs and general educational upgrading will also allow older men and women to take up new occupations and to cope with technological change in the workplace.

Improving the flexibility of the labor market, of course, raises a danger that older workers will experience reduced responsibilities or wages for reasons unrelated to their capability. Governments need to set up effective systems for monitoring and correcting problems related to age discrimination in the workplace.

Table 2. Mandatory retirement ages: Selected Asian countries

Country	Mandatory retirement age	
	Men	Women
China	60	55
Japan	65	65
South Korea	60	60
Indonesia	55	55
Philippines	60	60
Singapore	55	55
Vietnam	60	55
India	55	55
Pakistan	60	55
Sri Lanka	55	50

Sources: Social Security Administration (1999); United Nations (1999).

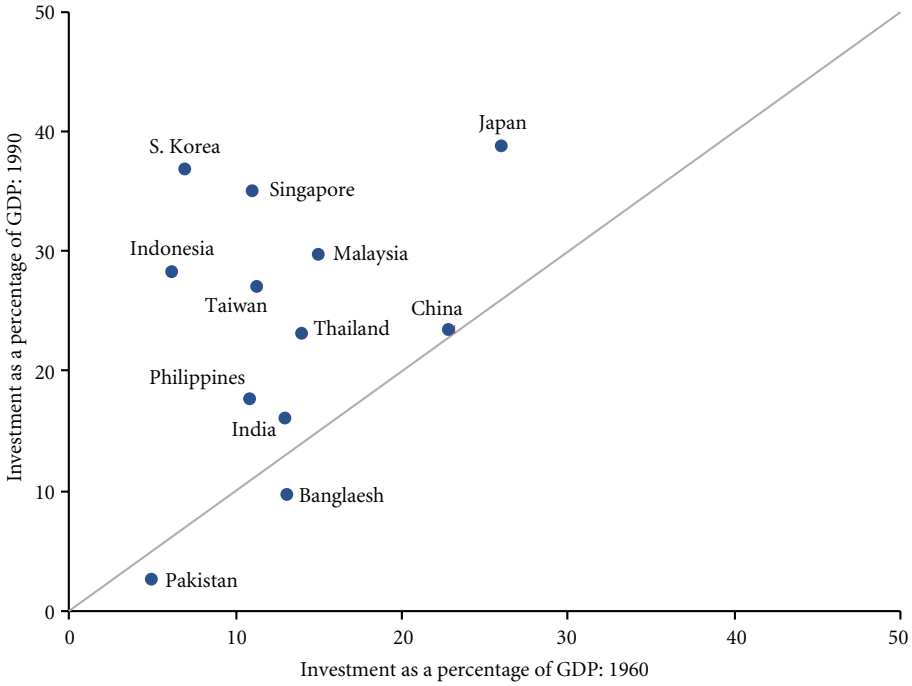
Saving and financial reform. Rapid population aging in Asia has been accompanied by a dramatic increase in saving and investment. In 1960, saving and investment rates were extremely low in countries such as South Korea, Singapore, Indonesia, and Thailand, but by 1990, these countries had some of the highest saving and investment rates in the world (Figure 3). In Bangladesh and Pakistan, saving rates remained low over the same 30-year period, and investment as a percentage of gross domestic product (GDP) went down.

High rates of personal saving have important implications for national development. The dramatic increase in saving and investment in some Asian countries has played a decisive role in the region's unprecedented economic growth. High rates of saving also provide an important source of retirement income for the elderly who do not wish to work or to depend on their children for old-age support. Unfortunately, low rates of return and financial turmoil in recent years have wreaked havoc with the savings of many who are retired or nearing retirement.

In countries where saving rates are low, policymakers have several options if their goal is to encourage workers to save toward retirement. One priority is to ensure that the nation's financial institutions provide attractive and secure long-term investment opportunities. A second is to control the rate of inflation so that money saved today will retain its value in the future. Several government policies have been designed to influence saving rates more directly. Some countries, such as Singapore and Malaysia, have established retirement programs that require workers to contribute to personal saving accounts.

The difficulty in many Asian countries is not so much the level of saving as the level of risk and return. In recent years, the failure of financial institutions and the precipitous decline in property and equity values have had a disastrous

Figure 3. Investment as a percentage of gross domestic product (GDP) in 12 Asian countries: 1960 and 1990



Source: Penn World Tables.
Note: Countries that experienced sharp increases in investment rates over the 30-year period (with dots well above the trend line) were characterized by rapid economic growth.

impact on those who had planned to depend on their personal wealth for support during retirement. In Japan, with nominal interest rates near zero, retirees can count on little interest income from their saving accounts. More than any demographic group in Asia, the elderly stand to benefit from far-reaching financial reforms to correct these problems.

Pension programs. During the past 60 years, national governments throughout the world have come to play an increasingly important role in providing old-age security for their citizens. Many Asian countries offer some type of support program for the elderly. Japan and Singapore have large-scale programs with close to universal coverage, but in most countries coverage is restricted to narrow population groups (Table 3). The Employees Provident Fund in India, for example, restricts coverage to employees in one of 177 prescribed occupations working in establishments with at least 20 workers.

The relatively modest scope of programs in most Asian countries is also reflected in financial measures of their size. In 1993, the proportion of public expenditure earmarked for social security programs was only 2 percent in the Philippines and 8 percent in South Korea, compared with 22 percent in the United States and more than 40 percent in most European countries.

Public pension programs offer two important advantages. First, they represent a politically acceptable means of providing an economic safety net for

those of the elderly who might otherwise experience severe levels of poverty. Second, national programs allow risk pooling. Individuals who must provide for their own retirement needs may make poor investments. They may suffer a disability that curtails their income-earning capacity or experience unusual longevity and outlive their savings. Public programs can spread these risks and provide a monthly benefit that lasts as long as the beneficiary survives. Most also include some form of disability insurance.

Public programs entail their own set of risks, however. First, providing wide coverage may entail enormous administrative hurdles, particularly in low-income countries with large numbers of agricultural, self-employed, casual, domestic, and informal-sector workers. It is notoriously difficult to collect pension payments in sectors where labor turnover is high and documentation is weak (Bailey 1997). Recent legislation in the Philippines, for example, requires that household help and self-employed workers be covered; yet there is probably a substantial gap between coverage under the law and coverage in practice.

Second, public pension programs are only feasible in countries with a substantial degree of political stability. The taxing ability of a government may decline, or the political regime may change, with new leaders backing out of promises made by their predecessors. As governments obtain privileged access to large pension reserves, they may also make unwise investments or pursue large-scale public infrastructure projects without adequate scrutiny of potential risk and return (World Bank 1994).

Third, public pension programs that are not carefully designed will prove to be unsustainable as the number of elderly increases relative to the working-age (and taxpaying) population. Many countries have pay-as-you-go systems in which current retirees are supported not by their own savings, but by contributions from current workers. Current workers will, in turn, be supported in old

Table 3. Coverage of pension schemes: Selected Asian countries, 1992

Country	Percent of work force covered
Japan	100
Singapore	100
Malaysia	96
Philippines	53
South Korea	26
China	21
Indonesia	7
India	1
Bangladesh	0

Sources: International Labor Office (1995); Japan International Social Security Association (1999).

age by the next generation of workers. As the number of retirees increases relative to the number of workers, either payroll taxes must rise to very high levels, or benefits must be reduced to very low levels, or some combination of the two. There is little doubt, for example, that Japan's public pension program will face enormous difficulties in the coming years.

For a country such as Japan with a large and unsustainable program, reform is urgent. Other Asian countries that are about to experience rapid aging but lack the strong political and financial institutions critical to meeting the needs of the elderly face an even bigger challenge.

Healthcare systems

Population aging will place an increasing burden on national healthcare systems. Among the world's economically advanced countries, including Japan, healthcare spending per capita is about four times higher for people age 65 and older than for the rest of the population. Whatever the level of economic development, population aging presents challenges in financing and delivering healthcare.

As people live longer, there is a growing demand for care related to conditions such as cardiovascular disease, cancer, chronic obstructive pulmonary disease, osteoporosis, vision impairment, and dementia. At the same time, many countries in Asia still face much higher prevalence rates of childhood diseases—such as acute respiratory infection and measles—than countries in the West. They also face a continuing need for reproductive-health services and increasing costs of treating new and re-emerging infectious diseases such as HIV/AIDS, drug-resistant tuberculosis, and malaria.

The focus of healthcare systems in many developing countries, including India, Indonesia, and the Philippines, is currently on maternal and child health and reproductive-health services. In countries that have not yet achieved basic healthcare for all, treating disease and disability among the elderly is generally not a high priority. In these countries, a major challenge will be to meet the needs of expanding elderly populations without sacrificing essential services for everyone else.

In many countries, spending on healthcare has been going up for years, in part as a result of population aging. Between 1960 and 1997, healthcare spending in Japan increased from 3 to 7 percent of GDP. Between 1970 and 1997, the increase in South Korea was from 2 to 6 percent. The difficulty is that other countries in Asia have expanding elderly populations with associated healthcare needs, but at much lower levels of economic development. Given the high costs involved, adequate healthcare services for the elderly may simply be beyond the reach of many Asian countries.

Asian governments are taking a variety of approaches to healthcare financing. In India, individuals and households pay for three-quarters of all healthcare expenses out of pocket. In South Korea, out-of-pocket payments account for

Pension and healthcare programs for the elderly will require a difficult balance between growing needs and the willingness of taxpayers to provide support (Fujian, China)
© Patrick Zachmann/Magnum

about one-half of healthcare expenditures, while Japan has universal health insurance funded by individuals and their employers with significant government subsidies. Premium structures in Japan are designed to generate cross-subsidies from the rich to the poor and from the young to the old. In Thailand, 59 percent of the population is covered by some type of health insurance, while the Philippines is attempting to achieve universal health insurance coverage by 2010.

Many of the challenges faced by the healthcare systems in these countries are similar to those faced by pension schemes. Both require a difficult balance between the needs of the elderly and the willingness of taxpayers to support large, expensive public programs.

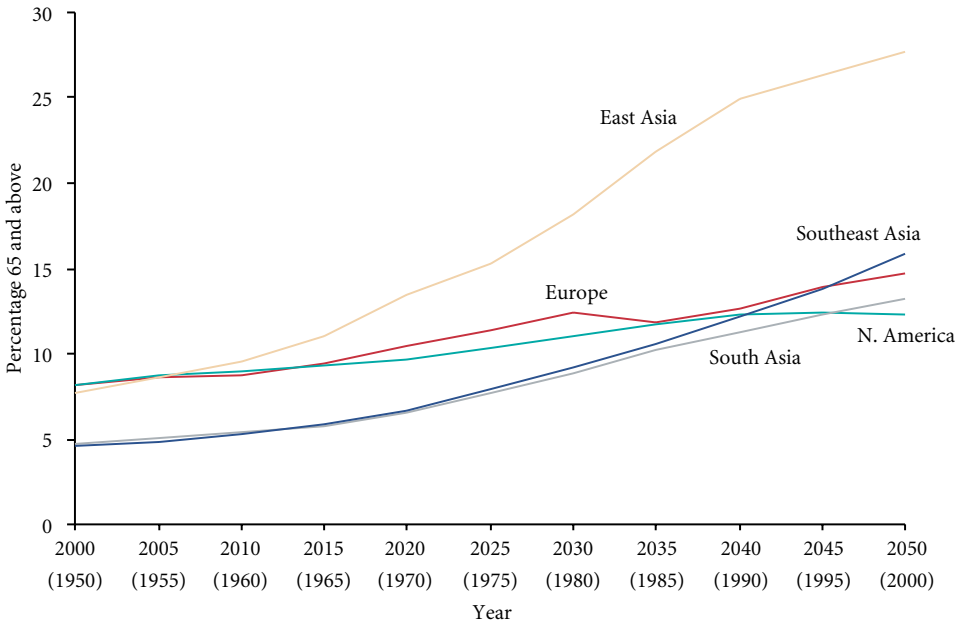
Today, population aging is much more advanced in Japan than in the other countries of Asia. The temptation might be to dismiss aging as an issue that need not be considered until some point in the future. To do so would be a mistake.

Although Asian countries are just beginning to experience population aging, the process is occurring much more rapidly than was the case in Europe or North America (Figure 4). Changes that occurred over 50 years in the West are being compressed into 20 to 30 years in Asia.

Not only will Asian countries have less time to prepare for aging, but most will have to meet the challenges of aging at much lower levels of development than in Japan or the West. The reason is that aging is occurring more rapidly than economic growth.

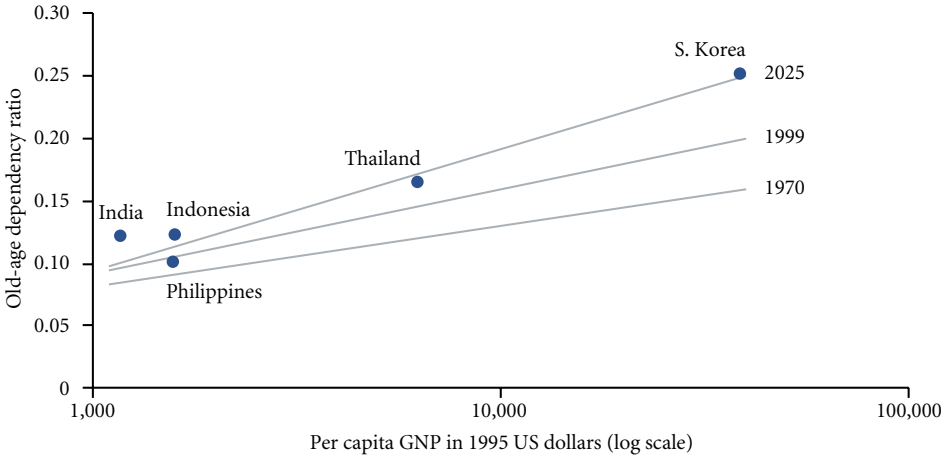
Figure 5 shows the simple statistical relationship between the old-age dependency ratio and income in 1970, 1999, and 2025. The old-age dependency ratio is calculated as the number of elderly (age 65 and above) in the population for each working-age adult (age 15 to 64), while income is expressed as the per capita gross national product (GNP) in 1995 US dollars. Based on World Bank data for 104 countries, the 1970 and 1999 lines show that higher-income countries had to cope with higher old-age dependency ratios in both years, but the line for 1999 is higher than the line for 1970, indicating a significant shift in the

Figure 4. Expected trend in aging in the major regions of Asia in 2000–2050, compared with the experience of Europe and North America in 1950–2000



Source: United Nations (2001).
Notes: The "x" axis for years depicts two scales: from 2000 to 2050 for the subregions of Asia and from 1950 to 2000, in parentheses, for Europe and North America. All data are based on the United Nations medium fertility variant. The analysis includes Taiwan.

