

World Population Beyond Six Billion

*by Alene Gelbard, Carl Haub, and
Mary M. Kent*

*There will be at least
another billion people
added to the world's
population by 2020.*

*Fertility and mortality
rates are starkly
different around
the world.*

*HIV/AIDS threatens
the survival of
millions in many
world regions.*

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About the Authors

Alene Gelbard is director of international programs at the Population Reference Bureau. She holds a Ph.D. in population dynamics from Johns Hopkins University and has extensive expertise on population and related policy issues. She has provided technical assistance on population and health issues to organizations in Africa, Asia, Latin America, and the Middle East. She has participated in many international meetings, including preparations and follow-up for the 1994 International Conference on Population and Development.

Carl Haub holds the Conrad Taeuber Chair for Population Information at the Population Reference Bureau. He is a consultant to international organizations and has provided technical assistance to governments in the former Soviet Union, India, and the Caribbean. He has written numerous articles on population and is a co-author of the annual PRB World Population Data Sheet. Mr. Haub holds a master's degree in demography from Georgetown University.

Mary M. Kent is editor of the Population Bulletin series at the Population Reference Bureau. She earned a master's degree in demography from Georgetown University.

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By Alene Gelbard, Carl Haub, and Mary M. Kent

In the history of the world, no century can match the population growth of the one now coming to a close. We entered the 20th century with less than 2 billion people, and we leave it with more than 6 billion.

What is the world population outlook beyond 6 billion? The momentum created by the unprecedented growth of the last half century will carry us toward the seventh billion—probably within the next 14 years. Nearly all of this increase will occur in less developed regions. Beyond that, our vision blurs.

Will world population stop growing over the next century? Will the 21st century witness long-term population decline? Or will the new century see even more population growth than the last? Any of these scenarios is possible.

World population in the next century, as in the last, will reflect starkly different demographic trends around the world: high fertility and mortality and rapid population growth in sub-Saharan Africa, for example, and low fertility and mortality and population decline in parts of Europe.

What accounts for these differences? Are they likely to change? To answer these questions, we must examine what causes population change. We have learned a great deal about the factors linked with population change. These include economic growth or decline; public health in-

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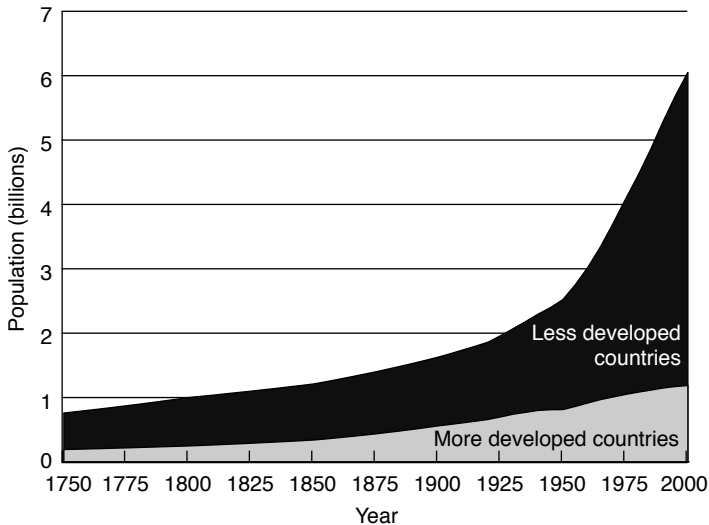
The well-being of these children in Bhutan will be linked to global events and trends in the 21st century.

terventions; investments in education and environmental protection; the status of women; epidemics and other health threats; and access to family planning information and services.

Some of these factors are harder to understand and predict than others. Many are intricately interconnected—

Figure 1

Population Growth in More Developed and Less Developed Countries, 1750 to 2000



Sources: United Nations, *World Population Projections: The 1998 Revision* (1998); and estimates by the Population Reference Bureau.

so that a change in one can cause a change in another.

We know that the future world population will be influenced heavily by the 2 billion young people under age 20 in less developed countries today. As these youths enter their child-bearing years, their decisions about how many children to have and when to have them will determine the size and characteristics of the world's population in 2050 and at the end of the 21st century.

This *Population Bulletin* chronicles the demographic history of the world and the changes in population in less developed and more developed countries. It examines the social and economic factors that affect population change. It also discusses the heightened international concern in the second half of the century about the rapid rate of growth and large increases in population size. And, it looks at the ways that governments and private groups around the world have responded to these concerns. It describes a new world vision of what to do about population issues. This vi-

sion draws attention to particular population groups and the importance of their well-being for the quality of life for all people in the 21st century.

Population Growth Before 1900

For much of our history, humans have struggled to survive. By A.D. 1, perhaps 300 million people lived on the Earth, a paltry total after millions of years of human existence. For most of the next 2,000 years, population growth was exceedingly slow. 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

The demographic history of Breteuil, France, in the 17th century, illustrates the fragility of life in this period. Breteuil's inhabitants depended on a single grain crop, and crop failure meant famine and death. Evidence of a crop crisis in Breteuil in 1694 was accompanied by records of 1,229 burials in the parish registers. Only 73 deaths had been recorded the previous year and only 49 were recorded the year following the crop failure.²

Despite dramatic spikes in mortality rates, the number of births exceeded the number of deaths during the 17th and 18th centuries and population growth proceeded at a slightly faster pace. World population was about 790 million in 1750 and reached 1 billion around 1800 (see Figure 1).

During the next century, something new began to take place in Europe and in a few other areas around the world. 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.

Population grew more quickly and more steadily. Total world population was nearly 1.7 billion by the beginning of the 20th century and would reach 2 billion within the next 30 years.

The 19th-century surge of population growth occurred primarily in the more developed countries.^a The population of Europe more than doubled between 1800 and 1900, while the population of North America increased nearly 12 times—fueled by immigration from Africa and Europe. In 1800, about one-fourth of world population lived in the now more developed regions of Europe (including Russia), Japan, and North America, but that share increased to about one-third by 1900 (see Table 1).

Less developed countries grew more slowly than more developed countries in the 19th century, but they already held the bulk of the world inhabitants. Asia, dominated by China, had 62 percent of world population in 1800, and Africa had 11 percent. Latin America and the Caribbean accounted for only about 2 percent of the world's population. Like North America, Latin America would see most of its population growth in the 20th century.

Some of the shift in regional distribution resulted from immigration, but it also reflects fundamental shifts in population trends that began in the more developed regions and spread to less developed regions in the 20th century.

Demographic Transition

The improvement in human survival and the consequent explosion of population growth marked the beginning of the shift from high to low mortality and from high to low fertility that is known as the “demographic transition.” This shift occurred throughout Europe, North America, and a number of other areas in the 19th and ear-

Table 1

Population Growth in World Regions, 1750 to 2000

Region/country	Population in millions				
	1750	1800	1900	1950	2000
World	791	978	1,650	2,521	6,055
More developed	191	236	539	813	1,188
North America	2	7	82	172	310
Europe	163	203	408	547	729
Japan, Australia, and New Zealand	26	26	49	95	149
Less developed	600	742	1,111	1,709	4,867
Africa	106	107	133	221	784
Asia (less Japan)*	478	611	904	1,321	3,563
Latin America & Caribbean	16	24	74	167	519
Region/country	Percent of world total				
	1750	1800	1900	1950	2000
World	100	100	100	100	100
More developed	24	24	33	32	20
North America	—	1	5	7	5
Europe	21	21	25	22	12
Japan, Australia, and New Zealand	3	3	3	4	2
Less developed	76	76	67	68	80
Africa	13	11	8	9	13
Asia (less Japan)*	60	62	55	52	59
Latin America & Caribbean	2	2	4	7	9

Note: Numbers may not add to totals because of rounding.

* Includes Oceania except for Australia and New Zealand. Countries of the Middle East are included either in Asia or Africa.

—less than 0.5 percent.

Sources: United Nations Population Division, *Briefing Packet, 1998 Revision of World Population Prospects*, October 1998; and Irene B. Taeuber, *The Population of Japan* (1958): 21-23.

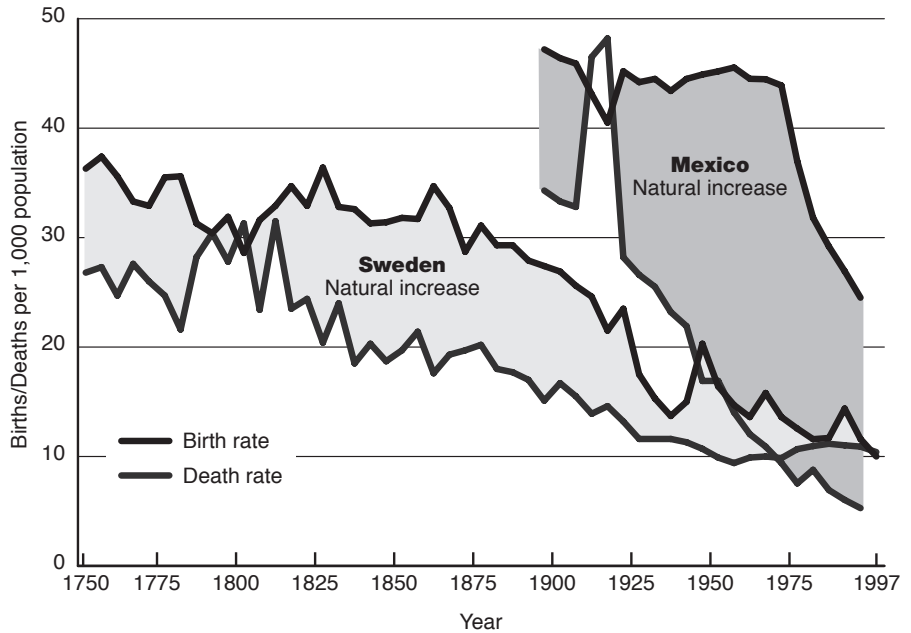
ly 20th centuries. It gave rise to the dominant model of demographic change, which most demographers assume will apply to all countries. In the classic demographic transition, the trend of high birth and death rates (and minimal population growth) is disrupted by a long-term decline in mortality. Mortality rates eventually stabilize at low levels. Birth rates also begin a long-term decline and 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 will vary depending on its culture, level of economic development, and

^a Following United Nations definitions, more developed, or industrialized, countries include Europe (including all of Russia), the United States, Canada, Australia, New Zealand, and Japan. The term “less developed” refers to countries in Africa, Asia (except for Japan), Latin America and the Caribbean, and Oceania (except for Australia and New Zealand).

Figure 2

Demographic Transition in Sweden and Mexico, 1750 to 1997



Sources: (Sweden) B.R. Mitchell, *European Historical Statistics 1750-1970* (1976): table B6; and Council of Europe, *Recent Demographic Developments in Europe*. (Mexico) CELADE *Boletín demográfico* no. 59 (January 1997): tables 4 and 7; and Francisco Alba-Hernandez, *La población de México* (1976): 14.

other factors. As countries pass through the various stages of the transition, population growth from natural increase (birth rate minus death rate) accelerates or declines depending on the gap between the birth rates and death rates. More developed countries such as Sweden have “completed” the demographic transition: Fertility and mortality are at low levels and natural increase adds little, if any, population growth. Many less developed countries are in an intermediate stage, in which mortality and fertility are falling at varying rates but are still high relative to the levels in Europe and other more developed areas.

Not all countries will follow the same path to low fertility and low mortality as did European countries. And, there may be 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.

The volatile level of mortality at the beginning of the transition is illustrated by the peaks and valleys of Sweden’s death rate between the 1750s and early 1800s (see Figure 2). When death rates rose sharply, population growth slowed or even turned negative. As people grew healthier, death rates declined, as illustrated by the path of Sweden’s death rate after 1826.

Settlement patterns changed in Sweden and other European countries during the 18th and 19th centuries, which affected population growth. More people moved to the cities. Trade and industrialization transformed society; they created new merchant classes and a need for wage labor. The cost and value of children changed. Children had been considered an asset to rural couples, who relied on them to help produce food

and income. Children were expected to support their parents in old age. But children could not contribute as much to families living in urban areas. Housing was often in short supply and incomes were generally low. Each additional child meant that the family's resources and living quarters must be stretched even further.

New patterns of marriage and childbearing emerged during this period. In many parts of Europe, couples began to wait longer to marry and relied on traditional methods of birth control to limit the number of children they had. In the 18th century, there were nearly 40 births per 1,000 population in northern and western Europe. The rates began a lengthy descent throughout the region in the 18th and 19th centuries, although the timing of fertility decline differed from country to country. Birth rates began a constant decline around 1875 in Sweden. By the end of the 19th century, fertility and mortality were falling in much of Europe and in a few other areas, including Australia and the United States.

Population Change: 1900 to 1950

As the 20th century began, more developed countries were entering a new stage of the demographic transition. In 1900, life expectancy at birth was 47 years in the United States and between 45 and 50 years in Europe, Japan, and Australia—up slightly from an average of about 40 years during the 19th century.³ But a revolution in health had already begun, and life expectancy would reach unimaginably high levels by mid-century. These improvements in health reflected scientific advances of the previous century—Louis Pasteur, Robert Koch, and others had identified disease-causing “germs,” and Joseph Lister introduced antiseptic practices that were eventually adopted by hospitals. But mortality was also declining be-

cause of better personal hygiene and public sanitation projects that removed garbage and sewage from city streets and provided safer drinking water. Death rates for infectious diseases began to fall well before vaccines and antibiotics were widely available.

