

Transitions in World Population

by Population Reference Bureau staff

World population is likely to reach nearly 9 billion by 2050.

Countries are sharply divided by whether their populations are growing or declining.

The transition to lower or higher fertility is tied to socioeconomic change.

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Transitions in World Population

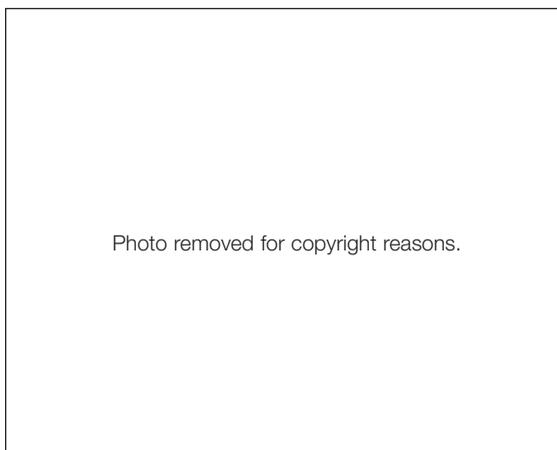
by *Population Reference Bureau staff*

World population was transformed in the 20th century as technological and social changes brought steep declines in birth rates and death rates around the world. The century began with 1.6 billion people and ended with 6.1 billion, mainly because of unprecedented growth after 1960. The momentum created by this population growth will carry us past 7 billion by 2015. Beyond that, the future of world population is less certain.

Public discourse on population today tends to flow in one of two directions. One emphasizes the continued growth in the less developed regions, and the economic, social, environmental, and political strains associated with adding a few billion more people in the next 50 years.

The other focus centers around the unprecedented low fertility in many countries. About 40 percent of the world's population lives in countries in which couples have so few children that the countries' populations are likely to decline over the long term. These countries, which include China and most of Europe, must grapple with social, economic, environmental, and political challenges associated with aging and eventually dwindling populations. And, if fertility rates continue to fall around the world, more countries will face this low-fertility predicament.

Are we experiencing a population explosion or birth dearth? The answer may be both. And these two



Wolfgang Schmidt / Peter Arnold

These children are likely to have smaller families than their parents did, but they are also likely to see world population reach nearly 9 billion people.

opposing trends—population growth and population decline—call for very different policies and contingencies. Those addressing population growth sometimes compete in funds, attention, and credibility with those concerned with population decline.

But the demographic reality is more complex and less certain than this simple dichotomy suggests. The United Nations warns that fertility decline in poor countries may halt unless couples have access to family planning, for example. Population decline in low-fertility countries could be slowed by massive immigration—or even by a baby boom. And researchers are looking beyond population numbers—to age, education, and other

characteristics—to study links between population change and economic, environmental, and political trends.

It is almost certain that nearly all future population growth will occur in the developing regions of the world. Urban areas in these regions will absorb most of the additional people. Population is growing fastest among the poorest population groups within developing countries. In these countries, a “youth bulge” ensures that the absolute number of births will rise even as couples are having fewer children.

At the other extreme, most countries in Europe now have a “youth dearth” after decades of low fertility. Stagnant growth or even population decline is challenging more countries as fewer workers must support expanding pension and social security systems for their aging citizens.

Governments have crafted a range of population policies to address these and other issues over the last half-century. In developing countries, policies include support for family planning and reproductive health programs and efforts to improve women’s status, to enable women to have the number of children they want. In developed countries, particularly Japan and parts of Europe, governments have implemented policies to promote gender equality in the workplace and ease the burden of childrearing—all to encourage women to have more children.

The factors that drive childbearing trends—such as the economy, education, gender relations, and access to family planning—are numerous and complex, and public policies and programs to influence population trends must address many issues at once. Demographic changes often take years to be evident, making it difficult to predict how today’s actions will affect the future size and distribution of populations. Small changes in childbearing trends today have huge implications for future population size.

This *Population Bulletin* chronicles changes in world population in the last century, with a particular focus on the last 50 years. It examines the social and economic factors that affect popula-

tion change, including wide disparities in income, education, and women’s status within countries. It also discusses the heightened international concern since the 1950s about rapid population growth, widespread fertility declines, and the new world consensus reached in the 1990s about how best to respond to population trends. It reviews the factors that have led to low fertility in Europe, Japan, and other areas and how governments there have begun to respond. Whether or not these responses bring the desired population change, their common goal is to improve the quality of life for individuals in the 21st century.

20th Century Transitions

The different demographic situations facing developed and developing countries today reflect the population trends of the 20th century, and especially the past 50 years.¹ These trends not only shaped the current profile of these countries’ populations, but also will influence their demographic futures.

The 20th century can be viewed as a triumph for human health. Death rates plummeted and life expectancy soared first in the more developed countries, and then in much of the less developed world. Although fertility also fell in many areas, the sudden decline in mortality fueled unprecedented population growth as births far exceeded deaths each year. The population of the more developed regions more than doubled over the century, exceeding 1 billion by 2000. But the most dramatic growth was in the less developed regions, where population more than quadrupled; the total neared 5 billion by 2000 (see Figure 1).

This uneven regional growth reduced the developed countries’ share of world population from one-third to one-fifth over the century. Europe’s relative share of world population fell most. In 1900, about one-

quarter of the world's population lived in Europe; by 2000, barely one-eighth lived in Europe (see Table 1). In contrast, the less developed countries in Africa, Latin America, and the Caribbean accounted for more than one-fifth of the world in 2000—up from one-eighth in 1900. Asia contained nearly three-fifths of the total population by century's end.

Population Change in Developed Countries

As the 20th century began, the more developed countries were well into the shift from high to low mortality and fertility known as the demographic transition (see Box 1, page 6).

In 1900, life expectancy at birth was 47 years in the United States and between 45 and 50 years in Europe, Japan, and Australia.² Life expectancy would reach remarkably high levels by midcentury. U.S. life expectancy at birth shot up to 68 years by 1950 and reached 77 years by 2000. Average life expectancy rose even higher in Japan and many European countries, and it continues to improve.

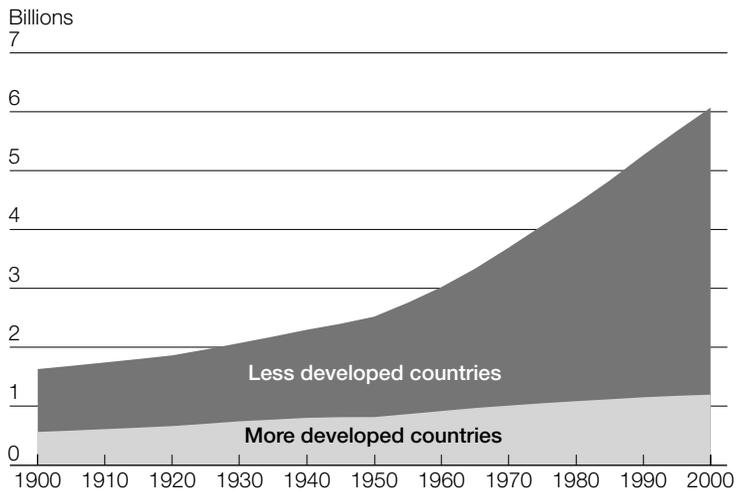
Infants and young children benefited most from this health transition. The infant mortality rate (IMR, number of deaths to infants less than 1 year of age per 1,000 births) was below 60 in developed countries by the 1950s, and below 10 by 2000.

Exceptions

Russia and several other Central Asian and Eastern European countries have been the exceptions to this general improvement in health and mortality in the last 50 years. Male life expectancy began to slip during the 1960s in Russia. After a temporary improvement in the early 1980s, life expectancy fell again during the late 1980s and early 1990s, when the Soviet Union was dissolving and economic conditions were deteriorating. Between 1990 and 2000, Russian male life expectancy at birth fell from 64 to 59 years. Female life expectancy at birth dropped about two years to an average of 72 years.

Figure 1

Population Growth in More Developed and Less Developed Countries, 1900–2000



Note: Developed countries include Australia, Canada, Japan, New Zealand, the United States, and all of Europe. All other countries are included in less developed.

Sources: UN Population Division, *World Population Prospects: The 2002 Revision* (2003); and Population Reference Bureau estimates.

Table 1

Population Changes in Major World Regions, 1900, 1950, and 2000

Region	1900		1950		2000	
	Million	%	Million	%	Million	%
World	1,650	100	2,519	100	6,071	100
More developed	539	33	813	32	1,194	20
Europe	408	25	547	22	728	12
North America	82	5	172	7	316	5
Japan, Australia, & New Zealand	49	3	97	4	150	2
Less developed	1,111	67	1,706	68	4,877	80
Africa	133	8	221	9	796	13
Asia & Oceania	904	55	1,315	52	3,561	59
Latin America & Caribbean	74	4	167	7	520	9

Source: UN Population Division, *World Population Prospects: The 2002 Revision* (2003).

The 1990s also saw marked increases in HIV/AIDS and other infectious diseases, which exacted a further toll on the region's health.³ Analysts disagree about why the health status has declined, but many point to inadequate health services, lack of prescription medicine, high

continued on page 7

Box 1

Demographic Transition

For most of history, human population grew very little because there were nearly as many deaths as births each year. High birth rates were often offset by frightful mortality from wars, famines, and epidemics. The bubonic plague, for example, reduced the populations of China and Europe by one-third in the 14th century.¹ Chronic infections and malnourishment also kept mortality high.

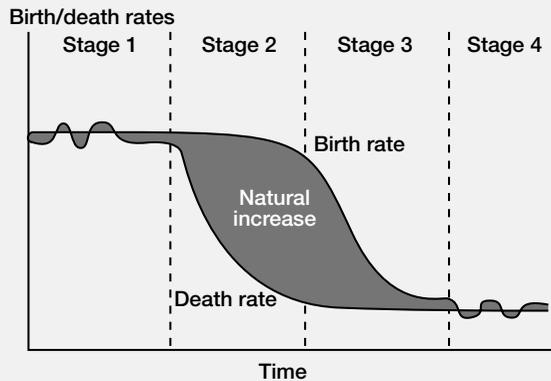
Health and living conditions improved in Europe in the 17th and 18th centuries, the number of births exceeded the number of deaths, and populations began to grow. Better hygiene and public sanitation reduced the incidence of disease. Expanded commerce made food supplies more widely available and improved nutrition. The wild fluctuations in mortality of previous centuries began to recede and life expectancy began a slow rise. Birth rates also declined as a result of later ages at marriage, urbanization, industrialization, rising aspirations, and other factors.

The shift from high to low mortality and fertility is known as the “demographic transition.” This shift occurred throughout Europe, North America, and a number of other areas in the 19th and early 20th centuries, and started in many developing countries in the middle of the 20th century. Although the pace and paths of decline varied tremendously among countries, the demographic transition emerged as the dominant model of demographic change.² In the classic demographic transition, the trend of high birth and death rates (and minimal population growth) is disrupted by a long-term decline in mortality. Mortality rates eventually stabilize at low levels (see figure). Then birth rates fall to about the same level as mortality rates. With birth and death rates at similar low levels, the equilibrium of slow population growth is regained.

The pace of change in a country varies depending on its culture, level of economic development, and other factors. As countries pass through the various stages of the transition, population growth from natural increase (birth rate minus death rate) accelerates or decelerates depending on the gap between the birth rates and death rates. More developed countries such as the United States have “completed” the demographic transition: Fertility and mortality are at low levels, and natural increase adds little, if any, population growth. Many developing countries are in an intermediate stage, in which mortality and fertility are falling at varying rates but are still high relative to the levels of Europe and other more developed areas.

Many low-fertility countries have entered what some describe as a “second demographic transition” in which fertility falls below the two-child replace-

The Classic Stages of Demographic Transition



Note: Natural increase or decrease is produced from the difference between the number of births and deaths.

ment level as forces of contemporary life interfere with childbearing. This transition has been linked with greater educational and job opportunities for women, the availability of effective contraception, a shift away from formal marriage, the acceptance of childbearing outside marriage, and the rise of individualism and materialism.³

Demographers disagree about whether all countries will follow the transition experienced in Europe and about whether there are additional stages of transition that we have not identified—long-term population decline, for example. But the demographic transition theory provides a useful framework for assessing demographic trends and projecting future population size.

References

1. Colin McEvedy and Richard Jones, *Atlas of World Population* (New York: Facts on File, 1978): 65; William H. McNeil, *Plagues and Peoples* (New York: Anchor Books, Doubleday, 1976): 177-83; “The Black Death,” accessed online at www.geocities.com/~mohan_ayer/315.htm, on Jan. 8, 1999; and Edward A. Wrigley, *Population and History* (New York: McGraw-Hill Book Co., 1969): 62ff.
2. Ronald Lee, “The Demographic Transition: Three Centuries of Fundamental Change,” *Journal of Economic Perspectives* 17, no. 4 (2003): 167-90; and Rodolfo Bulatao, “Introduction,” in *Global Fertility Transition. Supplement to Population and Development Review* 27, ed. Rodolfo A. Bulatao and John B. Casterline (New York: Population Council, 2001): 1-16.
3. United Nations Population Division, *Partnership and Reproductive Behaviour in Low-Fertility Countries* (New York: United Nations, 2002): 4; and Kirk van de Kaa, “Europe’s Second Demographic Transition,” *Population Bulletin* 42, no. 1 (1987).

rates of smoking, poor nutrition, and increased alcohol and drug abuse.⁴

Declining Fertility

Birth rates fell in most developed countries during the late 19th century. American women were having four children, on average, at the dawn of the 20th century, down from about seven in the early 1800s.⁵ Fertility declined further after 1900. Well before modern contraceptives were available, the total fertility rate (TFR, or average number of children a woman would have given prevailing birth rates) fell to about two children per woman in the United States and even lower in Europe during the world economic crises of the 1930s. The TFR recovered to 2.8 children per woman in the more developed countries after World War II, when many countries experienced a baby boom, but the general decline resumed by the 1970s.⁶

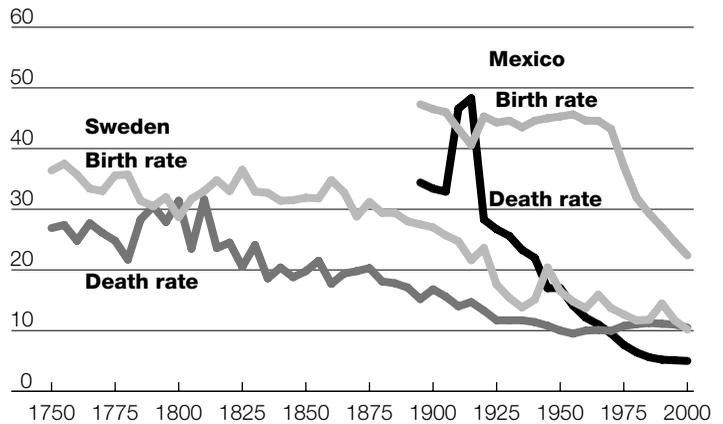
The protracted fertility declines after 1970 coincided with trends toward delayed marriage, more divorce, and an increase in the percentage of women going to college and working outside the home. The TFRs in many European countries fell below 2 children per woman by 1980. The TFR must be slightly above 2.0—about 2.1 in low-mortality countries—to maintain “replacement-level” fertility, partly because some girls and women die before the end of their childbearing years. When the TFR remains below 2.1 for a prolonged period, populations decline because deaths outnumber births—unless there is net immigration. By 2000, the TFR was below 2.1 in almost all developed countries, including the United States, and had sunk to 1.2 or less in the Czech Republic, Italy, Spain, and several other countries. Although these extremely low TFRs may be a temporary adjustment to changing socioeconomic conditions, the UN assumes TFRs will stay below 2.0 in developed countries in coming decades.

