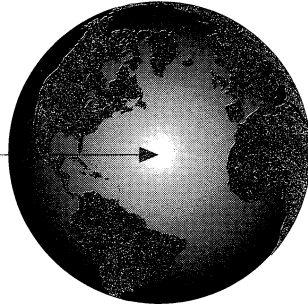


PROGRESS

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POPULATION,
FOOD, AND
INCOME:

GLOBAL TRENDS
FOR THE
TWENTIETH
CENTURY

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POPULATION, FOOD, AND INCOME:

Global Trends In The Twentieth Century

by Nicholas Eberstadt

EXECUTIVE SUMMARY

World population has increased tremendously in our century...and it continues to grow with extraordinary speed. This demographic explosion, however, has not plunged mankind into penury and deprivation. Quite the contrary: the global population boom coincided with an explosion of health, and of productivity, around the world. On average, the human population today lives longer, eats better, produces more, and consumes more than at any time in the past. And while dramatic — sometimes appalling — disparities in living standards can be identified between countries and within them, considerable evidence points to long-term improvements in the material condition of the most vulnerable elements in the world population. Despite a tripling of the world's population in this century, global health and productivity have exploded.

- Global per capita calorie availability rose by nearly a third between the 1930s and late 1980s.
- Per capita food supplies rose by 40 percent in Africa, Asia, and Latin America during the same period of time.
- Per capita productivity doubled in India and Pakistan, increased ten-fold in Taiwan, and even parts of Africa enjoyed a tripling of per capita output between 1913 and 1989.

“Overpopulation” is a problem that has been misidentified and misdefined. The term has no scientific definition or clear meaning, the problems typically associated with overpopulation (hungry families, squalid and overcrowded living conditions) are more properly understood as issues of *poverty*. Though some blame dwindling natural resources for the reversals and catastrophes that have recently befallen heavily-populated, low income countries, such episodes are directly traceable to the policies or practices of presiding governments. Population trends and demographic data provide no basis for defining “overpopulation.”

- The current rate of annual, world-wide population growth is *down* to 1.6% and continues to fall from its 1960s peak of 2.0%.
- The average annual growth rate is 0.4% for developed countries and 1.9% for developing regions. World-wide total fertility rates have been dropping since the early 1950s.

- Average fertility in the more developed regions has dropped from 2.8 to 1.7 children per woman. The less developed regions have experienced an even greater drop: from 6.2 to 3.5, or well over 40 percent.
- Global life expectancy more than doubled this century from 30 to 64 years, while global infant mortality fell from 170 infant deaths per 1000 births in 1950 to just 60 in 1990.

Rapid population growth has occurred not because human beings suddenly started breeding like rabbits but rather because they finally stopped dropping like flies. A "population crisis" which can be explained without any reference to demographic forces whatsoever is a crisis misdefined.

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INTRODUCTION

Today, as at various junctures in the past, there is growing public concern about the global race between population and sustenance. Attention to the question of whether mankind will be able to provide adequately for his growing numbers can be traced back to T.R. Malthus' original *Essay On The Principle Of Population* in 1798¹—and to less famous inquiries from even earlier times.² The specific concerns enunciated have varied from one generation to the next. Shortly after the Second World War, for example, the catchword was “overpopulation”; in the mid-1960s, the issue was framed as “the world food problem.” More recently, the world population question has been discussed in terms of “carrying capacity” and “sustainable development.” Whatever the particulars of these formulations, however, the underlying themes in much of this

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evolving commentary on the world population would be immediately familiar to Malthus himself: namely, that the globe cannot support the ongoing and enormous increase in human numbers that we are witnessing today—and that unless we somehow check this uncontrolled demographic growth we will be faced by rising poverty, mass starvation, or perhaps even worldwide catastrophe.

There is an unsettling extent to which such pronouncements and assessments, whether uttered today or in earlier times, sound like the utterances of a faith. Matters of faith are not meant to be held up to scientific scrutiny, nor are they meant to be treated as testable and potentially falsifiable hypotheses. If we wish to treat the population issue as an empirical question, however, we have considerable evidence at our disposal which deserves examination and analysis. Such evidence includes available estimates of global trends in population growth, fertility, and mortality; estimates of patterns and trends in the production and consumption of food in the world's diverse regions; and estimates of long-term trends in income and productivity within and between countries. To the extent that such quantitative materials are treated as admissible evidence in the contemporary population debate, they appear to weigh very heavily against the more pessimistic interpretation so often given favorable exposure in the mass media, in the university, and even in the corridors of government.

Succinctly stated, the facts are these: World population *has* increased tremendously in our century—more than tripling, it appears, between 1900 and 1990—and it continues to grow (by any historical benchmark)

with extraordinary speed. This demographic explosion, however, has not plunged mankind into penury and deprivation. Quite the contrary: the global population boom coincided with an explosion of health, and of productivity, around the world. On average, the human population today lives longer, eats better, produces more, and consumes more than at any time in the past. And while dramatic—sometimes appalling—disparities in living standards can be identified between countries and within them, considerable evidence points to long-term improvements in the material condition of the most vulnerable elements in the world population.