Infants and young children benefited most from this health revolution. In the more developed countries, the infant mortality rate (IMR, number of deaths to infants less than 1 year of age per 1,000 births) was about 200 in the 1800s—about two of every 10 babies died before their first birthday. In the early 1900s, the IMR dropped below 100 in the United States and many European countries and it was below 50 in nearly all these countries by the 1950s.

U.S. life expectancy at birth shot up to 56 years by 1920 and to 68 years by 1950. Average life expectancy was even higher in some European countries by 1950.

Although birth rates had fallen during the latter part of the 19th century, women still were having relatively large families in 1900. An American woman had four to five children on average; a European woman had somewhat fewer.⁴ Fertility decline quickened after 1900. The total fertility rate (TFR, or average number of children a woman would have given prevailing birth rates) would fall to about two children per woman in the United States and even lower in Europe during the world economic crises of the 1930s. As World War II broke out in 1939, the TFR rose. It reached 2.8 children per woman in the more developed countries by the early 1950s.⁵

During this same period, most of Africa, Asia, and Latin America were still in the predemographic transition stage of high mortality and high fertility. Around 1900, Mexico's birth rate was 40 to 50 births annually per 1,000 population (roughly consistent with about six births during a woman's lifetime). But the country's relatively high death rate kept the population growth rate low (see Figure 2). The

Infants and young children benefited most from the health revolution of the 20th century.

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Average U.S. fertility has been around two children per couple since the late 1980s, up slightly from lows reached in the 1970s.

sharp peak in the death rate in the early 1900s is attributed to turmoil surrounding Mexico's revolution.

Except during Mexico's revolution, Mexico's pattern of birth and death rates in the 1900s is quite similar to Sweden's during the late 18th century and early 19th century. But the birth and death rates were much higher in Mexico than they had been on the eve of Sweden's demographic transition, 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. In contrast, Mexico's growth rate rose from around 1 percent in the early 1900s to 2.7 percent by 1950. The Mexican population nearly doubled, from about 14 million to almost 28 million, in the same interval.⁶ With declining mortality and high fertility, Mexico was poised for an explosion of population growth. Mexico's demographic history was echoed in many less developed countries around the world and illustrates the origin of the rapid population growth in the second half of the 20th century.

Population Change: 1950 to 2000

The second half of the century brought many new demographic trends and patterns. The more developed countries completed their transition to low mortality and low fertility. Population growth slowed and even turned negative in a few countries. Populations grew older. The more developed countries also experienced sometimes disruptive changes associated with baby booms and baby busts, crises in health, and waves of immigrants and refugees.

In less developed countries, the second half of the century brought decades of rapid population growth and swelling streams of migrants from rural to urban areas. Some countries appeared to be rushing through the various stages of the demographic transition while others appeared to be following a new path of demographic change.

Mortality, Fertility, and Natural Increase

In Europe, population growth accelerated as countries recovered from the devastating effects of World War II. The rapid decline in death rates of the early part of the century slowed considerably, in part because infant and childhood mortality had already fallen to such low levels. By 1975, the IMR was down to 10 in Japan, 16 in the United States, and 15 in much of Europe. U.S. life expectancy rose by less than 10 years in the second half of the century, from 68 years to 76 years, after increasing by more than 20 years during the first half.⁷

Since 1950, the greatest gains in life expectancy at birth have been for adult women. Lower fertility has contributed to this gain. Women had fewer pregnancies, which lowered their risk of death from pregnancy or childbirth. In more developed countries, average life expectancy for women rose from 69 years to 78 years between 1950 and 1995, while the aver-

age for men rose from 64 years to 70 years.⁸ Life expectancy for men stagnated for several decades in many developed countries before beginning to rise again in the 1970s.

The growing gap between male and female life expectancy is one of the remarkable features of the 20th-century mortality decline.⁹ In 1900, life expectancy at birth was two to three years longer for women than for men in most developed countries. Women had lower mortality than men, except during the young adult ages when there was a high risk of death from complications of pregnancy and childbirth. By the second half of the century, maternal mortality had fallen and mortality from cancer and heart disease was increasing faster for men than for women. The male-female gap in life expectancy widened (see Table 2).

The post-1950 period also marks a stunning reversal in life expectancy in Eastern Europe, especially in Russia. Male life expectancy began to slip during the 1960s in Russia. After a temporary improvement attributed to Soviet President Mikhail Gorbachev's anti-alcohol campaign in the early 1980s, life expectancy sank even faster during the late 1980s and early 1990s.¹⁰ Health conditions seriously deteriorated around the time of the breakup of the Soviet Union in 1991. Between 1991 and 1994 Russian male life expectancy at birth fell by six years to just under 58 years, and female life expectancy at birth dropped by more than three years to an average of 71 years. Analysts disagree about what caused the drop, but many point to inadequate health services, lack of prescription medicine, increased alcohol abuse, and the long-term effects of smoking.¹¹ In the late 1990s, however, Russian life expectancy levels are increasing again.

After World War II, "baby booms" were commonplace in Europe, although they were more modest than the baby boom that occurred in the United States between 1946 and 1964. By the mid-1970s, however, TFRs in many European countries had fallen

Table 2

Life Expectancy at Birth in Selected Countries Around 1900, 1950, and 1990

Country	Life expectancy (years)		
	Males	Females	Female advantage
1900-1910			
India	22.6	23.3	0.7
Japan	42.4	43.7	1.3
Russia	30.9	33.0	2.1
Sweden	56.6	59.5	2.9
United States	45.6	48.3	2.7
1950-1955			
India	39.4	38.0	-1.4
Japan	62.1	65.9	3.8
Russia	62.5	70.5	8.0
Sweden	70.4	73.3	2.9
United States	66.2	72.0	5.8
1990-1995			
India	60.3	60.5	0.2
Japan	76.4	82.5	6.1
Russia	61.7	73.6	11.9
Sweden	75.4	81.1	5.7
United States	72.5	79.3	6.8

Sources: Alan Lopez, "Mortality and Morbidity," in *Encyclopedia of Biostatistics* vol. IV, eds. P. Armitage and T. Colton (1998): 2692; United Nations, *World Population Prospects: The 1998 Revision* (1998); and United Nations, *Country Monograph Series* no. 10 (1982): 137.

below 2 children per woman, the level at which a couple replaces itself in the population. A TFR must be slightly above 2.0 (about 2.1 in low mortality countries) to reach replacement level because some women will die before the end of their childbearing years. When the TFR remains below 2 for a prolonged period, populations may experience natural decrease because deaths will outnumber births.

European fertility had taken a previous nose dive during the 1930s Great Depression, but in the mid-1980s TFRs sank to record low levels and showed little sign of recovery. By the late 1990s, the TFR was 1.2 or less in Belarus, Bulgaria, the Czech Republic, Estonia, Italy, Latvia, and Spain.

The fertility decline began in Western Europe during a period that

Improving Health in Less Developed Countries

The remarkable improvements in life expectancy at birth since the 1950s primarily reflect better infant and child survival. One major contributor to the decline was a massive worldwide immunization program for children. In 1973, the World Health Organization initiated the Expanded Programme on Immunization (EPI) against six diseases that claimed millions of young lives: tuberculosis, measles, diphtheria, whooping cough, tetanus, and polio. In 1981, only about 20 percent of the world's children were immunized against these six diseases. By 1995, 80 percent were immunized against them.¹ Measles and other infectious diseases are still leading causes of child mortality, but epidemics of these diseases are less frequent and less deadly. Polio has become rare. Children are much more likely to live to adulthood.²

Another advancement in child health came through the use of a low-cost, low-technology intervention—oral rehydration therapy (ORT)—to control life-threatening cases of diarrhea. Diarrhea is a leading cause of infant and child mortality in the less developed regions. Again, international agencies coordinated efforts to train health workers around the world about ORT, which involves administering essential salts dissolved in water.³ ORT use was negligible in 1980, but it was used in about 80 percent of diarrheal episodes by the 1990s.⁴ Diarrhea still accounts for about 2 million deaths to children under age 5 each year, but ORT has prevented millions of additional deaths from this cause.⁵

The HIV/AIDS epidemic presents new challenges to child health. HIV-infected mothers can transmit the virus to their infants during pregnancy, at the time of delivery, or while breastfeeding their infants. One infant in every three born to an HIV-positive mother is likely to acquire the virus. Sub-Saharan Africa has been hardest hit by the epidemic—the UN estimates that 90 percent of the children now infected with HIV were born in Africa—but the number of affected children in India and Southeast Asia is rising as well. In parts of the world most affected by the epidemic, child mortality rates may double by 2010, reversing hard-won improvements in child survival brought by immunization and public health campaigns.

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saw delayed marriage, more divorce, high inflation, and an increase in the percentage of women going to college and working outside the home. These same social and economic factors favored lower fertility in the United States, where the TFR reached an all-time low in 1976 at 1.7 children per woman. Below-replacement fertility also hit Eastern Europe and the former Soviet Union after 1990.

Two decades of low fertility have halted population growth in nearly all of Europe and Japan. In many cases, a decline in population was avoided only by the flow of immigrants from abroad. In the late 1990s, 14 European countries are experiencing natural decrease, or fewer births than deaths each year.

Natural decrease will spread to other countries as low birth rates drastically reduce the number of people entering the childbearing ages. Although some countries have a net population gain from immigration, this is not expected to generate enough growth to stave off eventual population decline. As the 20th century ends, not one major industrialized country has fertility above replacement level.

Europe (including Russia and some other former Soviet republics), which accounted for 22 percent of world population in 1950, accounts for just 12 percent in 2000. This percentage will continue to drop in the foreseeable future. Among the more developed countries, only a few traditional immigration countries (Australia, Canada, New Zealand, and the United States) can expect significant long-term population growth. These countries have TFRs below replacement level (ranging from 1.6 in Canada to 2.0 in the United States). They have younger age structures and more immigration than Europe and Japan, however, which contributes to momentum for continued growth.

Fertility and mortality patterns have been very different among less developed countries in the past 50 years. Gains in life expectancy accelerated after 1950. The average life ex-

pectancy at birth in less developed countries rose from 41 years to 62 years between 1950 and 1995, according to UN estimates. The IMR fell from 178 deaths per 1,000 births to 68 deaths per 1,000 births over the same period.

Average life expectancy rose above 60 years in East Asia and Latin America by the early 1970s and to about 70 years by the late 1990s. The IMR fell to about 29 in East Asia and 36 in Latin America by 1998 (see Box 1).

Progress has been much slower in sub-Saharan Africa and South Central Asia. In the 1950s, about 180 infants died per 1,000 births in these regions. By the 1990s, the IMR was still close to 100 in sub-Saharan Africa and was nearly 80 in South Central Asia.

The pace of mortality decline in some areas has been slowed by the spread of HIV/AIDS, and many experts predict dramatic declines in life expectancy in some countries of sub-Saharan Africa.¹² Worldwide, nearly 14 million people have died from HIV/AIDS since the beginning of the epidemic in the 1980s. An additional 33 million are infected with the virus (see Table 3). Most will die within the next decade.¹³ The UN agency that tracks the AIDS epidemic, UNAIDS, estimates there are nearly 16,000 new infections daily—and 1,600 are to children.¹⁴

Population Growth

The general reduction in death rates after 1950 led to explosive population growth in many less developed countries. In Mexico, for example, the introduction of modern medical services and public health interventions (such as antibiotics, immunization, and sanitation) caused the death rate to drop three times more quickly than it had in Sweden. The birth rate remained high and the rate of natural increase shot to new highs. Growth rates exceeded 3 percent per year in the 1960s and 1970s. For the less developed countries as a whole, growth rates peaked during the 1960s and

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Since the 1960s, vaccination campaigns throughout the world have helped eliminate smallpox and reduce deaths from other infectious diseases.

Table 3

Estimates of the HIV/AIDS Epidemic, 1998

People newly infected with HIV in 1998

Total	5.8 million
Adults	5.2 million
Children <15 years	590,000

Number of people living with HIV/AIDS

Total	33.4 million
Adults	32.2 million
Children <15 years	1.2 million

AIDS deaths in 1998

Total	2.5 million
Adults	2.0 million
Children <15 years	510,000

AIDS deaths since the beginning of the epidemic

Total	13.9 million
Adults	10.7 million
Children <15 years	3.2 million

Source: UNAIDS, "Fact Sheets." Accessed online at <http://www.unaids.org>, on Feb. 25, 1999.

early 1970s at about 2 percent annually. The population total for less developed countries rose from 1.7 billion to 4.7 billion between 1950 and 1998. Population growth would have been

even higher if fertility rates had not started to fall in less developed countries. The pattern and pace of decline varied tremendously, depending on economic and social development,

Box 2

The Reproductive Revolution

The “reproductive revolution” has been one of the most remarkable events of the second half of the 20th century. The development of family planning methods such as the pill and the IUD, 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 and socioeconomic changes that motivated couples to limit their family size drove the fertility declines of the last few decades. Family planning use rose from less than 10 percent of married women of childbearing age in the 1960s to about 50 percent of these women in the 1990s.