Figure 5. Old-age dependency ratio and per capita gross national product (GNP) for 104 countries worldwide in 1970 and 1999 and projected for 15 Asian countries in 2025



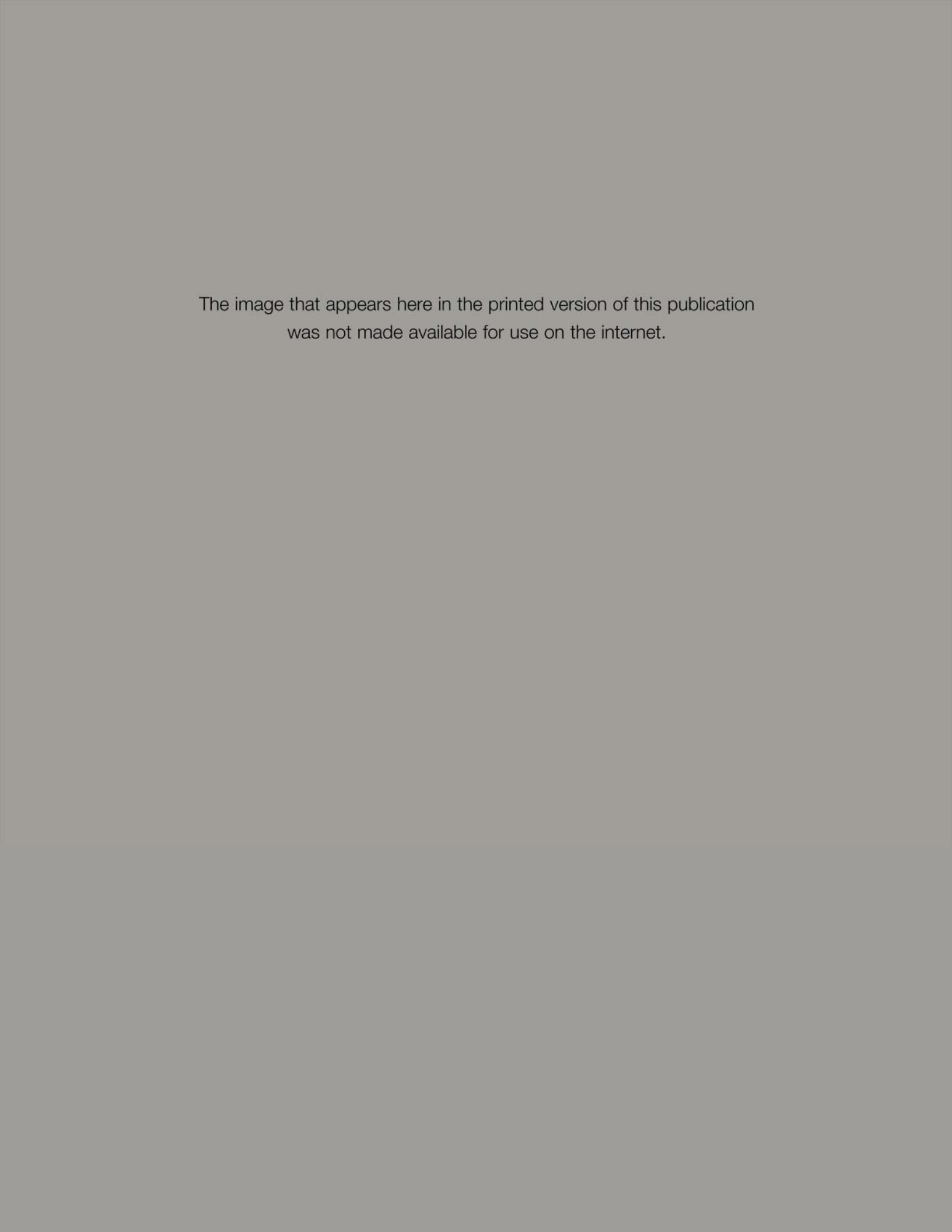
Sources: World Bank (2001); United Nations (2001).
Notes: The old-age dependency ratio is the number of elderly (age 65 and above) in the population for each working-age adult (age 15–64). Data points for individual countries are projections for 2025.

relationship between population aging and income. The typical country with an old-age dependency ratio of 0.15 in 1970 had a per capita GNP of US$26,000, while the typical country with an old-age dependency ratio of 0.15 in 1999 had a per capita GNP of only US$7,400.

The relationship between population aging and income will likely continue to shift in the same direction. The 2025 line shows the relationship between the old-age dependency ratio and per capita GNP in 15 Asian countries. The figure also shows specific 2025 estimates for five countries. The calculation assumes that per capita income will continue to grow at the same rate as in the 1990s and that the United Nations medium population projections will prove to be accurate. Under these conditions, a typical country with an old-age dependency ratio of 0.15 in 2025 will have a per capita GNP of only US$3,800.

Many Asian countries may simply not be able to afford a large dependent elderly population. Perhaps even more important, they might not have the necessary institutions and financial systems in place, including efficient and well-managed pension and healthcare programs, capital markets, and accounting and regulatory systems.

In some respects Asia is fortunate because aging is not as advanced (except in Japan) and because Asian public-support programs are not as ambitious—or unsustainable—as in the West. Asia also has the advantage of studying the successes and failures of policies and programs implemented elsewhere in the world. Today, the region is at a critical juncture. Countries such as Indonesia, Thailand, and China will need to establish or extend programs for the elderly very quickly, and they need to think very carefully about how these programs should be structured and managed.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was not made available for use on the internet.

Population Change and Economic Development: Success Stories from Asia

Forty years ago, the countries of East and Southeast Asia were among the most densely populated in the world. In most countries of the region, natural resources were limited, populations were growing, and standards of living were low. Few observers were optimistic about the region's development prospects. Beginning in the 1960s, however, several East and Southeast Asian countries adopted and vigorously pursued policies that have successfully slowed population growth and accelerated economic development.

The experience of six Asian countries—Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia—provides strong evidence that economic gains can be achieved by lowering rates of childbearing. Between 1960 and 1990, childbearing and population growth rates dropped steeply in these countries. During the same period, all six countries also achieved unparalleled economic development, progressing from poverty to catch up with, or even surpass, the high-income countries of the West. But did demographic change in general—and population policies in particular—play an important role in achieving economic success?

The situation in 1960

In 1960, per capita gross national product (GNP) in Japan was US$8,208 in constant 1995 US dollars (Appendix Table 1), compared with US$13,330 in the United States. In the other five countries, per capita GNP was much lower, ranging from US$252 in Indonesia to US$2,776 in Singapore.

The experience of Asia's fastest-growing economies provides strong evidence that lowering fertility can boost economic growth (Singapore)

Except in Japan and Thailand, a history of foreign domination had undermined the development of strong political and economic institutions. War and revolution—World War II, civil war in China, and the Korean War—had destroyed much of these countries' national institutions and wealth, and efforts to rebuild physical infrastructure and industrialization were hampered by low saving and investment rates. Although the economies were overwhelmingly agricultural, prospects for increasing food production or agricultural employment appeared bleak, especially in Japan, South Korea, and Taiwan where the supply of arable land was extremely limited. With the exception of Indonesia's large petroleum reserves, the countries were poorly endowed in natural resources.

Accelerating rates of population growth—due to high birth rates and declining death rates—were also a serious concern. In the 1950s, population growth rates reached historically high levels in Japan, Korea, Taiwan, and Singapore, and were rising in Thailand and Indonesia. Significant declines in infant and

child mortality were leading to much larger families and to large concentrations of population at young ages.

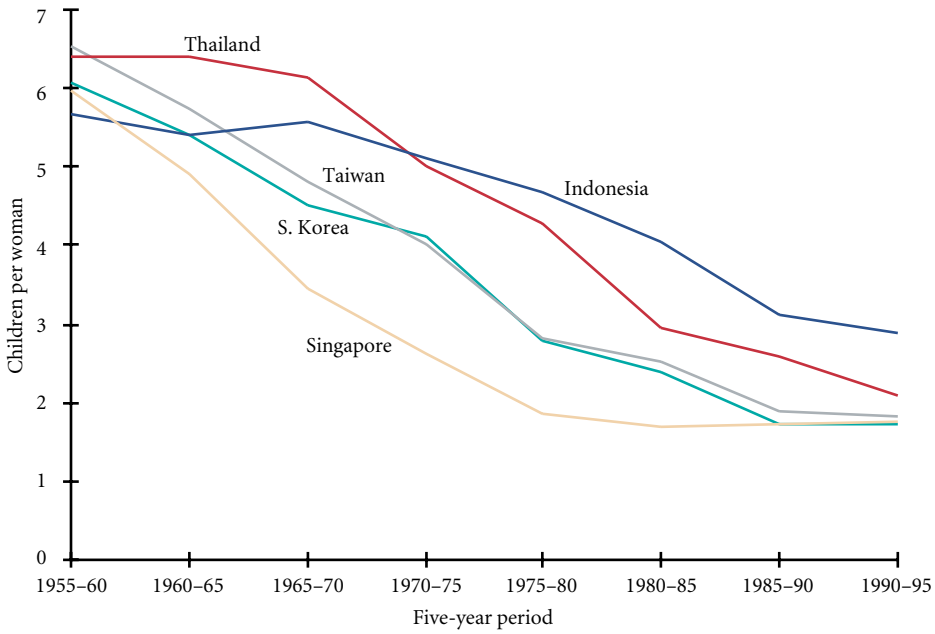
In Japan, South Korea, and Taiwan, there were also a few bright spots. Income inequality was relatively low, in part as a consequence of wartime destruction. In Taiwan and South Korea, major land-reform programs had also helped reduce inequality. The three countries all benefited from relatively high levels of literacy and significant pools of educated manpower. Substantial levels of foreign assistance, especially from the United States, helped with reconstruction efforts.

Slowing down population growth

Beginning in the 1960s and 1970s, women in South Korea, Taiwan, Singapore, Thailand, and Indonesia reduced their rate of childbearing at remarkable speed (Figure 1). The pace of this transition to low fertility is unique in history. Of 81 countries in the world that had total fertility of 4.5 children per woman or higher in 1960, only six managed to bring births down to two or fewer per woman by 1990. These were South Korea, Taiwan, Singapore, Thailand, Hong Kong, and China (Feeney and Mason 2001).

As a result of the decline in childbearing, Japan's population growth dropped to only 0.2 percent per annum by the early 1990s. Population growth in South Korea, Taiwan, Singapore, and Thailand declined to about 1 percent per annum. In Indonesia, where fertility declined somewhat later, population growth dropped to 1.6 percent per annum by 1990–94.

Figure 1. Total fertility rate (average number of children per woman): Singapore, South Korea, Taiwan, Thailand, and Indonesia, 1955–95



Source: United Nations (1994).

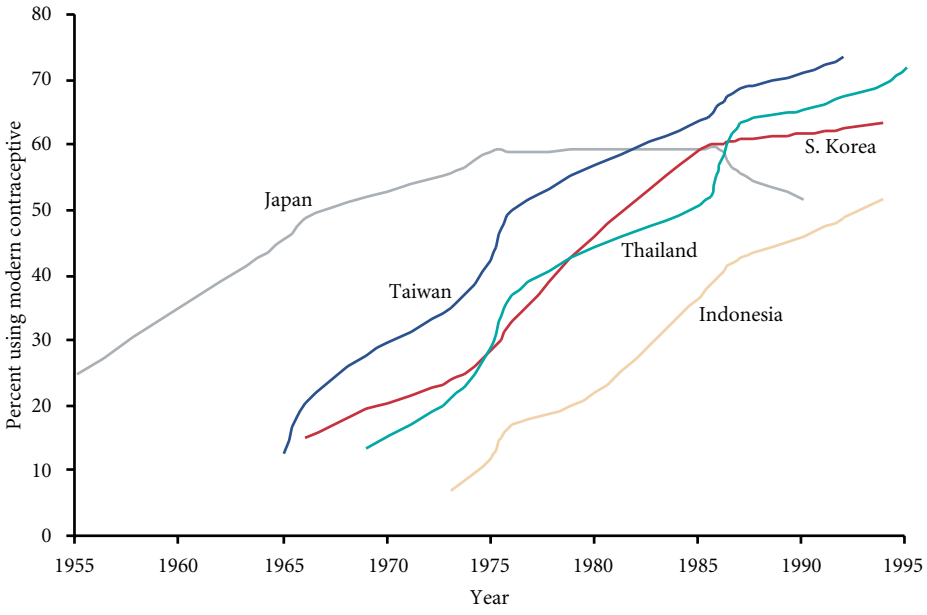
What caused the remarkable decline in fertility? Delays in marriage accounted for some of the drop in childbearing, but the most important factor was the overwhelming acceptance of modern contraception among married women. In all six countries, more than half of married women of reproductive age now use a modern contraceptive method. Prevalence rates for modern contraceptives in the mid-1990s ranged from 52 percent in Indonesia to 74 percent in Taiwan (Figure 2).

In evaluating the factors that contributed to increased contraceptive use, it is difficult to weigh the role of government family planning programs against the effects of social and economic development. The Japanese government reduced legal impediments to contraception and abortion and supported nongovernmental organizations (NGOs) that promoted family planning. The other five countries established national family planning programs that were arguably the best managed in the world.

Reductions in child mortality, increases in life expectancy, gains in female employment, higher wages, improved educational opportunities for women, and a host of other factors contributed to changing attitudes toward childbearing. Fertility preferences may have changed more rapidly because of government initiatives, but how large a contribution did government education and persuasion efforts make? And what was the true impact of government programs that made effective, safe, and inexpensive birth control widely accessible?

In an effort to estimate the contribution of family planning programs compared with the impact of economic and social development, Tsui (2001) concludes that total fertility in other developing countries might have been lower by at least two births per woman by 1994 had they implemented family planning programs similar to those in the Asian countries considered here.

Figure 2. Percentage of married women of reproductive age using modern contraceptive methods: Japan, Taiwan, South Korea, Thailand, and Indonesia, 1955–95



Source: Tsui (2001).

Although policies and programs made a strong contribution to fertility decline, it was not possible to achieve population stabilization overnight. Between 1950 and 1995, Japan's population increased by 50 percent, the populations of South Korea and Indonesia more than doubled, and those of Taiwan, Singapore, and Thailand nearly tripled (Feeney and Mason 2001).

Meeting development challenges

In 1960, rapid population growth presented the six countries with two key challenges. These were to feed their growing population and to provide jobs for their expanding labor force.

Despite the limited supply of agricultural land, the food challenge was met with spectacular success. Food production grew dramatically, easily outstripping population growth. Between 1963 and 1992, food output per capita increased by 36 percent in Asia as a whole and by 47 percent in East Asia. During the same period, food production per capita increased by only 13 percent in Latin America and declined by 7 percent in Africa. East Asia succeeded by greatly increasing agricultural yields through the development of new, high-yielding rice varieties combined with increased levels of fertilizer and other agricultural inputs (Hayami 2001).

The employment challenge was met most successfully in Japan, South Korea, and Taiwan, where expansion of manufacturing and service-sector employment was sufficient to match the rapidly growing working-age population and also absorb substantial numbers of agricultural workers and women newly entering the labor force. Between 1960 and 1990, while the total labor force was expanding, the agricultural labor force actually declined in these countries—by 4 percent per year in Japan, by 2 percent in Taiwan, and by 1 percent in South Korea.

In Asia's most successful economies, food production has increased dramatically, easily outstripping population growth (Shimane, Japan)

Thailand and Indonesia coped with the challenge of an expanding labor force somewhat differently and less effectively than the other countries. Both achieved rapid growth in manufacturing and service-sector employment, but these sectors were so small in 1960 that, even with rapid expansion, they could not absorb all the new entrants to the labor force or draw workers out of agriculture. Thailand managed to absorb substantial numbers of agricultural workers by expanding land under cultivation. In Indonesia, agricultural production intensified, as indicated by a drop in arable land per agricultural worker.

In Japan, South Korea, and Singapore, labor productivity in the agricultural sector grew even more rapidly than in manufacturing and services. In Taiwan, labor productivity also grew rapidly in agriculture. But in Indonesia and Thailand, where the agricultural sector had to absorb large numbers of new workers, labor productivity in agriculture grew much more slowly (Table 1). Not only was this a drag on economic growth but also a source of rising inequality between urban and rural residents.

All six countries achieved remarkable economic growth, beginning in the


平成8年度 高齢者生産活動支援事業

1950s in Japan, in the 1960s in South Korea, Taiwan, Singapore, and Thailand, and in the 1970s in Indonesia. From 1960 to 1990, South Korea, Singapore, Taiwan, and Japan were among the five top-performing economies in the world (with Hong Kong), and Thailand and Indonesia were not far behind (Figure 3). In spite of population growth, per capita income in South Korea increased nearly 10-fold between 1960 and 1999—from US$1,321 to US$11,958 in constant 1995 US dollars (World Bank 2001). In Singapore, per capita income rose from US$2,776 to US$28,486 during the same period.