The sustained low fertility in Europe was not foreseen in the classic demographic transition theory, which assumed that fertility would stabilize

Figure 2

Demographic Transition in Sweden and Mexico

Births/Deaths per 1,000



Sources: B.R. Mitchell, *European Historical Statistics 1750-1970* (1976): table B6; Council of Europe, *Recent Demographic Developments in Europe 2001* (2001): tables T3.1 and T4.1; CELADE, *Boletín demográfico 69* (2002): tables 4 and 7; Francisco Alba-Hernandez, *La población de México* (1976): 14; and UN Population Division, *World Population Prospects: The 2002 Revision* (2003): 326.

at replacement level and population growth would cease over the long term.⁷ The current low fertility will lead to population decline for Europe unless there is massive immigration.

The United States—the most populous developed country—has had higher fertility than most other developed countries for the past 25 years. The ethnic and racial diversity of Americans and the substantial immigration from countries where large families are the norm explain part, but not all, of the higher U.S. fertility.⁸ After falling briefly below 1.8 in the mid-1970s, the U.S. TFR has hovered around 2 for the past decade.

Transitions in Less Developed Countries

In the early 20th century, most of Africa, Asia, and Latin America were still in the predemographic transition state of high mortality and high fertility. The course of Mexico's birth and death rates over the century illustrates the situation in many less developed countries—though the speed and timing of decline varied substantially (see Figure 2). Mexico's

mortality and fertility were much higher in 1900 than Sweden's rates on the eve of that country's demographic transition in the 1770s, and Mexico's pace of demographic change was markedly faster.

In Sweden, fertility and mortality declined gradually over 150 years. At no time did Sweden's rate of natural increase much exceed a modest 1 percent per year. After spiking during the civil war period in the early 1900s, Mexico's death rate fell three times as fast as Sweden's, probably thanks to a rapid spread of public health knowledge and practices that were widely available only in the 20th century. With declining mortality and high fertility, Mexico's population growth rate

rose from around 1 percent in the early 1900s to 2.7 percent by 1950. The Mexican population nearly doubled from nearly 14 million to about 26 million in the same interval.⁹ Policies to lower fertility and improvements in communications and transportation also hastened the spread of family planning information—and the birth rate plummeted in the late 1970s, although it is still well above that of Sweden.

Mexico's demographic history was echoed in many less developed countries, but with many variations. Some countries appeared to be rushing through the various stages of the demographic transition, while others appeared to be following completely

Box 2

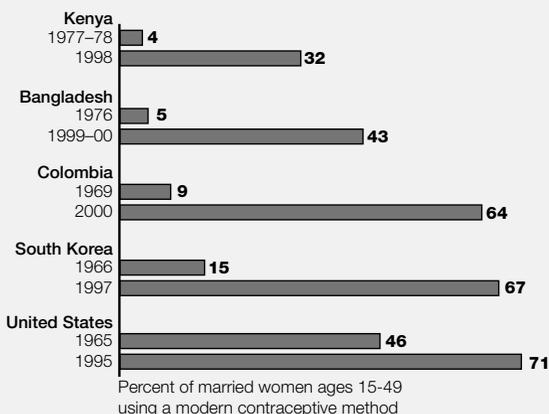
The Reproductive Revolution

The “reproductive revolution” was one of the most remarkable developments of the second half of the 20th century. The emergence of modern contraceptive methods such as hormonal pills, intrauterine devices, simpler sterilization techniques, and contraceptives that can be injected or implanted under the skin made it easier and safer for women to avoid unintended pregnancies. Increased access to these methods, along with socioeconomic changes that motivated couples to have fewer children, drove the fertility decline of the last 40 years.

Use of family planning worldwide rose from less than 10 percent of married women in the 1960s to about 60 percent in 2003. Due in part to modern contraception, fertility decline occurred much more rapidly in developing countries than it had in the industrialized countries. The shift from larger to smaller families in the United States and Europe occurred over 100 to 150 years, yet average family size dropped almost as much in developing countries in only a few decades.

The smaller family sizes also reflect a transformation in attitudes about childbearing. As countries have modernized and urbanized, and as women have become more educated and have begun to marry later, couples want fewer children. In the 1970s in Kenya, for example, surveys showed that women wanted seven or more children, on average. In the 1990s, Kenyan women said they wanted fewer than four children, on average. In Colombia and Indonesia, women want fewer than three children today, compared with just over four in the 1970s.

Increase in Modern Contraceptive Use in Selected Countries, 1960s–2000



Note: U.S. figures are for women ages 15 to 44. Modern contraceptives include sterilization, oral contraceptives, IUDs, condoms, diaphragms, Depoprovera, Norplant, and other barrier and chemical methods.

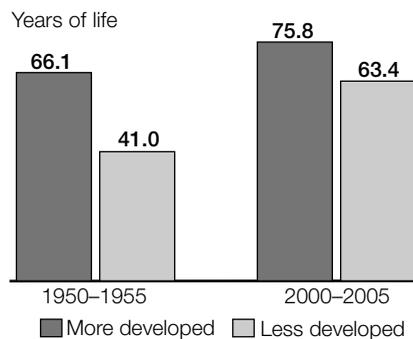
Sources: UN Population Division, *Levels and Trends in Contraceptive Use, 1998* (2000); C. Haub and B. Herstad, *Family Planning Worldwide* (2002); and ORC Macro, Demographic and Health Survey data, available online at www.measuredhs.com.

Organized family planning programs that brought contraceptive supplies and services to people, along with information campaigns promoting smaller, healthier families, contributed substantially to the shift to smaller families. Studies in the 1990s showed that these programs were responsible for 40 percent to 50 percent of the fertility decline of developing countries since the 1960s. Even couples

new paths of demographic change. Fertility change was accelerated by the advent of contraceptives that revolutionized women's ability to plan pregnancies, and by policies to make contraceptives more widely available (see Box 2).

The average life expectancy at birth in less developed countries rose from 41 years to 63 years between 1950 and 2000, according to UN estimates (see Figure 3). The IMR fell from 180 deaths per 1,000 births to 61 deaths per 1,000 births over the same period. Progress has been much slower in sub-Saharan Africa and South Asia. In the 1950s, at least 180 infants died per 1,000 births in these regions. In 2003, the IMR was still

Figure 3
Life Expectancy at Birth in More Developed and Less Developed Countries, 1950–1955 and 2000–2005



Source: UN Population Division, *World Population Prospects: The 2002 Revision* (2003): 40-43.

living in low-income, rural communities in countries like Bangladesh, Vietnam, and Zimbabwe have gained access to modern contraception through nationwide, organized family planning programs.

Still, the use of family planning varies widely between countries and within countries. In Ethiopia and Mali, for example, less than 10 percent of women use family planning, while in countries like Mexico and Thailand, family planning use is closer to 70 percent—levels of use found in developed countries. Within countries, similar disparities can be seen between the poorest and richest citizens.

More than 100 million women in developing countries, or about 17 percent of all married women, would prefer to avoid a pregnancy but are not using any form of family planning. Demographers refer to these women as having an “unmet need” for family planning. Over the past decade, rising contraceptive use has reduced unmet need in most countries. In some countries, however, particularly in sub-Saharan Africa, unmet need remains persistently high (more than one-fifth of married women).

The reasons women do not use family planning—even when they prefer to avoid a pregnancy—are complex. Surveys and in-depth research from the 1990s reveal a range of obstacles and constraints that can undermine a woman's ability to act on her child-bearing preferences. These obstacles include a fear of side effects of contraceptive methods, fear of husband's disapproval or retribution, religious opposition to family planning, perceived risk of becoming

pregnant, and ambivalent feelings about becoming pregnant.

Political and cultural barriers have limited the access to family planning for young people in particular. In some countries, unmarried adolescents are denied access to family planning services on the assumption that such access would promote promiscuity. Also, young married women may be encouraged to have a birth soon after marriage. Forty-two percent of women in developing countries (excluding China) give birth before age 20. The pace of fertility decline in sub-Saharan Africa, South Asia, and the Middle East and North Africa will be affected by whether young couples delay their first birth until they are in their 20s. This delay lengthens the interval between generations and lowers average fertility.

The vast majority of developing countries today do provide family planning services, albeit with different degrees of success. Not all women have easy access to family planning, but the expansion of choices of methods and wider availability of services and supplies around the world have truly been revolutionary.

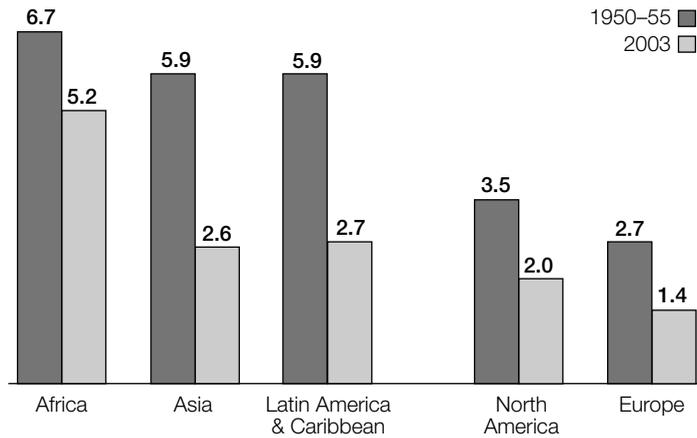
References

John Bongaarts, “The Role of Family Planning Programs in Contemporary Fertility Transitions,” *Working Paper No. 71* (New York: The Population Council, 1995): 23-24; Vera M. Zlizar et al., “New Survey Findings: The Reproductive Revolution Continues,” *Population Reports Series M*, no. 17 (2003); and country reports from the Demographic and Health Surveys.

Figure 4

Fertility Levels in Major World Regions, 1950 and 2003

Children per woman*



* The average number of children a woman would have under prevailing age-specific birth rates.

Sources: UN Population Division, *World Population Prospects: The 2002 Revision* (2003); and C. Haub, *2003 World Population Data Sheet*.

above 90 in sub-Saharan Africa and was nearly 70 in South-Central Asia.

Mortality decline in some areas has been slowed or reversed by the spread of HIV/AIDS infection. AIDS mortality has reduced life expectancy in some countries of sub-Saharan Africa, and infection rates are increasing rapidly in South and East Asia. Although the epidemic has affected all world regions, it has exacted its greatest loss of life in the poorest countries—at least 98 percent of the roughly 3 million HIV/AIDS-related deaths in 2003 were in sub-Saharan Africa and other less developed regions (see Box 5, page 33).

In some regions, a high prevalence of sexually transmitted infections increases susceptibility to HIV/AIDS and contributes to widespread infertility. While surveys suggest that most women in developing countries have more children than they would like, infertility prevents other women from having as many as they want, causing economic and social problems for families.¹⁰

In the 1950s, the average TFR was about 6.2 in less developed countries, a sharp contrast to 2.8 for more devel-

oped countries. The TFR in developing regions ranged from 6.7 in Africa to 5.9 in Asia and Latin America and the Caribbean. The high fertility and declining mortality fueled the explosive population growth that captured wide public attention in the 1960s, and helped fuel international efforts to slow population growth by bringing down fertility.

Fertility has fallen in most developing countries, but the paths to lower fertility have varied.¹¹ In 2003, the TFR in Asia stood at about 2.6, less than one-half its 1950 level; the TFR for Latin America and the Caribbean was down to 2.7 from 5.9 in 1950 (see Figure 4). Fertility also fell in Africa, but it remains well above the average for any other region.

These regional fertility averages mask very different levels and trends among and within individual countries. China's TFR is about 1.7, for example, well below that of most other Asian countries. Exclude China's 1.3 billion people from the region's statistics, and Asia's average TFR jumps from 2.6 to 3.1.

China represents one extreme of the childbearing patterns in the developing world: countries that have completed a transition to below-replacement fertility. The TFR is also near or below 2.1 in Brazil, Costa Rica, Korea, and Thailand. Including China, one-fourth of the population in the developing world lives in countries with below-replacement fertility. Momentum from a young age structure ensures continued growth for these countries, but the momentum will eventually subside and population size will stabilize or decline if these countries hold to their low-fertility path.

At the other extreme are countries where fertility has remained high. Most of these countries are in the Middle East (Yemen) or in extremely poor regions of sub-Saharan Africa (Congo, Uganda), and they make up less than 5 percent of world population (see Table 4, page 35).

Most developing countries—accounting for 53 percent of world

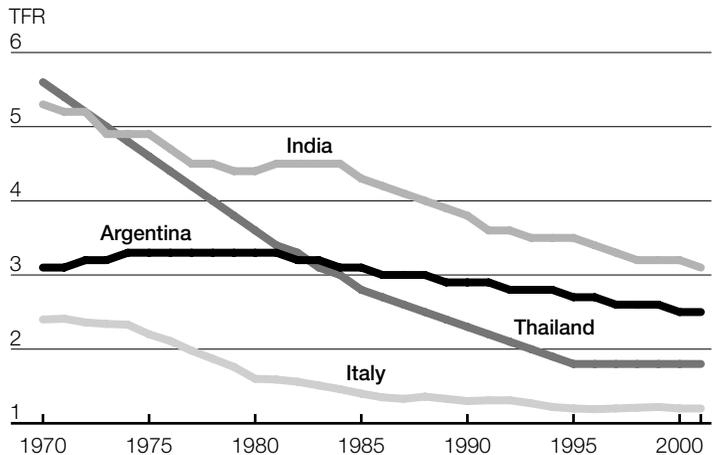
population—lie in a middle group, in which the TFR fell from more than 6 children per woman after 1960 but has remained above 2.0. Asia includes many of the most populous countries in this middle group, including Bangladesh, India, Indonesia, Pakistan, and the Philippines. In India, as in many countries, periods of fertility decline have been interrupted by plateaus (see Figure 5).

Most of Latin America is also in this middle range. Brazil and Costa Rica, for example, are on the lower end, with TFRs near replacement level. On the high end, a handful of Latin American countries, including Bolivia, Guatemala, Haiti, and Paraguay, had moderately high TFRs between 4.1 and 4.7 in 2003.