Before 1960, women’s choices of family planning methods were limited to such methods as withdrawal, rhythm, diaphragms, foams or jellies, or such ineffective methods as herbal medicines or douche. Women’s options improved immensely when the pill and the modern IUD became available after 1960. In the 1990s, about 20 percent of women worldwide rely on one of these two methods. New contraceptives, including injectables and implants, became available in many countries in the 1980s. They have become popular methods in some African countries. Female sterilization has been widely adopted in Asia and Latin America and is the most popular single method worldwide. An estimated 17 percent of married women ages 15 to 49 rely on female sterilization to prevent pregnancy.

The dramatic increase in family planning use caused fertility to decline much more rapidly in the less developed countries than it had during the fertility transition in the more developed countries.

Organized family planning programs and government promotion of family planning use were an important component of this phenomenon. Some demographers credit family planning programs with 40 percent to 50 percent of the fertility decline in less developed countries since the 1960s.¹

An estimated 120 million couples worldwide want to delay or prevent another pregnancy but are not using family planning.² If unmarried sexually active women were included, the number would be much higher, according to survey data.³

Family planning use varies widely around the world. Less than 10 percent of women use family planning in Mali, for example, and less than 20 percent in Pakistan (see table). But more than 60 percent of married women use family planning in Brazil, Mexico, Thailand, and many other less developed countries.

The expansion of family planning services has been controversial in some countries. And there have been a number of obstacles to their use. Many women report that they fear adverse health effects from specific methods.⁴ Others want to practice family planning but are dissuaded by their husband’s disapproval, their limited decisionmaking powers, or family pressures to have more children. Some methods are opposed for religious reasons. Difficulties in obtaining and transporting supplies and a shortage of trained medical personnel have also restricted access to family planning services.

Political and cultural barriers have limited access to family planning, especially for young people. In some countries, unmarried adolescents are denied access to family planning services on the assumption that such access would promote promiscuity. Yet about 40 percent of girls in less

government policies, family planning use, and other factors (see Box 2).

In 1950, the average TFR was about 6.2 in less developed countries, a sharp contrast to the average TFR of

2.8 in more developed countries. In less developed regions, the TFR ranged from 6.6 in Africa to 5.9 in Asia and in Latin America and the Caribbean.

developed countries give birth before age 20. The pace of fertility decline in Africa, South Asia, and other high fertility regions 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. Health analysts estimate that if all women delayed their first birth until after age 20, at least 25 percent of pregnancy-related deaths would be prevented. In many countries, children born to mothers under age 20 are 1.5 times more likely to die before their first birthdays than children born to mothers in their 20s.⁵

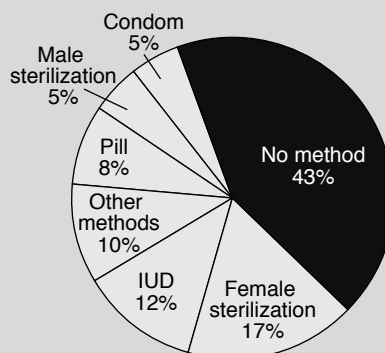
Increases in Family Planning Use in Selected Countries

Country	Year	Percent of women using contraception*	
		Any method	Modern method
Bangladesh	1983	19	14
	1996	49	42
Bolivia	1983	26	12
	1998	48	25
Brazil	1986	66	57
	1996	77	70
Kenya	1984	17	10
	1998	39	31
Mali	1987	3	1
	1995	7	5
Mexico	1976	30	23
	1996	65	56
Pakistan	1979/80	3	—
	1994/95	18	13
Thailand	1978	53	49
	1996	72	70

*Percentage of married women of reproductive age (generally ages 15 to 49).

Sources: UN, *Levels and Trends of Contraceptive Use As Assessed in 1994* (1996): table 5; and Survey Indicator Search Result. Accessed online at <http://www.macront.com/dhs/indicatr/listdata.asp?>; and preliminary DHS Reports.

Contraceptive Methods Used By Currently Married Women, Ages 15-49, World, 1990s



Source: United Nations, *Levels and Trends of Contraceptive Use As Assessed in 1994* (1996).

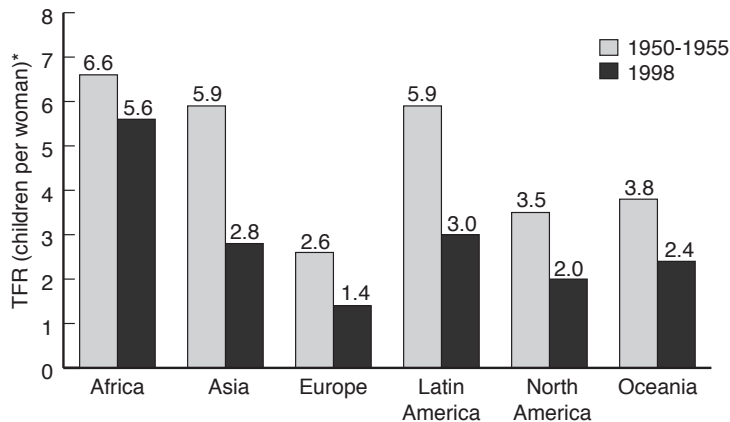
A majority of less developed countries provide family planning services. In many countries, family planning methods also are widely available in pharmacies and private health clinics. Not all women have easy access to family planning, but the expansion in the choices of methods and availability of services around the world over the past 40 years has been truly revolutionary.

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2. Eric R. Miller, Barbara Shane, and Elaine Murphy, *Contraceptive Safety: Rumors and Realities*, 2d ed. (Washington, DC: Population Reference Bureau, 1999).
3. Barbara Shane, *Family Planning Saves Lives* (Washington, DC: Population Reference Bureau, 1997).
4. Miller, Shane, and Murphy, *Contraceptive Safety*.
5. Shane, *Family Planning Saves Lives*.

Figure 3

Fertility Decline in World Regions, 1950 to 1998



* Total fertility rate (TFR) is the average number of children a woman will have under prevailing birth rates.

Sources: United Nations, *World Population Prospects: The 1998 Revision* (1998): table A.20; and Carl Haub and Diana Cornelius, *1998 World Population Data Sheet*.

In the late 1990s, the TFR in Asia stands at about 2.8, more than 50 percent below the 1950 level (see Figure 3). The TFR for Latin America and the Caribbean is down to 3.0 from 5.9 in 1950. Fertility transition is still in the early stages in most of Africa. In sub-Saharan Africa, the TFR is 6.0.

These regional averages mask a wide variety of patterns within regions. Fertility decline has been the most dramatic in China and in South Korea, Taiwan, and Thailand. These countries all had below-replacement fertility in 1998. When China (which is one-third of Asia's population) is excluded, Asia's TFR jumps from 2.8 to 3.3.

In the rest of Asia, fertility decline has been mixed. In some countries, the decrease has been marked by a leveling off after an initial decline (India), very little or no decrease (Iraq, Pakistan, Yemen), or an abrupt decline after a period of little change (Iran).

In India, Asia's (and the world's) second-largest country, periods of quickly falling fertility have been followed by periods of stable fertility levels (see Figure 4). The TFR was about 6.0 until 1966, fell to about 4.5 in the

mid-1970s, and remained at that level until the mid-1980s. Between 1985 and 1995, the TFR dropped again to about 3.4—but it is not clear whether India's TFR will drop further or whether it has entered another period of stability.

Many countries of Latin America exhibit yet another pattern of fertility decline. In Argentina, Colombia, Costa Rica, and Jamaica, TFRs declined to between 2.5 and 3.0 and remained at those levels for at least a decade. TFRs have fallen to these levels more recently in Brazil and Mexico, Latin America's two most populous countries. Brazil's TFR fell from nearly 6.2 in the 1960s to about 2.5 in the early 1990s. Mexico's TFR declined from nearly 7.0 in 1960 to about 3.1 by 1996. Still, as the 20th century ends, fertility remains above replacement level in nearly every Central and South American country.

In much of Africa, the transition to lower fertility is just beginning. The largest declines have taken place at the continent's extremes, in North and Southern Africa, where the TFR stands at 4.0 and 3.5 respectively in the late 1990s. In the balance of the continent, the TFR has fallen below 5.0 only in Kenya, which has a TFR of 4.5, and in Zimbabwe, which has a TFR of 4.4. Elsewhere, change has been slower. The TFR is still above 6.0 in some of the continent's largest countries, including Nigeria and Zambia. Accordingly, Africa's future growth is subject to a wide range of speculation. Many demographers see the beginnings of a transition to lower fertility in the region, but they disagree about how fast and how far fertility will decline. Africa's widespread poverty, high rates of illiteracy, largely rural populations, and strong traditional preferences for large families do not favor a rapid decline.¹⁵

The course of demographic transition also is not clear in the Middle East, which includes North Africa and parts of Western Asia. Fertility remains high despite impressive declines in mortality, but the situation varies throughout the region.

Mortality fell fastest and furthest in the oil-producing Persian Gulf states, thanks to improved public health, expanded education, and higher incomes brought by oil revenues. But the traditional culture in these countries favors large families, and fertility remained high. In contrast, Iran's TFR has plummeted in last decade—from about 6.7 in 1986 to 3.0 in 1996. Fertility decline has proceeded more slowly in Egypt, the region's largest country. Egypt's TFR is about 3.6 in 1998, down from around 5.0 in 1985 and around 7.0 in 1960. Elsewhere in the Middle East, TFRs range from extremely high (7.3 in Yemen and 7.4 in Gaza) to low (2.3 in Lebanon).¹⁶

20th-Century Migration

Fertility and mortality determine the size, composition, and growth of the world population. Migration is the third demographic variable that causes population change.

Throughout human history, people have moved to escape poverty and persecution and to improve their life chances and living standards. But pulling up roots and moving away from friends and family is a difficult and expensive process. People tend to move only when they think the higher income and preferred lifestyle in their destination will be worth the social and economic costs of moving.

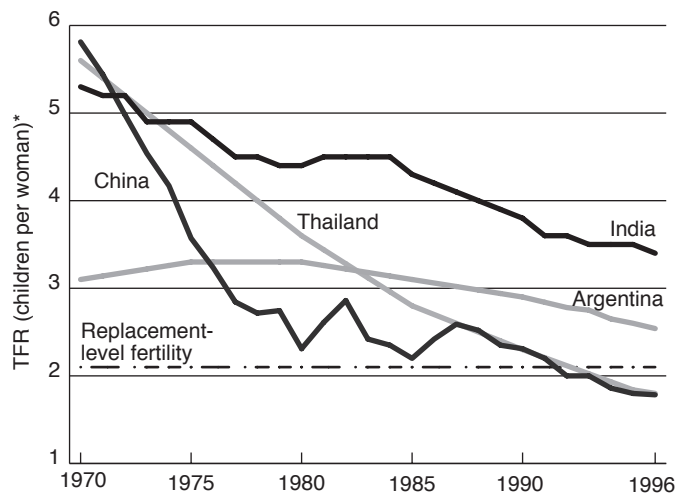
Migration can add to or subtract from the population total, but it has less effect on total population growth than fertility and mortality. Migration's greatest demographic effect is on the distribution of the population by age, sex, cultural, racial, and other characteristics in the countries of origin and destination.

In the past century, the largest population movements have been from rural areas to towns and cities. Other large population movements have crossed national borders. Both types of migration flows tend to wax and wane depending on economic, political, and environmental conditions.

Some people seek new opportunities in another country. They form

Figure 4

Patterns of Fertility Decline in Selected Countries, 1970 to 1996



* Total fertility rate (TFR) is the average number of children a woman will have under prevailing birth rates. A TFR of 2.1 is considered replacement-level fertility in countries with low mortality.

Sources: Registrar General of India; Instituto Nacional de Estadística (Argentina); United Nations Population Division; and the Population Reference Bureau.

part of a pool of about 125 million international migrants (equivalent to the population of Japan). Each year this pool, or stock, of international migrants is augmented by the net immigration of 2 million people (the people moving into another country minus the number moving out).

Although the immigrant population is large, international migration involves just 2 percent of the world's population and affects national population growth in relatively few countries.¹⁷

International population movements have occurred in waves in response to political, demographic, and economic factors. European and American colonial expansion between the 17th and 19th centuries, for example, brought an estimated 15 million African slaves to the Americas and millions of indentured laborers from various countries to work on plantations in Asia and the Pacific. This mix of voluntary and involuntary immigrants introduced ethnic diversity to the Americas and other regions. The legacies of some of these migration streams still exist today.¹⁸

*About one-half
of international
migrants move
from one less
developed
country to
another.*

The 20th century has witnessed many of history's largest and most dramatic population movements, both voluntary and involuntary. More than 18 million people immigrated to the United States between 1900 and 1930, and another 18 million between 1970 and 1997. This century also saw massive relocations of people because of war and political changes. Several million people (mostly Moslems) left India for the new Islamic country of Pakistan after India's independence in 1947; another large group left Pakistan for India.

About one-half of international migrants 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. The infusion of money and rapid economic development in the oil-producing countries of the Middle East attracted millions of foreign workers to the Persian Gulf region in recent decades. Egypt, South Korea, the Philippines, Thailand, and Pakistan were the source of many of these labor migrants. Foreigners made up the majority of the work force in many Persian Gulf states.