In addition to increases in food production, job creation, and per capita incomes, all six countries achieved substantial improvements in literacy and educational attainment. Rates of saving and investment rose to high levels, and the more-advanced economies became major lenders on international capital markets. The status of women improved, as evidenced by substantial declines in the gender gap in educational attainment, employment, and wages.

In retrospect, fears about the development impact of population growth per se were probably exaggerated. Substantial population growth was accommodated in Japan, South Korea, Taiwan, and Singapore with no apparent adverse economic effects and in Thailand and Indonesia with only modest difficulties. Several points should be born in mind, however. The first is that population growth, although significant, did slow substantially during this

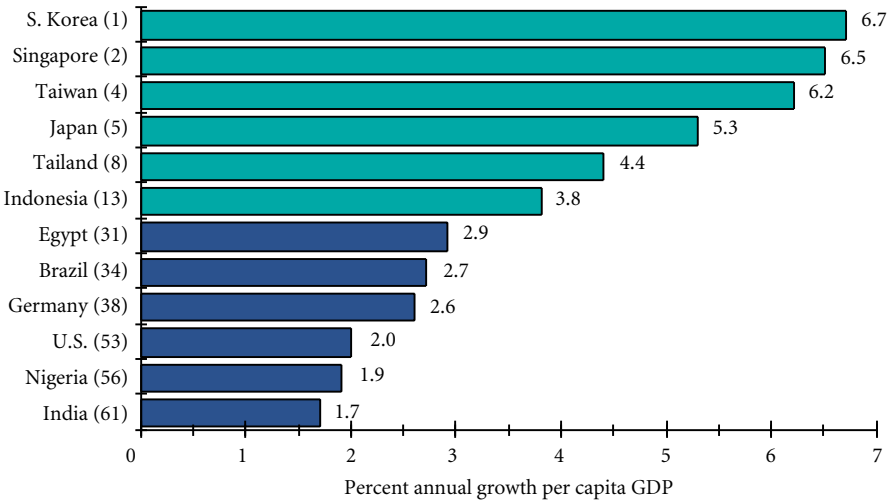
Table 1. Summary of labor statistics: Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia, 1960–90

Statistic	Japan	South Korea	Taiwan[a]	Singapore	Thailand	Indonesia
Annual labor force growth, 1960–90 (%)						
Agriculture	–3.9	–1.2	–1.9	–6.5	2.0	1.5
Nonagriculture	2.3	5.4	5.4	3.7	5.5	4.5
Combined	1.2	2.9	3.1	3.5	2.9	2.5
Intensification of agriculture: Hectares arable land per agricultural worker						
1970	0.47	0.38	0.54	0.18	0.88	0.61
1990	0.88	0.55	0.84	0.20	0.86	0.47
Percentage of total labor force in manufacturing and services						
1960	66.9	38.7	43.9	92.6	16.3	25.2
1990	92.7	81.9	87.4	99.6	35.9	44.8
Labor productivity: Annual growth in GDP per worker, 1960–90 (%)						
Agriculture	4.5	4.4	4.1	5.9	1.8	1.2
Nonagriculture	4.2	3.7	4.4	4.6	2.9	3.2
Combined	4.9	5.0	5.7	4.8	4.5	3.4

Source: Mason (2001).

[a] Labor force statistics for Taiwan are based on employment rather than on the labor force.

Figure 3. Percent annual growth of per capita gross domestic product (GDP): Selected countries, 1960–90



Source: Summers and Heston (1991).
Notes: All GDP figures are expressed in 1995 international prices and are taken from the Penn World Tables. International rankings are in parentheses.

period because of the rapid decline in fertility. Secondly, the favorable outcome in these countries was not automatic, but a consequence of effective development policies combined with a favorable international economic environment.

The third point is that changes in population age structure, childbearing, and life expectancy created special opportunities for rapid economic growth. These opportunities came in three forms: the emergence of a large gap between population growth and potential labor force growth; changes in incentives and age structure that favored higher rates of saving and investment; and changes in incentives and age structure that favored greater investment in human resources. The success of the six countries discussed here is based in large part on how they seized these three opportunities.

Opportunity one

Expansion of the potential labor force. Declining fertility and mortality in the six Asian countries resulted in changes in the age structure of their populations. Of particular importance to economic growth were changes in the size of the working-age population relative to the two dependent populations—children and the elderly.

In addition to favorable changes in population age structure, Asian economies benefited substantially from increased participation of women in the labor force. Women's greater participation in the formal labor force can be traced to a complex set of changes, some demographic (later age at marriage and declining childrearing responsibilities), others economic (rising wages and changes in employment structure), and still others political (changes in tax codes and policies on gender discrimination) (Bauer 2001; Okunishi 2001).

Table 2. Population and labor force growth: Average annual growth rates in major world regions, 1960–90

Region	Annual growth rate (percent)		
	Population	Labor force	Difference
Asia: High-performing economies[a]	1.9	2.7	0.8
Europe and North America	0.8	1.1	0.3
Latin America	2.3	2.7	0.4
South Asia	2.6	2.5	–0.1
Africa	2.6	2.3	–0.3

Source: Mason 2001.
Note: Values are unweighted averages of country values.
[a] Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia.

Between 1960 and 1990, the labor force in Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia grew more rapidly than the total population by an average of 25 percent (Table 2). The result of this "demographic bonus" was an increase in per capita income of about 0.8 percent per year.

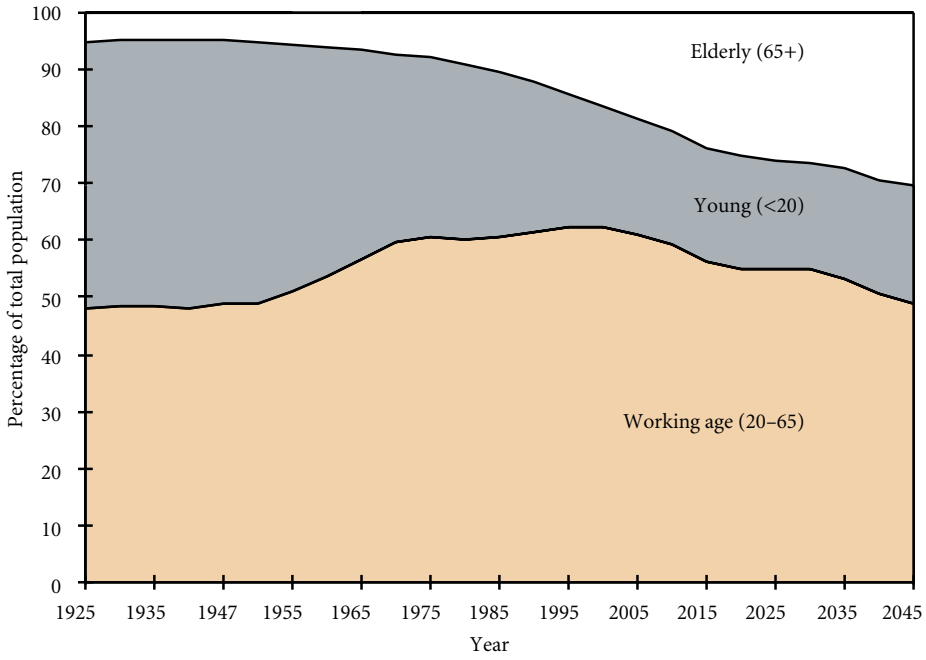
All six countries are progressing through three phases. During the first phase, dependent populations grow relative to working-age populations because declining infant and child mortality rates lead to increasing numbers of children. During the second phase, working-age populations expand relative to dependent populations because the number of dependent children stabilizes (or declines) with lower birth rates while working-age populations increase as the large number of children from the first phase grow older and enter the work force. During the third phase, the number of dependent children remains stable or declines, expansion of the working-age population slows and may begin to decline, and the older dependent population grows rapidly.

Between 1960 and 1990, populations in the six Asian countries were largely in the second phase. Japan has now entered the third phase (Figure 4), and the other countries will follow in the coming decades.

Opportunity two

Favorable conditions for saving and investment. Studies of economic development in East Asia consistently find that capital deepening—the increase in capital per worker—is one of the primary reasons why economic growth has been so outstanding. Between 1965 and 1990, capital per worker grew at an annual rate of more than 8 percent in South Korea and Taiwan, nearly 8 percent in Japan, and more than 6 percent in Thailand (Figure 5). This was two to three times faster than the growth of capital per worker in the United States. In fact, Japan surpassed the United States in terms of capital per worker in 1988.

Figure 4. Transition in the age structure of Japan's population: 1925–2045



Source: Mason (2001).

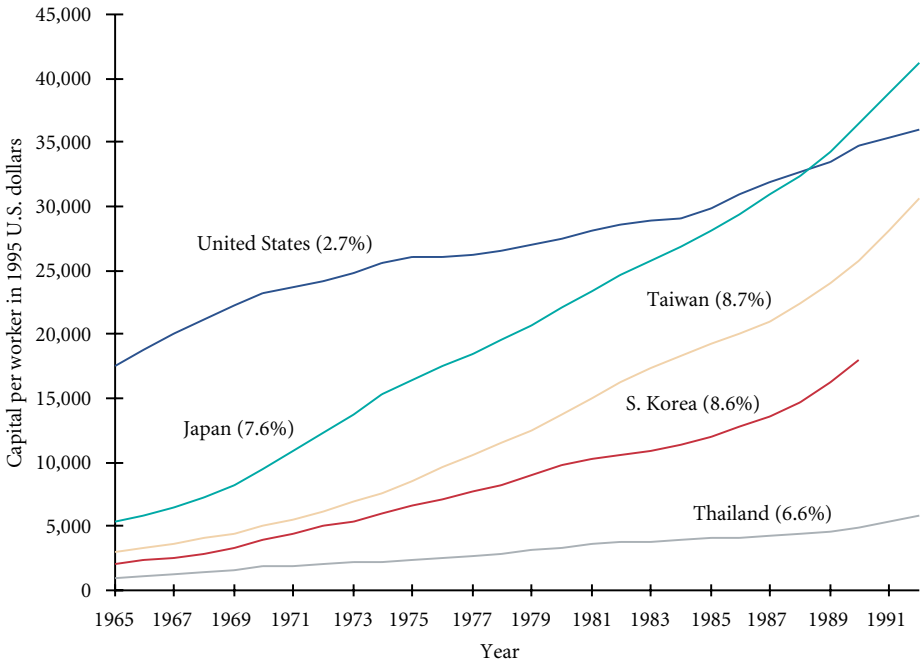
The rapid pace of capital deepening can be traced to high and increasing rates of saving and investment. Compared with levels in the 1970s, average annual saving and investment nearly doubled in the 1980s and nearly doubled again in the 1990s. In Japan, Taiwan, and Singapore, saving rates have been high enough to finance all domestic investment plus substantial investment abroad. In 1992, for example, the current account surplus for Japan—essentially Japan's net foreign investment—totaled US$121 billion, compared with US$70 billion for all other surplus countries in the world combined.

Why are saving rates so high in East Asia? Recent research shows that changes in population age structure, childbearing, and life expectancy all have an effect. As East Asians have fewer children, they can afford to save more. With life expectancy increasing and the average retirement age declining, they also have a greater incentive to save in anticipation of longer periods of retirement. In Japan, the expected retirement period for men nearly doubled between 1975 and 1990—from 4.4 to 8.7 years.

In the past, elderly East Asians relied on their children for old-age support, but with fewer children, the elderly will increasingly rely on accumulated wealth for economic security. In Japan, the proportion of men and women age 60 and above who mentioned children as a source of income dropped from 30 percent in 1981 to 15 percent in 1996.

Although researchers agree that these demographic changes have helped raise saving rates, estimates of the size of the effect vary greatly from study to study. Employing a "middle-of-the-road" estimate for Taiwan suggests that higher rates

Figure 5. Rising capital per worker: United States, Japan, Taiwan, South Korea, and Thailand, 1965–91



Source: Summers and Heston (1991).
Note: Average annual growth rates are in parentheses.

of saving and investment due to changing demographic factors accounted for 18 percent of the increase in output per worker between 1960 and 1990. When combined with the relative expansion of the labor force compared with the dependent population, it appears that demographic factors accounted for about 28 percent of Taiwan's increase in output per capita. This compares with an estimate based on econometric evidence by Bloom and Williamson (1998) that demographic changes accounted for about one-third of East Asia's "economic miracle."

Opportunity three

Favorable conditions for investment in human resources. Fertility decline has an almost immediate impact on education budgets, both for families and for nations. Fewer births mean fewer children entering school some years later. If a country's education budget remains constant, then expenditures per school-age child will be higher. Alternatively, a reduced share of national income can be invested in education without reducing expenditures per child. Fertility decline has a similar impact on resources available for child-health programs and on family-level spending on child health and education.

Over the past few decades, the countries of East Asia have actually increased, rather than reduced, the share of national income invested in education. In Taiwan, for example, the decline in the relative size of the school-age population in the 1970s and 1980s was accompanied by an increase in the share of

GNP devoted to education. Combined with the rapid growth of GNP as a whole, this allocation of resources resulted in a dramatic increase in expenditure per school-age child.

Increasing funds available for education can be used either to improve or expand the schooling system, or a combination of both. In South Korea, the proportion of the school-age population enrolled in school increased from 54 percent in 1950 to 97 percent in 1990. In Indonesia over the same period, the increase was from 21 percent to 81 percent. In other countries, the additional funds available for education have been used primarily to increase expenditures on existing students rather than bringing more students into the system. In some countries, funds have been used to reduce class size, in others to improve the quality of teachers.

Given the lag time between investment in children and improvements in the characteristics of workers, fertility decline could not have influenced labor-force quality to any great extent until the 1980s or later. The important effects of population change on human-resource development will be felt more in the future than evidenced in the past (Ahlburg and Jensen 2001; Jensen and Ahlburg 2001).

Policy lessons

Between 1960 and 1990, Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia were extraordinarily successful in reducing fertility and slowing population growth, in overcoming the potential problems associated with the population growth that did occur, and in turning changes in population age structure to their economic advantage. How this was accomplished is an important story because the experience of these countries offers four lessons for other countries facing similar problems.

The first lesson is that, given the right conditions and policies, it is possible to reduce fertility to low levels with remarkable speed. Within a period of two to three decades, the total fertility rate dropped in four of these countries—South Korea, Taiwan, Singapore, and Thailand—from six births per woman to two births per woman or less. Fertility declined earlier in Japan, and the process is still ongoing in Indonesia. For the most part, coercion did not play an important role in any of these countries.

Second, there are different paths to low fertility. In Japan, social and economic development drove fertility to low levels in the absence of strong government population programs. Social and economic development played a role in the other countries, but government programs were also very important, encouraging couples to reduce their childbearing and providing them with effective family planning methods at low cost.

Third, the development impact of population change is complex and multifaceted. During East Asia's unusually rapid demographic transition, countries

To reap the benefits of fertility decline, governments need effective policies to promote gainful employment and encourage saving and investment (Seoul, South Korea)
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were experiencing large changes in population size and growth rates, birth and death rates, and age structure. These demographic changes influenced the relative sizes of the dependent and working-age populations, the economic role of women, incentives for saving and investment, and decision-making about investing in the health and education of children.

Fourth, the development benefits of fertility decline and demographic transition are not automatic. Favorable outcomes depend to a great extent on effective development policies. In the countries considered here, the gap between labor force and population growth was advantageous only because a wide range

of successful development policies provided gainful employment to the expanding number of workers. These policies included outward-looking strategies that encouraged domestic enterprises to compete in the global marketplace; stable macroeconomic policies that ensured low rates of inflation, discouraged capital flight, and promoted economic efficiency; and the use of financial incentives, subsidies, and access to credit to promote the growth of key industries.