Sub-Saharan Africa is a high-fertility region—though fertility has declined and is continuing to decline in many of the region’s countries. Accordingly, Africa’s future growth is subject to wide speculation. Many demographers detect a transition to lower fertility in much of the region but disagree about how fast and how far fertility will decline.¹² Africa’s widespread poverty, high rates of illiteracy, largely rural populations, and strong traditional preferences for large families do not favor a rapid decline. In addition, some public health professionals fear that the HIV/AIDS pandemic has siphoned off public health funds that might have gone to expand family planning services for women, and could delay the fertility transition. Fertility has remained stubbornly high in Mali, Niger, and Uganda, for example, and may have risen in Kenya in the early 2000s.¹³

The course of demographic transition also is not clear in the Middle East, which includes North Africa and parts of Western Asia. Fertility remains generally high despite impressive declines in mortality, but the situation varies throughout the region. Mortality fell rapidly in the oil-producing Persian Gulf states, thanks to improved public health,

Figure 5
Patterns of Fertility Decline, 1970 to 2001



Note: TFR (total fertility rate) is the average number of children a woman would have under prevailing ages-specific birth rates.

Sources: Registrar General of India; Instituto Nacional de Estadística (Argentina); Council of Europe; and Population Reference Bureau.

expanded education, and higher incomes brought by oil revenues. But the traditional culture in countries such as Yemen favors large families, and fertility has remained high. In contrast, Iran’s TFR has plummeted in the last decade—from about 6.7 in 1986 to 2.5 in 2003. Fertility decline has proceeded more slowly in Egypt, the region’s largest country. Egypt’s TFR was 3.5 in 2003, down from around seven in 1960.¹⁴

Immigration and Urbanization

Fertility and mortality drive most demographic change, but migration within and between countries also affects population growth. Migration affects the distribution of the population by age, sex, cultural, racial, and other characteristics in the communities that send and that receive migrants.

Throughout the 20th century, the largest migration flows involved individuals and families moving from rural to urban areas. The major shift of population from rural to urban areas began during the late 19th century, when Europe and North

The population shift from rural to urban areas also stimulates social and economic changes.

America were industrializing, and when faster and better communication made it easier for people to move. Economic development and trade were centered in urban areas, and cities offered better job opportunities, amenities, and public services than villages and rural areas.¹⁵ By 1950, more than one-half (55 percent) of the residents of more developed countries lived in urban areas, up from about one-quarter in 1900. In 2000, about three-quarters (75 percent) lived in urban areas.

In most of Africa, Asia, and Latin America, life was centered in the countryside for much of the 20th century. Just 18 percent of developing country residents lived in urban areas in 1950. As these regions began to industrialize, rural residents began moving to the cities. These rural migrants fostered industrial development by enlarging the urban labor pool, as had their counterparts in Europe and the United States decades earlier. The flow began slowly but soon expanded into an unprecedented wave, helped by improved communication and transportation networks and increased population growth in rural areas. The percentage of less developed country residents living in urban areas rose from 18 percent to 40 percent between 1950 and 2000.

The early 21st century marks the first time that the majority of world population will live in urban areas. The population shift from rural to urban areas also stimulates social and economic changes. Urban residents usually have higher educational levels, lower fertility, higher incomes, better health, and longer lives than rural residents. Thus, urbanization appears to accelerate the demographic transition to lower mortality and fertility. Cities offer many amenities and economies of scale that lower the costs of providing public services.

But the unprecedented population growth in urban areas in the past 50 years has strained the capacity of many less developed countries to provide basic services for all but the most privileged residents, and there is a

growing gap between rich and poor in the urban areas of many countries.¹⁶

International Migration

About 175 million people—about 3 percent of world population—are international migrants: They live in a country other than their country of birth. This pool of international migrants is fluid; many migrants move back to their native country, while new migrants arrive. The migrant pool is augmented by an estimated 5 million to 10 million people each year.¹⁷

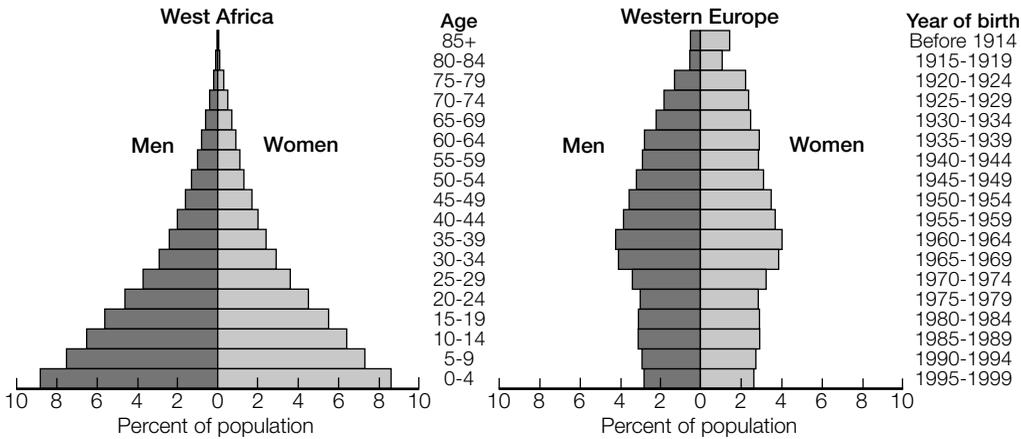
A large majority of international migrants are from less developed countries—not surprising since about 80 percent of world population lives in these countries. Most move from one less developed country to another, from Paraguay to Brazil, from Ghana to Côte d'Ivoire, or from Myanmar to Thailand, for example. Foreigners made up the majority of the work force in several smaller Persian Gulf states. In Southeast Asia, migrants from Cambodia, Indonesia, and Myanmar seek jobs in Singapore, South Korea, Thailand, and other newly industrialized countries in Asia.

Most people move to take advantage of better economic opportunities, but some 14 million international migrants are refugees or asylees who were forced from their home countries by political violence or the threat of persecution. In the late 1990s and early 2000s, for example, millions left Afghanistan for Iran and Pakistan—although many later returned. Refugees often return to their home countries when conditions stabilize.¹⁸

Migration flows from the less developed to the more developed countries include the movement from South and Central America to North America, and from North Africa and the Middle East to Europe. The flow from Asia to North America and Australia has also accelerated. Immigration makes up a significant part of the population growth in countries in which fertility has sunk so low that annual deaths outnumber annual births.

Figure 6

Age and Sex Profile for West Africa and Western Europe, 2000



Source: United Nations, *World Population Prospects: The 2002 Revision* (2003).

The flow from one industrialized country to another is relatively small, with a few exceptions: Ethnic Germans poured into Germany from former Soviet countries, and immigrants and refugees from Eastern Europe entered other European countries in the wake of war in the Balkans.

Large and sustained migrant flows can alter the fertility levels in receiving countries when migrants come from countries with higher fertility norms. For example, more than one-half of U.S. immigrants are from Latin American countries where fertility is much higher than in the United States. Although migrant families tend to adopt the lower fertility norms of their new country over time, Latin American immigrants tend to have larger families than U.S.-born couples.¹⁹ Similarly, Turkish immigrant women in Germany marry earlier and have higher fertility than German-born women.²⁰

Immigration can also introduce new health issues, such as infectious diseases or chronic health problems endemic in the countries of origin but less common in the countries of destination.

Migration, in concert with fertility and mortality, changes population size and characteristics. Some countries escape population decline only

because of a sustained influx of migrants. Other countries reduce stress from rapid population growth through emigration.

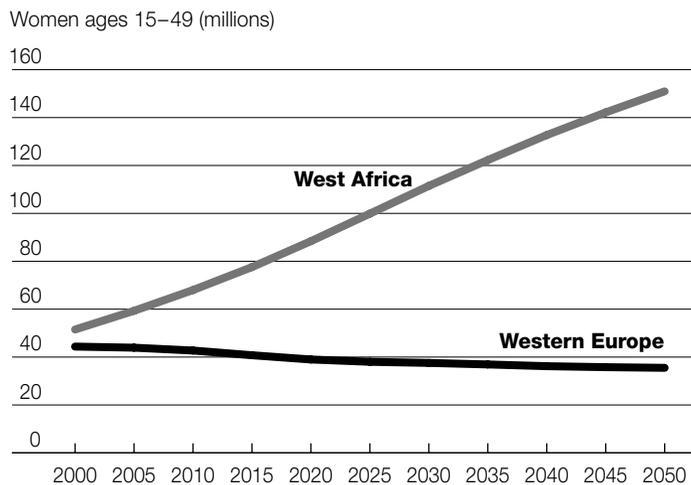
Momentum for Population Change

Fertility, mortality, and migration trends are reflected in the age and sex profiles of the world's countries. Fertility has the greatest influence on population structure in nearly all countries. The decades of high fertility rates in the less developed countries have meant ever-increasing numbers of young people, illustrated by the broad base of the age-sex pyramid for West Africa (see Figure 6). Children under age 15 made up 45 percent of the population of West Africa in 2000, and one-half of the population in Niger. Elderly people ages 65 or older are only 3 percent of the population in West Africa and 5 percent of the population in all developing countries.

Improvements in infant and child mortality also contributed to the expanding youth population, as greater proportions of each generation live to adulthood. The broad base of the West African population

Figure 7

Women of Childbearing Age in Western Europe and West Africa, Projected 2000 to 2050



Source: UN Population Division, *World Population Prospects: The 2002 Revision* (2003).

structure is a powerful force for future population growth, as these ever-larger cohorts of young people move into childbearing ages. The number of women of childbearing age, roughly ages 15 to 49, will rise from about 52 million to 151 million between 2000 and 2050 (see Figure 7). Even if they have fewer children than their own mothers did, West African women will produce about 11 million births annually during the 50-year period. The annual number of deaths is projected to rise from 3.6 million to 4.7 million over the same period.

The age structure of Western Europe, in contrast, reveals the effects of excessive deaths and dearth of births during World War II, a post-war baby boom, and then decades of low fertility. Almost every cohort born after 1965 was smaller than the one that preceded it. Occasional flows of immigrants—especially from Eastern and Southern Europe, North Africa, and the Middle East—have added to the middle-age bulge because most migrants enter as young adults. There are nearly as many older people as children in Western Europe and in many other

developed regions. The under-15 age group made up about 17 percent of the 2000 population in Western Europe, while those age 65 or older made up about 16 percent.

The narrowing base of the population pyramid is also a powerful force for “negative momentum.” The number of potential mothers is shrinking from 44 million in 2000 to 36 million in 2050. Even if Western European women have slightly more children than their mothers, the annual number of births is projected to edge downward, staying below 2 million over 50 years. Because these countries also have a large share of their populations in the oldest ages where most deaths occur, the annual number of deaths will rise from 1.8 million in 2000 to 2.5 million by 2050. With more deaths than births, the population will decline unless there is substantial immigration.

Changes in the age structure also alter the “dependency” burden—that is, the share of the population likely to require financial support from the working-age population. Age dependency is measured by the ratio of those under age 15 or over age 64 to those ages 15 to 64. When fertility is high, the proportion of children in a population also tends to be high, and so are dependency ratios. The dependency ratio in 2000 was estimated at 90 in sub-Saharan Africa—there were 90 people below age 15 or over age 64 per 100 people ages 15 to 64. But when fertility begins to fall, the dependency ratio also falls because the working-age population becomes a larger share of the total. The dependency ratio was 46 in East Asia, where fertility has fallen rapidly and substantially. In the later stages of transition, the ratio rises again as the elderly gain a larger proportion of the population.

The population age structure reflects the forces of the three demographic variables involved in any demographic change, but in the modern world, fertility is the major source of growth and change and warrants special attention.

Explaining Population Change

Recent population growth has been mainly determined by fertility, which, in turn, is influenced by a range of biological, cultural, and economic factors. Scientists have long studied the complex relationship between society and childbearing and have sought to identify which factors are most important. Because the factors that affect fertility drive population change, these research findings are relevant for policymakers who want to affect population growth.

Women are capable of bearing more than 15 children, but national averages never reach this level because social and economic factors directly or indirectly limit the number of children women have. These factors include physical or biological impairments (some related to age); marriage traditions; sexual mores; family size preferences; living arrangements; job opportunities; child-care options; and many others. In the 1980s, demographer John Bongaarts identified four variables—referred to as proximate determinants—that directly affect fertility and explain most of the difference in fertility levels among countries: the proportion of women of childbearing age who are married or in a sexual union; the percent of women using contraception; the proportion of women of childbearing age who currently are unable to conceive a child (usually because of postpartum infecundity from breastfeeding); and the level of abortion.²¹ The importance of each of these factors varies across countries depending on the cultural and economic situation. For example, the proportion of women in a sexual union is partly determined by the age at marriage, the proportion of women who never marry, and levels of divorce. Cultural mores about sexual activity and childbearing outside marriage also play a role.

In societies where women marry young and where all childbearing takes place within marriage, changes

in the age at marriage can significantly affect fertility. In societies where women breastfeed their babies for up to two years, postpartum infecundity affects fertility levels by delaying the next pregnancy. Prolonged breastfeeding is less common and therefore a less-important fertility constraint than it was a few decades ago, but it is still important in some parts of the world, especially in sub-Saharan Africa.

In most countries, contraceptive use and abortion are the main proximate determinants of fertility and account for most fertility differences between countries. The vast difference in contraceptive use in Mali and Brazil is the primary reason why Mali's TFR was 6.8 and Brazil's TFR was 2.5 in 2003. In Mali, less than 9 percent of women of reproductive age used a contraceptive in 2003, compared with about 76 percent of Brazilian women. The reasons why Brazilian women use contraceptives more than Malian women do are related to education, income, women's roles, and other factors, as well as to government policies.

The impact of abortion in a country depends on the availability of reliable contraception, cultural attitudes about abortion, and access to abortion. In some Eastern European countries, women often turn to abortion because modern contraceptives can be difficult to obtain, of poor quality, and not promoted by policymakers or the medical community. In contrast, abortion is generally legal, relatively unrestricted, and available at little or no cost. Recent surveys of 11 former Soviet republics reveal that the average number of abortions women have over their lifetimes (also known as the total abortion rate) ranges from 0.6 per woman in Uzbekistan to 3.7 per woman in Georgia—some of the highest rates in the world. However, abortion levels declined by as much as 38 percent during the 1990s in seven of 11 countries surveyed. Most of the decline occurred among women under age 30 and was associ-

Contraceptive use and abortion account for most fertility differences between countries.

Photo removed for copyright reasons.