In Southeast Asia, migrants from Cambodia, Indonesia, and Myanmar seek jobs in Singapore, Thailand, South Korea, and other newly industrialized countries in Asia.

Migration flows from the less developed to the more developed countries include the movement from South and Central America to North America, from North Africa and the Middle East to Europe, and from Southern and Eastern Europe to Western Europe. The flow from Asia to North America has also accelerated. The United States has received about 1 million legal and illegal immigrants per year in the 1990s, more than any other country. About 42 percent of U.S. immigrants are from Latin America and the Caribbean and 33 percent are from Asia.

Germany has received the second-largest influx of immigrants in the past two decades. Thousands of ethnic Germans poured into Germany from

former Soviet countries, augmenting a heavy flow of labor migrants and their families from Turkey and Eastern Europe.

Labor migrants send millions of dollars of their earnings back to families in their home countries. Some migrant-sending countries, such as Egypt and Cape Verde, derive a significant share of their national income from these remittances. Many labor migrants, while not intending to settle abroad, find it hard to return to an uncertain financial situation at home once they gain work experience in another country. Eventually, other family members join them, adding to the flow and increasing the immigrant community in the destination country.

Economic and political events can cause swift reversals of migration streams. Thousands of foreign workers left Kuwait and other Arab states during the 1990-1991 Persian Gulf War, for example, but many returned after the war.

The 20th century has also produced many examples of forced migration. Wars and civil unrest in areas throughout the world drove millions of people across national borders. The number of officially recognized refugees and asylum-seekers living outside their home countries peaked at 17.6 million in 1992, and it stood at 13.6 million in 1998. Immigrants are considered refugees or asylees if they can demonstrate that they left their home countries to avoid persecution because of their political, religious, or ethnic backgrounds.¹⁹ In 1998, an estimated 5.7 million refugees lived in the Middle East, 2.9 million lived in Africa, and 2.0 million in Europe.

Refugees often return to their home countries, but many spend years, some the rest of their lives, in another country. They are not always welcomed by the host community, and some host governments may be reluctant or unable to accept responsibility for their care. But governments are obligated to accept refugees under international law and many willingly provide them a safe haven.

All types of immigration can provoke strong public sentiment in the receiving countries. Immigrants may not be accepted into the communities of native-born populations. Migrants are often of different racial or ethnic backgrounds and they may speak different languages, practice different religions, and come from very different cultures. Migrants tend to rely on each other for help, and accordingly, they often live in the same neighborhoods and work in same occupations as other migrants from the same country. The native population may view large immigrant communities as a threat to their jobs and ethnic balance. Businesses, however, may rely on foreign labor to produce goods and services. Policymakers are often caught between the interests of the public and businesses while attempting to maintain good relations with the sending countries. These competing interests can lead to conflicting or ineffective immigration policies.

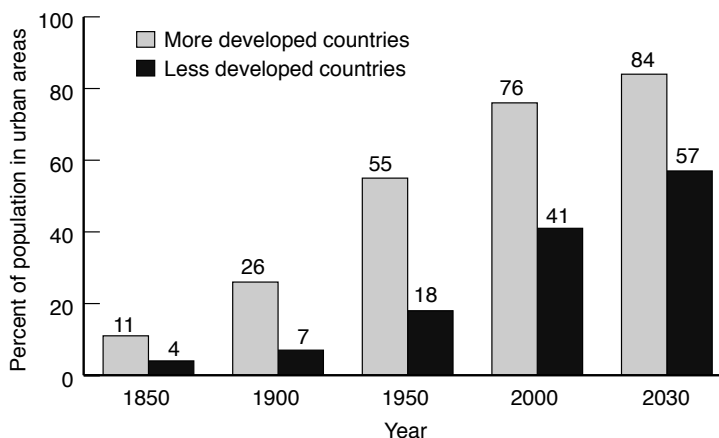
Urbanization

Most migrants never cross national borders. The largest migration flows within countries have been from rural to urban areas. A major movement of population from rural to urban areas began during the late 19th century, when Europe and North America were industrializing, and when faster and better communication made it easier for people to move. Cities had become more attractive to rural migrants because economic development and trade were centered in urban areas and cities offered better job opportunities, amenities, and public services than villages and rural areas.

In 1850, about 11 percent of the residents in what are now considered developed countries lived in urban areas. By 1900, this percentage had grown to 26 percent, as the urban population grew more than three times faster than the rural population.²⁰ By 1950, more than one-half (55 percent) of the residents of more developed countries lived in urban

Figure 5

Urbanization in More Developed and Less Developed Countries, 1850 to 2030



Sources: United Nations, *Patterns of Urban and Rural Population Growth* (1980): table 3; and *World Urbanization Prospects: The 1996 Revision* (1997): table A-2.

areas, and in the late 1990s, three-fourths live in urban areas (see Figure 5).

In most of Asia, Africa, and Latin America, life was still centered in the countryside for much of this century. There were large, thriving cities throughout the less developed regions at the beginning of the 20th century—Buenos Aires, Shanghai, Mumbai (Bombay), and Cairo, for example—but only about 7 percent of the population of less developed countries lived in urban areas in 1900.²¹

When these countries began to industrialize after World War II, more people moved to the cities to take advantage of the new opportunities. These rural migrants fostered industrial development by enlarging the urban labor pool, as had their counterparts in Europe and the United States 75 years earlier. The flow began slowly but soon expanded into an unprecedented wave, helped along by improved communication and transportation networks. Between 1950 and 1975, the urban populations of less developed countries grew at 4 percent annually, much faster than in the more developed countries. The urban population more than doubled over that period and the percentage

of residents living in urban areas in less developed countries rose from 18 percent to 27 percent. About 60 percent of the urban population growth came from natural increase; 40 percent from migration.

The urban growth rate slowed after 1975, but the percentage urban keeps expanding and is expected to

reach 41 percent by 2000. By 2005, one-half of the world's population is projected to live in urban areas.

Urban settlement patterns changed during the century. In the early 1900s, a few dominant "primate" cities—Mexico City, Lagos, and Calcutta, for example—characterized the urban landscape in each region. In the past 25 years, however, urban growth has been much more diverse. Since 1975, cities with fewer than 1 million inhabitants have grown faster than the large cities of 1 million or more.

The population shift from rural to urban areas also stimulates other demographic change. 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.

Demographic and Health Surveys (DHS) in Bolivia and Cameroon in 1998 highlight these urban-rural differences. In Bolivia, rural women had 6.4 children on average, while urban women had an average of just 3.3 children. In Cameroon, rural women had 5.8 children, compared with 3.9 children for urban women.

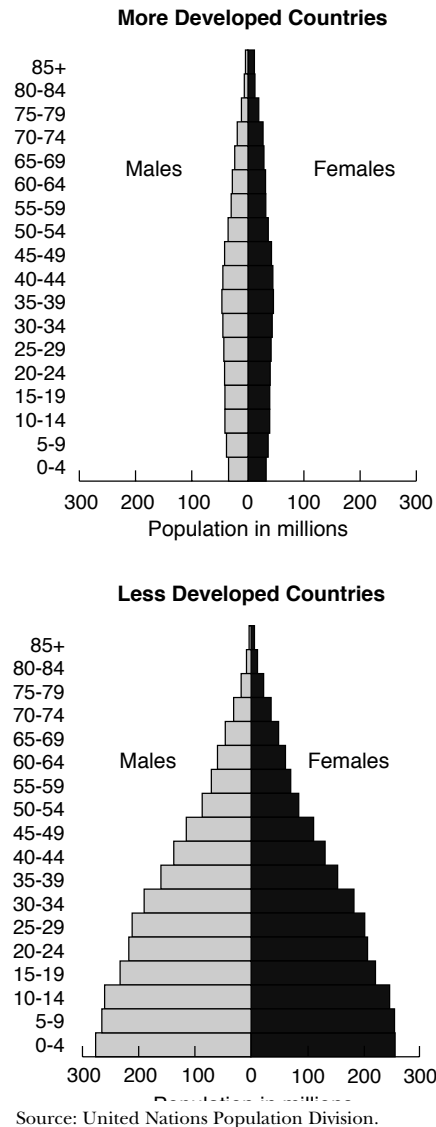
Cities offer many amenities and economies of scale that lower the costs of providing public services. The geographic concentration of population in urban areas can also allow natural areas to be protected from development. But the unprecedented population growth in urban areas in the past 50 years has strained the capacity of many less developed countries to provide basic services for all but the most privileged residents.²²

Changing Age Profiles

Fertility, mortality, and migration trends are reflected in the age and sex profiles of the world's countries. The decades of high fertility rates in the less developed countries meant ever-increasing numbers of young people, illustrated by the broad base of the age-sex pyramid shown in Figure 6. Improvements in infant mortality also contributed to the expanding youth

Figure 6

Population by Age and Sex in More Developed and Less Developed Countries, 1998



population. Children under age 15 made up one-third of the population in the less developed countries in 1998, and even greater proportions in some regions. In sub-Saharan Africa, children made up nearly one-half (45 percent) of the population. Elderly people ages 65 or older are only 5 percent of the population in all less developed countries and 3 percent of the population in sub-Saharan Africa.

The base of the population pyramid for less developed countries shows some narrowing—the result of declining fertility in many countries beginning in the 1980s. But even with declining fertility rates, the young age structure creates considerable momentum for future growth because the population reaching childbearing ages continues to expand. Women have fewer children than women did in the past, but today there are more women having these children.

The fertility transition in the more developed countries earlier this century produced a very different age and sex profile. In 1900, the age and sex structure of these countries looked similar to that of the less developed countries today. In 1998, the profile is different in each country, but in the aggregate, each generation born in more developed countries since 1965 is smaller than the one that preceded it. In the late 1990s, the share of older people is approaching the share of children in more developed countries. The under-15 age group makes up about 19 percent of the population in these countries, while those ages 65 or older make up about 14 percent.

Changes in the age structure also alter the “dependency” burden—that is, the share of the population that is likely to require financial support from the working-age population. Age dependency is measured by the ratio of those under age 15 or ages 65 and older 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 1998 was es-

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Spain's rapid fertility decline since the 1970s boosted the elderly dependency ratio and lowered the youth dependency ratio. Spain has one of the world's fastest aging populations.

timated at 93 in sub-Saharan Africa—there were 93 people less than age 15 or ages 65 and older 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 47 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 ratio is about the same in Western Europe (49) as in East Asia, but the retirement-age component is much larger in Western Europe.

The improvements in health and medical care for the elderly have extended the life expectancy for those ages 65 and older and increased the percentage of the oldest old—those ages 80 and older. In 1996, American men who survived to age 65 could expect to live another 16 years on average; American women who were age 65 could expect to live another 19 years.²³ Because women live longer than men, women are a majority of the elderly in every country. The female share increases with age. There were 81 men per 100 women ages 65

Sources of Data

Our knowledge of population characteristics and trends has expanded during the past 25 years. Most of this improvement reflects the growing availability of more and better data from surveys and censuses in less developed countries.

Demographic data from more developed countries have been available for decades. Nearly all births and deaths that occur each year are registered, and vital statistics are published regularly. These countries also have a relatively long history of census-taking.¹ The United States conducted its first population census in 1790.

Very few less developed countries have complete registration of births and deaths, but nearly all have conducted at least one modern census and published the results. The census data were often of poor quality, but they provided the basis for most demographic measures in these countries until the 1980s. Estimates of birth and death rates were derived using demographic models and census questions on recent births and deaths.

While models often produced adequate estimates of basic demographic rates and trends, we now have a much richer store of information about health and childbearing behavior from demographic surveys. These additional sources are especially important in countries where fertility and mortality are falling.

The World Fertility Survey (WFS), launched in the 1970s, was the first large-scale international project to administer comparable demographic surveys in every world region. About 40 less developed countries (and 20 more developed countries) participated in the program. The WFS was followed by other internationally funded survey projects. The largest project today is the Demographic and Health Surveys (DHS), which has conducted at least one survey in more than 50 less developed countries.² Reproductive health surveys have been administered in less developed countries by the U.S. Centers for Disease Control and Prevention (CDC) since 1975.³

Demographic surveys usually target women of reproductive age, although some also interview men. These surveys have become a primary source of information about current fertility rates, infant mortality, knowledge and use of family planning, and child immunization. Researchers increasingly use DHS and other survey data to develop models that investigate fertility and health trends and the effects of education, residence, marital status, and other factors. The results of this research have influenced population-related policies in countries around the world.

References

1. For an explanation of demographic measures, see Arthur Haupt and Thomas T. Kane, *Population Handbook*, 4th ed. (Washington, DC: Population Reference Bureau, 1997).
2. Access the DHS Web site at <http://www.macrout.com/DHS>.
3. Access the CDC Web site at <http://www.cdc.gov/nccdphp/drh>.

to 69 in more developed countries in 1998, but only 50 men per 100 women ages 80 to 84, and just 20 men per 100 women ages 100 or older.

Although mortality and migration affect a population's age and sex profile, fertility has the largest influence. And fertility will have the greatest effect on the pace and level of future population growth in most societies. The factors that affect these demographic variables drive population change.

