

Forecasting the Unknowable: The U.N. “World Population Prospects: The 2002 Revision”

by Lindsey Grant

The United Nations Population Division has put the highlights of its new population estimates and projections onto the Web¹. Present world population is 6.3 billion. It is projected to rise to 8.9 billion by 2050, a number almost identical to the 1998 projection but 400 million below the 2000 version and slightly below the U.S. Census Bureau projection of 9.079 billion. The projection reflects (1) the expectation that fertility is heading below 2.1 in all but the poorest less developed countries (LDCs) and (2) the growing seriousness of AIDS.

The new report represents an ongoing effort to bring the projections into line with recent experience. That process is still incomplete. Uncertainties internal and external to the calculations raise several questions:

- *Will European fertility rise as anticipated?*
- *Will mortality continue to decline, particularly in the least developed countries, or will it rise and thus eventually bring population growth to a stop through the grim process of rising death rates rather than the benign process of reduced fertility?*
- *Do the projections still understate U.S. fertility and population growth?*

The report makes no effort to analyze the external forces that will affect mortality and migration.

The Numbers

The first table in the report gives the total numbers. It is reproduced on page 2.

Population is expected to decline substantially in Europe and Japan.

The “least developed countries” will double. Africa, where most of them are located, is expected to double to 1.83 billion. The question arises; can they really get there?

The “medium” projection is the one the Population Division considers most likely and is the one discussed in this paper. The “high” and “low” projections reflect arbitrary average fertility levels one-half child higher and lower, respectively, than the “medium” projection, keeping the same assumptions about mortality and migration. The “constant” projection is a reminder of what would happen if fertility in all the world’s countries should stay where it is

now, instead of continuing to drop as it has been doing in most countries.

The world total for 2050 is 400 million less than was projected in 2000. Of the 400 million decline, about half reflects lower fertility expectations and half reflects the impact of AIDS. (Incidentally, the new total is almost identical to the one projected in 1998. The projections fluctuate as the authors’ expectations change, and the projections were raised in 2000 because fertility, particularly in India, was not declining as anticipated.)

The report says that half of world population growth between now and 2050 will be in India, Pakistan, Nigeria, the United States, China, Bangladesh, Ethiopia and the Democratic Republic of the Congo, in that order. The United States is a member of that unhappy club — and not the least — because of migration.

TABLE 1. ESTIMATED AND PROJECTED POPULATION OF THE WORLD, MAJOR DEVELOPMENT GROUPS AND MAJOR AREAS, 1950, 2000, 2003 AND 2050 ACCORDING TO FERTILITY VARIANT

| <i>Major Area</i> | <i>Estimated Population (millions)</i> | | | <i>Population in 2050 (millions)</i> | | | |
|--------------------------------------|--|-------------|-------------|--------------------------------------|---------------|-------------|-----------------|
| | <i>1950</i> | <i>2000</i> | <i>2003</i> | <i>Low</i> | <i>Medium</i> | <i>High</i> | <i>Constant</i> |
| World | 2519 | 6071 | 6301 | 7409 | 8919 | 10633 | 12754 |
| More developed regions..... | 813 | 1194 | 1203 | 1084 | 1220 | 1370 | 1185 |
| Less developed regions..... | 1706 | 4877 | 5098 | 6325 | 7699 | 9263 | 11568 |
| Least developed countries | 200 | 668 | 718 | 1417 | 1675 | 1960 | 3019 |
| Other less developed countries..... | 1505 | 4209 | 4380 | 4908 | 6025 | 7303 | 8549 |
| Africa..... | 221 | 796 | 851 | 1516 | 1803 | 2122 | 3279 |
| Asia..... | 1398 | 3680 | 3823 | 4274 | 5222 | 6318 | 7333 |
| Latin America and the Caribbean..... | 167 | 520 | 543 | 623 | 768 | 924 | 1032 |
| Europe..... | 547 | 728 | 726 | 565 | 632 | 705 | 597 |
| Northern America | 172 | 316 | 326 | 391 | 448 | 512 | 453 |
| Oceania | 13 | 31 | 32 | 40 | 46 | 52 | 58 |

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Population growth is continuing to slow down in most of the world. This is some comfort for those of us who believe that world population is already too large. However, the world may already be at that grim point where growth will be constrained by ever-tighter resource and environmental problems. The Population Division — in all four projections — changes its fertility assumptions but assumes that mortality will continue to decline. I will suggest that mortality may play a greater role.