Turkish immigrants tend to marry at younger ages and have more children than other Europeans, but national fertility rates are below replacement level in all European countries.

ated with increased use of modern contraceptives, illustrating the trade-off between these two proximate determinants.²²

In societies with very low fertility and easy access to modern contraceptives, cultural and economic factors explain most of the fertility differences among countries. Women in these countries usually have fewer children than they say they expect. Life experiences—lack of a stable partner, frustrated material aspirations, insecure or inflexible employment, and inadequate housing, for example—might cause women to revise their ideas about how many children to have, or to delay a pregnancy until they are past reproductive age. This mismatch between expectations and behavior arising from lifestyles and experiences is sometimes referred to as “competition.”²³

A shift in the timing of childbearing has an independent “tempo” effect on the TFR. Widespread delays in having the first birth and longer waits between subsequent children slow the “tempo” of fertility and push down the TFR. Conversely, if women start having children at younger ages,

the TFR can rise temporarily without any change in the number of children women want.

A recent assessment of fertility in Italy and the United States highlights how three factors—delayed childbearing, infecundity, and competition—explained much of why Italian and American women had fewer children than they originally expected.

The gap between expected and actual fertility was greater in Italy, where the second demographic transition transformed society after World War II (see Box 1, page 6). Women gained opportunities in education and employment and postponed marriage and childbearing. Divorce became legal only in the 1970s and, although divorce laws are more restrictive in Italy than in most other European countries, divorce is increasing. In the 1970s and 1980s, young Italian women had greater individual choice and access to contraception and abortion than did earlier generations.

Yet Italians have maintained strong family and cultural traditions that discourage cohabitation and childbearing outside marriage—contrary to trends in the United States and northern Europe. In the United States and many European countries, one-third or more of all births occurred outside marriage as early as 1990. In Italy, less than one-tenth of births were outside marriage by the late 1990s. Young Italian men and women remain single and live in their parents’ homes longer than Americans or most other young Europeans.²⁴ Italian women wait longer to have children than American women. The struggle between traditional values and contemporary social reality in Italy helped push fertility to unprecedented lows in the past decade.

Three factors that contribute indirectly to fertility levels through the proximate determinants are education, income, and gender roles—the social roles and relative power held by men and women. Low levels of education and poverty go hand-in-hand, and they are related to public health

and to levels of economic development, urbanization, and environmental conditions. Gender issues cut across all aspects of society, but have a particular impact on women's ability and desire to use contraceptives.

Education

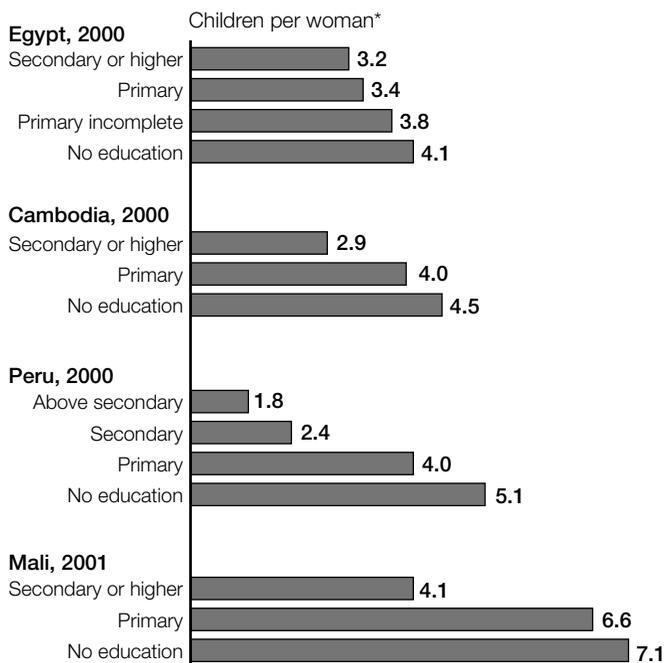
Around the world, more young people are enrolling in school and advancing their educations.²⁵ This welcome trend is likely to affect health and fertility in developing countries because women with more education wait longer to have children and tend to have smaller, healthier families. Women with more education usually have their first sexual experience later, marry later, want smaller families, and are more likely to use contraception than their less-educated counterparts. Among Peruvian women ages 20 to 29 in the 1990s, for example, only 17 percent of those with seven or more years of education had a baby by age 20, while 60 percent who completed fewer than seven years of education had a baby by age 20.

The fertility-education gap is particularly wide in some countries. Malian women with no education had 7.1 children on average in 2001, while those with at least a secondary education had 4.1 children. Yet the effects of education vary among countries. Highly educated women in Mali have more children than highly educated women in Egypt, for example (see Figure 8).

In countries with poor living conditions and low literacy levels, gaining a little education is not always associated with lower fertility. A 1995 study found that in some poor countries, women with a few years of schooling had at least as many children as women with no education. In these settings, gaining any formal education is associated with higher incomes and better nutrition, which enhances women's ability to bear children. But women who completed at least seven years of education had far fewer children than less educated women, sug-

Figure 8

Fertility by Mother's Education Level in Selected Countries, Around 2000



*Average number of children that a woman would have under prevailing age-specific birth rates.

Sources: ORC Macro, country final reports, Demographic and Health Surveys, available online at www.measuredhs.org.

gesting that seven years of education may be a threshold for significant fertility decline in poor countries with low literacy levels.²⁶

The context in which education takes place is critical in shaping childbearing decisions (see Box 3, page 18).²⁷ Fertility tends to decline more rapidly where schooling is widespread or primary school enrollment is nearly universal. Schools and education-related activities often help spread attitudes about the benefits of smaller families throughout a community. As overall education levels rise, social norms concerning childbearing and parenting can change even for women without much formal education. The costs of having children also rise when primary education becomes universal—not only do parents sometimes have to pay school fees for each child,

Education and Fertility in the Middle East and North Africa

Education is the single most important determinant of the average age at marriage and age at first birth in the Middle East and North Africa because women in the region tend to give birth soon after marriage. Among married Egyptian women ages 25 to 29, for instance, those with no education had married at age 18, on average, and had their first child by age 20; those with a secondary or higher education married at an average age of 23 and had their first child by age 25. In 1998, among Turkish women ages 15 to 19, 22 percent who had not completed primary school were already mothers or pregnant, compared with only 2 percent of teenagers who had completed secondary education or higher.

More-educated women generally want smaller families and use reproductive health services more effectively than less-educated women. Moroccan women with at least some secondary education had, on average, half as many children as women with no education in 1995.

Women with more education also tend to have healthier families. In Egypt, for example, children born to mothers with no education were more than twice as likely to die as those born to mothers who had completed secondary school. Egyptian women with less education were less likely to receive antenatal care: In 2000, only 34 percent of Egyptian mothers with no education received antenatal care, compared with 75 percent of those with a high school or college degree.

More-educated women tend to know more about birth control options than less-educated women. Among married Egyptian women ages 15 to 49, 69 percent of secondary school graduates reported seeing family planning messages in newspapers or magazines in 2000, compared with 32 percent of primary school graduates. Women with more education are also more likely to discuss family planning issues with their husbands.

Adapted from Farzaneh Roudi-Fahimi and Valentine M. Moghadam, "Empowering Women, Developing Society: Female Education in the Middle East and North Africa," *MENA Policy Briefs* (October 2003).

they also lose potential labor that children could provide.²⁸

Other factors, such as exposure to mass media, access to family planning services, and job opportunities for women, are also associated with fertility declines, even without universal education.²⁹ Fertility declined substantially in Côte d'Ivoire and Senegal, for example, where education was not universal. Researchers think that films, television, and other mass media in those countries spread the concept that women could control their fertility and that

there were benefits to having fewer children.

Women's education is also associated with better child health. Educated women may have higher status within their families and communities than women with no education, and their higher status makes them more effective at negotiating for better care for their children. In developing countries, women with some formal education are more likely to obtain care during pregnancy, to immunize their children, and to take appropriate action when a child becomes ill. Further, in most societies, children of mothers with some education have a lower risk of dying than do children whose mothers had no education.

Education clearly affects the age at childbearing in low-fertility countries. Education usually brings women more employment options; a few years of education can result in smaller family size when the education provides access to a job that offers a promising alternative to early marriage and childbearing. Universal education can also make it more difficult for women to combine working and large families because older children are in school and not available to care for younger siblings.³⁰ Many women postpone having children until they have completed their educations and established their careers. This delay in childbearing is the cause of the tempo effect that has kept fertility low in most developed countries.³¹

In more developed countries, women's educational levels are high yet fertility rates differ within regions. The higher level of government-provided family services and allowances and more open attitudes about marriage and childbearing in Northern than in Southern Europe might explain why fertility is higher in Sweden and France than in Italy and Spain.³² Fertility is higher still in the United States, where the government does not offer family allowances or paid family leave, but where women may have more job

Table 2

Fertility, Education, and Contraceptive Use for the Poorest and Wealthiest Women in Selected Countries, Around 2000

Country	Total fertility rate (TFR)		Percent of women ages 15–49 who			
			Completed 5th grade		Use modern contraceptives	
	Poorest	Wealthiest	Poorest	Wealthiest	Poorest	Wealthiest
Bangladesh, 1999–2000	4.6	2.2	10	76	37	50
Cambodia, 2000	4.7	2.2	11	66	13	25
Colombia, 2000	4.4	1.8	44	95	54	66
Egypt, 2000	4.0	2.9	22	91	43	61
Ethiopia, 2000	6.3	3.6	2	42	3	23
Uganda, 2000/01	8.5	4.1	24	82	11	41

Notes: The poorest and wealthiest women have household assets in the lowest and top fifths of the wealth distribution, respectively. Total fertility rate (TFR) is the average number of children a woman would have under prevailing age-specific birth rates.

Source: D.R. Gwatkin et al., *Initial Country-Level Information About Socio-Economic Differences in Health, Nutrition, and Population*, 2d ed. (2003).

options and flexibility than in many European countries, and where childbearing often takes place outside marriage.

Traditional explanations for the relationship between education and fertility emphasize the trade-offs between women having children or taking advantage of employment opportunities opened up by a good education. But this relationship is not always straightforward because many other variables determine whether and how much women work for pay, including the local economy, availability of child care, and social attitudes about mothers in the workplace. As one study concluded “In some countries ... women have found ways to combine work and child rearing, and in others they have not.”³³ In low-fertility countries in particular, the relationship between fertility and education is mediated by the other factors associated with the second demographic transition, including income and gender roles.

Income

Income is clearly linked to fertility levels across and within countries. Women in richer countries generally have fewer children than women in poorer ones. The exceptions to this relationship are the rich oil-producing states of the Middle East, where cultural traditions that foster low sta-

tus for women also support high fertility.

Income levels and poverty thresholds are difficult to compare among countries, but a recent study on the relationship between income and health in developing countries uses household asset data from the Demographic and Health Surveys (DHS) program—a survey research project operating in Africa, Asia, and Latin America—to measure wealth. The study develops an asset index based on measures such as ownership of a refrigerator, television or radio, car, motorcycle, or bicycle; the household’s construction material, size, and source for drinking water; and the type of toilet facilities. The resulting household asset index reflects a country-specific or relative definition of economic status rather than an absolute measure. Researchers divided the population in each country into five income groups or quintiles based on the household asset index for that country. Thus, the economic status of the poorest quintile in Haiti differs from that of the poorest quintile in Brazil.³⁴

Within countries, women from wealthier families usually have fewer children, higher contraceptive use, and more education than women from low-income families in the same society (see Table 2).

The average level of inequality is especially high for modern contra-

ceptive use. On average, women in the wealthiest quintile are almost five times more likely than those in the poorest quintile to use contraception. This may reflect disparities in access to family planning services, as well as different levels of demand for contraception. Less-educated women, for instance, tend to want larger families than do better-off, more-educated women.

Gender Roles

In high- and low-fertility countries, fertility is influenced by the relative power held by men and women and the dynamics of the relations between them.

Gender norms affect fertility in many ways. In societies in which women have lower literacy and less access than men to mass media, women may know relatively little about reproductive health, including how to avoid unwanted pregnancies. Where men have more power than women, women may find it hard to negotiate contraceptive use.³⁵ In low-fertility countries, fertility is lowest where women combine full-time employment with most of the household and childrearing responsibilities. Fertility is higher where women have more support from their spouses for housework and childrearing, access to government-provided family support resources, or both.³⁶

Son preference is another manifestation of gender norms that can influence fertility levels. In several South Asian and Middle Eastern countries, couples may continue to have children until they have a son, thereby pushing up overall fertility. Authors of a study of six countries with strong son preference—Bangladesh, Egypt, India, Nepal, Pakistan, and Turkey—estimated that the number of women pregnant at the time of the survey would have been 9 percent to 21 percent lower if there were no son preference.³⁷ In a few countries, son preference has led to sex-selective abortions and the abandonment of female babies.

Population and Development

The relationship among demographic variables, income, and gender is highly complex—and it is tied to the broader question of how population size and the pace of population growth affect economic development. For decades, experts have debated the impact of rapid population growth on economic development. Population pessimists have insisted that high fertility and rapid population growth inhibit development. This view contributed to the rationale for widespread funding of family planning policies and programs in the 1960s. Conversely, population optimists have argued that rapid population growth and large population size can promote economic prosperity by furnishing abundant human and intellectual capital and by increasing market size.³⁸ In the 1980s, a third view, population neutralism, gained prominence, supported by a sizable body of economic research showing little evidence that population growth by itself affects economic performance.³⁹ But measuring the impact of population on the economy is complicated by many factors, such as economic cycles and financial crises. Studies in the 1990s found that “the clearest evidence of negative effects of population growth under high fertility are at the individual and household levels.”⁴⁰ More-recent research has also found a slight negative effect of population growth on economic status and development.⁴¹

The focus on population size and growth has largely ignored a critical demographic variable: the age structure of the population (that is, the way the population is distributed across different age groups). Because individual economic behavior varies at different stages of life, changes in age structure can significantly affect national economic performance. Nations with a high proportion of young or old dependents tend to devote a relatively high proportion of resources to these groups, often

limiting economic growth. By contrast, nations in which a relatively large share of the population has reached the prime ages for working and saving may enjoy a boost to income growth stemming from the higher share of the population that is working, from the accelerated accumulation of capital, and from reduced spending on dependents. This phenomenon, known as the demographic dividend, can arise in countries that have a sharp decline in fertility. The combined effect of this dividend and effective policies in other areas can stimulate economic growth.⁴²

The demographic transition and its impact on economic development are playing out differently in different regions of the world. East Asian nations, such as Korea and Thailand, have had the most success in reaping the demographic dividend produced by declining fertility. This achievement has been less pronounced in other areas. Many Latin American countries have also undergone a fairly sharp demographic transition, but their economic policies did not take full advantage of the growing work force. The demographic transitions in South-Central and Southeast Asia started later and have been less pronounced than that in East Asia; these regions are only beginning to enjoy the economic benefits of demographic change. The Middle East and North Africa are still in earlier phases of the demographic transition, and indeed many parts of sub-Saharan Africa have seen little decline in traditionally high fertility rates.