Causes and Effects of Population Change

The demographic processes of fertility, mortality, and migration—which determine our future population—are influenced by biological, cultural, economic, geographic, political, and social factors. These factors affect demographic processes directly and indirectly through a web of interdependent variables. Cultural traditions that encourage girls to marry at a young age, for example, can contribute to high fertility rates because women will spend more years exposed to the risk of becoming pregnant. Early marriage can also lead to higher mortality because health risks to the infant and mother are greater when childbearing starts in adolescence.

With mounting information from vital records, surveys, and censuses, demographers are learning a great deal about how and why fertility changes (see Box 3). In the 1980s, demographer John Bongaarts identified four variables that account for most differences in fertility rates. These four “proximate determinants” of fertility are: (1) the proportion of women married or in a sexual union; (2) the percent of women using contraception; (3) the proportion of women who cannot conceive a pregnancy, especially during the infertile period following childbirth (postpar-

tum infecundity); and (4) the level of abortion.²⁴

The importance of each proximate determinant depends on cultural, economic, health, and social factors within a population. The proportion of women in a sexual union is partly determined, for example, 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 nearly all childbearing takes place within marriage, changes in the age at marriage can significantly affect fertility. In the Arab countries of the Middle East, for example, an increase in the average marriage age for women led to significant fertility declines in some countries (see Box 4, page 22).

The length of postpartum infecundity usually depends on how long women breastfeed their babies.

Breastfeeding releases hormones in the nursing mother that can prevent her from becoming pregnant.

Postpartum infecundity is not a significant factor in such countries as the United States, where women usually breastfeed their babies only for a few months, but it is important in sub-Saharan Africa and other traditional societies where women commonly breastfeed their babies for two years. In most populations, contraceptive use and abortion are the primary determinants of fertility levels.

Education and poverty are among the most important influences on the proximate determinants and consequently have a strong indirect effect on fertility. Low levels of education and poverty go hand in hand, and they are related to health and to levels of economic development, urbanization, and environmental conditions.

Education

Education affects all aspects of people's lives and is intricately linked to demographic processes. Although researchers cannot untangle all the rea-

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School enrollments in Bangladesh are still low for girls. In 1996, less than 15 percent of Bangladeshi girls of secondary-school age attended school.

sons why, education is associated with lower fertility and mortality and with a greater likelihood of migrating. A formal education may act as a catalyst for changes in values and behavior. Education may make people more receptive to new ideas—such as family planning—and more willing to take risks—such as moving to a new community or taking a job outside the home. Social scientists point out that education does not have the same effect in all cultural settings, and that many other factors—such as women's status—may explain much of the association.²⁵

More educated women have higher rates of family planning use, smaller families, and healthier children than other women in the same society. Where educational levels are high, women are likely to postpone marriage until they finish secondary school or college. In these societies, school attendance directly competes with marriage. But even in societies with low levels of educational attain-

ment, where girls are likely to leave school well before the average age at marriage, women who have completed a few years of schooling marry later than women with no formal education. In 1996, the median age at first marriage was 19.5 years for Tanzanian women ages 20 to 49 who had at least a primary level education. The median was 17.1 years for Tanzanian women with no education.

Married women are more likely to use family planning if they have some formal education. A 1998 survey in the Philippines showed a contraceptive use rate of 50 percent for married

women of reproductive age who had at least some secondary education. Only 15 percent of their counterparts with no formal education used a contraceptive method.²⁶

In most societies, total family size also declines as education increases. In the early 1990s, Peruvian women with at least some secondary education had nearly four fewer children, on average, than women with no formal education. A similar gap was recorded in a 1998 survey in Togo, West Africa. Togolese women with a secondary or higher education had 2.7 children on average, while women

The family has always been at the center of Arab society.

Box 4

Changing Marriage Patterns in the Arab Region

The family has always been at the center of Arab society. Women traditionally marry and have children at young ages—usually while still in their teens. Social recognition and support systems revolve around the roles of women as wives and mothers.

But in recent decades, a growing proportion of Arab women are waiting longer to marry or are remaining single. These changing marriage patterns have led to lower fertility in some parts of the region. And they signal some fundamental changes for Arab society.

During the 1950s, the Arab region—which spans North Africa and portions of Western Asia—had uniformly high fertility and mortality. The average TFR was 7.0 children per woman. Fertility fell rapidly in some Arab countries in the past few decades, and led to gaps in fertility rates among countries. In 1998, TFRs in Arab countries varied from 2.5 in Lebanon to 7.6 in Yemen.

Fertility changes in the Arab region, as in other less developed countries, coincided with advances in contraceptive technology, the legitimization of family planning programs, and a growing desire for smaller families.

Increased contraceptive use is responsible for a large part of the shift to smaller families. But changes in marriage patterns also played a role in fertility decline. Increases in the age at

marriage and in the proportion of women who remain single accounted for two-thirds of the fertility decline in Tunisia and Morocco and almost all of the long-term decline in Algeria in the 1980s and 1990s.

The median age at first marriage for women ages 25 to 29 has increased in every Arab country since the 1970s (see table). In the Persian Gulf country Bahrain, for example, the median age rose from 14.8 years to 22.5 years between the late 1960s and the early 1990s. The median marriage age is still below 19 years in Yemen, United Arab Emirates, and Oman, but it is 21 or older in a number of countries, including Morocco, Tunisia, and Jordan.

A greater share of Arab women are remaining single into their thirties. In the 1960s and 1970s, less than 7 percent of women ages 30 to 39 had never been married. In the 1980s and 1990s, the picture is more varied—between 7 percent and 21 percent of women in their 30s had never married in 11 Arab countries. While some of these women may eventually marry, the proportion who remain single throughout their lives is likely to be higher in the 21st century than in the last.

The future challenges for single Arab women—and for married women who spend fewer years rearing children—are to have fulfilling lives and the financial means to support

with no education had an average of 6.5 children.

Education usually expands employment options, and educated women may delay marriage and childbearing to earn income. And school may introduce young women to new ideas or values that could influence the number of children they want and their use of family planning.²⁷

Women’s education is also associated with better child health. Education promotes better health, even after accounting for differences in wealth or living standards. 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 within their families and within the health care system.²⁸ 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.

Education may also promote better child health indirectly because children of mothers with some education have fewer risk factors for infant mortality. Infants are at a higher risk of

themselves and their families. But job opportunities for Arab women are extremely limited. Less than 30 percent of women in this region work outside the home in the 1990s, compared with 57 percent or more in the United States and 71 percent in East Asia. In some countries plagued by high unemployment, governments are encouraging women to refocus on familial roles and responsibilities and are discouraging them from seeking jobs, presumably to leave more slots for men.

Education is one key to greater economic independence. Although educational opportunities have improved for Arab boys and girls in recent decades, about one-half of adult women are illiterate in Arab countries, according to UNESCO estimates. Less than one-half of the girls of secondary-school age were enrolled in school in the 1990s. For some countries of the region, the prospects for universal education remain very slim. In others, the improvements in education have not brought better job opportunities.

In the near term, many Arab women will live their lives fulfilling their traditional roles of wives and mothers, but a growing share will seek alternative roles and wider opportunities. These women will present policymakers with new challenges in the next century.

Increase in Median Age at First Marriage for Women Ages 20 to 29 in Arab Countries

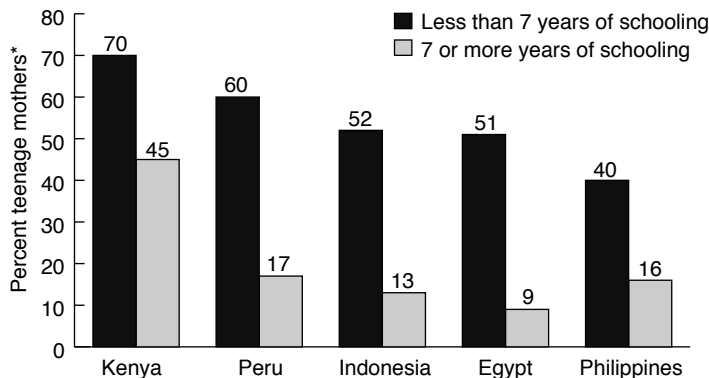
Country	Median marriage age in years		
	1967-1975	1987-1995	Increase
Algeria	16.3	21.9	5.6
Egypt	18.0	20.2	2.2
Morocco	17.5	23.8	6.3
Sudan	14.8	19.5	4.7
Tunisia	19.9	23.2	3.3
Bahrain	14.8	22.5	7.7
Jordan	18.9	21.2	2.3
Kuwait	17.1	19.1	2.0
Oman	14.7	15.7	1.0
Qatar	15.9	21.4	5.5
Saudi Arabia	16.3	20.5	4.2
Syria	18.0	20.1	2.1
United Arab Emirates	16.2	17.7	1.5
Yemen	15.7	16.2	0.5

Source: Hoda Rashad and Zeinab Khadr, “The Demography of the Arab Region: New Challenges and Opportunities.”

This text was excerpted from Hoda Rashad and Zeinab Khadr, “The Demography of the Arab Region: New Challenges and Opportunities,” in *Population Challenges in the Middle East and North Africa: Towards the Twenty-First Century*, ed. I. Sirageldin (forthcoming). Additional references include Carl Haub and Diana Cornelius, *1998 World Population Data Sheet*; United Nations, *World Population Prospects: The 1998 Revision* (1998); and UNESCO, *World Education Report 1998*: 105-08.

Figure 7

Mother's Education and Teenage Childbearing in Selected Countries, Early 1990s



* Percent of women ages 20 to 24 who had a child by age 20.

Source: The Alan Guttmacher Institute, *Hopes and Realities* (1995): 18.

dying if they are born to adolescents or to mothers over age 40, if they are born into large families, or if they are born less than two years after an older sibling.²⁹

By delaying marriage and childbearing, education reduces high-risk births to teenage mothers. In Peru, for example, 60 percent of women ages 20 to 29 who completed less than seven years of education had a baby by age 20, while only 17 percent of those with seven or more years of education had a baby by age 20. The gap was less pronounced in Kenya, but even more stark in Egypt in the early 1990s (see Figure 7).

Women who have completed some formal education tend to wait longer between pregnancies and births and to stop childbearing at a younger age than less-educated women. Consequently, they have smaller families and have fewer births after age 40.

In most societies, children of mothers with some education have a lower risk of dying than children whose mothers had no education. In Zambia, the IMR was 133 for the children of mothers with no education, while it was 82 for children of women with a secondary or higher education (see Figure 8). The difference is less pronounced in some countries, but edu-

cation nearly always has a “protective” effect on child health.

The 20th century has brought enormous improvements in literacy and educational levels. The recent improvements in literacy rates reflect the expansion of educational services throughout the world. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) reports that 77 percent of people over age 15 were literate in 1995, compared with only 56 percent in the 1950s. Basic literacy is nearly universal among populations of Europe, North America, and other industrialized regions, but the range is substantial throughout the rest of the world. In 1995, an estimated 50 percent of the populations of South Asia were literate, as were 57 percent of the populations in sub-Saharan Africa and the Middle Eastern Arab states. More than 83 percent of the populations are literate in East Asia and Latin America and the Caribbean.

Trends in Education

Increasing school enrollment has been a major goal articulated in international conferences and national agendas and by nongovernmental organizations. Nearly all boys and girls in more developed regions attend secondary school, but the situation is mixed in the rest of the world. In less developed countries, enrollment rates drop between primary and secondary school, and they fall more quickly for girls than for boys. Overall, average school enrollments have been rising. In 1980, 42 percent of boys and 28 percent of girls of secondary school age in less developed countries were enrolled in secondary school. By 1996, 55 percent of boys and 45 percent of girls were enrolled in secondary school in less developed countries. Within regions, enrollment levels reflect socioeconomic development as well as cultural values about the role of women. In Southern Africa (where 86 percent of the population resides in the country of South Africa), 73 percent of boys and 87 percent of girls are enrolled in secondary school,

compared with only 30 percent of boys and 18 percent of girls in Middle Africa.³⁰

Rapid population growth in some countries is undermining improvements in educational attainment. In the sub-Saharan African countries of Angola, Benin, and Togo, for example, economic difficulties and burgeoning numbers of young people have caused school enrollment ratios to level or fall in the 1980s and 1990s.³¹ In the mid-1990s, about 67 percent of girls and 81 percent of boys in sub-Saharan Africa were enrolled in primary school, according to UNESCO estimates.

Economic Development and Environment

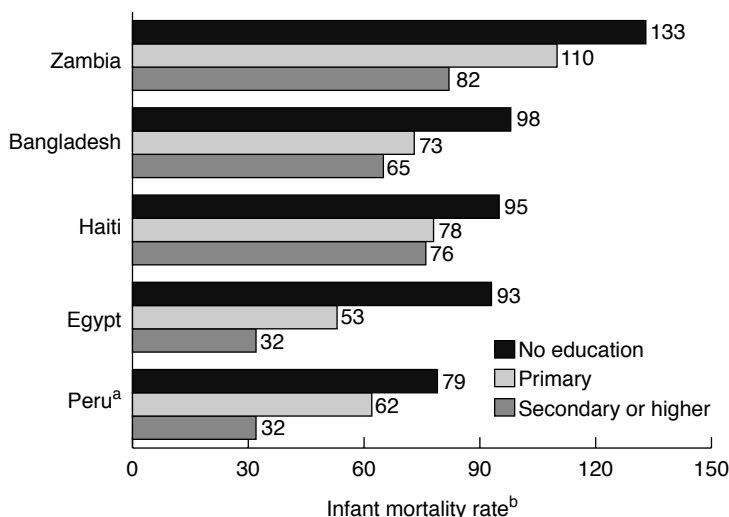
In most societies, poor families have higher mortality and fertility than affluent families. Some of the association between poverty and population reflects the lower educational levels and rural residence of poor households. But the relationship among demographic variables, poverty, and affluence is highly complex—and it is tied to the broader question of how population size and the pace of population growth are linked to economic development. The issue is further complicated by nagging questions about whether economic growth and human activity are causing irreversible damage to the natural environment.