The Division's estimates of present population are a valuable compilation of world data, but they are not immune from error. Even in an industrial nation such as the United States, there is intense disagreement as to the accuracy of our Census counts. Population counts in the LDCs can be very casual and may be subject to differing political pressures. Nigerian population, for instance, has in the past been inflated by tribal efforts to multiply their population count to increase their power. In China and some other countries, the ratio of boy to girl babies is suspiciously high. Some of that difference may reflect lingering infanticide as families seek to have boy children, but more of it probably reflects under reporting of girl babies. (There is anecdotal evidence of that practice.) We should recognize that the real world

numbers are far less precise than the detailed figures produced by the computers.

The projections are even more chancy — as are any projections of an unknowable future. The numbers simply encapsulate the Population Division's assumptions about trends in fertility, mortality and migration. The Division is engaged in a continuing but still incomplete adjustment of those assumptions to bring them into line with recent experience. The projections still do not completely reflect recent realities. And there is a fundamental conceptual question: will the real world continue to behave as it has in recent decades?

Fertility

In the 1990s, the Statistical Division (with decreasing confidence) based its medium projection on the assumption that average fertility everywhere will arrive by 2050 at a level that would eventually stabilize population numbers. At the very low mortality levels we presently enjoy in the industrial world, that “replacement fertility” level is about 2.1 children per woman. It would lead to population stability (or, technically, “stationarity”.) It portrays a serene future, without runaway growth or decline, in a prosperous, industrialized world.

There is no basis in demography for assuming that fertility will arrive at that level, or stay there. Fertility may gravitate toward a different level. More likely, it will fluctuate in decades to come, and between countries, as it has in the past. Replacement fertility is a mythical goal, better explained by psychological and political needs than by demographic logic. In a profoundly unstable world, we seek stability.²

The 2002 projection still seems to reflect a doomed effort to preserve some vestige of the dream of “replacement level fertility” while recognizing that there are wide disparities and that it doesn’t fit the observed facts. Worldwide fertility in 2045-2050 is projected at 2.02, down from the previous projection of 2.15. The country-by-country fertility projections generally arrive at 1.85 (give or take a percentage point) except for those countries to which it is clearly inapplicable. This in effect substitutes a 1.85 target for 2.1.

Countries with 84 percent of the world’s population are projected to be below replacement fertility level by 2050.

The Industrial World. For Europe, the “replacement fertility” fixation for years led the Population Division to underestimate population decline. It simply ignored the implications of declining European fertility, choosing instead to project a turnaround to 2.1 by 2045-2050. Probably it did so because, like most demographers, they simply could not believe that Europe was on a demographic path to extinction.

That convention has been progressively modified. Starting in 1998, the Division recognized that European and Japanese fertility levels were not on course toward 2.1 by 2050. In the new projection, rising fertility is still projected for Europe, but now it stops at 1.84. That projection still reflects hope rather than experience. European fertility was 1.41 in 1995-2000 and still falling.

For the whole industrialized world, fertility is projected to rise to 1.85 in 2045-2050, even though it has been low and declining for decades and is now at 1.58. (Those figures include the United States, which is *sui generis*. I will discuss it later.)

The LDCs. Fertility is projected at 2.04 in 2045-2050, down from the previous projection of 2.17. Excluding the least developed countries, LDC fertility is predicted at 1.90. The adjustment of future

fertility results not so much from any dramatic recent evidence as from the realization that in many LDCs fertility is on a trajectory taking it below replacement level, as happened in the industrial world.

The “least developed countries.” At the demographic extreme, the Division in 2000 belatedly recognized that the 48 (now 49) poorest countries – with current fertility at 5.46 — are most unlikely to reach 2.1 by 2050. It pegged their 2045-2050 fertility at 2.51 — which in itself would be a remarkable decline. In 2002, the projection has been lowered very slightly, to 2.47.

Demographically, this fertility distribution is less arbitrary than a universal target of 2.1, and closer to current trends. Its implications, however, are much more complex and perhaps less reassuring.

On the plus side, the projected fertility levels would lead to a declining world population at the end of this century. That would bring human numbers into a better balance with the Earth’s support system. If population declines sufficiently, per capita incomes in most of the world can improve, and the present terrible imbalance between living standards in the industrialized countries and the LDCs can be ameliorated. A declining population generates its own problems, but it offers the hope of a better world.