Declining mortality, followed by declines in fertility, resulted in a rapid demographic transition in East Asia between 1965 and 1990. As a result, the working-age population grew four times faster than the dependent (youth and elderly) population. Strong educational systems and greater international trade have enabled national economies to absorb this “boom” generation into the work force. The demographic dividend fueled the region’s spectacular

economic boom: Real per capita income growth averaged 6 percent per year between 1965 and 1990. The demographic dividend accounted for approximately one-fourth to two-fifths of this growth.⁴³

As the East Asian case shows, falling fertility rates can create conditions for economic growth. Effective family planning can accelerate the demographic transition, potentially enhancing economic benefits and lifting nations out of a cycle of poverty. However, reduced fertility by itself provides no guarantee of prosperity. In order to capitalize on their demographic dividend, nations need effective policies in other key areas:

- **Health.** Improved sanitation, immunization programs, and antibiotics lead to declines in mortality that lead in turn to declines in fertility. Furthermore, research indicates that a healthy population can spur economic growth and lessen poverty.⁴⁴
- **Education.** Transforming a youthful population into a productive work force requires investment in education at all levels.
- **Economic policy.** A larger, better-educated work force will yield benefits only if the additional workers can find jobs. Government policies that lead to stable economies, labor-market flexibility, and open trade are associated with the growth of productive and rewarding jobs.
- **Good governance.** In many countries, reaping the benefits of the demographic dividend requires strengthening the rule of law, improving the efficiency of government operations, reducing corruption, and guaranteeing contract enforcement.
- **Gender.** Fertility declines more rapidly and health status improves more quickly where policies redress gender inequities in access to health and family planning services, education, and employment. And women can contribute more to the economy when their roles are not constrained.

Falling fertility rates can create conditions for economic growth.

Researchers have more recently become concerned about the effect of low or negative population growth on economic prosperity in low-fertility countries. One recent study found that many young people face difficulties getting established in their careers in an older, stable work force, and thus delay the transition to independent living.⁴⁵ This in turn leads them to postpone children, which depresses fertility rates.

Responses to Population Growth

Concerns about rapid population growth and overpopulation have a long history. English economist Thomas Malthus wrote a famous treatise on the subject in 1798, arguing that growing populations would outstrip food supplies, resulting in poverty, famine, and death. Almost 200 years later in the United States, the publication of Paul Ehrlich's *The Population Bomb* in 1968 stimulated widespread media coverage and public debate about the harmful consequences of rapid population growth. The dire predictions of these and other writers have generated both support and criticism over the years, as well as lingering questions about the consequences of future growth.

Growing Attention in Mid-20th Century

In the 1930s and 1940s, scientists and intellectuals in some developing countries such as Egypt, India, and Mexico began to express concern that rapid population growth would hinder development in their countries.⁴⁶ The UN held its first meetings on global population in 1954 and 1965, in collaboration with the International Union for the Scientific Study of Population. Scientists at these meetings warned that rapid population growth could exacerbate poverty and hinder development in countries with limited resources.

The earliest population policies and programs developed in the 1950s tried to slow population growth by encouraging couples to have fewer children and providing them access to family planning services. India launched such a policy in 1952 and stepped up efforts to promote family planning after a famine struck many parts of the country in the mid-1960s. The International Planned Parenthood Federation (IPPF), the largest private organization devoted to family planning, was also founded in 1952.

In the mid-1960s, the United States, Sweden, and several other industrialized countries launched large-scale aid programs to support national family planning efforts in developing countries. The United States became the largest single donor of population assistance. In 1969, the UN created the UN Fund for Population Activities (UNFPA), now the UN Population Fund. UNFPA's mission included helping countries address population issues and giving support to national family planning programs. From this time on, governments began to view family planning as central to stabilizing population growth. However, the very idea of limiting family size engendered debate from the outset.

Waxing and Waning Support

In 1974, when the UN sponsored an intergovernmental meeting on population in Bucharest, the United States was among those who argued that investments in population control would reap large benefits for developing economies. In the early years of population programs, however, many governments in developing countries perceived that family planning was unpopular and instead embraced the idea that fertility would fall and population growth would slow as living standards rose through economic development. This view held that prosperity would encourage lower fertility, rather than lower fertility

encouraging development. At the 1974 World Population Conference, an Indian delegate expressed the views of many developing-country leaders when he declared: “Development is the best contraceptive.”

During the late 1970s and the 1980s, attitudes began to change in many developing countries as a growing body of research documented high rates of population growth, high rates of infant and maternal death, and a widespread desire by women to limit childbearing. Government leaders grew increasingly concerned that rapid population growth would interfere with economic development. Evidence of a large unmet need for family planning suggested that family planning programs were a worthwhile investment that might lower fertility. Programs became more common.

At the 1984 World Population Conference in Mexico City, governments reached a near consensus in declaring that “as a matter of urgency” family planning services should be made “universally available.” This time, the U.S. government was at odds with the emerging consensus, announcing that it would withdraw funding from any organization that provided abortion services or counseling—even with funds from non-U.S. sources. This restriction became known as the Mexico City policy, affecting many non-governmental organizations that received U.S. assistance.

Consistent with the main thrust of the Mexico City declaration, many sub-Saharan African countries joined in regional declarations on population and development in the 1980s and adopted national population policies in the early 1990s.⁴⁷ By the time of the 1994 International Conference on Population and Development, more than one-half of developing countries had national population policies to slow growth, and most of the rest reported that they planned to develop such policies in the near future.⁴⁸ At that time, most national population policies included support for family planning and maternal and child health to

Photo removed for copyright reasons.

In the post-Cairo approach to population policies, improving women’s education is considered essential for advancing women’s health and rights.

achieve a combination of objectives—usually slowing population growth and improving health, and usually in support of overall development objectives.⁴⁹

Growing Influence of Women’s Groups

In the late 1980s and early 1990s, women’s health and rights advocates became increasingly concerned about many governments’ apparent interest—even obsession—in promoting family planning to stabilize population growth. They asserted that government-funded programs were distributing contraceptives with little regard for the health of women who used them. Especially in Asia, where governments were the largest providers of services, family planning programs were administered and evaluated based on targets and quotas for “family planning acceptors.”

Women’s rights advocates opposed top-down, target-driven approaches to slowing population growth. They maintained that these approaches promote coercion and violate women’s right to reproductive freedom. Programs based on targets and quotas, the groups argued, tend to emphasize numerical goals at the expense of service quality and women’s reproductive choices.

The Cairo conference helped reframe population discussions.

Women's rights advocates also argued that the focus of many family planning programs—delivering contraceptives and related information—was too narrow. Advocates believed that family planning programs would be more effective if they took into account the social and cultural context surrounding sexual relations, childbearing, and contraceptive use. In other words, if women could be empowered to have greater control over their sexuality and childbearing, they would be more able to have the number of children they intend to. Some demographers sympathetic to this view believed that meeting women's needs would ultimately lower fertility because women in most developing countries were having more children than they wanted.⁵⁰

The 1994 Cairo Conference

Debates about women's rights formed the backdrop for the world's largest population conference, the International Conference on Population and Development (ICPD), held in Cairo in 1994. Attended by 11,000 representatives of governments, nongovernmental organizations (NGOs), and international agencies, the Cairo conference attracted more attention from high-level policymakers, advocacy groups, religious leaders, and the media than any previous population conference.

Sharp ideological differences divided participants on some issues. Women's health advocates argued strongly for incorporating the concepts of reproductive health and reproductive rights in the conference document. These terms had never been defined in an international context, and negotiating a definition acceptable to all parties was difficult.

The Vatican, some Catholic and Muslim countries, and a small number of NGOs took issue with how reproductive health and rights were defined. A central sticking point was whether abortion could be interpreted as a component of reproductive health

and as a universal right. The abortion debate at the ICPD sparked wide media coverage, even though the conference addressed far more than women's reproductive health.

The 20-year Programme of Action adopted at the conference avoided mention of specific population growth or size targets, but called on governments to promote human development and stabilize population growth. It called for investments in individuals' health, education, and rights—particularly for women.

This landmark conference is credited with reframing population discussions. The heart of the new agenda is the belief that responding to individual needs is a more humane and effective way to slow population growth than the old model that focused on family planning use. By placing the causes and effects of population growth in the context of human development and social progress, governments and individuals from diverse political and cultural backgrounds could support the recommendations.

Cairo's Programme of Action is ambitious: It contains more than 200 recommendations in the areas of health, development, and social welfare.⁵¹ A central feature is the recommendation to provide comprehensive reproductive health care, which includes family planning, safe pregnancy and delivery services, abortion where legal, prevention and treatment of sexually transmitted infections (including HIV/AIDS), information and counseling on sexuality, and elimination of harmful practices against women, such as genital cutting and forced marriage.

The reproductive health approach that flowed from the Cairo consensus places women's needs and opportunities—for healthy pregnancies, for more influence over sexuality and childbearing, and for more life choices—at the center of population policies in developing countries. The approach also requires greater financial and political investments in a wider array of health and other

services than family planning programs alone would require.

Progress and Challenges Since Cairo

Five years after the Cairo conference, in 1999, the UN once again brought together world governments to discuss population and development policies. The review, nicknamed ICPD+5 or Cairo+5, involved a series of meetings that culminated in a UN General Assembly session. This session focused on the key actions needed to reach the goals set out in 1994.

The five-year review uncovered a host of examples around the world of how new policy and program approaches were being developed, as well as obstacles encountered in implementing the program. In many countries there were reports of promising areas of change, including new laws and policies, health care reform, and increased civic participation in population-related programs (see Box 4, page 26).⁵²

The principal challenges to implementing the Cairo program boil down to resources, capacity, and commitment. In developing countries, where human and financial resources are limited and development challenges are great, reproductive health services may not receive priority attention, either in national budgets or in health workers' daily tasks. Donor governments have also fallen far short of the levels of assistance they had pledged, according to the UN documents that track such assistance.

As the world approaches the 10th anniversary of the Cairo conference, the midpoint of its 20-year program, governments are due for a review of progress and challenges in achieving the program's goals. Rather than convening another international conference, UNFPA will commemorate the 10-year anniversary of the landmark conference with an analysis of countries' achievements and constraints, to be presented to the UN committees tasked with review-

ing population issues. Country-level and regional governmental meetings, as well as an independent meeting of NGOs, are being held to assess progress.

Responses to Low Fertility

As early as the 1930s, scholars in the United States and Europe began to take note of falling average family size in the industrialized countries and warned about the long-term prospects of fewer workers, population decline, and economic stagnation.⁵³ Most of these countries had already experienced substantial fertility decline. Early fears about fertility decline dissipated with the post-World War II baby boom, only to resurface in Europe in the 1980s and 1990s. By 1999, nearly all countries in Western and Eastern Europe (plus a number of countries in other regions) had fertility rates below the replacement level, with no signs of a rebound. Researchers and governments have studied the possible policy responses to low fertility in recent years, especially in Europe, where the economic and social consequences are already apparent. The UN convened technical meetings on low fertility in 2000, but has yet to convene a major intergovernmental conference on the subject.

Growing Concerns About Low Fertility

When sustained over time, low fertility (below the replacement level) leads to population aging and population decline. These two phenomena have profound economic, social, and political consequences.⁵⁴

- A shift to an older age structure strains a nation's social security system and pension plans, as fewer people of working age must support more people of retirement age. Older people also have higher health costs, putting additional

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Evolving Population Policies in India and China

The world's two population billionaires, India and China, have established national policies to address population growth, though they differ greatly in their details and implementation. Although both countries have substantial regional variation, China's policy has been strictly enforced nationwide and more effective than India's in dramatically reducing fertility and slowing population growth. But China's "success" has also met with international criticism because it limits women's freedom to bear children. The experiences of these large countries affect and respond to global discussions about population and individual rights.

India

In the 1950s, India launched the world's first state-sponsored family planning program to slow population growth. From the early 1960s to the mid-1990s, government-determined targets for contraceptive use dominated the management of the program. Between 1975 and 1977, Prime Minister Indira Gandhi's government promoted male sterilization campaigns that sometimes led to coercion. Public outrage about the reported abuses contributed to the downfall of Gandhi's government and created a backlash against family planning programs that took years to overcome.¹

In the 1980s and 1990s, the government continued supporting the national family planning program with centrally mandated targets for contraceptive use. Although acceptance of family planning was voluntary, the apparent zeal to achieve the targets again met with growing criticism. Critics argued that the overemphasis on reaching annual targets led health workers to worry about meeting numerical goals rather than meeting the needs of the women they served. Two years after the Cairo conference, in 1996, the Indian government made a major policy shift by announcing the "Target-Free Approach" to family planning, eliminating all centrally mandated targets for contraceptive acceptance. Targets remained for plan-

ning purposes at the local and state levels, but health workers and administrators were no longer to be reprimanded for not meeting them.²

Studies in the late 1990s showed that the new approach, called the reproductive and child health approach, was being implemented unevenly throughout the vast and populous states of India.³ This is not surprising given the decentralized government and the tremendous economic and social diversity in the country. The 2000 national population policy calls for reducing the average family size from 3.2 in 1999 to 2.1 children per woman by 2010, which would require a rapid decline in birth rates.⁴ To achieve this goal, the policy calls for meeting the needs for family planning and other health care and for integrated reproductive and child health care services. In India's largest and poorest states, expanding and improving these services will require substantially greater resources and human capacity.

China

China's "one-child policy," introduced in 1979, is unique in its scope and enforcement. The policy is credited with slowing population growth in the world's most populous country (now about 1.3 billion). It is also notorious for limiting individual rights and for heavy-handed enforcement. Reports of forced abortions and other coercive practices have plagued the program and brought condemnation from the United States and other national governments.

China's policy generally limits urban couples to one child and allows rural residents two children if the first child is a daughter. Other couples are allowed a second child if certain conditions are met. The regulations have been implemented unevenly throughout China, making enforcement a key political issue.

In 1995, the Chinese government called for reorienting the family planning program to be "driven by the people's interest" and to emphasize more comprehensive services—a concern sparked in part by the 1994 Cairo con-

ference. The State Family Planning Commission introduced the reforms gradually by selecting pilot counties where family planning services would offer a range of contraceptive method choices, reproductive health care, and counseling. Although local officials still set family planning targets, the concept of “informed choice” has gained acceptance, and an estimated 25 percent of all counties in China have reformed their family planning services to some degree.⁵

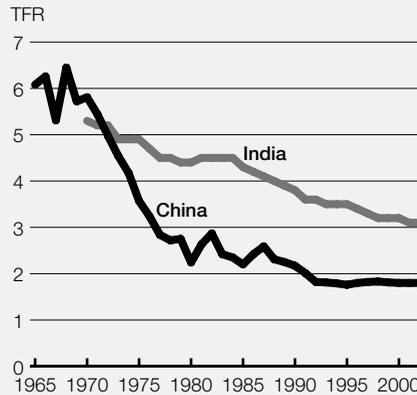
Though the policy is credited with reducing the total fertility rate from 5.8 in 1970 to less than 2 in 2000 and averting an estimated 300 million births, the government is increasingly faced with the negative side of the changes it brought about.⁶ There are fewer children and grandchildren to care for the growing number of elderly people, and limits on childbearing have exacerbated couples’ traditional preference for sons, leading to sex-selective abortions, female infanticide, and a deficit of girls in the country.