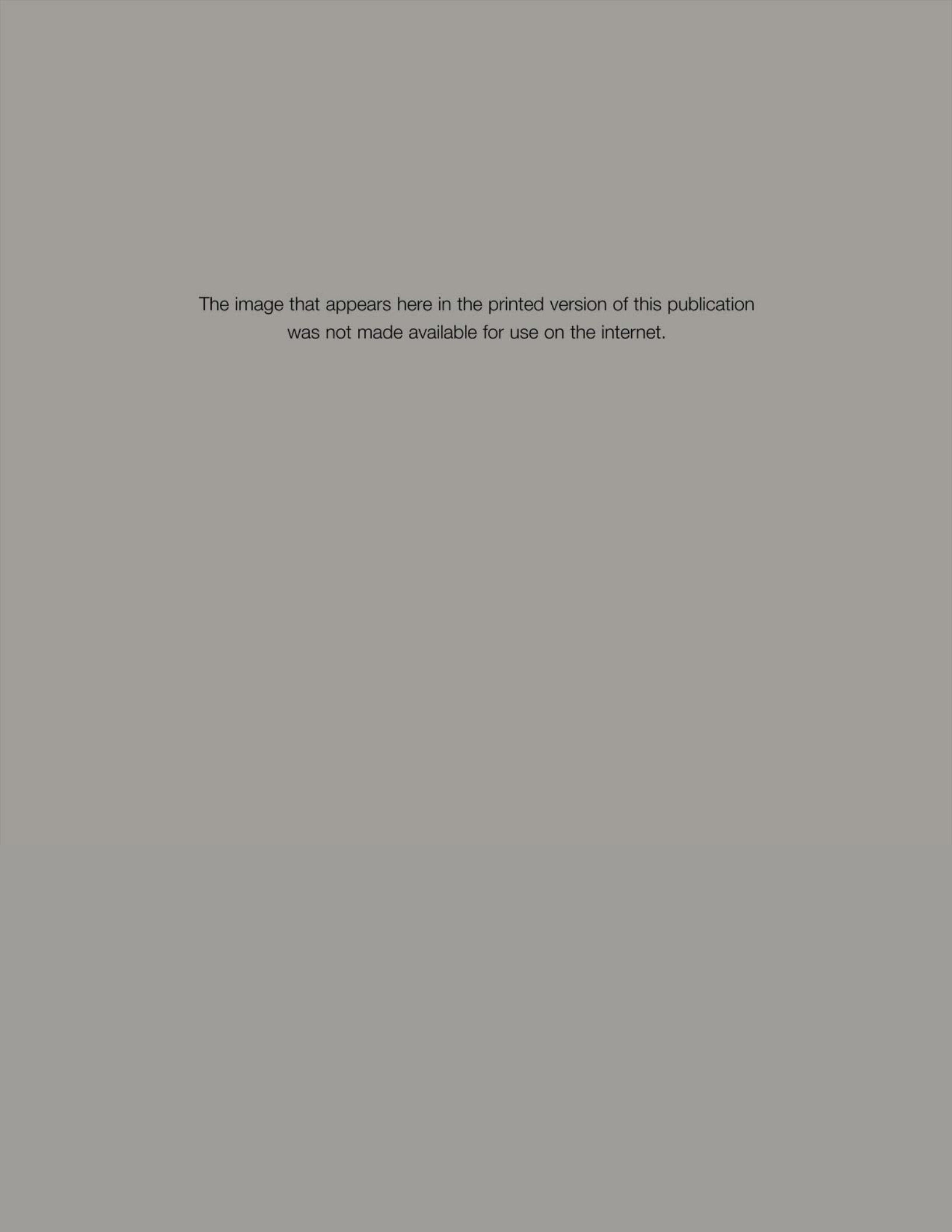
Similarly, demographic change led to high saving rates because macroeconomic stability and the development of financial institutions encouraged saving and because governments avoided large-scale transfer programs (such as expensive public pension schemes) that might have undermined saving incentives. Changes in the population age structure led to greater spending on education because both governments and parents attached a high priority to education. Changes in the childbearing responsibilities of women had a favorable economic effect because governments eliminated laws and administrative policies that discriminated against women in the workplace. In short, rapid demographic change was a necessary but by no means sufficient condition for rapid economic growth.

And what about the future? Although economic trends will ultimately depend on myriad forces, demographic conditions—except in Japan—will favor strong economic growth for several decades to come. Populations will be heavily concentrated at the working ages, high rates of investment in education will ensure an educated, productive labor force, and high rates of saving will support additional capital deepening at home and investment abroad.

First in Japan and later in the other countries, saving rates are likely to decline as the elderly population grows more quickly than other age groups. This possibility has been the source of a good deal of pessimism about the future of the Japanese economy. Is this pessimism warranted? Probably not.

The anticipated downturn in saving rates in Japan, and eventually elsewhere in East Asia, mirrors not only demographic changes, but also fundamental changes in capital requirements. At the end of World War II, the investment opportunities in Japan were enormous. There were severe shortages of capital due to war-time destruction, and a rapidly growing labor force had to be "equipped." Under these circumstances, high rates of saving and investment could fuel rapid economic growth. In recent years, attractive domestic investment opportunities have not kept up with the accumulation of wealth so that Japan's high level of saving is increasingly financing the country's remarkable rate of foreign investment.

In the absence of a new economic miracle, the extraordinary growth rates of the past four decades are unlikely to continue in Japan. Yet the economic growth that has already occurred has allowed the Japanese to achieve a standard of living among the highest in the world, with a per capita GNP in 1999 of US$42,783. Several other East Asian countries are following the same path. Such a situation should not be grounds for undue pessimism.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Population, Natural Resources, and Environment

Asia has a wealth of natural resources and ecological and biological diversity. Yet population growth and economic development are threatening the region's rich heritage through the expansion and intensification of agriculture, the uncontrolled growth of industrialization, the destruction of natural habitats, and urban sprawl.

The interplay between population growth, resource depletion, and environmental degradation has been a matter of debate for decades. For the most part, the argument has been between those who view population numbers per se as the main culprit in increasing pressure on the environment and those who place more blame on economic development, nonsustainable agricultural and industrial practices, and excessive or wasteful consumption. In fact, both population growth and nonsustainable development are cause for concern in Asia.

Rising population numbers

Clearly there is a relationship between population growth and environmental stress, but very little empirical evidence exists to prove or disprove the effects of population on the environment. Available sources of information on population and the environment in Asia even define the region differently. Broadly defined, Asia includes some 56 percent of the earth's population, depending on only 31 percent of the planet's arable land.

Although fertility is declining everywhere in the region, Asian populations will continue to grow for many decades to come, increasing pressure on the region's natural resources. Between 2000 and 2050, national populations are expected to grow in every country of East, Southeast, and South and Central Asia except Japan and Kazakhstan (Appendix Table 2). Populations will double or nearly double in Pakistan, Nepal, Bangladesh, Afghanistan, Cambodia, and Laos. Growth rates will also be particularly high in India, Indonesia, Iran, Malaysia, Mongolia, Myanmar, the Philippines, and Vietnam.

Much of the population growth projected for the next few decades will occur in countries that are least capable of coping with additional stress on land, water, and other natural resources. According to a recent study (Prescott-Allan 2001), the countries where population is projected to grow fastest have some of the lowest income levels in the world. These countries already rank high in terms of environmental stress.

Changing consumption patterns

Economically and industrially, Asia is the fastest-growing region in the world. This economic and industrial development is inevitably accompanied by changing patterns of consumption. The number of motor vehicles in the region provides one useful indicator of expanding consumption and economic growth.

Today, the total number of cars, trucks, and buses in Asia is doubling every seven years, producing more air pollution, fuel consumption, traffic jams, and demands for road construction—often at the expense of prime agricultural land. And what does the future hold? Over the next 20 years, the number of motor vehicles is projected to increase at least fivefold in Asia's two most populous countries, India and China.

The population of India in 2000 was just over 1 billion, and there were about 10 motor vehicles for every 1,000 people (Energy Information Administration 2001), or a total of roughly 10 million motor vehicles in the country. In 2020, the population of India will be about 1.3 billion, and there will be about 44 motor vehicles for every 1,000 people, making a total of about 57 million vehicles. A similar calculation shows the number of motor vehicles in China rising from 15 million in 2000 to 75 million in 2020.

These are realistic projections. If, by contrast, the Indians and Chinese come to own three motor vehicles for every four people—as Americans do today—there will be more than two billion cars, trucks, and buses in India and China in 2020, or about eight times the number projected (266 million) for the United States.

Persistent poverty

Ironically, another source of environmental stress is the persistence of poverty in the region. An estimated 900 million people in Asia survive on incomes of less than US$1 per day (measured in terms of purchasing power parity). Poor slum dwellers in cities, who lack the most basic sanitation facilities, do not have the luxury of worrying about environmental pollution. In rural areas, poor farmers tend to live in the most marginal, fragile environments where they may be forced to sacrifice long-term sustainability for short-term survival, overexploiting croplands, pastures, and forests (UNFPA 2001). Per Pinstrup-Anderson and Rajul Pandya-Lorch (1994) maintain that "The most serious environmental threat in low-income developing countries is poverty." In the long run, however, the contribution of the poor to environmental degradation in the region as a whole may be small compared to the impact of large-scale agro-business and rich consumers.

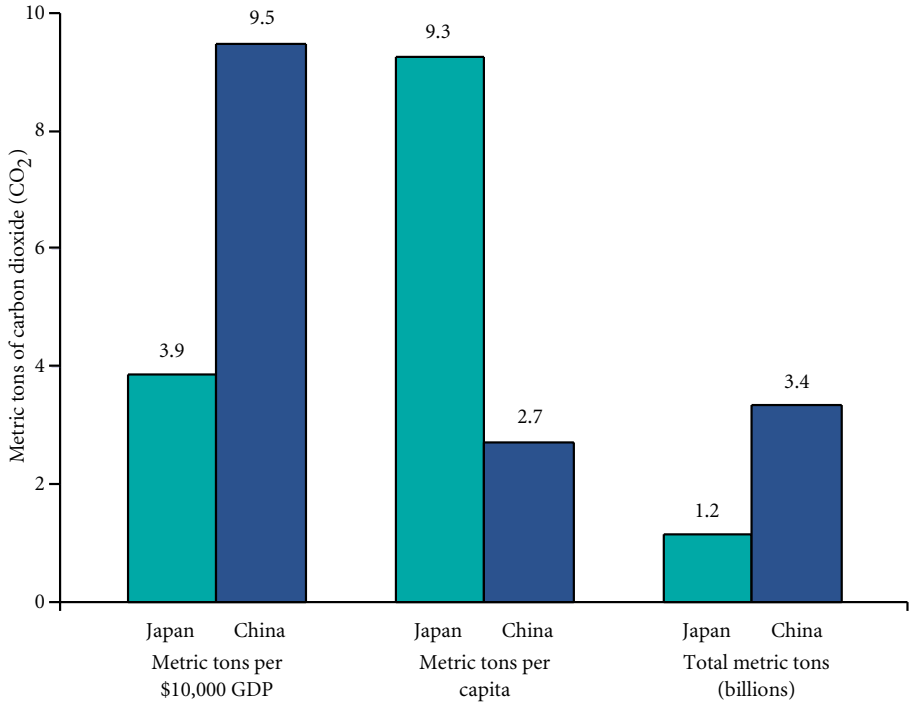
Rising demand for energy

Increasing population numbers and growing affluence have already resulted in rapid growth of energy consumption in Asia, and this trend can only be expected to accelerate in the future. Energy use (mostly fossil fuels) in the world as a whole has increased by nearly 85 percent in the past 30 years, but the increase has been more than 300 percent in Asia (Energy Information Administration 2001).

Over the next 20 years, the demand for energy will grow more quickly in Asia than in any other region of the world. The fastest growth will be in Asia's developing countries. Energy use in the developed countries of the world is projected to increase by about 29 percent between 1999 and 2020, while energy use in the developing countries of Asia will increase by about 129 percent. Within Asia, China will lead the demand for energy (see box).

In addition to depleting natural resources, rising energy use results in environmental pollution, particularly when countries are unable or unwilling to insist on energy-efficient, nonpolluting technology. China, for example, generates more than twice as much carbon (CO_2) per unit of gross domestic product (GDP) as does Japan (Figure 1), indicating that industries in China use much less efficient production technologies than Japanese industries. Carbon emissions per person, by contrast, are more than three times as high in Japan, indicating much higher consumption levels by the Japanese.

Figure 1. Comparison of carbon dioxide (CO_2) emissions (metric tons) in Japan and China, 1996



Source: World Resources Institute (2001).
Note: GDP is expressed in terms of current purchasing power parity.

ECONOMIC DEVELOPMENT FUELS CHINA'S GROWING DEMAND FOR ENERGY

Over the next few decades, China's energy demands are likely to grow faster than those of any other country in the world. In 1999, China's total energy consumption was less than half that of Western Europe, but by 2020, energy consumption in China is expected to surpass consumption in Western Europe (see figure), coming second only to energy consumption in the United States. This increase in energy demand will be fueled primarily by economic development and changing consumption patterns and not so much by population growth.

China's expanding demand for energy is linked to the projected growth of the country's gross domestic product (GDP). Energy consumption per unit of GDP will be particularly high because production technologies in China are much less energy efficient than technologies in most industrialized nations.

Between 1999 and 2020, China's demand for oil and coal is projected to increase by 4 percent a year. The demand for natural gas will increase by 10 percent a year, for nuclear energy by 12 percent, and for hydroelectricity and other renewable energy by 5 percent. China's heavy reliance on coal is of particular concern from the environmental standpoint because coal tends to burn less efficiently than other fossil fuels. In 2020, China's coal consumption is projected to exceed that of all industrialized countries of North America, Western Europe, and Asia combined, helping to make China the second largest producer of greenhouse gases in the world (after the United States) (Energy Information Administration 2001).

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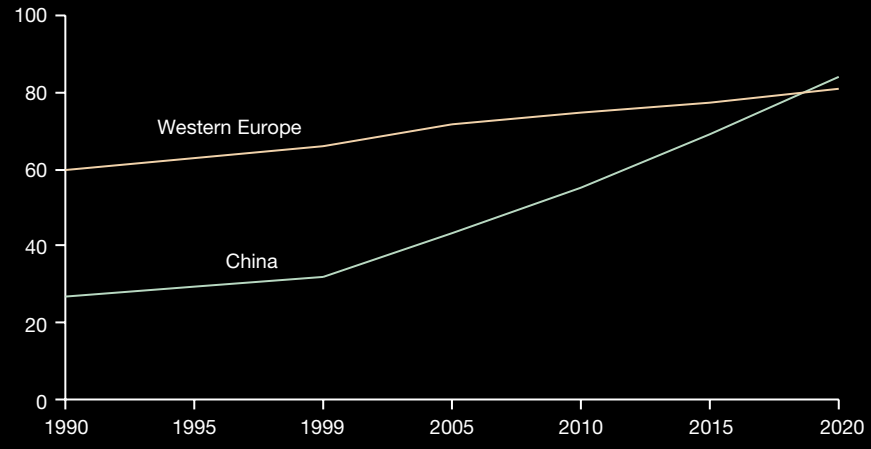
China's increasing energy demands are fueled primarily by economic development and changing consumption patterns rather than by population growth (Chongqing, China)
© Keren Su/Corbis

Projected growth of China's total energy demand (quadrillion btu) compared with that of Western Europe: 1990–2020



Source: Energy Information Administration (2001).

Unplanned urbanization

Primarily as a result of rural-to-urban migration, Asia is the fastest urbanizing region in the world. According to United Nations estimates, the urban population in Asia will nearly double in the next 30 years. By 2030, more than half of Asia's population will live in cities—some 2.6 billion people. The urban population of Asia will be larger than the urban population of all the other regions of the world combined (United Nations 2001b).

In 2025, the proportion urban is projected to be 52 percent in East Asia, 53 percent in Southeast Asia, and 45 percent in South and Central Asia. More than half of national populations will be urban in Brunei, China, Indonesia, Iran, Japan, Kazakhstan, Malaysia, Mongolia, North Korea, Pakistan, the Philippines, Singapore, South Korea, and Turkmenistan (Appendix Table 2).