However, with fertility of 1.85 in the industrial world and 1.90 among the more prosperous LDCs, the poorest will inherit the Earth. Having abandoned the myth of a universal convergence at replacement level, the Population Division now recognizes that differential fertility will be with us indefinitely, which brings us face to face with the phenomenon known as “shifting shares”. In the midst of a general population decline, those countries with fertility above replacement level will grow and replace less fertile groups. Theoretically, at some distant time, if they stay above replacement level, they will raise world fertility and even world population again.

Is that possible? Within the conceptual limits of demography, it is almost inevitable. The new report notes that the 38 countries with fertility above 2.1 in 2050 will constitute 16 percent of the world’s total population at that time, up from their present eight percent. This is the statistical result of “shifting shares.”

That distant and frightening threat may, however, evaporate. It can disappear happily if the most fertile come to recognize that they are being kept poor by

their own fertility, or grimly if the conditions in the poorest countries reach the point where mortality rises enough to outweigh their fertility. I will later suggest that mortality in the poorest countries may not decline according to the U.N. expectations. If it actually rises, replacement level fertility will rise with it. (After all, replacement level fertility was probably more than four children in the United States when the Republic was founded.) Their population growth may thus slow down and eventually be stopped by the resource constraints I will describe below, but their people may, in desperation, emigrate in increasing numbers.

There is no really satisfactory way to predict fertility. Unlike mortality, it does not respond predictably to changes in conditions. Trends change. One cannot safely project current fertility, nor can one graph a curve of past fertility changes to predict the future, because the curves lead quickly to absurdities. Perhaps the safest approach is an empirical one, taking account of current trends but making value judgments as to when they must flatten out or reverse. This approximates the U.S. Census Bureau's approach. It works fairly well but, like all projections, it requires constant adjusting.

A final note on the fertility projections: the Population Division is well aware that its projections depend on world efforts to address fertility. It warned that the medium projection for the LDCs is unrealistic unless there are continuing efforts to provide family planning.

Mortality

The Population Division has long assumed that life expectancy will rise (and mortality will decline) indefinitely. That has been true almost everywhere in recent generations, but perhaps a closer look is needed at the happy assumption that it will continue.

The report raises worldwide life expectancy at birth from 65 years in 1995-2000 to 75 years in 2045-2050. The developed countries go from 75 to 82 years. The LDCs go up from 63 to 73, and within that group the least developed countries go from 49 to 66. Those last two projections are somewhat lower than two years ago, suggesting that the Division is becoming a bit less sanguine.

Still, the dramatic longevity projection for the poorest countries seems to defy the evidence of worsening conditions in those countries. The report itself

noted that sub-Saharan Africa saw a decline of life expectancy from 49 to 47 years during the 1990s. It attributed that decline to AIDS, but other diseases and hunger may have played a role. Faced with such numbers, one wonders how the Population Division arrived at a 35 percent increase in the least developed countries' longevity by 2050.

To dramatize my point, look at two specific countries.

- Bangladesh is projected to grow from a crowded 142 million now (in which perhaps 20 percent live in flood-prone, typhoon-prone disaster areas) to 255 million in 2050 — in a country smaller than Wisconsin. The growth will happen despite a sharp fertility decline from 3.5 to 1.85. Life expectancy is expected to rise from 61 years to 75 years. Is that projection credible?
- Ethiopia, with 71 million people now, is projected to rise to 171 million in 2050, even though fertility (which has not changed significantly since records have been kept) is expected to decline from 6.1 to 2.55. Life expectancy is projected to rise from 46 to 61 years. That projection — to be charitable — is at the outside edge of the credible, for a country already suffering serious and rising food deficits even in good years, and with famines a regular occurrence. It becomes incredible in the “high” projection, which leads to a population of 198 million, and absurd in the “constant fertility” projection, which is 324 million.

Such projections are simply an act of faith. It would be more reasonable to expect that mortality will skyrocket and population growth will stop and perhaps reverse. It is a chilling prospect.

The projections ignore multiple changes occurring in the world — including the consequences of population growth itself. They will affect mortality. The Division periodically convenes groups of experts to examine its assumptions. The problem is that the experts are all demographers, and demographers as a group tend to be insensitive to the forces that drive

mortality and migration. Perhaps the Division should include some public health specialists, urban sociologists, environmental biologists, agronomists, air and water specialists and climatologists in its meetings.