Increasing individual freedoms, market-oriented economic reforms, and greater openness to the global community all point toward a more relaxed approach to family planning. But the government’s public stance indicates a continued interest in controlling population growth. It codified its family planning policy into law in September 2002, reaffirming the one-child policy (with a list of exceptions) while at the same time criminalizing coercive enforcement measures.⁷

Common Challenges

In both India and China, the almost universal preference for sons is a major barrier to reducing family size. In cultures where women are subordinate to men and sons contribute more than daughters to families and aging parents, couples may have more children than they would like to ensure they have a son. Some couples in both countries have turned to sex-selective abortions to limit their family size and still have the son they want. While China implements its official policies more effectively than

Fertility Decline in India and China, 1965–2002



Note: TFR (total fertility rate) is the average number of children a woman would have under prevailing age-specific birth rates.

Sources: Registrar General of India; and China Population Information and Research Center.

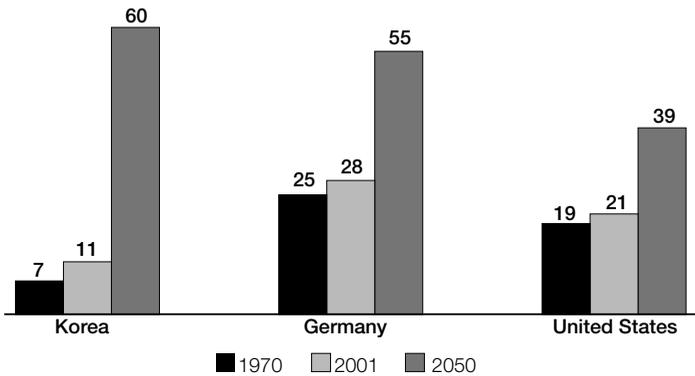
India, deeply entrenched cultural practices and individual preferences thwart both countries’ stated goals.

References

1. Leela Visaria and Pravin Visaria, “India’s Population in Transition,” *Population Bulletin* 50, no. 3 (1995): 39.
2. Leela Visaria and Pravin Visaria, *Reproductive Health in Policy and Practice: India* (Washington, DC: Population Reference Bureau, 1999).
3. Leela Visaria and Pravin Visaria, *Reproductive Health in Policy and Practice: India; and The POLICY Project, Targets for Family Planning in India: An Analysis of Policy Change, Consequences, and Alternative Choices* (New Delhi: The Futures Group International, 1998).
4. India, *National Population Policy 2000* (New Delhi: Ministry of Health and Family Welfare, 2000): 2.
5. Joan Kaufman, “China’s Population Policy: Recent Developments and Prospects for Change,” Presentation for the National Committee on U.S.-China Relations/Center for Strategic and International Studies, Sept. 25, 2002, accessed online at www.csis.org/china/020925kaufman.pdf, on Dec. 29, 2003.
6. Kaufman, “China’s Population Policy.”
7. Kaufman, “China’s Population Policy”; and Xinhua News Service, “China Neither Relaxes Nor Tightens Population Policy,” Dec. 31, 2001, accessed online at www.hitec.net.cn/html/english/main.htm, on Feb. 2, 2004.

Figure 9

Old-Age Dependency Ratio in Korea, Germany, and the United States, 1970, 2001, and 2050



Note: The old-age dependency ratio is the number of retirement-age people (ages 65 or older) per 100 working-age people (ages 20 to 64).

Sources: Federal Statistical Office of Germany, *In the Spotlight: Population of Germany Today and Tomorrow*; UN Population Division, *World Population Prospects: The 2002 Revision* (2003); and F. Hobbs and N. Stoops, *Demographic Trends in the 20th Century* (2002).

strain on health insurance and national health budgets.

- A shrinking working-age population could lead to lower productivity gains and lower economic growth.
- Social cohesion could be threatened if increasing labor demand results in major flows of immigrants from other cultures.
- Population decline might weaken national identity and degrade international political and economic standing.

Of immediate concern to most governments is the changing old-age dependency ratio—fewer workers to support the growing number of retirees—a trend that has serious budget (and therefore political) implications for elected officials. South Korea’s rapid fertility declines over the last 25 years will push the old-age dependency ratio to 60 by 2050, according to projections (see Figure 9). The United States and Germany will also see substantial increases in their dependency ratios in the 21st century.

Concern about population aging and decline has sparked lively debate about the most effective ways to reverse the trends or mitigate their

consequences. Governments can take three broad approaches:

- Adopt policies that directly or indirectly influence childbearing by, for example, encouraging couples to marry and have more children, have them earlier, or both;
- Increase the immigration of working-age people; and
- Reform policies to address the effects of population aging by, for example, raising the retirement age and reducing the financial burden of pension, social security, health, and tax systems.

The first two approaches address two major determinants of population change: fertility and migration.

Policies to Influence Fertility

In much of Europe where fertility is very low, there is public resistance to pronatalist government policies, both because of heavy-handed birth promotion programs supported by undemocratic governments in the past (such as in Germany, Romania, and Spain), and because births may be viewed as impediments to women’s progress in the workplace.⁵⁵ Most family policies in Europe today try to ensure equal opportunities in the workplace and help women combine childrearing with employment. The range of possible interventions to support families is extensive, and there is no evidence of a single “magic bullet” that would reverse fertility decline.⁵⁶ Instead, governments can combine a number of reinforcing policies and interventions.

Government policies do appear to make a difference. Today, Spain has one of the lowest fertility rates in Europe, in contrast to a generation ago, when Spain had one of the highest rates. The dramatic decline in fertility since then is associated with a shift from dictator Francisco Franco’s government, which prohibited contraception and promoted large families, to a democratic government that lacks an explicit population policy.⁵⁷

Conversely, France has the second-highest fertility rate in Europe (1.9 in

2003) and Europe's strongest policies for encouraging families to have children. France's fertility decline in the last century stirred up deep concerns about the population decline, and family policies have been high on the political agenda.⁵⁸ The types of policies that France and other European countries have implemented are described below.

Family Support Policies

Family allowances are government cash payments to families on the birth of a child to compensate them for a loss of income or increase in expenses. These allowances have been part of family policies for more than a century, and are provided by 88 countries worldwide. Similarly, many countries (including the United States) provide tax credits or tax benefits to help defray the costs of children. But family allowances have not had a major effect on fertility, and they may be less important today than provisions such as maternity leave and child care.⁵⁹

Governments can also support families by providing low-cost housing loans. Some research indicates that lowering the cost of housing could encourage couples to have children earlier than they otherwise would. Other family policies, such as promoting marriage and discouraging divorce, may also influence the formation of families and thereby the timing of fertility. Influencing the timing of childbearing can also affect overall fertility. If couples have children earlier in life, population aging could be slowed because a shorter time between generations contributes to a more youthful age structure.

Family-Friendly Employment Policies

Several policy measures aim to ease the burden of combining work and family responsibilities. These measures include child-care assistance, parental leave, and flexible working arrangements. The rationale for this support goes well beyond promoting fertility, however. Encouraging moth-

ers to enter and remain in the work force is important to build and maintain their skills, increase the size and quality of the work force, and promote gender equity.⁶⁰

Providing free or subsidized child care is an important way to allow mothers to work. Support ranges from tax breaks for child care to a more comprehensive state-supported child-care system, as in Sweden.

Maternity leave and benefits have a long history, but "parental" leave (including fathers) is more recent. There are considerable variations in the amount of leave provided, with the United States providing less leave than other developed countries. Norway's policies are especially generous: All mothers have a right to return to part-time work after childbirth, and fathers are required to take a portion of the parental leave entitlement to encourage sharing child-care responsibilities. Policies in Sweden and the Netherlands also encourage men's involvement in childrearing.⁶¹

Regulations affecting work hours, such as flexible hours, part-time work, and family-related leave, can also help employees reconcile work and family responsibilities.⁶²

Reproductive Health Policies

Reproductive health policies aim to help women and couples have the number of children they desire, usually by providing access to family planning and related services. Several countries in Europe, however, have a history of using these policies for birth promotion, with a number of unintended consequences.

The most famous of these cases is Romania. In 1966, Romania's totalitarian government tried to reverse the country's fertility decline with draconian measures: outlawing abortion, restricting all means of contraception, launching a propaganda campaign against hormonal contraception, and introducing incentives to encourage women to have more births. Fertility increased sharply right after the 1966

Free or subsidized child care is an important way to allow mothers to work.

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Decades of low fertility in Europe have heightened concerns about population aging, and renewed interest in immigration's role in population growth and change.

decree, but the increase was not sustained. To avoid unplanned births, many women resorted to illegal and often unsafe abortions, which contributed to Romania's relatively high maternal death rate. Many families were having children they did not want and could not afford, and increasingly placed their children in state institutions.

After the fall of Romania's totalitarian government in 1989, health policymakers quickly lifted restrictions on contraception and abortion and developed a national family planning program. The new program provided more contraceptive options and gradually evolved into a comprehensive reproductive health program. Survey data confirmed that maternal and child health improved following the introduction of these measures.⁶³ Fertility has continued its decline to 1.2 children per woman, well below Romania's two-child ideal family.⁶⁴

Elsewhere in Europe, the widespread availability of contraception and abortion also contributed to fertility decline. But Romania's experience showed that restricting access to family planning is not an effective

strategy for boosting fertility rates over the long term.

Immigration Policies

With much of the world still young and growing, some analysts suggest that working-age immigrants from developing countries could fill the labor gap in countries with aging populations. In the last half-century, European and other industrialized countries have relied on immigrants to supply labor for growing economies. But political and social forces in the receiving countries influence immigration policies, and most countries restrict immigration.⁶⁵

Immigrants often provoke strong public sentiment in the receiving countries because they are usually of different racial or ethnic backgrounds, speak different languages, and have different religions and cultures. The native populations may view large immigrant communities as a threat to their jobs and ethnic dominance. Even though many businesses rely on immigrant labor, government officials concerned about reelection are keenly aware that the prospect of large new waves of immigrants is politically unpopular.

In 2000, the UN issued a report on "replacement migration" that estimated the number of international migrants that countries would need to prevent population decline and population aging resulting from low fertility and increased longevity. The report found that to prevent the total population of Europe from declining, immigration would need to be twice the 1990s' levels.⁶⁶ Furthermore, the levels of immigration needed to prevent population aging—that is, maintaining constant ratios between working-age and retired people—are many times larger, because the working-age population is declining faster than the overall population. Moreover, the migrants themselves age and retire. Thus, maintaining constant ratios between the working-age and retired age groups would involve lev-

els of immigration entirely out of line with both past experience and reasonable expectations.⁶⁷

The UN model on replacement migration shows that, for Germany, 3.4 million people would have to immigrate each year to maintain a constant ratio of working-age people (ages 15-64) to retired people (over age 64). In the period from 2003 to 2050, the total number of immigrants would be almost 175 million, or twice Germany's current population. Thus, the German government does not consider this a realistic scenario.⁶⁸

Immigration is not a completely closed subject, however. The relatively large flows of immigrants to the United States have both supported the economy and prevented an overall decline in fertility because the immigrant populations tend to have higher fertility than native-born Americans. Socially and politically, immigration will remain a sensitive issue, especially in those areas that have large groups of ethnic minorities due to immigration. Nevertheless, immigration is likely to continue in all developed countries and will remain a policy option for regulating population size.

Promoting Fertility or Immigration

A UN review in 2000 found that most governments facing low fertility found it preferable to raise fertility rather than to substantially increase the flow of immigrants.⁶⁹ However, past attempts to directly influence fertility appeared to have temporary effects. Governments are thus shifting toward a more comprehensive approach, combining fiscal policies (allowances, taxes, and bonuses) with policies that allow parents to combine work with family life.

Moreover, the UN reports that more governments see it necessary to change society's attitudes toward children, to enhance the value of children and to help families raise and educate them. Governments also see the importance of further changing

gender relations both in the family and at work and, in particular, encouraging both parents to raise children. "The trend is that governments are becoming more concerned not with population numbers, but with the well-being of families, with enabling parents to have as many children as they want."⁷⁰

Looking Ahead

In the past century, the world's population has undergone a sweeping change in both its total numbers and its distribution across regions. The current century is likely to see the next phase of the transition—lower fertility, continued growth followed by stabilization or decline, and an even more dramatic redistribution of population among today's developed and developing countries.

In the first half of the 21st century, the world population growth will surge in the world's developing regions—the countries where populations are relatively young and families still have more than two children. In some countries of Europe and the former Soviet Union, populations will decline because of below-replacement fertility and aging populations. The U.S. population will likely grow because of continued immigration and because of near-replacement fertility.

How Certain Are Projections?

While we cannot know the exact future size of Algeria, Germany, or India, we can assess the possibilities by creating a series of likely scenarios. All of the major international agencies that project populations use mathematical models that start with current population estimates and make assumptions about how fertility, mortality, and migration will change over time. The assumptions about future rates may be wrong, and the conditions that affect these rates may change unexpectedly. Because of these uncertainties, demographers

In most countries, fertility will determine future population size.

Table 3

Projected 2050 Population Size for Major Regions, Three Scenarios

Region/country	2004	2050		
		High	Medium	Low
Population in millions				
World	6,378	10,633	8,919	7,409
More Developed	1,206	1,370	1,219	1,084
Less Developed	5,172	9,263	7,699	6,325
Africa	869	2,122	1,803	1,516
Sub-Saharan Africa	716	1,825	1,557	1,315
Asia	3,871	6,318	5,222	4,274
China	1,313	1,710	1,395	1,129
Japan	128	120	110	100
Latin America/Caribbean	551	924	768	623
North America	329	512	448	390
Europe	725	705	632	565
Oceania	33	52	46	40

Source: UN Population Division, *World Population Prospects: The 2002 Revision* (2003).

often create a series of projections based on a range of likely fertility, mortality, and migration scenarios.

In most countries, fertility will change more rapidly than mortality, and fertility will determine future population size—hence demographers’ continuing focus on fertility. Future international migration is more difficult to project than fertility or mortality because migration flows often result from short-term changes in economic, social, or political factors that are hard to predict or quantify. In contrast, future fertility and mortality depend heavily on the future age structure, which is largely determined by the relative size of current generations. HIV/AIDS represents an unexpected demographic crisis: Though it may not affect the total size of the world’s population, it will have a devastating impact on population in some countries (see Box 5).

When projecting population, demographers must make assumptions about how far and how fast fertility will fall. A central issue is when, or whether, a country will reach the “magic” replacement level of 2.1 children per woman. If fertility remains at replacement level, a population eventually will cease growing and sta-

bilize at a certain size. In practice, national rates rarely follow such an orderly pattern: Some TFRs drop well below 2.1 (Italy at 1.2), and others remain above it (Argentina at 2.5).⁷¹

Demographic transition theory (see Box 1, page 6) suggests that a country’s fertility will gradually fall to about two children per woman and stabilize at that level. Because most countries in the transition have fallen below that level or have yet to reach it, no current theory can predict fertility levels or trends. These issues are widely discussed and debated among the world’s demographers.