The research into these questions has yielded contradictory results. The extremes of these differences are characterized by two opposing camps: “pessimists” and “cornucopians.”³²

The theoretical foundation of the pessimist view can be found in the writings of the economist Thomas Malthus, published in 1798. Malthus suggested that the potential population size is limited by the amount of crop land—and therefore food—available for human consumption. Malthus assumed (based on his observations of 18th-century English society) that if population growth continued unchecked, population would outstrip the food available and

Figure 8

Mother's Education and Infant Mortality in Selected Countries, Mid-1990s



^aExcludes women with higher than secondary educations.

^bThe infant mortality rate is the number of deaths to children under age 1 per 1,000 live births in a given year.

Source: Demographic and Health Surveys.

cause widespread famine and death. He also described a natural feedback mechanism: When the population grew too large for the available food supply, elevated mortality would reduce the population to the level that could be sustained by the amount of food produced.³³

A neo-Malthusian view of the relationship between population, economic growth, and resources gained credence between the 1940s and the 1960s, a period of unprecedented population growth and economic development. In a landmark study in the 1950s, Ansley Coale and Edgar Hoover found that population growth slowed economic development and held down per capita incomes.³⁴

Coale and Hoover pointed out that the young age structure created by rapid population growth required substantial investments in education and health care. These social expenditures diverted funds that, for example, might have built new factories that could generate income and trade.

Photo removed for
copyright reasons.

A Brazilian family lives in precarious economic and health conditions in an urban slum.

These researchers also assumed that the supply of some natural resources and capital was fixed, or that supply would grow more slowly than population. The amount of petroleum or education funds available for each person, for example, dwindled as population numbers grew.

Other researchers in this period expanded the idea that rapid population growth would eventually bump up against some absolute limit on resources. They examined the damage to the natural environment from human activities (air pollution from factories and automobiles, for example, and water pollution and land degradation from lumbering, mining, and industry). Many concluded that continued population growth accompanied by the environmental stresses associated with economic development could cause irreversible damage to the basic natural systems that sustain life. These concerns were popu-

larized by such books as *The Population Bomb* (1968) by Paul Ehrlich and *The Limits to Growth* (1972) by Donella Meadows and colleagues.

Other researchers rejected this neo-Malthusian viewpoint. They saw population growth as a positive influence on economic development, and held that human ingenuity would create the technology to overcome any environmental constraints to development. The ideological basis of this “cornucopian” approach owes much to the writings of Ester Boserup in the 1960s and 1970s. Boserup argued that the need for more food, coupled with the synergy created by the concentration of intellects and flow of ideas in dense settlements, can stimulate, for example, the adoption of better farming techniques or the sharing of higher-yield plant varieties.³⁵

Economist Julian Simon, in *The Ultimate Resource* (1977) and other writings, also rejected the idea that population growth was a threat to the welfare of humans or the environment. He suggested that, although population growth might have negative consequences in the short run, it was beneficial in the long run.³⁶

The scientific evidence about the effects of population size and growth on economic development was still inconclusive in the 1980s, according to a major study published in 1986 by the U.S. National Research Council.³⁷ The study left open the possibility that population did have an effect on development, but the research methods and models available could not measure it conclusively. Measuring the impact of population on the economy during these years was complicated by such external factors as economic cycles and the worldwide inflation generated by the sudden escalation of petroleum prices in the 1970s. And a review of research on population and economic development published in 1994 found that “the clearest evidence of negative effects of population growth under high fertility are at the individual and household levels,” but considered the evidence less clear at national or regional levels.³⁸

In the late 1990s, however, several new studies provided a clearer picture of the relationship between population and development at the national level and the links between poverty and demographic factors at the household level. Researchers could draw on long-term data from more countries and were developing more sophisticated econometric models.³⁹

Several new studies suggest that a rapid transition from high to low fertility contributed to the economic miracles in South Korea and other East Asia countries.⁴⁰ The rapid fertility decline increased the share of working-age people in the population, which created a “demographic bonus.” The working-age population adds more to the economy than it consumes in services and generates taxes and savings that can be invested in education and further economic growth. This demographic bonus may last several decades; it recedes as the bulge of working-age men and women reach retirement age and the dependency ratio rises again.

The research shows that countries can benefit from this bonus only if they increase the value of their human capital—especially the youth entering the labor force—through education, and if governments adopt policies favoring international trade and industrialization. The newly industrializing Asian countries capitalized on their demographic bonus by making these investments. They “raised millions of people from abject poverty and transformed some of the poorest economies in the world to some of the richest.”⁴¹

East Asia’s experience might or might not be repeated in Africa or South Asia, but it offers important examples of how population change and government policies are linked to economic development.

Other recent research models attempt to measure the relationship between population change, economic development, and environmental systems (see Box 5, page 28). Such models have been plagued by the complexity of the relationships and

the difficulty of measuring such factors as environmental quality.

Poverty and Population

The links between poverty, population growth, and environmental problems are more obvious at the household level—although once again they are intertwined with other factors, including educational levels, the status of women, and job opportunities.

Poverty is often accompanied by illiteracy, poor nutrition and health, low status of women, and exposure to environmental hazards. Poverty and a lack of economic opportunities can lead people to exploit marginal resources by overgrazing land or overharvesting forests—creating a repeating cycle of environmental deterioration.

Poverty is associated with a host of health risks and problems. Families in poverty live with inadequate sanitation, unsafe drinking water, air pollution, and crowding. Such an environment often leads to frequent cases of diarrhea and of pneumonia and other acute respiratory infections, two leading causes of child mortality in less developed countries. Recurrent bouts of disease lead to poorer nutritional status and leave a child more susceptible to other infections.

In less developed countries, poverty is often widespread among rural populations that rely on the land for their sustenance and income. The lack of good transportation and communication networks in the rural areas of less developed countries limits access to health care, schools, and jobs, and makes it hard for poor families to improve their situations. Poverty has been a “push factor” encouraging migration from rural to urban areas.

Although cities offer more income opportunities, many rural migrants cannot find jobs or housing after they arrive. In some cities, rural residents move into makeshift shelters in urban slums that have few public services. A 1996 international conference on human settlements highlighted poverty as the most pressing problem facing

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areas.***

the world's cities. The UN Center for Human Settlements estimates that 600 million poor urban residents in the less developed world live in life- and health-threatening conditions because of inadequate sanitation and housing.

Economic growth has slowed in many world regions in the late 1990s, which makes it harder to meet the needs of urban residents. The new century could bring more prosperity, but some experts foresee an era of so-

Box 5

Measuring Population, Development, and Environment Relationships

Research into the links among population, economic growth, and the environment may follow one of several very different approaches. One approach emphasizes population's direct and indirect effects on the environment. Under this view, population size is a "multiplier" of the effects of other factors that influence the environment.

The IPAT equation exemplifies this approach. In this equation, total environmental impacts (I, air pollution, for example) are a product of population size (P), the level of affluence or per capita consumption (A), and the level of technology (T); that is, $I = PAT$.¹ IPAT implies that, although population, consumption, and technology might each have an independent effect on the environment (I), their combined effect is probably the most important. IPAT has been criticized because it oversimplifies the relationships among the variables.²

Other approaches highlight the social, cultural, institutional, and political context in which population and environment relationships occur.³ Demographer Richard Bilsborrow, for example, has studied how poverty, government policies, and market demands in Latin America determine whether population growth leads to technological change in agriculture, soil degradation, or out-migration.⁴ Paul Harrison has examined how cultural values affect women's status, which ultimately affects the size and growth rate of the population and the state of the environment.⁵

Many recent models look at how social, cultural, demographic, and economic systems interact to form larger "socioecological systems" within which population and the environment interact.

Each approach is likely to yield some useful information, but scientists are still struggling to measure and explain many of the basic relationships among population, development, and the environment.⁶

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cial unrest fostered by a growing gap between the rich and poor in the world's cities.⁴²

Health experts warn that dense population concentrations in cities and lack of public services for the poor create prime opportunities for the spread of disease.⁴³ Inadequate public health services were implicated in an outbreak of bubonic plague in Surat, India, in 1994, for example. A recent study found that infant mortality was nearly as high in cities as it was in small towns and rural areas of Latin America and North Africa, reversing a long-standing pattern of declining mortality in urban areas.⁴⁴

Poverty is clearly linked to fertility levels. Throughout the world, women from low-income families have more children than women from wealthier families in the same society. Women from low-income households also have less access to family planning and other health services that might allow them to have fewer and healthier children.

Declining poverty in conjunction with economic development tends to favor declining fertility. South Korea's TFR fell from 6 to 2 between 1960 and 1985, for example, and it has been below 2 at least since 1987.⁴⁵ The dramatic fertility decline coincided with the investments in education and economic development.

Other factors—including stiffer competition for jobs, housing shortages, and government efforts to lower birth rates—also encourage fertility decline in industrializing countries.

The number of children couples want to have tends to decrease as incomes increase. Sociologists note that when a society's income and living standards are rising, parents' aspirations for their children also rise. Parents often opt to have just a few children so they will have more to invest in each child and to ensure that child has a comfortable life and bright prospects for the future.

The relatively high cost of education has been cited as a crucial reason for couples to limit their childbearing. Education is viewed as the ticket to a

coveted white collar job in Kenya, as it is in many parts of Africa. In the 1980s, a number of Kenyan parents chose to have fewer children so they could afford to send more of their children to school.⁴⁶

Bangladesh, one of the world's poorest countries, provides evidence that fertility can decline even in the midst of endemic poverty. Bangladesh had an annual per capita income of less than US\$300 in 1996; about 44 percent of the population lives in poverty. At least half of all children suffer from moderate to severe malnutrition and three-fourths of adult women are illiterate. Women hold a low status in society and rarely work outside the home. Yet fertility has declined in Bangladesh—from 7.0 births per woman in 1975 to about 3.3 births per woman in the late 1990s.⁴⁷ Bangladesh's fertility is now well below that of Pakistan, another South Asian Muslim country, where the TFR was about 5.6 in 1998.

Many of the stresses of rapid population growth are exacerbated by poverty and inequality. The international community has made the eradication of poverty a primary goal to improve child and maternal health, ease the problems of rapid urbanization, and ensure adequate nutrition.⁴⁸

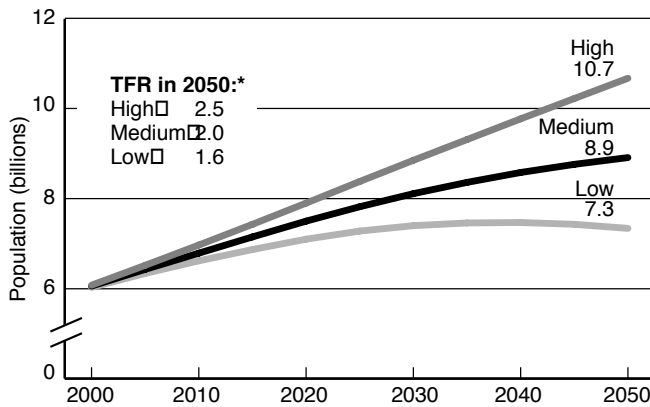
Many of the stresses of rapid population growth are exacerbated by poverty.

Population Prospects: 2000 to 2050

In the past century, the world's population has undergone a sweeping change in both its total numbers and its distribution across regions. The next century is likely to see the second phase of that transformation—lower fertility and an even more dramatic redistribution of population among the more developed and less developed countries. Nearly all future world population growth will take place in less developed countries. In short, the Earth is reinventing itself demographically.

Figure 9

Three Scenarios of World Population Growth, 2000 to 2050



* Total fertility rate (TFR) is the average number of children a woman will have under prevailing birth rates.

Source: United Nations, *World Population Prospects: The 1998 Revision* (1998).

While we cannot know the future size of Algeria, India, or Germany, we can assess the possibilities by creating a series of likely scenarios. Population projections are not predictions of future population size; they are mathematical calculations based on assumptions about current levels and future trends. Demographers apply assumed rates of fertility, mortality, and migration to an estimated starting population to project its size at a future date. The assumptions about future rates may be wrong or the conditions that affect these rates may change unexpectedly. Because of these inherent uncertainties, demographers often create a series of projections based on a range of likely fertility, mortality, and migration rates.

Because mortality is relatively low, fertility levels and trends will determine future population size. In general, the higher a country's birth rate, the greater the uncertainty about its future population size. Projections of Brazil's future population, with its 1998 TFR of 2.5, are likely to be more accurate than those of India, where the TFR is 3.4, and India's future is more certain than Uganda's, where the TFR is 6.9.