Health. The U.S. Surgeon General in 1969 told Congress “The war against infectious diseases is effectively finished.”

In 2000, a generation later, Dr. James Hughes, Director of the National Center for Infectious Diseases at the Centers for Disease Control and Prevention (CDC), said that “The microbes are challenging us in ways we wouldn’t have imagined ten years ago and for which we’re not prepared.”³

The quotations stand for themselves. We have learned that we are not in command, as we thought we were. The microbes have regrouped and counterattacked.

The Population Division has addressed AIDS. In the new report, it has studied the 53 most severely afflicted countries and calculated that their population will be 480 million smaller in 2050 than it would have been without AIDS. But it concludes that the epidemic will be brought under control by 2010 and that only lingering pockets will remain in 2050. The optimism seems questionable.

The report does not foresee any epidemics beyond AIDS, but the World Health Organization (WHO) has identified several major diseases that constitute a greater threat, such as (1) the new drug-resistant strains of tuberculosis, or (2) malaria, which is estimated to attack some 500 million people a year, mostly African children, and to cause some 2.5 million deaths.⁴ And new threats constantly appear, such as the lethal new epidemic SARS.

The American Chemical Society’s worldwide registry of chemicals listed 22 million chemicals in 1999, four times the number in 1980. Some of them are medicines and presumably good for our health, but others are known to be dangerous. Few of them have been systematically tested for direct health effects, and almost none have been tested for secondary effects on health or the environment. We are multiplying the environmental sources of illness, even as we learn that minute quantities of chemicals can affect human health.⁵

Crowding. The health problem is compounded by rapid urbanization, particularly of the LDCs, where cities have exploded from 300 million to 2.2 billion

since 1950 and are expected to grow by another 1.6 billion by 2030. Urban services have not kept pace, and it is a tribute to modern medicines that epidemics have so far been kept fairly well under control.

Water. Growing shortages of water compound the problems of providing water and sanitation in those exploding cities.

WHO predicts that by 2025 some 2.7 billion people “will face severe shortages of fresh water” and five billion will face shortages, in “a looming crisis that overshadows nearly 2/3rds of the Earth’s population.”⁶ That threat is not just to human health. Irrigation takes over 70 percent of human water consumption, and shortages mean less food.

Food. World agricultural production in the past half century experienced a rise unlike anything in human history. That growth has been the principal support for a near trebling of human numbers. There was a 15 percent increase in cultivated acreage, more than a doubling of irrigated acreage, a six fold increase in the use of commercial fertilizers, a bigger increase in chemical pesticides, and a remarkable propagation of improved crop varieties.⁷

Those sources of growth of food production are tapering off or finished. Grain yields grew faster than population growth from the 1950s until the 1980s, but much slower in the 1990s. Cultivated acreage is decreasing in the industrial world and stagnant in the LDCs. Irrigated acreage, worldwide, has almost stopped growing, and it is constrained by the accumulation of salts in irrigated soils, and of course by the tightening competition for water. The United States and China, and probably many other countries, are diverting water from irrigation to urban needs. Commercial fertilizer use in the industrialized world has been declining since the 1980s, because heavy use did not produce enough food to pay for itself. There are hopes that genetic modification will reinvigorate plant breeding, but the technique is still unproven, chancy, and bitterly resisted in many quarters.

Commercial farming itself is under attack for the disturbance to environmental systems caused by its release of chemicals and pesticides, its damage to soils, and the intense pollution generated by operations like factory hog and poultry farms.

The basic sources of food are arable land, range fed livestock, and wild fishery. Expedients such as aquaculture actually compete with traditional crops

for grains and arable land, and are extremely polluting to boot. The three sources are already being over-exploited, and there are no magic solutions in sight to enable the world to continue the dramatic growth in production that has supported population growth.

The European Union is actually trying to scale back intensive commercial agriculture, but the growing populations of the LDCs do not have that option. They need all the food they can get. Contrary to popular wisdom, the LDCs have become net food importers. Some are totally dependent on imports, or nearly so. Africa, and the least developed countries generally, are in the worst shape. The industrialized regions (except Japan) are exporters, on balance. The United States provides some 26 percent of all the grains entering the world market. U.S. population is growing fast, and – barring a remarkable increase in U.S. grain production or a renunciation of our meat diet – that source will be drying up as our own consumption increases.