UN Projections to 2050

The most widely used projections, produced every two years by the UN Population Division, include population projections for every country of the world through 2050. They are invaluable for evaluating present trends and prospects. The three main scenarios of population growth in the latest UN series are shown in Figure 10, page 36.

By 2050, the UN suggests that total world population will grow to between 7.4 billion and 10.6 billion, with a “medium” projection of 8.9 billion. In the high projection, world population will still be growing in 2050; in the low projection, it will have begun a gradual decline (see Table 3). In recent years, UN projections for 2050 have been adjusted downward because of changing assumptions about fertility: UN demographers now predict that fertility in all countries will eventually decline to an average of 1.85—below the two-child average—before stabilizing.

Regardless of the projection used, the UN shows that at least 1 billion will be added to the world’s population by 2025. These projections take into account the AIDS epidemic, which has had a devastating impact on the population in some countries (see Box 5).

There are three reasons that growth in world population is inevitable in the next half-century: First, the average fertility rate in the developing coun-

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The Rising Toll of HIV/AIDS

Now in its third decade, HIV/AIDS may become one of the deadliest epidemics in human history. Experts estimate that at least 20 million people have already died of AIDS, and that most of the 40 million people now living with HIV are likely to die a decade or more prematurely. In 2003, an estimated 5 million people were newly infected with HIV, about 95 percent of whom live in developing countries.¹ The UN projects 45 million new HIV infections by 2010 unless the international community launches massive, coordinated measures to combat the epidemic.²

In developing countries, AIDS is reversing hard-earned improvements in health over the last 50 years as the disease claims the lives of millions of young adults in their most productive years. Indicators of human development, such as child mortality, literacy, and food production, are slipping. The disease ravages families, communities, and health systems, and in severely affected countries, the economy and political stability are also threatened.

Areas Most Affected

Sub-Saharan Africa is the hardest hit region in the world, accounting for almost one-third of all people infected

with HIV. In this region, where the disease is mainly transmitted heterosexually, more people die of AIDS-related illnesses than of any other cause. South Africa has the highest absolute number of infections of any country in the world: 5 million. Botswana has the highest adult HIV prevalence rate: An estimated 39 percent of the country's adults are infected with HIV.

Other regions face serious HIV/AIDS epidemics as well, though the main mode of transmission varies from one region to another (see table). HIV prevalence is already high in the Caribbean and is rising rapidly in Eastern Europe, the former Soviet republics, and many parts of eastern and southern Asia. Demographic billionaires China and India have relatively low prevalence rates, but the numbers of infected people are staggering: An estimated 1 million in China and 4.5 million in India are living with the disease.³ These two countries will see millions of additional infections unless they launch large-scale, effective prevention programs.

Health and Life Expectancy

In sub-Saharan Africa and elsewhere, HIV infection has triggered an upsurge

The HIV/AIDS Epidemic by World Region, 2003

Region	People living with HIV/AIDS (million)	% Adults ages 15-49 with HIV/AIDS	% of infected who are women	Main mode of transmission
World	40.0	1.1%	50%	Heterosexual
Sub-Saharan Africa	26.6	8.0	58	Heterosexual
South/Southeast Asia	6.5	0.6	37	Heterosexual, IDU
Latin America	1.6	0.6	31	MSM, IDU, Heterosexual
Eastern Europe/Central Asia	1.5	0.7	26	IDU
East Asia/Pacific	1.0	0.1	24	IDU, MSM, Heterosexual
North America	1.0	0.1	20	MSM, IDU, Heterosexual
Western Europe	0.6	0.6	26	MSM, IDU
North Africa/Middle East	0.6	0.3	54	Heterosexual, IDU
Caribbean	0.5	2.5	53	Heterosexual, MSM

Notes: Data in the first two columns are midpoints of estimated ranges provided by UNAIDS.

Main mode of transmission is listed in order of importance for the region.

MSM: Men who have sex with men; IDU: Injecting drug use.

Sources: UNAIDS, *AIDS Epidemic Update: December 2003*; and *Report on the Global HIV/AIDS Epidemic—July 2002*.

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in several other infectious diseases and is contributing to an explosive tuberculosis epidemic. In heavily affected countries, HIV has overwhelmed public health systems, stretching health care providers, infrastructure, and budgets beyond capacity.

HIV/AIDS is now the fourth leading cause of death worldwide. In 2003, an estimated 3 million adults and children died of AIDS, of whom 2.3 million were in sub-Saharan Africa.⁴ In a few countries, such as Brazil, where drugs are available to treat HIV/AIDS, AIDS deaths have fallen, but in most countries the drugs are not widely available or affordable, and the death toll will continue to rise.

The excess deaths are contributing to a rapid drop in life expectancy: In the 38 most-affected African countries, nearly 10 years of life expectancy will have been lost by 2020-2025.⁵ Average life expectancy has dropped to age 40 or less in Botswana, Mozambique, and six other countries.

Population Growth and Structure

Despite large numbers of AIDS deaths, populations continue to grow in many heavily affected countries, although the growth is less than it would be in the absence of AIDS. Africa's population will grow to 1 billion by 2050 because of continued high fertility in the region, but this is about 350,000 less than projected without AIDS. In South Africa, one of the hardest-hit countries, the current population of 44 million is projected to be 33 million in 2050, almost one-half what it would have been without AIDS.⁶ AIDS will trigger population decline in a few African countries in addition to South Africa—Botswana, Lesotho, Mozambique, and Swaziland. Population growth is expected to halt in Malawi, Namibia, and Zimbabwe.

Because HIV/AIDS tends to strike the young and sexually active, AIDS deaths have distorted the age and sex profiles of the populations in heavily affected communities and countries. Individuals are often infected as young

adults and can survive an average of about 10 years after infection; thus, AIDS deaths tend to be high among women in their 30s and among men in their 40s and 50s. The unbalanced ratios affect population growth as well as the social and economic well-being of the heavily infected areas.

Toll on Societies

Households bear most of the burden of the disease, as families must care for the ill or for orphans whose parents succumbed to AIDS, and cope with a loss of income when breadwinners die. In addition, HIV/AIDS exacts a particular toll on a country's health sector, educational system and other public services, and industry and agriculture.

The global HIV/AIDS pandemic shows little sign of slowing despite stepped-up efforts to control it. The future course of the epidemic is difficult to predict and will depend on several factors: the effectiveness of prevention programs in educating people about HIV/AIDS and persuading them to change their behavior; the availability of treatments for those who have the disease; the future availability of an effective vaccine (now still distant); and the financial and human resources devoted to these efforts worldwide.

References

1. Joint United Nations Programme on AIDS (UNAIDS), *AIDS Epidemic Update: December 2003* (Geneva: UNAIDS, 2003), accessed online at www.unaids.org, on Dec. 1, 2003.
2. UNAIDS, *Report on the Global AIDS Epidemic—July 2002*, accessed online at www.unaids.org, on Dec. 1, 2003.
3. UN Population Division, *The Impact of AIDS* (New York: UN, 2003), accessed online at www.unpopulation.org, on Dec. 1, 2003.
4. UNAIDS, *AIDS Epidemic Update: December 2003*.
5. UN Population Division, *The Impact of AIDS*.
6. U.S. Census Bureau, International Data Base, demographic estimates and projections (2002).

Table 4

Countries by Stage of Fertility Decline

Stage of fertility decline	Little or no decline	Moderate decline	Substantial decline	At or below replacement fertility	
TFR in 2003	6.0+	4.0 to 5.9	2.1 to 3.9	2.0 or below	Total
Number of countries*	21	49	56	71	197
Percent of 2003 world population	4	12	41	43	100
Selected countries	Afghanistan Burkina Faso Congo (Dem. Rep. of) Uganda Yemen	Bolivia Iraq Kenya Nigeria Pakistan	Bangladesh Brazil Indonesia India Iran	China Germany Japan Russia United States	

Note: TFR (total fertility rate) is the average number of children a woman would have under prevailing age-specific birth rates.

*With a population of 100,000 or more.

Source: C. Haub, 2003 *World Population Data Sheet*, after a table in P. Morgan, *Demography* 40, no. 4 (2003): 589-603.

tries (excluding China) is twice as high as the average for developed countries. Second, the young age structure of developing countries creates momentum for population growth for several decades, no matter what future fertility trends may be. Third, continuing improvements in infant and child mortality will add to growth, particularly in countries with high mortality from easily preventable causes.

Future Trends

What future trends can we expect? It is likely, even highly probable, that fertility will continue to fall in those developing countries where it is already declining and that it eventually will begin to decline in countries where fertility rates have remained persistently high. But future population size will depend not only on whether fertility will fall, but how fast it declines and to what level. Current fertility levels are shown in Table 4, but future patterns of decline will vary by country and may or may not follow the UN's current assumptions.

Survey data from Bangladesh and Egypt show that average family size hardly declined at all in either country from the mid-1990s to 2000. These findings were surprising given the rapid drop from 5 or 6 children to 3.5 children on average between the

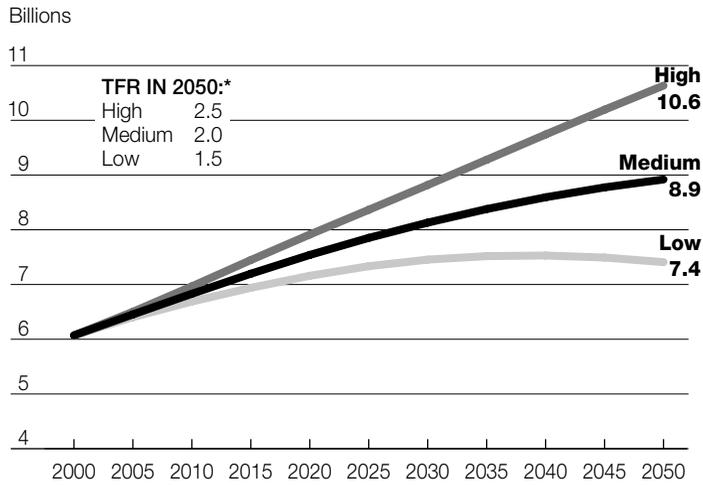
1970s and the 1990s. These countries may well have stalled in their fertility transitions, while UN projections assume they are proceeding steadily toward a two-child average. In fact, it is possible that the two-child average is a long way off, or will never be reached, in some societies. If the two-child average is not reached, then growth will continue.

Often, we must look at trends within countries to make reasonable assumptions about future fertility trends. In India, for example, fertility has fallen in the more-educated and advanced southern states such as Tamil Nadu, where the estimated TFR was 1.9 in 2002. But the real story of India's future population growth will unfold in the large, impoverished northern Indian states, such as Uttar Pradesh, which had 170 million people and a TFR of 4.5 in 2002.⁷² In Bangladesh, survey data show that the poorest fifth of the population has a fertility rate of 4.6, while the wealthiest fifth has essentially reached replacement level, at 2.2 children per woman.⁷³

A key question for those who make projections is whether the poorest and least educated (and also largely rural) population groups in developing countries will "catch up" with the urban, more-educated, and wealthier citizens who share Western preferences for smaller families. While

Figure 10

World Population Projections, 2000–2050



*TFR (total fertility rate) is the average number of children a woman would have under prevailing age-specific birth rates.

Source: UN Population Division, *World Population Prospects: The 2002 Revision* (2003).

urbanization and modernization seem inexorable forces, large and growing numbers of people remain disadvantaged and underserved by modern health services. In future population projections, these growing populations will make up a larger proportion of the total and therefore have greater weight in national averages than the wealthier, low-fertility populations.

Small differences in fertility have large ramifications for the world's population. Projections show that a small difference in average family size—2.5 children versus 2.0 children—translates into a difference of 1.7 billion people in the world's population total in 2050 (see Figure 10).

How Might Governments Respond?

With 2 billion to 3 billion additional people in coming decades, world population is just over halfway through the surge in growth that began in the mid-1900s. But because fertility decline seems almost certain almost everywhere, many governments have turned their attention from population growth to other

pressing issues. There are several reasons for the shift in focus.⁷⁴

- Developed-country governments, particularly in Europe and Japan, are preoccupied with low fertility and potentially declining population size at home;
- Many analysts and governments in developing countries are convinced that the current trend toward lower fertility is universal and unstoppable; and
- Governments and donor agencies have shifted resources to fighting the HIV/AIDS epidemic, which has reached crisis proportions in southern Africa and threatens to do so in Asia.

These forecasts assume continued increases in contraceptive use in developing countries. The UN notes in its published projections that the expected decline to low levels of fertility is “contingent on ensuring that couples have access to family planning.”⁷⁵ Such a development is anything but certain. Without substantial foreign aid to bolster these programs, it is unclear whether national governments will continue to support them at the level needed for growing populations. A particular challenge is maintaining a continuous supply of modern contraceptives. Without government subsidies, supplies such as condoms, pills, and intrauterine devices are too costly for most individuals in low-income countries.

Pursuing other UN goals, such as improving girls' education and raising the status of women, will reinforce the objectives of family planning programs, though they won't negate the need for modern contraception. Advancing women's health and rights may well contribute to the transition to smaller families, but these advances also require long-term efforts in the poorest societies, because of cultural resistance to change.

In the 21st century, continued population growth presents many of the same challenges to development as the rapid growth of the last century. But governments' responses to growth are dramatically different

from just over a decade ago: Policies aimed at population control have fallen out of favor in most countries because of concerns about protecting individual rights. Moreover, many governments may believe that these policies are no longer necessary. Policies that increase women's choices and opportunities are far more acceptable today, and can improve society's welfare in addition to helping couples meet their childbearing goals.

Questions for the Future

World population projections are valuable and informative, but they are based on current assumptions about distant events. As events unfold, demographers will incrementally adjust the forecasts. Some questions that demographers will grapple with include:

- Will people throughout Africa, Asia, and Latin America come to prefer the much smaller families now preferred by couples in Europe?
- Will developing countries be able to provide family planning services to their diverse impoverished populations, as the projections assume?

- Will the HIV/AIDS epidemic in Asia and other developing regions reach the catastrophic levels seen today in southern Africa?
- Will increased mortality from HIV/AIDS spur families to have larger families, reversing the long-term fertility declines in less developed countries?
- Will climate change or environmental degradation threaten human health?
- Will couples in Europe and other low-fertility societies have more children, leading to an increase in fertility?

Tracking answers to these questions over the coming years will be interesting and may be vital. From a global perspective, changes occurring in the largest countries will have the greatest impact on world population. But in any individual country, demographic changes can have profound implications for the economy, the environment, health, and quality of life. As population growth either follows or deviates from its projected path, governments will have to address its impacts, whether or not they have an explicit population policy.