When projecting population, demographers make assumptions about how far and how quickly fertility will fall. A common issue (and a common assumption) is when, or whether, a country will reach the "magic" replacement-level TFR of about 2.1 children per woman. With fertility at replacement level, a population eventually will cease growing and "stabilize" at a given size. 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).

Every two years, the United Nations (UN) Population Division produces a set of population projections for every country. These are invaluable tools for evaluating present trends and prospects. The three main scenarios of population growth in the latest UN series are shown in Figure 9. By 2050, the UN suggests that total world population will grow to between 7.3 billion and 10.7 billion. In the high projection, world population will still be growing in 2050; under the low projection series, it will have begun a gradual decline.

Regardless of the projection used, the UN shows that at least 1.3 billion people will be added to the world's population over the next 25 years (see Table 4). There are three reasons for this inevitable growth. First, fertility in less developed countries is twice as high as in more developed countries, on average. Second, the young age structure of less developed countries constitutes momentum for population growth for several decades no matter what future fertility trends may be. Third, continuing improvements in mortality will contribute to additional growth, particularly in countries where life expectancy remains comparatively low.

What trends can we expect? It is likely, even highly probable, that fertility will continue to fall in those less developed 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 popula-

tion size will depend not only on *whether* fertility will fall, but how quickly it declines and to what level it falls. The outcome will vary by country. Fertility has declined in countries with widespread illiteracy (Bangladesh) and has remained surprisingly high in societies in which people are relatively well educated (Argentina).

The accuracy of population projections declines as the projection interval extends further into the future—and the range of likely scenarios widens. Accordingly, the UN projections for 2150 range from 4 billion (about 2 billion fewer people than today) to 27 billion.

Often, we must look at trends below the national level to make reasonable assumptions about future fertility trends. In India, for example, fertility has fallen in the more educated southern states such as Kerala and Tamil Nadu, where 1998 TFRs are 1.8 and 2.1, respectively. But the real story of India's future population growth will be told in the less developed states of the northern "Hindi Belt," such as Uttar Pradesh, which has 150 million people and a TFR of 4.8 in 1998.

Perspectives and Responses to Growth

Anxiety about the negative effects of rapid population growth and excessive population numbers has a long history.⁴⁹ Long before Malthus, ancient Greeks and Egyptians voiced concern about "overpopulation" in lean times. They also promoted population growth in times of plenty.

In the 1930s and 1940s, scientists and intellectuals in some less developed countries such as Egypt, India, and Mexico began to express concern that rapid population growth would hinder development in their countries.⁵⁰ Widely publicized food shortages and famines in certain less developed areas in the 1960s were also linked to rapid population growth.

Table 4

Population Projections for World Regions, Three Scenarios for 2050

Region/country	Population in millions			
	2000	2050		
		High	Medium	Low
World	6,055	10,674	8,909	7,343
More developed	1,188	1,361	1,155	990
Less developed	4,867	9,313	7,754	6,353
Africa	784	2,102	1,766	1,467
Sub-Saharan Africa	641	1,804	1,522	1,272
Asia	3,683	6,316	5,268	4,312
China	1,278	1,686	1,478	1,250
Japan	127	117	105	92
Latin America & Caribbean	519	994	809	654
North America	310	464	392	324
Europe	729	746	628	550
Oceania	30	52	46	36

Source: UN, *World Population Prospects: The 1998 Revision* (1998).

These concerns sparked a number of actions around the world directed at lowering fertility and slowing population growth. India initiated a national policy to slow population growth in 1952. The International Planned Parenthood Federation, the largest private-sector organization devoted to family planning, was founded the same year.⁵¹ UN involvement in population issues also expanded. The first UN meeting on global population was convened in 1954, in collaboration with the International Union for the Scientific Study of Population.⁵² UN agencies, including UNICEF and the World Health Organization (WHO), incorporated reproductive health services into their missions. In 1969, the UN Fund for Population Activities (UNFPA) became a separate entity.

Beginning in the 1960s, governments of some wealthier countries, most notably the United States, supported efforts to strengthen family planning programs in less developed countries.

Population Policies

The idea that couples should limit their family size went against cultural mores in many societies, and some governments were loath to support a

*Efforts to
control
immigration
often are
overwhelmed
by political
events.*

potentially unpopular policy. Many governments embraced the more acceptable idea that fertility would fall and that population growth would slow as living standards rose through economic development. This view was expressed at the 1974 UN World Population Conference when an Indian delegate declared that “development is the best contraceptive.”

During the late 1970s and 1980s, concern about the negative effects of population growth on economic development broadened. Increasing numbers of countries accepted the idea that government actions could slow population growth.⁵³ An important factor contributing to this change in attitude was the increasing availability of data and research findings documenting high rates of population growth, high rates of infant and maternal death, stagnant economic and social development, and a widespread desire by women to limit childbearing. The research has also demonstrated the interrelationships among these variables. Regional meetings on population and development in the 1980s heightened awareness of the challenges of rapid population growth as well.

Many sub-Saharan African countries adopted regional declarations on population and development in the 1980s⁵⁴ and adopted national population policies in the early 1990s. By 1994, more than one-half of less developed countries had national population policies to slow growth. Most of the rest reported in a UN survey that they planned to develop population policies in the near future.

Most national population policies include support for family planning and maternal and child health programs to improve health, slow population growth, or both.⁵⁵

National efforts to influence population growth include incentives to have more or fewer children, disincentives for having more than a given number of children, and measures to encourage or discourage migration.

These efforts have met with mixed success. Some argue that China's pop-

ulation policies initiated in the 1970s were a success from a demographic perspective. China's TFR fell from about 6.0 in the 1960s to less than 2.0 in the 1990s, in part because of government policies and programs. However, China's stringent “one-child family” policy introduced in 1979 was widely criticized for violating human rights.⁵⁶ Between 1975 and 1977, Indira Ghandi's government in India promoted male sterilization campaigns that sometimes led to coercion. Public outrage about the reported abuses contributed to the downfall of Ghandi's government and created a backlash against family planning programs in India that took years to overcome.⁵⁷

In 1997, 155 countries subsidized family planning services, and 68 stated explicitly that they wanted to slow their population growth. In Africa, the world's fastest growing region, 40 countries saw their fertility levels as too high and 36 had policies to lower fertility.

A few countries, in contrast, view their fertility rates as too low and would welcome faster population growth. In 1997, 23 countries reported to the UN that they had explicit policies to increase birth rates.⁵⁸ Many governments in Europe and the former Soviet Union worry that their continued low fertility will cause rapid population aging and an eventual decline in population size. Some small oil-rich countries in the Persian Gulf also want to increase, or at least maintain, current levels of population growth. They see population growth as a way to spur socioeconomic development and reduce their reliance on foreign labor. Labor migrants make up one-half or more of the labor force of most Persian Gulf states.⁵⁹ Israel also has policies to increase its fertility and rate of population growth.

Policies to stem rural-to-urban migration, or to redirect migration streams to less-populated areas, also have had mixed success. China prohibits rural residents from moving to urban areas, for example, yet large “floating populations” of rural mi-

grants live and work illegally in China's cities. Efforts to control immigration often have been overwhelmed by political events—such as the breakup of the Soviet Union and civil wars in Africa—and by economic disparities—between Thailand and Myanmar, for example—that render legal and border controls ineffective in stopping people who want to move.

The U.S. Role

Industrialized countries took steps during the 1960s to help less developed countries slow population growth. Sweden, the United States, and several other industrialized nations began to develop population assistance programs aimed at slowing growth.

By the late 1960s, the United States began to play a strong leadership role in international efforts to reduce population growth. The primary motives were to reduce the threat of rapid population growth to economic and social development in less developed countries and to U.S. national security interests affected by international trade, political conflict, the environment, and international migration.⁶⁰ The U.S. Agency for International Development (USAID) funded demographic work abroad as early as 1965. Since then, the United States has been the largest government donor for international population programs and for technical expertise to help countries develop programs to slow population growth.⁶¹

The U.S. program focused on family planning as a means of slowing population growth and was criticized by governments of some less developed countries. Many critics favored greater investments in social and economic development and less emphasis on family planning. Some felt that population growth did not affect economic growth and did not warrant the attention and resources it was receiving. Certain religious groups opposed the U.S. approach, arguing that it intruded into religious and individual beliefs. The United States and many

other countries, however, continued to support family planning specifically to slow population growth. They felt their approach was justified by studies showing that many women wanted to limit or space births, but were not practicing family planning.⁶²

By the mid-1970s, USAID supported family planning to improve maternal and child health as well as to reduce population growth rates. This broader approach was spurred by research showing that women and their children gained substantial health benefits when high-risk births are avoided. “High-risk” births included those occurring less than two years apart, to very young or older mothers (women below age 20 or above age 35), and to mothers who already have many children.

During the 1980s, support for family planning by the United States continued, but this support generated more controversy than in earlier decades. Economists in the Reagan administration viewed population growth as a neutral factor in economic development. Many U.S. policymakers also strongly opposed using U.S. funds on abortion-related activities, which they saw as linked to family planning programs. In 1984, a stunning reversal in U.S. policy took place in an international forum—the International Conference on Population, in Mexico City. U.S. delegates at the meeting declared that population growth had no effect on the economic development of poor countries. In what became known as the “Mexico City Policy,” delegates announced that the United States would withdraw support from any organization that provided abortion services, even with non-U.S. funding.⁶³

The decline in U.S. support for family planning was countered by less developed countries participating in the conference. By 1984, many of these countries had reversed their previous opposition to organized family planning programs and lauded the benefits of smaller families and slower population growth. Their views prevailed. The Mexico City declaration

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The health, education, and job opportunities of women featured prominently in international discussions about population growth and economic development in the 1990s.

called on governments “as a matter of urgency” to make family planning services “universally available.”⁶⁴

Despite the Reagan administration’s position, the U.S. Congress still allocated funds to support family planning, primarily to slow population growth in less developed countries. Many national programs shared this primary goal; a few included demographic quotas or targets and incentives to motivate couples to have fewer children.

Women’s rights activists, among others, generally opposed the demographic rationale for family planning as an infringement on individual rights. They argued that women’s rights and well-being should take precedence over national interests.⁶⁵ Many criticized the family planning programs’ lack of integration with other health services.⁶⁶

During the 1970s and 1980s, women around the world began forming small nongovernmental organizations (NGOs) to lobby for improvements in their social, economic, and political circumstances. By the 1990s, women’s NGOs in less

developed countries were advocating for improvements in family planning programs by better informing clients about various contraceptive methods, expanding the range of methods available, and encouraging service providers to treat clients with greater respect.

The 1994 International Conference on Population and Development

The opposition by women’s groups to existing family planning programs, and ethical and scientific debates about population, development, and environment, formed the backdrop for the fifth UN conference on population, which was held in Cairo in September 1994. These factors helped shape the content and goals of the final conference document. The Programme of Action of the 1994 International Conference on Population and Development (ICPD) redefined the world’s view of population growth and the best way to address this growth. The Cairo document placed population within the

context of sustainable development and argued for investments in human development, especially improvements in women's status, as key to stabilizing population growth. It rejected the use of demographic targets by family planning programs and it integrated family planning into a broader women's health agenda.

The level of participation by NGOs at the ICPD was unprecedented. Over 1,200 NGOs participated as delegates or observers and worked closely with government officials to craft the ICPD Programme of Action. For the first time, conference deliberations were informed by a wide range of interests, from the grassroots level to the highest levels of government. Women's groups were a driving force behind the strong emphasis on women's empowerment as part of human development. This focus was also driven, however, by research from the past 30 years that linked fertility declines with reductions in infant mortality, increased use of family planning, and improvements in women's education and other aspects of women's status.

Despite the consensus, the ICPD engendered dissent and debate. Ideological and religious tensions characterized discussions leading up to the conference, deliberations during the conference, and the follow-up after the conference. Abortion generated the most highly publicized ideological splits. Debate also swirled around definitions of reproductive health and family and adolescent reproductive rights and responsibilities. None of the 180 or so nations rejected the central premises and goals of the ICPD, despite the range of political structures, cultures, and religions they represented. This marked the first time in the history of UN population conferences that no official delegation rejected the entire document.

The final ICPD document defined reproductive health to encompass a broad range of services, including family planning, prenatal and postnatal care, medical attention at birth, cancer screening, and protection from sexually transmitted diseases. It also

supported access to safe abortion where it is legal, but it stated that abortion should not be used as a method of family planning.⁶⁷

The ICPD Programme of Action specified five goals for 2015 to improve individual and family well-being and enhance women's status. These include universal access to family planning and other reproductive health services, universal access to primary school education, increased access by girls and women to secondary and higher education, and reductions in infant, child, and maternal mortality.⁶⁸ The ICPD document also called for government and private sector actions to alleviate poverty, protect the environment, encourage greater male involvement in the family, and address the specific health needs of adolescents.