The demographers should meet the agronomists. Anybody who projects rising life expectancy in coming generations needs to answer the question: what will they eat?

Climate. There is very little doubt now that human activities are warming the climate, though there is much to learn about the details and the regional changes. There is a debate as to the net effect of climate warming on food production in middle and northern latitudes, because increasing carbon dioxide tends to promote plant growth (within limits), while droughts, floods and heat waves do not — and climate warming means more such weather. There is no real disagreement among the experts that climate warming is making agriculture more perilous in the lower latitudes where most of the world's population lives.

That calculation should be factored into expectations of future human mortality. It adds force to the question I asked above: what will they eat?

Aging. The report points out that “In more developed regions, the population aged 60 or over currently constitutes 19 percent of the population; by 2050 it will account for 32 percent of the population. In the less developed regions, the proportion of the population aged 60 or over will rise from 8 percent in 2000 to close to 20 percent in 2050.” Here, from within the demographers' own precinct, comes another warning. The aged are a particularly vulnerable

group. If an effort is made to maintain health services for this growing population, the services will be spread increasingly thin. If the effort is not made, the mortality of the aged presumably will rise. The sheer magnitude of the problem, and the intergenerational conflict posed by the needs of the aged, make one wonder whether they will continue to get the resources they now receive.

The Impact of Growth Itself. In the U.N. projections, population growth has no effect on mortality. All the projections assume that life expectancy in the LDCs will be 16 percent higher in 2045-2050 than in 1995-2000, even though (for example) water resources per capita — the mirror image of population growth — will be down 23 percent in the low projection, 37 percent in the medium projection, 47 percent in the high projection and 58 percent in the constant fertility projection. (Those figures are optimistic, because deforestation, urbanization, and the draw down of groundwater reserves will presumably reduce total available water supplies.) It is hard to believe that mortality will be the same for all the projections, or that any of them will lead to rising longevity.

Tropical forest resources are being cut down at a rising rate. We are running out of the petroleum/gas era and must find other sources of **energy and chemical feedstocks**, which will necessarily impose some very difficult stresses and adjustments, and probably armed conflicts.

In Sum... Taken together, this is an impressive set of trends that will raise mortality, or at least forestall the predicted gains. The Population Division mortality projections rely on some unexplained *deus ex machina*, medical or technological, which is not identified. They do not deal with the looming realities. We cannot predict what the numbers will be, but we have reason to believe that population growth will be constrained more by mortality levels than the Division predicts.

It would be difficult for the Population Division to incorporate all these issues into its projections, simply because they are so complex and unpredictable, and because of the controversy that would attend any estimate. On the other hand, the Division is in fact taking a position on all of them by assuming that they are not serious enough to diminish the anticipated improvement in mortality.

Perhaps the most prudent projection would take note of those other experts' testimony and assume that those problems may stop or dramatically slow down the recent improvement in mortality.

Migration

Until the early 1990s, the UN simply ignored international migration. Then it introduced migration into the projections but made the assumption that it would soon taper off and stop. In 2000, for the first time, the projections suggested that it would continue. The new study projects the major flows at their current rate through 2050. Net immigration into the United States is estimated at 1.1 million annually. For Germany, the figure is 211,000, for Canada 173,000, for the United Kingdom 136 thousand, and Australia 83 thousand. The major net senders are identified as China at 303,000, Mexico at 267,000, India at 222,000, the Philippines at 184,000 and Indonesia at 180,000. There are other, lesser flows, including those between poorer and richer LDCs.

The migration projections approximate the present realities. The receiving countries are not effectively controlling immigration, their businesses like the cheap labor, political leaders in aging societies will welcome new workers, and sending countries regularly promote emigration as a way of easing their population pressures. The working age population (15-64) in the LDCs is expected to grow by 1.8 billion by 2050, and there is little hope that there will be enough jobs for them in their home countries. On the other hand, migration is creating growing political resentment among working people in Europe and – to judge by the polls – in the United States.⁸

In short, although the present projection is an improvement over the earlier practice, international migration will be perhaps the most volatile and unpredictable demographic vector for the foreseeable future. It will particularly affect the industrial countries because it is larger relative to their total population than it is for the LDCs. And it is already profoundly affecting the United States, because migration presently drives our population growth.

“Shifting Shares” in the U.S.

The U.N. statistics treat each country as a single demographic entity. The U.S. Bureau of the Census runs separate projections for different racial and eth-

nic groups in the United States and then combines those projections.⁹ It can thereby chart the relative size of those groups as time passes. Its methodology predicts “shifting shares” within the country, not just among countries.