References

1. The terms more developed, developed, or industrialized refer to Australia, Canada, Japan, New Zealand, the United States, and all of Europe. The terms less developed or developing refer to all other countries. The designation is based on United Nations' definitions dating from the 1950s as a way to distinguish countries with wealthier, more modern economies from other countries. The terms still offer a convenient way to discuss trends in the past, but are less relevant for current trends and projections because of globalization, and because many former developing countries have industrialized economies.
2. United Nations (UN) Population Division, *Determinants and Consequences of Population Trends*, vol. 1 (New York: UN, 1973): 110-25.
3. Peter Lamprey et al., "Facing the HIV/AIDS Pandemic," *Population Bulletin* 57, no. 3 (2002).
4. Jose Louis Bobadilla and Christine A. Costello, "Overview," in *Premature Death in the New Independent States*, ed. Jose Louis Bobadilla, Christine A. Costello, and Faith Mitchell (Washington, DC: National Academy of Sciences, 1997): 1-31.
5. UN Population Division, *Determinants and Consequences*: 64-72.
6. UN Population Division, *World Population Prospects: The 2002 Revision* (New York: UN, 2003).
7. Jonathan Grant et al., *Low Fertility and Population Ageing: Causes, Consequences, and Policy Options*, Report to the Employment and Social Affairs Directorate General of the European Commission (RAND Europe and RAND Labor and Population Programme, forthcoming).
8. S. Philip Morgan, "Is Low Fertility a Twenty-First Century Demographic Crisis?" *Demography* 40, no. 4 (2003): 589-603.
9. Francisco Alba-Hernandez, *La población de México* (Mexico City: El Colegio de México, 1976): 6; and UN Population Division, *World Population Prospects: The 2002 Revision*.
10. See Ulla Larsen, "Primary and Secondary Infertility in Sub-Saharan Africa," *International Journal of Epidemiology* 29 (2000): 285-91.
11. Vera M. Zliadar et al., "New Survey Findings: The Reproductive Revolution Continues," *Population Reports M-17* (Baltimore, MD: Johns Hopkins Bloomberg School of Public Health, 2003); and John B. Casterline, "The Pace of Fertility Transition: National Patterns in the Second Half of the Twentieth Century," in *Global Fertility Transition*, ed. Rodolfo A. Bulatao and John B. Casterline (New York: Population Council, 2001): 17-52.
12. Barney Cohen, "The Emerging Fertility Transition in Sub-Saharan Africa," *World Development* 26, no. 4 (1998): 1431-61; and UN Population Division, "The Demographic Situation in High-Fertility Countries," accessed online at www.un.org/esa/population/publications/prospects/decline/highfert.pdf, on Jan. 26, 2004: 5.
13. Zliadar et al., "The Reproductive Revolution Continues"; and Central Bureau of Statistics (Kenya) et al., *Kenya Demographic and Health Survey 2003: Preliminary Report* (Calverton, MD: ORC Macro, 2003): 9-10.
14. Farzaneh Roudi-Fahimi, "Iran's Family Planning Program: Responding to a Nation's Needs," *MENA Briefs* (Washington, DC: Population Reference Bureau, 2002); Carl Haub, *2003 World Population Data Sheet* (Washington, DC: Population Reference Bureau, 2003); Abdel R. Omran and Farzaneh Roudi, "The Middle East Population Puzzle," *Population Bulletin* 48, no. 1 (1993); and UN Population Division, *World Population Prospects: The 2002 Revision*.
15. Urban as defined by most countries refers to relatively small population concentrations, such as 2,000 inhabitants or more. The definition varies considerably from country to country. See Martin Brouckerhoff and Ellen Brennan, "The Poverty of Cities in Developing Regions," *Population and Development Review* 24, no. 1 (March 1998): 75-114.
16. Brouckerhoff and Brennan, "The Poverty of Cities."
17. International Organization for Migration (IOM), *World Migration 2003* (Geneva: IOM, 2003): 4-11.
18. U.S. Committee for Refugees (USCR), *World Refugee Survey 2003* (Washington, DC: USCR, 2003): 5-7.
19. Philip Martin and Elizabeth Midgley, "Immigration to the United States," *Population Bulletin* 58, no. 3 (2003).
20. Ulrich Mammey and Karl Schwarz, "The Demographic Characteristics of the Immigrant Population in Germany," in *The Demographic Characteristics of Immigrant Populations*, ed. Werner Haug, Paul Compton, and Youssef Courbage (Strasbourg, France: Council of Europe, 2002): 226-29.
21. John Bongaarts, "The Fertility-Inhibiting Effects of the Intermediate Variables," *Studies in Family Planning* 13, no. 6/7 (June/July 1982): 179-89.
22. Lori S. Ashford et al., "Reproductive Health Trends in Eastern Europe and Eurasia" (Washington, DC: Population Reference Bureau, 2003); and Centers for Disease Control and Prevention (CDC) and ORC Macro, "Reproductive, Maternal, and Child Health in Eastern Europe and Eurasia: A Comparative Report" (Atlanta, GA: CDC, 2003).
23. Morgan, "Is Low Fertility a Twenty-First Century Demographic Crisis?"; and John Bongaarts, "The End of the Fertility Transition in the Developed World," *Population and Development Review* 28, no. 3 (2002): 419-44.
24. Morgan, "Is Low Fertility a Twenty-First Century Demographic Crisis?": 598-99; Council of Europe, *Recent Demographic Developments in Europe* (CD-Rom) (Strasbourg, France: Council of Europe, 2002); and Joëlle E. Sleebos, "Low Fertility Rates in OECD Countries: Facts and Responses," *OECD Social, Employment, and Migration Working Papers*, no. 15 (Paris: Organization for Economic Co-Operation and Development (OECD), 2003): 28.

25. Dara Carr, "Is Education the Best Contraceptive?" MEASURE *Communication Policy Brief* (Washington, DC: Population Reference Bureau, 2000).
26. S.J. Jejeebhoy, *Women's Education, Autonomy, and Reproductive Behaviour: Experience from Developing Countries* (Oxford, UK: Clarendon Press, 1995).
27. Ian Diamond, Margaret Newby, and Sarah Varle, "Female Education and Fertility: Examining the Links," in *Critical Perspectives on Schooling and Fertility in the Developing World*, ed. Caroline Bledsoe et al. (Washington, DC: National Academy Press, 1998): 23-45.
28. Cynthia Lloyd, Carol Kaufman, and Paul Hewett, *The Spread of Primary Schooling in Sub-Saharan Africa: Implications for Fertility Change* (New York: Population Council, 1999), cited in Carr, "Is Education the Best Contraceptive."
29. Lloyd, Kaufman, and Hewett, *The Spread of Primary Schooling in Sub-Saharan Africa*.
30. Diamond, Newby, and Varle, "Female Education and Fertility": 32-33.
31. Sleebos, "Low Fertility Rates in OECD Countries"; and OECD, *A Caring World: The New Social Policy Agenda* (Paris: OECD, 1999).
32. UN Population Division, *Partnership and Reproductive Behaviour in Low-Fertility Countries* (New York: UN, 2002).
33. Karen L. Brewster and Ronald L. Rindfuss, "Fertility and Women's Employment in Industrialized Nations," *Annual Review of Sociology* 26 (2000); and Sleebos, "Low Fertility Rates in OECD Countries."
34. The World Bank, Multi-Country Reports by HNP Indicators on Socio-Economic Inequalities: Discussion, accessed online at www.worldbank.org/poverty/health/data/discuss2.htm, on April 16, 2003.
35. Nancy Yinger with Anne Peterson et al., *A Framework to Identify Gender Indicators for Reproductive Health and Nutrition Planning* (Washington, DC: Population Reference Bureau, 2002).
36. UN Population Division, *Partnership and Reproductive Behaviour in Low-Fertility Countries*.
37. Zlidor et al., "New Survey Findings: The Reproductive Revolution Continues"; and Fred Arnold, "Gender Preferences for Children," *DHS Comparative Studies* no. 23 (Calverton, MD: Macro International, 1997).
38. Catherine Marquette and Richard Bilsborrow, "Population and Environment Relationships in Developing Countries: A Select Review of Approaches and Methods," in *The Population, Environment, Security, Equation*, ed. Barbara S. Baudot and William R. Moomaw (New York: Macmillan, 1997); and Gayl D. Ness with Meghan Golay, *Population and Strategies for Sustainable Development* (London: Earthscan Press, 1997).
39. National Research Council, *Population Growth and Economic Development: Policy Questions* (Washington, DC: National Academy Press, 1986).
40. Robert Cassen and contributors, *Population and Development: Old Debates, New Conclusions* ODC U.S.-Third World Policy Perspectives No. 19 (New Brunswick, NJ: Transaction Publishers, 1994); and Robert Cassen with Lisa M. Bates, *Population Policy: A New Consensus*, ODC Policy Essay No. 12 (Washington, DC: ODC, 1994).
41. See Nancy Birdsall, Allen Kelley, Steven Sinding, eds., *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World* (New York: Oxford University Press, 2001).
42. RAND, "Banking the Demographic Dividend" *Population Matters Policy Brief* (Santa Monica, CA: RAND, 2002); and David E. Bloom, David Canning, and Jaypee Sevilla, *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change* (Santa Monica, CA: RAND Corporation, 2003).
43. Bloom, Canning, and Sevilla, *The Demographic Dividend*.
44. Commission on Macroeconomics and Health, "Macroeconomics and Health: Investing in Health for Development" (Geneva: World Health Organization, 2001), accessed online at www3.who.int/whois/cmh/cmh_report/e/pdf/001-004.pdf, on Jan. 5, 2004.
45. Sleebos, "Low Fertility Rates in OECD Countries."
46. Anrudh Jain, ed., *Do Population Policies Matter?* (New York: Population Council, 1998).
47. Thomas J. Goliber, "Population and Reproductive Health in Sub-Saharan Africa," *Population Bulletin* 52, no. 4 (1997): 4-5.
48. UN, *Synthesis of National Reports on Population and Development* (New York: UN, 1994).
49. Stephen Isaacs, Gail S. Cairns, and Nancy I. Heckel, *Population Policy: A Manual for Policymakers and Planners*, 2d ed. (New York: Center for Population and Family Health, Columbia University, and The Futures Group, 1991).
50. Steven W. Sinding, *Seeking Common Ground: Demographic Goals and Individual Choice* (Washington, DC: Population Reference Bureau, 1994).
51. UN, "Programme of Action of the International Conference on Population and Development," in *Report of the International Conference on Population and Development* (Cairo, Sept. 5-13, 1994): para. 7/2-7.3 and 8.25, accessed online at www.unfpa.org/icpd/, on Feb. 19, 2004.
52. See also: Lori Ashford and Carolyn Makinson, *Reproductive Health in Policy and Practice* (Washington, DC: Population Reference Bureau, 1999); Jennifer Catino, *Meeting the Cairo Challenge: Progress in Sexual and Reproductive Health* (New York: Family Care International, 1999); and Nicole Haberland and Diana Measham, *Responding to Cairo: Case Studies of Changing Practice in Reproductive Health and Family Planning* (New York: Population Council, 2002).
53. Grant et al., *Low Fertility and Population Ageing*.

54. Wolfgang Lutz, Brian C. O'Neill, and Sergei Scherbov, "Europe's Population at a Turning Point" *Science* 229 (March 28, 2003): 1991-92; Sleenbos, "Low Fertility Rates in OECD Countries": 11-12; and Grant et al., *Low Fertility and Population Ageing*.
55. Lutz, O'Neill, and Scherbov, "Europe's Population at a Turning Point."
56. Grant et al., *Low Fertility and Population Ageing*; and Sleenbos, "Low Fertility Rates in OECD Countries."
57. Grant et al., *Low Fertility and Population Ageing*; and Sleenbos, "Low Fertility Rates in OECD Countries": 13.
58. Grant et al., *Low Fertility and Population Ageing*.
59. Grant et al., *Low Fertility and Population Ageing*.
60. Sleenbos, "Low Fertility Rates in OECD Countries."
61. Anatoly Zoubanov, *Population Ageing and Population Decline: Government Views and Policies* (paper prepared for the Expert Group Meeting on Population Ageing and Population Decline, UN Population Division, New York, Oct. 16-18, 2000).
62. Sleenbos, "Low Fertility Rates in OECD Countries."
63. Lori Ashford, "Improving Reproductive Health in Romania," *Policy Brief* (Washington, DC: Population Reference Bureau, forthcoming).
64. U.S. Centers for Disease Control and Prevention (CDC), *Reproductive Health Survey, Romania, 1999: Final Report* (Atlanta, GA: CDC, 2001).
65. Grant et al; *Low Fertility and Population Ageing*.
66. UN Population Division, *Replacement Migration: Is It a Solution to Declining and Ageing Populations?* (New York: UN, 2000).
67. UN Population Division, "New Report on Replacement Migration Issued by UN Population Division," Press Release 17 March 2000, accessed online at www.un.org/News/Press/docs/2000/20000317.dev2234.doc.html, on Dec. 12, 2003.
68. Federal Statistical Office of Germany, *In the Spotlight: Population of Germany Today and Tomorrow* (Wiesbaden, Germany: Statistisches Bundesamt, Federal Statistical Office, 2003).
69. Zoubanov, *Population Ageing and Population Decline*.
70. Zoubanov, *Population Ageing and Population Decline*.
71. Haub, *2003 World Population Data Sheet*.
72. PRB estimate based on India's Sample Registration System, 2002.
73. Davidson R. Gwatkin et al., *Initial Country-Level Information About Socio-Economic Differences in Health, Nutrition, and Population*, 2d ed. (Washington, DC: The World Bank, 2003).
74. John C. Caldwell, "The Contemporary Population Challenge," and Steven W. Sinding, "The Role of International Funding in Future Fertility Declines Among Intermediate-Fertility Countries," in *The Future of Fertility Decline in Intermediate-Fertility Countries*, ed. UN Population Division (New York: UN Population Division, 2002).
75. UN Population Division, *World Population Prospects: The 2002 Revision*: xvi.

Suggested Resources

- Birdsall, Nancy, Allen C. Kelley, and Stephen W. Sinding, eds. *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*. New York: Oxford University Press, 2001.
- Bulatao, Rodolfo A., and John B. Casterline, eds. *Global Fertility Transition*. New York: Population Council, 2001.
- International Organization for Migration (IOM). *World Migration 2003*. Geneva: IOM, 2003.
- Morgan, S. Philip. "Is Low Fertility a Twenty-First Century Demographic Crisis?" *Demography* 40, no. 4 (2003): 589-603.
- Sleenbos, Joëlle E. "Low Fertility Rates in OECD Countries: Facts and Responses," *OECD Social, Employment, and Migration Working Papers*, No. 15. Paris: Organization for Economic Co-Operation and Development (OECD), 2003.
- Zlidar, Vera M., et al. "New Survey Findings: The Reproductive Revolution Continues." *Population Reports* M-17. Baltimore, MD: Johns Hopkins Bloomberg School of Public Health, 2003.

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