This urbanization of national populations is reflected in the growth of Asia's largest cities. In 1975, there were only five megacities (with populations of more than 10 million) in the world, and only two of these were in Asia (Table 1) (United Nations 2001b). In 2015, 15 of the world's 23 megacities will be in Asia. This rapid—largely unplanned—expansion of urban areas has robbed many Asian countries of some of their most productive agricultural land and has resulted in serious problems of air, soil, and water pollution.

Despite rapid urbanization, Asia's rural population is also projected to grow, although not as quickly. Most of the region's rural areas are already densely populated, however, and many are characterized by high rates of underemployment, so that any increase in rural population, however small, will pose impediments to modernizing agriculture and raising rural living standards.

Environmental challenges

Population growth and economic development are contributing to many serious environmental problems in Asia. These include pressure on land, habitat destruction and loss of biodiversity, water scarcity and water pollution, air pollution, and global warming and climate change.

Pressure on land. Asia faces the most acute pressure on agricultural land of any region in the world. Over the past 30 years, while Asia's total population increased by about 68 percent, the total area of land under cultivation increased by only 21 percent—from 355 to 430 million hectares. This expansion has been largely at the expense of lowland forests. Today, there are very few possibilities for further expansion—almost all the suitable land in the region is already under cultivation.

Despite past expansion of the area under cultivation, less agricultural land is available to feed each person in Asia (0.16 hectares per person) than in the world as a whole (0.26 hectares per person) (World Resources Institute 2001).

Table 1. Population of cities with 10 million or more inhabitants: 1975, 2000, and 2015

Population in 1975 (millions)		Population in 2000 (millions)		Population in 2015 (millions)	
Tokyo	19.8	Tokyo	26.4	Tokyo	26.4
New York	15.9	Mexico City	18.1	Mumbai	26.1
Shanghai	11.4	Mumbai	18.1	Lagos	23.2
Mexico City	11.2	Sao Paulo	17.8	Dhaka	21.1
Sao Paulo	10.0	New York	16.6	Sao Paulo	20.4
		Lagos	13.4	Karachi	19.2
		Los Angeles	13.1	Mexico City	19.2
		Calcutta	12.9	New York	17.4
		Shanghai	12.9	Jakarta	17.3
		Buenos Aires	12.6	Calcutta	17.3
		Dhaka	12.3	Delhi	16.4
		Karachi	11.8	Metro Manila	14.8
		Delhi	11.7	Shanghai	14.6
		Jakarta	11.0	Los Angeles	14.1
		Osaka	11.0	Buenos Aires	14.1
		Metro Manila	10.9	Cairo	13.8
		Beijing	10.8	Istanbul	12.5
		Rio de Janeiro	10.6	Beijing	12.3
		Cairo	10.6	Rio de Janeiro	11.9
				Osaka	11.0
				Tianjin	10.7
				Hyderabad	10.5
				Bangkok	10.1

Source: United Nations (2001b).

The shortage of land combined with Asia's growing population has resulted, and will continue to result, in greater intensification of land use (see box). Pastures are overgrazed, rivers, lakes, and coastal areas are overfished, and more crops are produced from the same fields every year, using more irrigation water and more chemical fertilizers and pesticides.

Every year, some of the land currently under cultivation is degraded through nonsustainable farming practices, and some is lost to industrial and infrastructure development and urban sprawl. As a result, the area of productive farmland in Asia may actually decrease in coming decades. Even if the absolute area under cultivation does not go down, projected population growth will substantially reduce the amount of arable land available for each person who needs to be fed.

Over the past 40 years, agricultural inputs plus new, high-yielding seed varieties have resulted in tremendous gains in food production throughout the region. Yet experts predict that it will not be possible to sustain this pace of

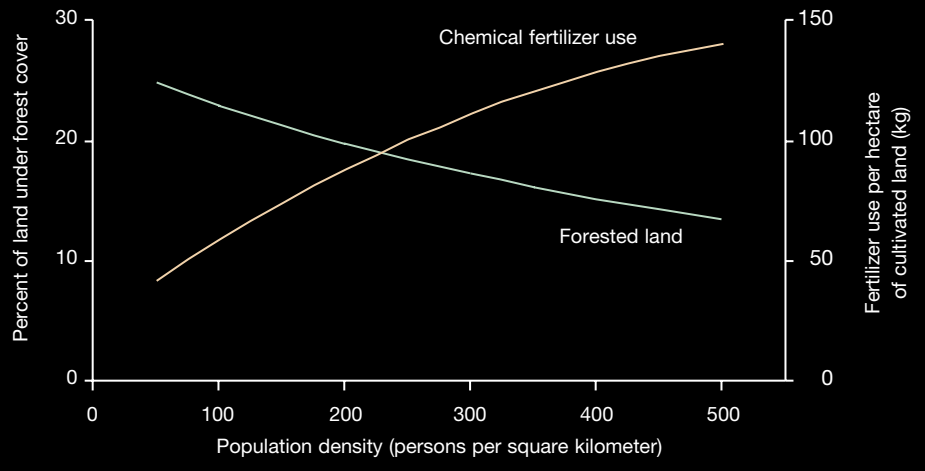
POPULATION GROWTH IS A MAJOR CAUSE OF LAND-USE CHANGES IN INDIA

Population growth has been the main force behind agricultural intensification in India (Kashmir, India)
© Steve McCurry/Magnum

India provides a clear example of the impact of population growth on land use. The population of India accounts for 16 percent of the world's total, and it is growing at about 2 percent a year. Yet India accounts for only 2.3 percent of the world's land area and only 1.7 percent of its forest resources. Population density has increased from 117 persons per square kilometer in 1951, to 274 in 1991, to 324 in 2001. This increase in population density has been accompanied by shrinking forests and pasturelands and more intensified use of agricultural land, including increased cropping frequency and greater use of irrigation and chemical fertilizers.

Cross-sectional and longitudinal analyses of district-level data for 1951–91 show that population growth has been the main force behind these land-use changes, above and beyond any effects of agro-climatic conditions or changes in key socioeconomic factors. This is illustrated in the figure, which shows the estimated effects of population pressure in 1991 on the proportion of land under forest cover and on the use of chemical fertilizers per hectare of cultivated land. The effects of population pressure are estimated after statistically controlling for the effects of several relevant agro-climatic and socioeconomic variables (Mishra 1996).

Estimated effects of population pressure on forest cover and chemical fertilizer use in India, 1991



Source: Mishra (1996).

productivity increase in the future (Rosegrant et al. 2001). At the same time, demand continues to rise, fueled both by the expanding population and the increasing demand for meat, requiring large amounts of grain to feed livestock. The global demand for cereal has been projected to rise from 1,847 million metric tons in 1997 to 2,497 million metric tons in 2020. China alone will account for more than one-fourth of this demand. By 2020, it is projected that China and South Asia will be forced to more than quadruple their grain imports over current levels.

In the shadow of growing demand for food, productivity losses due to land degradation take on heightened urgency. Throughout Asia, it is estimated that about one-third of all cropland has already been damaged by agricultural practices that are not sustainable. In South Asia alone, land degradation is causing more than US$10 billion in economic losses every year (United Nations 2001a). And countries with high population growth rates are likely to experience the greatest land degradation in the coming decades.

Habitat destruction and loss of biodiversity. Preservation of the earth's biological diversity is an important goal in its own right. In addition, the diversity of plant and animal species provides a key input for medical and agricultural research. The greatest threat to biodiversity is not destruction of plants and animals per se, but rather the destruction of their habitat.

Asia is home to diverse ecosystems that host many plant and animal species. More than two-thirds of the planet's biological resources are found in 17 countries, and five of these—China, India, Indonesia, Malaysia, and the Philippines—are in Asia. Indonesia alone is home to more than 30,000 plant species.

Population growth leads to expanding human settlements and increasing demand for food, fuel, and building materials. Due in part to population pressure, forests and wetlands that were once home to indigenous species in South, Southeast, and East Asia have been cleared and drained. As a result, an estimated 70 to 90 percent of the region's original wildlife habitat has been lost (United Nations 2001a).

Modernization of agriculture also threatens potentially valuable local crops. In Indonesia alone, some 1,500 local varieties of rice have disappeared in the past two to three decades as farmers plant a single, improved variety. In addition, habitat destruction and pollution threaten fresh-water and marine fish and coral reefs in the region.

Water scarcity and water pollution. Over the past 50 years, water use in Asia has more than tripled. Out of total water consumption, by far the largest share goes to agriculture—at 84 percent. Industrial use accounts for another 10 percent and domestic use 6 percent. Agriculture—as it is practiced in much of Asia—wastes large quantities of water. With current irrigation practices, an estimated 60 percent of water is lost.

Over the past century, the use of fresh water increased more rapidly in Asia than in any other region of the world (ADB 2001). Today, Asia has the least fresh water available per person of any region. The amount of water available per person has declined in recent decades—primarily because of population growth—and water scarcity is projected to worsen in the future.

Water pollution is also a serious problem, mainly caused by the disposal of untreated sewage and industrial waste, urban and agricultural runoff, and the intrusion of seawater. Levels of suspended solids in Asia's rivers have grown more than fourfold since the early 1970s and are now about four times the world average and about 20 times the levels typically found in developed countries. Lakes and other water systems are also heavily polluted.

Largely because of widespread pollution, one out of three Asians does not have access to safe drinking water, defined as a reliable source within 200 meters of the home. Polluted, unsafe water causes millions of deaths every year, particularly among infants and young children.

Air pollution. Asian cities are among the most polluted in the world (ADB 2001). Of the 15 large cities on the planet with the worst air pollution (measured in terms of suspended particulate levels), 12 are in Asia. Suspended particulate levels in Delhi, Beijing, Karachi, and Jakarta are many times higher than recommended by the World Health Organization (WHO). Other types of air pollution, including emissions of sulfur dioxide (SO_2) and nitrogen dioxide (NO_2), are also far above levels recommended by WHO.

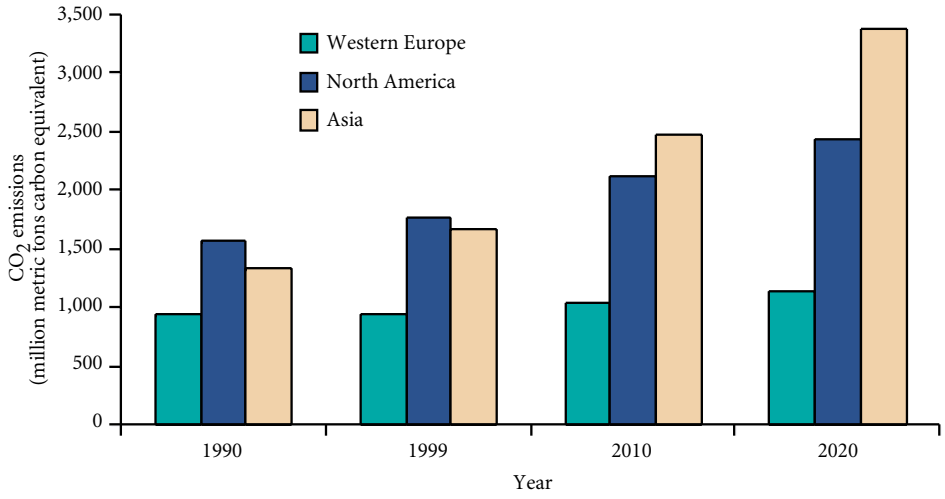
Asian cities are among the most polluted in the world (Ketapang, Kalimantan, Indonesia)
© Michael S. Yamashita/Corbis

In the countryside, nitrates from animal waste and chemical fertilizers pollute the soil and water, and in the cities, the air is contaminated with lead from vehicle exhaust. In India's largest cities—Mumbai and Delhi—about one-half of children under age 3 show signs of harmful exposure to lead, defined as 10 or more micrograms of lead per deciliter of blood (IIPS and ORC Macro 2000). Such elevated levels of lead in the blood can be harmful to the developing brain and central nervous system of young children and can cause damage to other body organs (CDC 1991).

In the poorest countries of Asia, indoor air pollution may pose an even greater hazard for human health. Cooking and heating with wood, crop residues, animal dung, and low-quality coal produce smoke that contains dangerous particles and gases. When fuels such as these are burned indoors, using inefficient stoves and poor ventilation, they can cause tuberculosis, other serious respiratory diseases, and blindness (Mishra, Retherford, and Smith 1999). In fact, indoor air pollution from cooking and heating with unsafe fuels has been designated by the World Bank as one of the four most critical environmental problems in developing countries.

Global warming and climate change. The emission of greenhouse gases, such as carbon dioxide (CO_2), methane, nitrous oxide, and chlorofluorocarbons, is much lower per person in Asia than in the industrialized nations, but—given Asia's large population and rapidly increasing energy use—the region plays an important and growing role in global warming. In the 1950s, Asian countries produced about one-fifth of the CO_2 emissions (the most important greenhouse gas) produced by Europe, but by the mid-1980s carbon emissions from Asia surpassed those from Europe (Figure 2). If current trends continue, CO_2 emissions from Asia will double between 2000 and 2020, growing at more than three times the rate of emissions from industrialized countries (Energy

Figure 2. Growth of carbon dioxide(CO_2) emissions (million metric tons equivalent) in Western Europe, North America, and Asia, 1990–2020



Source: Energy Information Administration (2001).

Information Administration 2001). By 2020, Asia will be the leading producer of CO_2 in the world.

There is growing evidence that atmospheric concentrations of CO_2 and other greenhouse gases have been rising as a result of population growth, changing consumption patterns, and expansion of economic activity. If current trends continue, the average surface temperature of the earth is projected to increase by 1.4–5.8 degrees Celsius by 2100. A recent assessment by the Intergovernmental Panel on Climate Change (IPCC) suggests that the adverse effects of global warming—including rising sea levels and changes in rainfall, vegetation, wind, and pest/disease patterns—will be felt most severely in the poor countries of Asia and Africa (IPCC 2001).

The image that appears here in the printed version of this publication was not made available for use on the internet.

In many Asian countries, indoor air pollution from unsafe fuels poses critical health problems (Zhejiang, China) © Keren Su/Corbis

Policy implications

Projections of future resource requirements and environmental stress in Asia are worrying—even alarming—whether the focus is on population numbers alone or on the effects of poorly planned economic development. It is not easy to predict the future magnitude of environmental problems in the region, but issues of land degradation, habitat destruction, loss of biodiversity, water scarcity, and water and air pollution have already reached crisis proportions in some places.

Unless significant measures are taken to incorporate environmental concerns into agricultural development, urban planning, technological innovation, industrial growth, and resource management, the situation is likely to worsen in the future. At the international level, technological innovation and the transfer of technical and management skills will play a major role in alleviating Asia's environmental problems. At the national level, political and economic priority setting will be essential.

And finally, slowing down population growth—as soon as possible—will be a key component of any effort to protect Asia's natural resources and environment. Population growth continues for many years after fertility reaches replacement level, so the sooner fertility can be brought down the sooner the process toward stabilizing population numbers can begin. When looking at current and future environmental concerns in Asia, the number of people to be fed, clothed, housed, transported, educated, and employed may not be the only issue, but it is an issue that cannot be ignored.