The U.N. has chronically underestimated U.S. growth, both by underestimating future immigration and failing to take account of “shifting shares.” In 1998, it thought U.S. population would reach 348 million by 2050. In 2000, it recognized that immigration is unlikely to stop, and it raised the projection to 397 million. In 2002, the projection is 409 million. It predicts that U.S. fertility will be down to 1.85 in 2045-2050, well below the current 2.1.

The Census Bureau also has tended to underestimate U.S. population growth, because it has underestimated current immigration. Its methodology does, however, incorporate the impacts of “shifting shares” as more fertile groups multiply and become a larger share of the population. For 2050, overall fertility in its Middle series is 2.219, raised primarily by the growing Hispanic population, which has a current fertility of 3.0. Its Middle estimate of total population in 2050 has tentatively been raised to 420 million. It will probably be raised again, because new data show that the Hispanic population is larger than expected, and growing faster, and its fertility is rising rather than falling.

The Population Division might consider using the Census Bureau's methodology for countries with distinct ethnic groups with markedly different fertility rates. As the Census calculations suggest, domestic as well as international “shifting shares” raise the growth projections.

Conclusions

The doubts I have raised would push the projections in different directions. If European fertility stays where it is, Europe will be growing smaller, faster. If LDC fertility does not drop so far, it will speed their population growth and the world's. External forces may drive mortality upwards and population growth downwards, particularly in the poorest countries. The United States is growing faster than either the Statistical Division or the U.S. Census Bureau expected, and growth projections will have to be raised again.

Those adjustments may balance each other out in some ways. They may well lead to a 2050 world

population somewhere around nine billion, or less, but it would be a very different world. Forecasting is an elusive art. Demographic projections often seem to be immune from the fluctuations of real life. The questions that will shape our demographic futures are being asked mostly by non-demographers. Will there be enough water and enough food for rising populations? Will epidemics and the proliferation of chemicals be counterbalanced by the continuing advance of medical knowledge? Will climate change diminish the support capacity of world ecosystems and reduce population growth within the time period under review? Or later?

We may never have all the answers to those questions in advance, but we would come closer if we began to integrate our demographic projections with the findings that are being made in other disciplines.

For anybody with a sense of humanity, it is an agonizing time. The issue has long been – not whether population growth will go on forever – but whether it will be brought to a stop by nature and the rise of mortality or by the more benign path of conscious human decisions to limit fertility. The choice is stark: Europe and Japan have opted for the benign alternative. For the LDCs, and particularly for the poorest, the chance to make that choice is ebbing away. The numbers I have cited for Bangladesh and Ethiopia make that point. And the rich countries will not escape the consequences of their desperation. I think the U.N. statisticians implicitly recognize those realities. Perhaps they should spell them out.

NOTES:

1. See www.un.org/esa/population/unpop.htm for the Highlights and Annex Tables. Nation-by-nation figures are not systematically included in this preliminary report, but can be accessed by punching the “data” button at the website. The complete printed text is scheduled for publication during 2003.
2. Lindsey Grant, *Juggernaut: Growth on a Finite Planet* (Santa Ana, Seven Locks Press, 1996, pp. 10-11.)
3. Associated Press 4-27-2000.
4. World Health Organization, quoted by Environmental News Service E-Wire 11-29-2000. The U.S. National Institutes of Health offers a less precise estimate embracing the same numbers, and adds that global warming threatens to spread the disease more widely in the southern United States. Environmental News Service, 8-2-2001.
5. For an extended treatment of recent evidence supporting the statements in this entire section, see Lindsey Grant, *Too Many People: The Case for Reversing Growth* (Santa Ana: Seven Locks Press, 1996) and *Diverging Demography, Converging Destinies* (NPG FORUM, January 2003).
6. AP 3-22-2002, “UN Warns of Severe Water Shortages.”
7. These numbers are approximate. The 1950 base is extrapolated from 1961, when the Food and Agriculture Organization (FAO) FAOSTAT data series start.
8. In a Roper Poll on 3-7-2003, 76 percent of the respondents thought immigration should be less than one million and 85 percent considered illegal immigration to be a “serious problem.”
9. See the international population projections revised on 10-10-2002 at www.census.gov/ipc/www/idbnew.html.

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Negative Population Growth

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