The historic agreements reached at the ICPD were reaffirmed at subsequent UN conferences in the 1990s. These conferences included the World Summit for Social Development, in Copenhagen, Denmark, in 1995; the Fourth World Conference on Women, in Beijing, also in 1995; the UN Conference on Human Settlements (or Habitat II), in Ankara in 1996; and the World Food Summit, in Rome, also in 1996.⁶⁹

In the late 1990s, countries are reviewing how the Cairo Programme of Action is being implemented. The reviews identify successes, obstacles, and future challenges.⁷⁰

Governments in some less developed countries have changed their policies and institutions to reflect the broader emphasis on women's status and health. Many of the changes were already underway before 1994, while others involved a dramatic departure from previous policies. India eliminated demographic targets from its population program, which shifts the program's emphasis to reproductive health rather than limiting family size.⁷¹ Algeria, Belize, Brazil, Paraguay, Tajikistan, and some other countries have created national institutions to address population and development issues using the ICPD framework.⁷²

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The opportunities open to these African children will help determine the future size and characteristics of the world's population.

At the program level, most countries have tried to integrate family planning more fully with other reproductive health services and to offer women a greater choice of family planning methods. In Brazil and India, service providers are reducing their reliance on sterilization and expanding access to other methods.⁷³ Countries are also taking steps to improve other aspects of women's lives. Bolivia, Costa Rica, Ecuador, Panama, and several other less developed countries have new legislation to combat domestic violence.⁷⁴

Changes are visible among donor countries as well. The United States supported the integration of family planning and other reproductive health services prior to the Cairo conference, but it has strengthened this commitment since 1994. USAID has spearheaded efforts to find the best way to integrate services, to involve men in reproductive health, and to promote better health programs for adolescents. In 1996, USAID adopted a Gender Action Plan that includes initiatives to expand women's education, legal and political rights, and

access to credit. The 26 member countries of the Organization for Economic Co-Operation and Development (OECD) are committed to eliminating the gender gap in secondary school enrollment by 2005, along with other social development goals.⁷⁵

The review process has also highlighted potential obstacles to implementation, including entrenched bureaucratic structures, insufficiently trained personnel, and inadequate funding, especially among international donors. ICPD participants estimated that US\$17 billion dollars would be needed annually by 2000 to cover the costs of reproductive health services, including family planning. Less developed countries would cover up to two-thirds of the costs and international donors would pay the remaining one-third. Overall, less developed countries are closer to meeting the ICPD goals than the international donors. In 1997, more developed countries spent less than US\$2 billion on aid for reproductive health services and are unlikely to meet their goal of US\$5.7 billion annually by 2000. "Donor fatigue" has plagued efforts to boost development assistance from many industrialized countries since the 1994 conference.⁷⁶ In the United States, political opposition to abortion and family planning have also contributed to cuts in international family planning assistance.

A New Vision

At the end of the 20th century, the world community has articulated a new vision of population and its links to other global concerns. This vision places human development at the center of efforts to improve the quality of lives and to stabilize global population growth, improve the natural environment, and promote sustainable economic development. The new vision calls for greater equality between men and women, stronger partnerships between governments and the private sector, and greater involvement by communities. It singles

out the following population groups as having particular needs and problems that have profound implications for the quality of life for all people. These groups include children, adolescents, women, the elderly, people at a high risk of HIV/AIDS, and migrants.

Children

Remarkable improvements in the survival and education of children in this century showed the world how much better life is for children when they have adequate health care and education. At the 1990 World Summit for Children, representatives from more than 150 nations specified 27 critical goals for 2000, including cutting infant and child mortality by one-third and maternal mortality by one-half.⁷⁷ These goals encompassed expanding immunization coverage, improving nutrition, and ensuring safe drinking water. Education goals set at the Children's Summit included boosting primary school enrollment to 80 percent.

By 1996, nearly three-fifths of all countries had achieved or were likely to achieve the overall goal of improved child survival by 2000. The most progress has been in stabilizing deaths from neonatal tetanus and drastically reducing the incidence of polio.⁷⁸

New approaches to children's health promote interventions that reduce several risk factors simultaneously, such as improving household sanitation and hygiene. Reducing malnutrition, which affects 200 million children worldwide, is another important goal. Governments can work to prevent crop failures leading to famines, reduce parasite infestation, and promote breastfeeding and better nutrition. Improving child nutrition also involves increasing the incomes of poor families.

This holistic approach also reflects the growing understanding that an individual's health as a child is linked to his or her health in later life. Some causes of poor health in later life—

including diabetes, cardiovascular disease, stroke, and high blood pressure—may originate before birth from undernourishment of the developing fetus.⁷⁹

The education of the children today and in the next century will be key to improving the quality of their lives and, by extension, the future society. Most countries promote the goal of universal education at the primary level and closing the gap between girls' and boys' educational levels. Because of rapid increases in the number of children in many countries, coupled with economic stagnation or even decline, meeting these goals will require a much greater commitment by national governments and international donors. Although illiteracy rates are declining, UNICEF estimates that the number of illiterate people is increasing and will near 1 billion by 2000. Two-thirds of these people will be women.

Adolescents

The health, education, and well-being of future generations will be reflected in the opportunities open for adolescents. Meeting the health, education, and employment needs of the nearly 1 billion teenagers in the world today will be one of the most important policy challenges in coming decades.

Their decisions about when to have children and how many to have will determine the future size and quality of life of the world's population. Providing young people access to reproductive health information and services is a controversial issue in many countries, but whether or not they gain this access will determine their ability to make those decisions and to act on them.

Women

Expanding access to reproductive health services, narrowing the literacy gap between men and women, and providing income opportunities for women will not only enrich their lives but will reduce the inequities between

Most countries promote the goal of universal education at the primary level.

*There will be
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60 and older
by 2025.*

men and women that perpetuate women's lower status in many societies. Better health and higher educational levels will position women to contribute more actively in the economic and political arenas in the future.

Although the last 50 years have brought extraordinary increases in literacy, worldwide literacy for women has lagged far behind that of men, especially in some regions. Worldwide, 71 percent of women can read and write a simple statement, compared with 84 percent of men. The gender gap is greatest in regions where overall literacy rates are low. In India, for example, 66 percent of men but only 38 percent of women were literate in 1995.⁸⁰ Narrowing the gender gap in literacy and educational levels was a major goal identified in international conferences of the 1990s.

Ensuring access to reproductive health services was a major goal of the UN conferences of the 1990s. Some activists view this access as a human rights issue. Many analysts also support it for economic reasons. Family planning and maternal health services are the most cost-effective health services available for women of reproductive age in less developed countries.⁸¹ Such services reduce maternal mortality and morbidity by helping women avoid unintended pregnancies, and they lower health risks associated with pregnancy, childbirth, and abortion. Improving maternal health services also strengthens a country's overall health system.⁸²

Elderly

The 20th-century transition to lower fertility and mortality ignited an unprecedented growth in the numbers and percentages of elderly. That growth will accelerate in the next century. There will be more than 1 billion people ages 60 and older by 2025, and nearly 2 billion by 2050. Three-fourths of these elderly people will live in the less developed world. The largest percentage increases in the elderly population will occur in the world's poorest

regions: South Asia and sub-Saharan Africa.

Population aging is a growing challenge throughout the world. The OECD estimates that the wave of retirees leaving the work force in industrialized countries over the next three decades will fuel a massive outflow of savings from pension funds and a global shortage in capital for investment.⁸³

Less developed countries face the greatest challenge from population aging. Most of these countries are not equipped to meet the financial, health, and housing needs of older people. Many have minimal public pension programs for the elderly and many people entering retirement age in these countries over the next 25 years will have little income from private pensions or savings.

Policymakers in many less developed countries have relied on families to support aging family members.⁸⁴ Traditional support systems for the elderly are deteriorating in many areas just as the need for support is growing. Widespread fertility declines mean there are fewer children to care for elderly parents. The imbalance between the ratio of older individuals to working-age family members is especially stark in areas where fertility fell rapidly. Urbanization, industrialization, and other aspects of development are disrupting family structures. People are less likely to live near older parents. More working-age women have jobs outside the home and cannot provide the daily care needed by some elderly parents.

The health and financial needs of the elderly sometimes conflict with the needs of children. National governments will face difficult decisions about how to spend public funds so that neither group benefits at the expense of the other.

Migrants

Migrants will play an increasingly important role in population change in the next century as travel becomes more affordable and national economies become more interde-

pendent. Migrants are increasing in number and in diversity. They move from and to more countries and for more varied reasons. In some countries, for example, family reunification has surpassed employment as a leading reason for immigration.⁸⁵

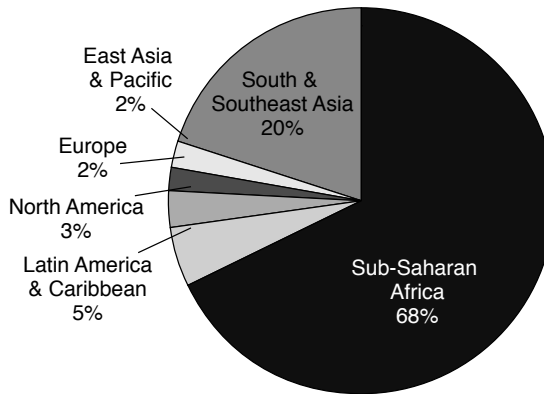
The political controversy and debate engendered by migration flows are likely to accelerate in the next century. Migration challenges nations to control their borders and maintain national sovereignty. Migration often brings ethnic diversity to immigration countries, which can foment anti-immigrant sentiments. Refugees often arrive without means of support and must look for help from host countries and international agencies.

European countries have adopted treaties and laws to control immigration, but they have not resolved how to treat immigrants who settle within their borders. Many immigrants and children of immigrants in Germany and other European countries have limited political rights, for example. In general, these countries welcome temporary foreign workers but not permanent settlers. The United States grapples with some of the same issues, despite its tradition of integrating immigrants into its society. In 1991, the seven largest industrial powers (the G-7 countries) declared that "international migration has made and can make a valuable contribution to economic and social development [and that] ... there is now a growing concern about worldwide migratory pressures, which are due to a variety of political, social, and economic factors."⁸⁶ These concerns will heighten in the next century.

Refugees and other involuntary migrants face special problems because they are cut off from traditional networks that provide economic and social support and they are especially vulnerable to persecution and exploitation. The number of refugees worldwide has declined from 18.2 million in 1993 to 13.2 million in 1997, but the number of internally displaced people has risen to 25 million.⁸⁷ There will be a grow-

Figure 10

HIV/AIDS Cases in Major World Regions, 1998



Note: The Middle East and North Africa (with less than 1 percent of cases) are grouped with sub-Saharan Africa.

Source: UNAIDS, "Fact Sheets." Accessed online at <http://www.unaids.org>, on Feb. 25, 1999.

ing need for national and international agencies, such as the UN High Commissioner for Refugees, to address the needs of refugees and other displaced people around the world.

Populations at High Risk of HIV/AIDS

People at a high risk of contracting HIV/AIDS present extraordinary challenges for the next century.

Sub-Saharan Africa and South and Southeast Asia have suffered the brunt of the epidemic so far (see Figure 10), but the disease threatens health in all regions. This disease primarily strikes the most sexually active segments of the population, and it has produced alarming increases in death rates among younger adults just when they are most likely to be building families and raising children. Around the world, 8.2 million children have lost their mothers to AIDS since the start of the epidemic. Many have lost both parents to the disease. The overwhelming majority of AIDS orphans live in sub-Saharan Africa. Increasing urbanization and labor migration in Africa is taxing the ability of extended

family structures to care for AIDS orphans. The number of children infected with HIV/AIDS is likely to increase in the beginning of the next century.

Some African countries have slowed the HIV/AIDS epidemic and offer hope for other countries. Uganda cut HIV prevalence by more than a quarter in just three years—from 13.0 percent in 1994 to 9.5 percent in 1997. In the urban area of Bukoba, Tanzania, HIV prevalence for women ages 15 to 24 fell from 28 percent in 1987 to 11 percent in 1993.⁸⁸ While few people infected with HIV in less developed countries can afford the life-extending drugs used in more developed countries, the transmission of HIV can be prevented. Surveillance, education, expanded reproductive health services, and safer health-care practices have helped stem the epidemic.

Conclusion

Population change has been one of the most significant events of the 20th century. Since 1900, the world population has more than tripled in size and average life expectancy has increased by two-thirds. Declines in childbearing and shifts in population distribution are more striking than at any time in history. Along with these population changes, the world has witnessed extraordinary improvements in technology, communication, education, and agriculture. These changes have un-

dermined the dire predictions of Thomas Malthus and his successors that population growth would lead to worldwide famine and disease. Yet, these predictions may come true for some areas of the world. More than one-fifth of today's population lives in poverty, subsisting on less than US\$1 a day.⁸⁹ The HIV/AIDS pandemic threatens the health and well-being—and the very survival—of large portions of the population in many countries.

Under all likely scenarios, the next century will see continued population increases—at least during the first few decades. This is because of the built-in momentum of growth associated with the very young age structures of most less developed countries. The growth will also be fueled by childbearing levels that are still above replacement levels. Not all countries will experience this growth, but they will all be affected by it. One of the greatest success stories of the 20th century has been the dramatic decline in childbearing brought about by investments in family planning and other health programs, in education, and in greater social and economic opportunities, especially for women. In the 1990s, the world community made financial and program commitments to continue investments in these areas. Both the future size of the world's population and the quality of people's lives will be closely linked to the extent to which these commitments are met.

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U.S. Bureau of the Census (international data):
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