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Appendix Tables

Appendix Table 1. Gross national product (GNP) per capita in constant 1995 U.S. dollars: Selected countries of East, Southeast, and South and Central Asia, 1960–1999

Subregion and country	1960	1970	1980	1990	1999
East Asia					
China	96	109	167	351	755
China, Hong Kong (SAR)	3,021	5,946	11,289	18,811	22,667
China, Macao SAR	NA	NA	NA	13,881	14,568
Japan	8,208	19,971	27,664	38,976	42,783
Korea, Rep. (South)	1,321	2,171	3,686	7,960	11,958
Mongolia	NA	NA	NA	493	452
Southeast Asia					
Brunei Darussalem	NA	NA	NA	29,888	NA
Cambodia	NA	NA	NA	237	279
Indonesia	252	300	483	746	907
Lao PDR (Laos)	NA	NA	NA	320	441
Malaysia	953	1,357	2,267	3,048	4,305
Philippines	701	829	1,164	1,091	1,201
Singapore	2,776	5,479	10,673	17,996	28,486
Thailand	450	761	1,113	1,974	2,656
Vietnam	NA	NA	NA	202	314
South and Central Asia					
Bangladesh	218	256	223	283	374
Bhutan	NA	NA	193	353	427
India	160	211	229	321	448
Kyrgyzstan	NA	NA	NA	1,492	817
Maldives	NA	NA	NA	784	1,096
Nepal	150	157	151	185	229
Pakistan	183	279	319	445	511
Sri Lanka	266	325	430	569	799
Tajikistan	NA	NA	NA	NA	306
Turkmenistan	NA	NA	NA	2,087	967
Uzbekistan	NA	NA	NA	NA	750

Source: World Bank. 2001. *World development indicators.* Washington, D.C.: World Bank.
NA: Data not available.

Appendix Table 2. Characteristics of national populations in Asia: 1950–2050

Subregion and country	Population (1,000s)	Percent of Asia's population	Crude birth rate (CBR)[a]	Crude death rate (CDR)[a]	Rate of natural increase (RNI)[a]
East Asia					
China					
1950	554,760	41.1	43.8	25.0	18.8
1975	927,808	40.4	21.5	6.7	14.8
2000	1,275,133	36.6	14.3	7.0	7.4
2025	1,470,787	32.9	11.2	9.2	2.1
2050	1,462,058	29.2	10.6	13.0	-2.4
China, Hong Kong SAR					
1950	1,974	0.1	37.7	8.9	28.8
1975	4,396	0.2	17.2	5.0	12.2
2000	6,860	0.2	9.5	5.9	3.7
2025	8,678	0.2	9.1	8.7	0.4
2050	9,648	0.2	9.1	12.5	-3.4
China, Macao SAR					
1950	190	0.0	37.7	13.5	24.2
1975	253	0.0	17.1	6.6	10.5
2000	444	0.0	8.8	4.6	4.1
2025	529	0.0	7.6	8.5	-0.9
2050	527	0.0	8.6	14.4	-5.9
Japan					
1950	83,625	6.2	23.7	9.4	14.3
1975	111,524	4.9	15.4	6.1	9.3
2000	127,096	3.6	9.2	8.3	1.0
2025	123,798	2.8	7.7	12.3	-4.5
2050	109,220	2.2	7.9	14.3	-6.4
Korea, Dem. Rep. (North)					
1950	10,815	0.8	22.7	14.8	7.9
1975	16,018	0.7	20.5	6.3	14.2
2000	22,268	0.6	16.7	9.9	6.8
2025	25,872	0.6	14.5	10.1	4.4
2050	28,038	0.6	13.8	11.2	2.6
Korea, Rep. (South)					
1950	20,357	1.5	37.0	32.0	5.0
1975	35,281	1.5	23.6	7.1	16.5
2000	46,740	1.3	12.8	5.9	6.9
2025	52,065	1.2	11.1	9.2	1.9
2050	51,560	1.0	10.9	13.3	-2.3
Mongolia					
1950	761	0.1	43.7	21.7	22.0
1975	1,447	0.1	39.2	11.4	27.8
2000	2,533	0.1	21.6	7.2	14.4
2025	3,478	0.1	15.3	5.9	9.4
2050	4,146	0.1	13.5	8.9	4.6

Total fertility rate (TFR)[a]	Life expectancy[a]	Percent age 0–14	Percent age 65+	Dependency ratio[b]	Percent of women age 15–49	Percent urban[c]
6.22	40.8	34	4	0.61	50	12.5
3.32	65.3	39	4	0.78	46	17.4
1.80	71.2	25	7	0.46	56	32.1
1.90	76.3	18	13	0.46	45	47.1
1.90	79.0	16	23	0.64	40	50.3
4.44	61.0	30	2	0.49	59	82.5
2.32	73.6	30	5	0.56	50	89.7
1.17	79.9	16	11	0.37	60	100.0
1.65	82.6	14	20	0.51	42	100.0
1.70	84.7	14	29	0.76	37	100.0
5.03	54.0	29	3	0.47	57	97.4
2.00	69.4	30	6	0.54	53	97.6
1.10	79.3	22	7	0.42	60	98.8
1.34	82.1	13	21	0.51	42	99.1
1.70	83.8	12	30	0.73	33	99.2
2.75	63.9	35	5	0.68	50	50.3
1.81	75.5	24	8	0.47	54	75.7
1.33	81.5	15	17	0.47	45	78.8
1.58	85.6	12	29	0.70	36	83.7
1.75	88.0	13	36	0.96	32	84.8
3.35	49.0	41	3	0.78	47	31.0
2.80	66.9	38	4	0.72	50	56.7
2.07	65.1	27	6	0.48	52	60.2
2.10	72.4	22	10	0.47	47	70.0
2.10	76.3	20	17	0.57	44	72.0
5.40	47.5	42	3	0.81	46	21.4
2.92	64.8	38	4	0.71	50	48.0
1.51	75.5	21	7	0.39	58	81.9
1.98	79.9	16	17	0.49	42	89.9
2.10	82.0	16	27	0.78	37	90.5
6.00	42.2	42	3	0.83	46	18.9
6.65	55.5	44	3	0.88	46	48.7
2.32	63.9	35	4	0.64	54	63.5
2.10	74.1	24	6	0.44	54	74.3
2.10	77.5	20	16	0.56	44	76.0

Appendix Table 2 (continued)

Subregion and country	Population (1,000s)	Percent of Asia's population	Crude birth rate (CBR)[a]	Crude death rate (CDR)[a]	Rate of natural increase (RNI)[a]
Southeast Asia					
Brunei Darussalam					
1950	48	0.0	48.9	11.6	37.3
1975	161	0.0	30.9	5.4	25.5
2000	328	0.0	19.0	3.2	15.8
2025	473	0.0	14.6	6.2	8.4
2050	565	0.0	13.1	9.3	3.8
Cambodia					
1950	4,346	0.3	45.4	23.8	21.6
1975	7,098	0.3	33.4	40.0	-6.6
2000	13,104	0.4	34.9	10.6	24.3
2025	22,310	0.5	20.2	7.1	13.1
2050	29,883	0.6	17.2	6.8	10.4
East Timor					
1950	433	0.0	47.4	34.5	12.9
1975	672	0.0	25.0	45.0	-20.0
2000	737	0.0	25.4	13.2	12.2
2025	1,204	0.0	15.9	9.5	6.4
2050	1,410	0.0	14.5	9.9	4.6
Indonesia					
1950	79,538	5.9	42.7	26.1	16.6
1975	134,571	5.9	35.6	13.4	22.2
2000	212,092	6.1	20.0	7.1	12.9
2025	272,911	6.1	15.2	7.4	7.8
2050	311,335	6.2	13.6	9.6	4.1
Lao PDR (Laos)					
1950	1,755	0.1	45.7	25.3	20.4
1975	3,024	0.1	45.1	20.7	24.4
2000	5,279	0.2	35.7	12.6	23.1
2025	8,721	0.2	20.2	7.3	12.9
2050	11,438	0.2	16.4	7.3	9.0
Malaysia					
1950	6,110	0.5	45.2	19.9	25.3
1975	12,258	0.5	29.4	7.7	21.7
2000	22,218	0.6	22.3	4.7	17.6
2025	31,326	0.7	16.2	6.1	10.1
2050	37,850	0.8	13.6	8.2	5.4
Myanmar					
1950	17,832	1.3	44.6	26.8	17.8
1975	30,158	1.3	37.9	15.7	22.2
2000	47,749	1.4	23.2	11.6	11.6
2025	60,243	1.3	16.3	8.9	7.5
2050	68,546	1.4	13.9	10.7	3.1

Total fertility rate (TFR)[a]	Life expectancy[a]	Percent age 0–14	Percent age 65+	Dependency ratio[b]	Percent of women age 15–49	Percent urban[c]
7.00	60.4	36	5	0.70	48	27.1
4.40	69.7	40	4	0.77	48	62.1
2.53	76.3	32	3	0.54	56	72.2
2.10	79.3	22	12	0.51	50	81.3
2.10	81.1	19	18	0.57	43	82.6
6.29	39.4	42	3	0.82	47	10.2
4.70	31.2	42	3	0.82	47	10.3
4.77	56.2	44	3	0.88	46	15.9
2.34	66.1	34	4	0.63	52	28.7
2.10	72.2	24	7	0.46	52	31.9
6.44	30.0	41	3	0.78	47	9.9
4.31	31.2	42	3	0.81	47	8.9
3.85	50.0	43	3	0.84	45	7.5
2.10	62.5	27	5	0.47	55	13.0
2.10	70.3	22	11	0.49	48	15.0
5.49	37.5	39	4	0.76	48	12.4
4.73	52.7	41	3	0.81	48	19.4
2.27	67.3	31	5	0.55	54	40.9
2.10	73.9	23	8	0.46	52	60.9
2.10	77.4	20	16	0.57	44	63.5
6.15	37.8	42	3	0.81	48	7.2
6.69	43.5	42	3	0.81	47	11.4
4.80	54.5	43	3	0.86	47	23.5
2.35	65.9	33	5	0.59	53	39.3
2.10	72.2	23	9	0.47	52	42.6
6.83	48.5	41	5	0.85	46	20.4
4.16	65.3	42	4	0.85	47	37.7
2.90	73.0	34	4	0.62	53	57.4
2.10	77.4	24	9	0.48	52	70.7
2.10	79.7	20	15	0.54	45	72.7
6.00	36.8	38	3	0.70	50	16.2
5.30	50.6	41	4	0.82	46	23.9
2.80	56.2	33	5	0.61	53	27.7
2.10	68.3	23	8	0.45	53	43.3
2.10	72.0	20	16	0.55	44	46.6

Appendix Table 2 (continued)

Subregion and country	Population (1,000s)	Percent of Asia's population	Crude birth rate (CBR)[a]	Crude death rate (CDR)[a]	Rate of natural increase (RNI)[a]
Philippines					
1950	19,996	1.5	48.2	18.4	29.8
1975	42,022	1.8	37.5	9.2	28.3
2000	75,653	2.2	26.0	5.2	20.8
2025	107,073	2.4	17.3	5.5	11.7
2050	128,383	2.6	13.8	7.6	6.2
Singapore					
1950	1,022	0.1	44.4	10.6	33.8
1975	2,263	0.1	17.2	5.1	12.1
2000	4,018	0.1	10.8	5.3	5.5
2025	4,998	0.1	10.5	10.1	0.4
2050	4,620	0.1	9.4	15.4	-6.0
Thailand					
1950	19,626	1.5	44.3	14.7	29.6
1975	41,067	1.8	30.3	8.3	22.0
2000	62,806	1.8	17.8	6.2	11.6
2025	77,480	1.7	13.1	7.8	5.3
2050	82,491	1.6	11.4	11.3	0.1
Vietnam					
1950	27,367	2.0	42.7	23.9	18.8
1975	47,974	2.1	36.1	12.9	23.2
2000	78,137	2.2	19.7	6.4	13.3
2025	105,488	2.4	15.0	6.3	8.7
2050	123,782	2.5	13.8	9.1	4.7
South and Central Asia					
Afghanistan					
1950	8,151	0.6	53.1	33.3	19.8
1975	14,313	0.6	49.9	24.8	25.1
2000	21,765	0.6	47.3	21.4	25.9
2025	45,193	1.0	35.4	13.0	22.4
2050	72,267	1.4	22.8	8.5	14.3
Bangladesh					
1950	41,783	3.1	48.0	28.3	19.7
1975	75,590	3.3	42.5	18.0	24.5
2000	137,439	3.9	29.9	8.7	21.3
2025	210,823	4.7	17.5	6.3	11.2
2050	265,432	5.3	15.0	7.6	7.4

Total fertility rate (TFR)[a]	Life expectancy[a]	Percent age 0–14	Percent age 65+	Dependency ratio[b]	Percent of women age 15–49	Percent urban[c]
7.29	47.8	44	4	0.89	45	27.1
5.50	60.1	44	3	0.90	46	35.6
3.24	70.0	38	4	0.70	51	58.6
2.10	75.5	25	7	0.47	55	71.9
2.10	78.4	20	14	0.52	46	73.8
6.40	60.4	40	2	0.75	49	100.0
1.87	70.8	33	4	0.59	54	100.0
1.45	78.1	22	7	0.41	57	100.0
1.78	81.3	14	21	0.55	40	100.0
1.90	82.9	14	29	0.74	35	100.0
6.40	52.0	42	3	0.83	47	10.5
3.96	61.4	43	3	0.84	47	15.1
2.00	70.8	27	5	0.47	58	21.6
1.90	76.8	20	11	0.45	49	35.8
1.90	79.1	17	21	0.62	42	39.1
5.75	40.4	32	4	0.56	52	11.6
5.89	55.8	43	5	0.92	43	18.8
2.25	69.2	33	5	0.63	54	19.7
2.10	75.1	24	8	0.47	52	30.4
2.10	78.2	20	17	0.59	43	33.7
7.70	31.9	43	3	0.83	47	5.8
7.40	39.7	44	3	0.87	46	13.3
6.80	43.2	43	3	0.86	46	21.9
4.74	53.5	40	3	0.77	48	36.6
2.82	62.4	30	5	0.55	54	39.9
6.70	36.6	38	4	0.70	47	4.2
5.70	46.7	45	3	0.95	44	9.8
3.56	60.7	33	3	0.62	51	24.5
2.10	70.6	28	5	0.50	54	40.5
2.10	75.0	16	11	0.40	50	43.8

Appendix Table 2 (continued)

Subregion and country	Population (1,000s)	Percent of Asia's population	Crude birth rate (CBR)[a]	Crude death rate (CDR)[a]	Rate of natural increase (RNI)[a]
Bhutan					
1950	734	0.1	44.0	28.1	15.9
1975	1,178	0.1	41.6	19.1	22.5
2000	2,085	0.1	34.8	8.6	26.2
2025	3,843	0.1	24.3	5.4	18.9
2050	5,569	0.1	17.4	5.4	12.0
India					
1950	357,561	26.5	45.4	25.4	20.0
1975	620,701	27.0	34.8	13.9	20.9
2000	1,008,937	29.0	23.8	8.4	15.4
2025	1,351,801	30.2	16.2	7.8	8.4
2050	1,572,055	31.4	13.7	9.5	4.2
Iran (Islamic Rep.)					
1950	16,913	1.3	47.7	23.5	24.2
1975	33,467	1.5	42.2	12.0	30.2
2000	70,330	2.0	22.1	5.0	17.1
2025	99,343	2.2	15.7	5.5	10.2
2050	121,424	2.4	14.0	7.6	6.4
Kazakhstan					
1950	6,703	0.5	33.2	14.4	18.8
1975	14,136	0.6	24.9	8.8	16.1
2000	16,172	0.5	16.3	10.1	6.3
2025	16,090	0.4	13.0	9.8	3.2
2050	15,302	0.3	11.7	11.5	0.2
Kyrgyzstan					
1950	1,740	0.1	35.6	16.4	19.2
1975	3,299	0.1	29.9	9.6	20.3
2000	4,921	0.1	19.5	7.1	12.4
2025	6,460	0.1	15.5	6.9	8.6
2050	7,538	0.2	13.9	8.9	5.0
Maldives					
1950	82	0.0	45.2	27.3	17.9
1975	137	0.0	42.0	13.9	28.1
2000	291	0.0	36.0	6.0	30.0
2025	580	0.0	24.5	3.6	20.9
2050	868	0.0	17.3	4.6	12.7
Nepal					
1950	8,502	0.6	40.8	27.0	13.8
1975	13,137	0.6	39.7	18.3	21.4
2000	23,043	0.7	34.0	9.9	24.2
2025	38,706	0.9	21.4	5.8	15.6
2050	52,415	1.0	16.7	6.2	10.6

Total fertility rate (TFR)[a]	Life expectancy[a]	Percent age 0–14	Percent age 65+	Dependency ratio[b]	Percent of women age 15–49	Percent urban[c]
5.90	35.2	40	4	0.77	48	2.0
5.90	45.5	41	4	0.81	47	3.5
5.10	63.2	43	4	0.89	45	7.1
3.10	71.9	36	5	0.68	51	15.6
2.10	76.0	24	8	0.48	53	17.9
5.97	38.7	39	3	0.73	48	17.3
4.83	52.9	40	4	0.77	47	21.3
2.97	64.2	33	5	0.62	51	28.4
2.10	71.6	23	8	0.46	53	42.5
2.10	75.4	20	15	0.53	46	45.8
7.00	44.1	39	5	0.80	46	27.0
6.00	56.6	45	3	0.93	44	45.8
2.76	69.7	37	3	0.69	51	61.6
2.10	75.5	25	7	0.47	55	72.8
2.10	78.5	20	15	0.53	45	74.6
4.41	56.5	34	7	0.69	50	39.0
3.06	65.4	35	6	0.68	49	52.2
1.95	65.0	27	7	0.51	53	56.4
1.90	72.4	21	11	0.47	50	65.6
2.10	76.4	18	18	0.56	42	67.9
4.51	55.4	29	8	0.59	52	31.0
4.05	64.2	40	6	0.85	44	37.9
2.34	68.6	34	6	0.67	51	33.3
2.10	74.3	24	8	0.48	52	40.7
2.10	77.8	20	16	0.56	44	44.0
7.00	38.9	33	5	0.62	50	11.0
7.00	54.6	42	4	0.86	44	18.2
5.36	67.6	44	4	0.89	47	26.1
3.19	75.3	37	4	0.68	51	38.1
2.10	78.2	24	8	0.48	54	41.3
5.75	36.3	39	4	0.74	48	2.3
5.65	46.2	41	3	0.79	47	5.0
4.48	59.8	41	4	0.81	47	11.9
2.53	70.5	33	5	0.61	52	23.4
2.10	74.9	24	8	0.47	53	26.4

Appendix Table 2 (continued)

Subregion and country	Population (1,000s)	Percent of Asia's population	Crude birth rate (CBR)[a]	Crude death rate (CDR)[a]	Rate of natural increase (RNI)[a]
Pakistan					
1950	39,659	2.9	44.6	25.0	19.6
1975	70,278	3.1	43.1	16.0	27.1
2000	141,256	4.1	36.3	9.7	26.6
2025	250,981	5.6	23.1	6.0	17.1
2050	344,170	6.9	17.0	6.3	10.7
Sri Lanka					
1950	7,483	0.6	38.5	13.9	24.6
1975	13,512	0.6	27.3	6.9	20.4
2000	18,924	0.5	17.3	6.3	11.0
2025	22,529	0.5	12.7	8.2	4.5
2050	23,066	0.5	11.3	11.3	0.0
Tajikistan					
1950	1,532	0.1	44.7	12.2	32.5
1975	3,442	0.1	37.2	8.9	28.3
2000	6,087	0.2	23.0	6.2	16.8
2025	8,066	0.2	16.4	5.9	10.5
2050	9,763	0.2	14.1	8.0	6.1
Turkmenistan					
1950	1,211	0.1	43.2	16.2	27.0
1975	2,520	0.1	35.3	9.6	25.7
2000	4,737	0.1	25.3	6.5	18.8
2025	6,844	0.2	17.1	6.1	11.0
2050	8,401	0.2	13.9	8.2	5.7
Uzbekistan					
1950	6,314	0.5	42.4	14.7	27.7
1975	13,981	0.6	34.8	8.5	26.3
2000	24,881	0.7	20.5	5.8	14.7
2025	34,203	0.8	15.4	6.2	9.2
2050	40,513	0.8	13.6	8.5	5.2

Source: United Nations. 2001. *World population prospects: The 2000 revision.* New York: Population Division, Department of Economic and Social Affairs.

[a] Refers to 1950–54, 1975–79, 2000–04, 2025–29, and 2045–49. CBR and CDR refer to births or deaths per 1,000 population per year.

[b] The dependency ratio is defined as the sum of the number of children age 0–14 and the number of elderly age 65+, divided by the number of working-age population age 15–64. It is interpreted as the average number of dependents that a person of working age must support.

[c] Data from United Nations. 2001. *World urbanization prospects: The 1999 revision.* New York: Population Division, Department of Economic and Social Affairs.

Total fertility rate (TFR)[a]	Life expectancy[a]	Percent age 0–14	Percent age 65+	Dependency ratio[b]	Percent of women age 15–49	Percent urban[c]
6.28	41.0	38	5	0.76	47	17.5
6.28	51.0	42	3	0.83	47	26.4
5.08	61.0	42	4	0.83	47	37.0
2.79	69.7	34	5	0.65	52	52.9
2.10	73.7	23	8	0.46	53	55.9
5.94	55.5	40	5	0.84	46	14.4
3.75	66.4	37	4	0.69	50	22.0
2.09	72.6	26	6	0.48	56	23.6
1.90	77.2	20	12	0.48	49	38.6
2.00	79.5	17	21	0.63	41	41.9
6.00	55.7	34	4	0.62	53	29.4
5.90	64.5	45	5	1.00	42	35.5
2.87	68.0	39	5	0.78	50	27.5
2.10	73.7	26	6	0.47	54	36.0
2.10	77.3	20	14	0.52	45	39.3
6.00	53.0	33	6	0.63	52	45.0
5.32	61.7	43	4	0.92	43	47.5
3.17	67.1	38	4	0.72	51	44.8
2.10	73.6	24	7	0.45	55	55.9
2.10	77.1	20	14	0.51	46	58.8
5.97	56.4	32	6	0.59	52	31.4
5.58	65.2	43	6	0.96	43	39.1
2.29	69.7	36	5	0.69	52	36.9
2.10	74.7	24	7	0.47	53	44.2
2.10	78.1	20	16	0.55	44	47.4

Appendix Table 3. Life expectancies at birth for women and men and difference between women's and men's life expectancy: Subregions and countries of Asia: 1950–2000

Subregion and country	Women			Men		
	1955–60	1975–80	1995–2000	1955–60	1975–80	1995–2000
East Asia	48.5	67.6	73.4	45.1	65.2	68.7
China	46.2	66.3	72.0	43.1	64.5	67.9
China, Hong Kong SAR	68.5	76.8	82.0	61.0	70.5	76.5
China, Macao SAR	59.5	72.0	80.8	54.5	67.0	76.1
Japan	68.8	78.0	83.8	64.3	72.7	77.0
Korea, Dem. Rep. (North)	55.2	69.8	66.0	53.1	64.4	60.5
Korea, Rep. (South)	54.2	68.5	78.1	51.1	61.3	70.6
Mongolia	46.5	57.0	63.9	44.0	54.0	59.9
Southeast Asia	45.2	56.5	67.5	42.8	52.9	63.2
Brunei Darussalam	62.0	71.4	78.1	61.0	68.1	73.4
Cambodia	42.8	32.5	58.5	40.0	30.0	54.3
East Timor	33.1	32.5	48.4	31.9	30.0	46.7
Indonesia	40.7	54.0	67.0	39.2	51.5	63.3
Lao PDR (Laos)	41.8	45.0	53.8	39.1	42.1	51.3
Malaysia	53.7	67.1	74.5	50.6	63.5	69.6
Myanmar	43.9	52.8	58.3	41.0	48.6	53.6
Philippines	53.1	62.0	70.7	49.6	58.3	66.5
Singapore	64.9	73.1	79.3	61.5	68.6	74.9
Thailand	56.8	65.1	72.6	52.3	58.0	66.7
Viet Nam	44.6	58.1	69.6	41.3	53.7	64.9
South and Central Asia	42.1	52.3	62.0	43.6	52.7	61.0
Afghanistan	33.4	39.8	42.8	33.6	39.8	42.3
Bangladesh	37.2	46.4	58.2	40.0	47.1	58.1
Bhutan	38.0	46.5	62.0	36.5	44.5	59.5
India	41.7	52.4	62.6	43.5	53.3	61.9
Iran (Islamic Rep.)	46.3	57.0	68.8	46.3	56.2	67.3
Kazakhstan	63.9	70.4	70.0	53.7	60.2	58.6
Kyrgyzstan	61.8	68.3	71.1	53.3	59.8	62.8
Maldives	40.7	53.2	64.5	43.3	55.9	66.3
Nepal	37.1	45.4	57.1	38.1	47.0	57.6
Pakistan	42.0	50.7	58.9	44.1	51.3	59.2
Sri Lanka	58.3	68.5	74.7	59.0	65.0	69.0
Tajikistan	60.4	66.9	70.2	55.3	61.8	64.2
Turkmenistan	58.6	65.1	68.9	51.7	58.2	61.9
Uzbekistan	61.9	68.4	71.3	55.2	61.7	65.3

Source: United Nations. 2001. *World population prospects: The 2000 revision.* New York: Population Division, Department of Economic and Social Affairs.

	Difference: women–men	
1955–60	1975–80	1995–2000
3.4	2.4	4.7
3.1	1.8	4.1
7.5	6.3	5.5
5.0	5.0	4.7
4.4	5.3	6.7
2.1	5.4	5.5
3.1	7.2	7.6
2.5	3.0	4.0
2.5	3.6	4.3
1.0	3.3	4.7
2.8	2.5	4.3
1.1	2.5	1.8
1.5	2.5	3.7
2.7	2.9	2.5
3.1	3.6	5.0
2.9	4.2	4.7
3.5	3.7	4.1
3.4	4.5	4.4
4.4	7.1	5.9
3.3	4.4	4.7
-1.5	-0.4	1.0
-0.2	0.0	0.5
-2.8	-0.7	0.1
1.5	2.0	2.5
-1.8	-0.9	0.7
0.0	0.8	1.5
10.2	10.2	11.4
8.5	8.5	8.2
-2.5	-2.7	-1.8
-1.0	-1.6	-0.5
-2.1	-0.6	-0.3
-0.7	3.4	5.7
5.2	5.1	6.0
6.9	6.9	7.0
6.8	6.8	6.0

Appendix Table 4. Population age 15–24 and proportion of total population in this age group: Asia, subregions, and countries, 1960–2040

Subregion and country	1960		1980	
	(1,000s)	%	(1,000s)	%
Asia	283,509	17.3	489,298	19.4
East Asia	131,348	16.6	224,832	19.1
China	105,652	16.1	195,049	19.5
China, Hong Kong SAR	356	11.6	1,139	22.6
China, Macao SAR	22	12.5	61	24.3
Japan	17,751	18.9	16,172	13.8
Korea, Dem. Rep. (North)	2,685	23.5	3,325	19.3
Korea, Rep. (South)	4,700	18.8	8,762	23.0
Mongolia	182	19.0	324	19.5
Southeast Asia	40,369	18.1	72,589	20.3
Brunei Darussalam	12	14.7	43	22.3
Cambodia	1,046	19.2	1,423	21.5
East Timor	96	19.1	137	23.5
Indonesia	18,559	19.3	29,605	19.7
Lao PDR (Laos)	421	19.3	626	19.5
Malaysia	1,424	17.5	2,925	21.3
Myanmar	3,661	16.9	6,435	19.1
Philippines	5,020	18.6	9,912	20.6
Singapore	284	17.4	584	24.2
Thailand	4,886	18.4	9,953	21.6
Vietnam	4,961	14.7	10,947	20.7
South and Central Asia	111,793	18.0	191,877	19.5
Afghanistan	1,899	18.9	2,856	19.0
Bangladesh	8,987	17.4	17,473	20.5
Bhutan	164	18.8	246	18.6
India	80,561	18.2	133,640	19.4
Iran (Islamic Republic of)	3,653	16.8	7,631	19.5
Kazakhstan	1,862	18.6	3,066	20.5
Kyrgyzstan	338	15.6	763	21.0
Maldives	16	15.9	30	19.1
Nepal	1,872	19.0	2,742	18.8
Pakistan	8,710	17.9	15,367	18.9
Sri Lanka	1,744	18.0	3,116	21.3
Tajikistan	347	16.7	834	21.1
Turkmenistan	258	16.2	621	21.7
Uzbekistan	1,381	16.1	3,493	21.9

Source: United Nations. 2001. *World population prospects: The 2000 revision.* New York: Population Division, Department of Economic and Social Affairs.

2000		2020		2040	
(1,000s)	%	(1,000s)	%	(1,000s)	%
615,245	17.7	666,866	15.5	658,202	13.6
227,744	15.4	206,954	12.5	195,444	11.5
198,945	15.6	183,701	12.7	174,789	11.7
986	14.4	804	9.6	887	9.4
61	13.7	48	9.2	49	9.2
16,099	12.7	12,136	9.6	9,808	8.5
3,397	15.3	3,686	14.7	3,822	14.0
7,718	16.5	6,063	11.8	5,540	10.5
537	21.2	516	15.7	549	14.0
103,132	19.8	108,696	16.4	107,523	14.0
56	17.0	68	15.2	72	13.4
2,445	18.7	4,160	20.3	5,016	18.7
134	18.2	178	15.3	196	14.7
42,268	19.9	41,452	15.8	41,380	13.8
1,024	19.4	1,588	19.7	1,852	17.8
4,199	18.9	5,151	17.4	4,974	13.9
9,530	20.0	9,989	17.3	9,325	14.1
15,377	20.3	19,205	18.9	17,422	14.3
501	12.5	567	11.6	499	10.2
11,755	18.7	11,299	15.0	10,093	12.3
15,843	20.3	15,039	15.0	16,693	14.2
284,369	19.2	351,216	17.7	355,235	14.9
4,202	19.3	7,828	19.5	12,086	19.5
28,000	20.4	37,275	18.9	38,629	15.7
407	19.5	663	19.2	929	18.9
190,107	18.8	224,702	17.4	206,690	13.7
15,380	21.9	15,010	16.1	16,725	14.7
2,956	18.3	2,201	13.7	2,024	12.8
949	19.3	972	15.8	1,027	14.3
59	20.4	100	19.4	144	18.9
4,409	19.1	7,079	20.0	8,581	18.2
27,156	19.2	44,655	19.6	57,599	18.6
3,632	19.2	3,110	14.1	2,872	12.4
1,205	19.8	1,308	17.2	1,362	14.8
920	19.4	1,175	18.2	1,111	14.1
4,988	20.0	5,138	15.8	5,456	14.2

Appendix Table 5. Characteristics of Asia's youth population (age 15–24): Region, subregions, and selected countries, 1950–2025

Subregion, country, and year	Percent single		Percent in school		Percent in labor force		Percent single and out of school	
	Male	Female	Male	Female	Male	Female	Male	Female
All Asia								
1950	75.1	33.6	9.2	6.1	87.2	55.5	65.9	27.5
1970	81.3	50.4	14.6	8.3	79.7	55.0	66.6	42.1
1990	83.2	62.4	17.6	11.7	75.1	52.1	65.5	50.7
2025	95.5	92.6	21.0	14.5	67.3	41.7	74.5	78.1
Asia (excluding China)								
1950	65.3	32.0	15.0	8.2	83.7	40.5	50.3	23.8
1970	75.4	41.6	23.4	11.2	73.5	35.7	52.1	30.4
1990	80.5	52.5	26.5	16.4	67.9	29.7	54.0	36.1
2025	95.4	92.6	25.8	16.6	63.5	28.1	69.7	76.0
East Asia (excluding China)								
1950	87.1	70.2	24.0	20.3	75.4	53.7	63.1	49.9
1970	94.9	82.0	35.1	28.4	62.9	52.4	59.8	53.6
1990	96.3	90.8	48.4	45.8	50.5	46.5	48.0	44.9
2025	95.7	92.7	48.2	46.3	48.2	50.0	47.5	46.4
China								
1950	87.8	35.9	1.6	3.2	91.6	77.0	86.2	32.7
1970	88.6	61.7	3.8	4.4	87.4	79.9	84.8	57.3
1990	86.6	75.2	6.2	5.7	84.3	81.0	80.4	69.5
2025	95.7	92.7	10.5	9.7	75.7	73.3	85.1	83.0
Hong Kong								
1950	86.0	62.4	0.0	0.0	74.8	42.5	86.0	62.4
1970	96.2	82.1	27.6	24.4	68.5	61.3	68.6	57.7
1990	96.3	89.8	30.0	33.0	68.2	61.8	66.3	56.8
2025	96.0	92.6	32.4	38.0	67.6	61.2	63.5	54.6
Japan								
1950	91.7	76.9	26.0	25.2	73.9	58.0	65.7	51.7
1970	94.4	83.7	38.4	32.4	61.6	54.5	56.0	51.3
1990	95.5	92.0	54.0	50.4	45.1	43.8	41.5	41.6
2025	95.6	92.6	50.9	47.7	46.2	46.0	44.7	44.9
South Korea								
1950	70.3	46.5	19.5	6.4	80.5	43.0	50.8	40.1
1970	96.5	79.3	25.6	16.0	64.8	48.6	70.9	63.2
1990	98.2	90.3	43.5	40.4	56.5	50.1	54.7	50.0
2025	96.0	92.8	45.2	45.2	54.8	54.8	50.7	47.6
Taiwan								
1950	80.8	58.7	21.2	7.0	77.7	36.6	59.7	51.7
1970	94.7	75.9	34.1	25.8	65.6	43.4	60.5	50.0
1990	95.9	86.0	35.9	38.6	59.7	47.8	60.0	47.4
2025	95.8	92.8	46.6	44.5	38.5	53.8	49.2	48.3

Appendix Table 5 (continued)

Subregion, country, and year	Percent single		Percent in school		Percent in labor force		Percent single and out of school	
	Male	Female	Male	Female	Male	Female	Male	Female
Southeast Asia								
1950	78.4	45.1	12.5	8.2	85.5	44.7	65.9	36.9
1970	80.7	53.7	19.4	11.9	74.6	43.9	61.3	41.8
1990	84.8	65.8	26.9	22.9	67.9	42.4	57.8	42.9
2025	95.4	92.6	29.1	27.7	62.7	40.7	66.4	65.0
Brunei								
1950	85.3	44.8	30.0	18.4	63.5	34.5	55.4	26.4
1970	89.7	70.0	40.4	36.0	57.1	30.0	49.3	34.0
1990	89.9	76.8	33.0	44.0	61.5	28.9	57.0	32.8
2025	95.5	92.3	35.7	47.9	62.1	29.9	59.8	44.4
Indonesia								
1950	79.3	38.6	14.4	6.6	85.0	28.5	64.9	32.0
1970	79.0	42.5	20.1	10.1	74.2	31.8	58.9	32.4
1990	86.1	59.9	29.9	23.0	65.9	32.5	56.2	36.9
2025	95.4	92.7	31.9	28.8	60.6	32.5	63.5	63.9
Malaysia								
1950	80.8	39.0	18.6	10.4	81.4	33.9	62.2	28.6
1970	86.4	64.6	24.0	17.3	68.3	37.9	62.4	47.2
1990	92.4	77.0	24.9	22.3	65.0	44.9	67.5	54.7
2025	95.6	92.2	29.6	28.4	62.4	53.0	66.0	63.9
Myanmar								
1950	69.1	39.9	13.8	7.7	84.1	60.1	55.3	32.2
1970	74.8	54.7	20.9	10.1	78.9	56.8	53.9	44.7
1990	78.1	70.3	22.3	13.9	74.1	51.8	55.8	56.4
2025	95.6	92.6	24.5	17.3	66.6	49.2	71.1	75.4
Philippines								
1950	83.5	67.7	9.6	20.9	90.4	57.4	74.0	46.8
1970	85.3	72.2	22.3	21.4	70.0	42.1	63.0	50.8
1990	85.9	74.1	31.6	34.7	61.4	36.2	54.4	39.4
2025	95.2	92.6	30.9	34.5	61.0	35.5	64.2	58.1
Singapore								
1950	83.7	40.8	22.5	14.0	76.2	20.0	61.2	26.8
1970	94.6	81.2	23.4	14.2	71.5	47.6	71.2	67.0
1990	96.9	88.1	28.3	29.5	71.7	65.1	68.6	58.6
2025	95.9	92.5	29.7	34.1	70.3	64.9	66.2	58.4
Thailand								
1950	76.6	55.5	4.7	2.4	85.6	88.5	71.9	53.1
1970	82.6	63.0	10.3	6.6	80.4	77.5	72.3	56.5
1990	82.0	68.0	17.9	17.3	76.4	70.0	64.1	50.7
2025	95.6	92.7	20.9	22.8	67.9	62.4	74.6	69.9

Appendix Table 5 (continued)

Subregion, country, and year	Percent single		Percent in school		Percent in labor force		Percent single and out of school	
	Male	Female	Male	Female	Male	Female	Male	Female
South Asia								
1950	55.8	17.7	13.5	5.1	85.3	35.6	42.3	12.6
1970	69.4	27.9	22.0	7.0	75.5	28.8	47.4	20.9
1990	76.8	42.1	23.1	9.7	70.5	22.8	53.6	32.4
2025	95.4	92.6	23.1	11.1	65.0	22.7	72.3	81.5
Bangladesh								
1950	65.7	0.4	2.8	0.0	86.2	4.4	62.9	0.4
1970	75.4	11.8	18.8	3.4	80.9	5.1	56.5	8.4
1990	82.4	30.3	23.7	12.4	76.3	6.6	58.7	17.8
2025	95.2	92.5	23.4	14.0	71.2	12.4	71.8	78.4
India								
1950	54.2	17.7	15.2	5.7	84.8	41.6	39.0	12.0
1970	67.2	26.5	23.5	7.5	74.5	33.5	43.6	19.0
1990	75.7	41.1	24.2	9.3	69.1	26.1	51.5	31.8
2025	95.4	92.6	24.9	11.2	63.5	24.1	70.6	81.4
Nepal								
1950	36.9	6.9	3.6	5.2	96.4	57.2	33.3	1.7
1970	55.0	24.2	17.4	6.1	82.6	52.2	37.6	18.1
1990	60.4	34.5	21.0	11.1	77.2	47.2	39.5	23.4
2025	95.5	93.0	20.3	13.3	73.7	40.5	75.2	79.7
Pakistan								
1950	56.2	30.1	9.4	1.3	88.8	8.0	46.8	28.8
1970	80.8	47.3	12.9	4.1	78.9	7.8	67.8	43.2
1990	79.8	58.5	15.1	6.5	75.2	10.8	64.7	52.0
2025	95.3	92.8	14.6	7.0	67.1	19.3	80.8	85.7
Sri Lanka								
1950	90.8	54.4	21.6	20.1	75.3	30.0	69.2	34.3
1970	93.4	71.5	23.8	20.3	67.4	34.5	69.6	51.2
1990	91.6	72.5	25.2	26.4	63.3	29.4	66.4	46.1
2025	95.6	92.8	28.2	29.0	57.0	33.7	67.4	63.8

Source: Peter Xenos and Midea Kabamalan. 1998. *The social demography of Asian youth: A reconstruction over 1950–90 and projection to 2025.* Report for the Project on Long-Term Transformations of Youth in Asia. Honolulu, Hawaii [USA]: East-West Center.

Appendix Table 6. HIV/AIDS in Asia: Subregions and selected countries, end 1999

Subregion and country	Total estimated number living with HIV	Prevalence rate (%) in adults (15–49)	Total estimated deaths, 1999	Total number of AIDS orphans, cumulative
East Asia	530,000	0.06	18,000	5,600
China	500,000	0.07	17,000	4,500
China, Hong Kong SAR	2,500	0.06	<100	NA
Japan	10,000	0.02	150	NA
Korea, Dem. Rep. (North)	<100	<0.01*	NA	NA
Korea Rep. (South)	3,800	0.01	180	<100
Mongolia	<100	0	NA	NA
Southeast and South Asia	5,600,000	0.54	460,000	850,000
Southeast Asia				
Brunei Darussalam	<100	0.2*	NA	NA
Cambodia	220,000	4.04	14,000	13,000
Indonesia	52,000	0.05	3,100	2,000
Lao PDR (Laos)	1,400	0.05	130	280
Malaysia	49,000	0.42	1,900	680
Myanmar	530,000	1.99	48,000	43,000
Philippines	28,000	0.07	1,200	1,500
Singapore	4,000	0.19	210	120
Thailand	755,000	2.15	66,000	75,000
Vietnam	100,000	0.24	2,500	3,200
South Asia				
Afghanistan	NA	<0.01*	NA	NA
Bangladesh	13,000	0.02	1,000	610
Bhutan	<100	<0.01	NA	NA
India	3,700,000	0.7	310,000	NA
Iran (Islamic Rep.)	NA	<0.01*	NA	NA
Maldives	NA	0.05*	NA	NA
Nepal	34,000	0.29	2,500	2,500
Pakistan	74,000	0.1	6,500	7,900
Sri Lanka	7,500	0.07	490	600

Source: UNAIDS. 2000. *Report on the global HIV/AIDS epidemic: June 2000.* Geneva: UNAIDS.
NA: Data not available.
* Not enough data were available to produce an estimate of HIV prevalence for the end of 1999. The 1994 prevalence rate published by the WHO Global Programme on AIDS (*Weekly Epidemiological Record*, 1995, 70:353–60) was applied to the country's 1999 adult population to produce the estimates given here.

Appendix Table 7. Proportions of working-age adults (age 15–64 years), children (age 0–14 years), and elderly (age 65+ and 75+ years) in Asia's populations: Region, subregions, and countries, 2000 and 2050

Region, subregion, and country	2000				2050			
	15–64	0–14	65+	75+	15–64	0–14	65+	75+
Asia	64.1	29.9	5.9	1.9	62.1	17.9	20.0	9.7
East Asia	68.4	23.9	7.7	2.6	60.2	16.1	23.6	12.7
China	68.3	24.8	6.9	2.1	61.0	16.3	22.7	11.9
China, Hong Kong SAR	73.1	16.3	10.6	4.1	56.9	13.9	29.2	16.6
China, Macao SAR	70.6	22.1	7.3	3.0	57.9	12.5	29.6	17.0
Japan	68.1	14.7	17.2	7.0	51.1	12.5	36.4	22.8
Korea, Dem. Rep. (North)	67.6	26.5	5.9	1.8	63.7	19.6	16.6	8.1
Korea, Rep. (South)	72.1	20.8	7.1	2.2	56.1	16.5	27.4	15.0
Mongolia	61.0	35.2	3.8	1.2	64.1	19.7	16.3	6.5
Southeast Asia	62.9	32.4	4.7	1.4	64.0	19.8	16.1	6.6
Brunei Darussalam	64.9	31.9	3.2	1.0	63.6	18.8	17.7	8.4
Cambodia	53.3	43.9	2.8	0.8	68.3	24.3	7.4	2.4
East Timor	54.3	43.0	2.7	0.6	67.2	21.8	11.1	3.1
Indonesia	64.4	30.8	4.8	1.3	63.7	19.9	16.4	6.5
Lao PDR (Laos)	53.8	42.7	3.5	1.0	67.9	23.2	8.8	3.0
Malaysia	61.8	34.1	4.1	1.3	64.7	19.8	15.4	6.6
Myanmar	62.3	33.1	4.6	1.6	64.5	19.7	15.8	6.4
Philippines	58.9	37.5	3.5	1.1	65.8	20.3	13.9	5.4
Singapore	70.9	21.9	7.2	2.6	57.5	13.9	28.6	17.9
Thailand	68.1	26.7	5.2	1.5	61.8	17.1	21.1	9.9
Vietnam	61.3	33.4	5.3	1.9	63.1	19.8	17.1	7.2
South Asia	60.3	35.2	4.6	1.3	66.1	20.8	13.2	5.1
Afghanistan	53.7	43.5	2.8	0.6	64.6	30.5	4.9	1.4
Bangladesh	58.2	38.7	3.1	0.9	67.1	22.0	10.9	3.7
Bhutan	53.0	42.7	4.2	1.3	67.6	24.2	8.2	2.8
India	61.5	33.5	5.0	1.5	65.5	19.7	14.8	5.9
Iran (Islamic Rep.)	59.2	37.4	3.4	1.0	65.2	20.1	14.7	5.1
Kazakhstan	66.2	27.0	6.9	2.2	64.1	17.7	18.2	7.6
Kyrgyzstan	60.0	33.9	6.0	1.8	64.2	20.0	15.8	6.6
Maldives	52.8	43.7	3.5	1.0	67.7	24.2	8.1	2.7
Nepal	55.2	41.0	3.7	1.0	68.1	23.6	8.3	2.7
Pakistan	54.5	41.8	3.7	1.0	68.5	23.1	8.3	2.9
Sri Lanka	67.4	26.3	6.3	2.0	61.4	17.3	21.3	9.4
Tajikistan	56.0	39.4	4.6	1.4	65.7	20.0	14.3	5.8
Turkmenistan	58.1	37.6	4.3	1.3	66.0	20.1	13.9	5.7
Uzbekistan	59.1	36.3	4.7	1.5	64.4	19.9	15.7	6.5

Source: United Nations. 2001. *World population prospects: The 2000 revision.* New York: Population Division, Department of Economic and Social Affairs.

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Acknowledgments

The Future of Population in Asia brings together research on population and health conducted in recent years by staff members at the East-West Center and their colleagues. Much of the numerical data used in this report is taken from *World population prospects: The 2000 revisio*n, released by the United Nations in 2001.

Sidney B. Westley, Communications Specialist, largely compiled the material presented here with professional and technical guidance from Robert D. Retherford, Senior Fellow and Coordinator, Population and Health Studies. Authorship of individual chapters is as follows:

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Fertility and Family Planning. *Robert D. Retherford and Sidney B. Westley*
Tradition and Change in Marriage and Family Life. *Minja Kim Choe, Sidney B. Westley, and Robert D. Retherford*
The Changing Status of Women in Asian Societies. *Sidney B. Westley*
Asia's Changing Youth Population. *Sidney B. Westley and Minja Kim Choe*
HIV/AIDS in Asia. *Tim Brown*
Asia's Aging Population. *Sidney B. Westley and Andrew Mason*
Population Change and Economic Development: Success Stories from Asia. *Andrew Mason and Sidney B. Westley*
Population, Natural Resources, and Environment. *Vinod K. Mishra*

This publication is the result of a broad group effort. In February 2002, Robert D. Retherford, Andrew Mason, and Tim Brown made presentations to policy audiences in New York and Washington, D.C., based on the material published here. At the East-West Center, Sally Dai provided research assistance, Loraine Ikeda proofread the report and managed its distribution, Phil Estermann provided administrative support, and Karen Yamamoto provided fiscal support. Karen Oppenheim Mason, former Coordinator, Population and Health Studies, helped conceptualize the project.

Several scholars provided background material or comments on earlier drafts. These include Peter Xenos and Wiwat Peerapatanapokin at the East-West Center, Noriko O. Tsuya at Keio University, Tokyo, Larry L. Bumpass at the University of Wisconsin, Madison, Ronald R. Rindfuss at the University of North Carolina, Chapel Hill, Herbert Smith at the University of Pennsylvania, and Mark W. Rosegrant at the International Food Policy Research Institute, Washington, D.C. Responsibility for any errors, however, rests solely with the chapter authors.

Publication of *The Future of Population in Asia* was made possible by a grant from the Bill and Melinda Gates Foundation.