The global population boom coincided with an explosion of health, and of productivity, around the world

To take note of these basic facts is not to argue that rapid population growth has *of itself* accelerated the pace of material advance in the modern world. The relationship between population change and economic change is complex and varied; despite intensive research into the topic over the past several generations, our understanding of the linkages in this relationship remains distinctly limited.³ At the very least, however, the coincidence of rapid population growth and long-term improvements in material conditions should conclusively demonstrate that population increase and economic development are not inherently incompatible.

To observe that the world has been moving in the general direction of affluence over the course of our century, moreover, is by no means to ignore the setbacks and tragedies that have befallen large populations over the past several generations. To the contrary: In living memory entire regions of the globe have suffered severe economic reversals or sustained economic declines; harvest failures and other disasters have threatened the nutritional security of many hundreds of millions of persons; and millions of men, women and children have perished outright from famine.

At first glance, these grim realities may seem to affirm the neo-Malthusian claim that poor but rapidly-breeding populations will tend to exhaust the resources at their disposal, and will thereafter suffer the terrible consequences of an “overshoot” of “carrying capacity.” A closer look leaves a rather different impression.

For the most part, the reversals and catastrophes that have afflicted large populations in low-income countries in recent decades can be traced directly to the policies or practices of presiding governments. Ill-advised, injurious, or positively destructive programs have been enthusiastically embraced by more than a few regimes in Asia, Africa, and Latin America over the past two generations. Such programs have direct and predictable consequences. Most of the troubling episodes which proponents of the “population crisis” invoke to make their case can be more easily explained in terms of specific, albeit perverse, governmental actions. A “population crisis” which can be explained without any reference to demographic forces whatsoever is a crisis misdefined.

WORLD POPULATION TRENDS, “LIMITS TO GROWTH,” AND “OVERPOPULATION”

While no one can know the exact world population total at the start of the twentieth century, it is conventional to place the figure at around 1.6 billion in 1900.⁴ In 1990, by the estimate of the United Nations, world population totaled about 5.3 billion persons.⁵ By these numbers, world population would have increased by a factor of about 3.3 over the intervening decades—this despite two world wars, a number of major famines, and innumerable brutal but less famous conflicts. Between 1900 and 1990, by these numbers, the average pace of global population growth would have been about 1.3 percent a year. However such a rate may look to the reader, it would be extremely rapid by any historical perspective. It would, for example, be well over

twice the tempo of growth demographers guess the nineteenth century to have experienced,⁶ and vastly faster than the rate of increase that could conceivably have characterized earlier periods.

It should be no surprise that the pace of world population growth has not been steady over the course of our century, or even among its diverse regions. Figure 1 outlines the trends from 1950/55 to 1990/95, as estimated and projected by the United Nations. For the world as a whole, the rate of natural increase is believed to have peaked in the 1960s at about 2.0 percent a year; at present it is said to be around 1.6 percent a year. Today the pace of population growth in the “more developed regions”—defined as the OECD countries plus the former Warsaw Pact region—is said to be about 0.4 percent a year. By contrast, the rate for the “less developed regions”—the rest of the world’s put at about 1.9 percent a year, or over four times as fast. Within these less developed regions, in turn, distinct differences are also evident: Africa’s rate of natural increase is currently placed at about 2.8 percent a year, while average rates for Asia and Latin America are put respectively at roughly 1.6 and 1.8 percent per year—significantly slower tempos.

With these extant differentials in population growth, the distribution of the world’s population has been shifting quite rapidly in recent decades. In 1950, by the U.N.’s estimates, North America and “Europe” (defined here to include “european” republics from the former Soviet Union) together accounted for an estimated 28 percent of the world’s population; by 1990, their share was down to an estimated 19 percent. Conversely, Africa is thought to have accounted for less than 9 percent of the world total in 1950, but for nearly 12 percent by 1990.⁷

There is no accurate method for forecasting the future rate of population growth for a country or a region, much less the world.

Such patterns, it should be noted, mark a sharp reversal from the trends of the previous several centuries. During the “Age Of Exploration” and the “Age of Colonization,” the world’s European population grew much more rapidly than its non-European population. A rough indication of those differences is provided in figures used by Nobel economics laureate Simon Kuznets. By those numbers, the rate of population increase for what he termed the “area of European settlement” (Europe, the Americas,

Oceania, and the Russian Empire/Soviet Union) was well over twice as fast as for the rest of the world over the years 1800 to 1930. Over that same period, the share of world population living in this “area of European settlement” is said to have increased dramatically: from 24 percent to nearly 40 percent.⁸

It was not until after the Second World War that demographers generally recognized that the pace of growth for the world’s non-European populations had finally come to exceed that of its populations of European descent. It is also true that the international movement for worldwide population control is essentially a postwar phenomenon that has drawn upon the revitalization of Malthusian concerns since the end of the Second World War. It is worth pondering the significance of this coincidence.⁹

In reviewing global population trends and prospects, two points deserve emphasis. Strangely, both are usually neglected in conventional presentations of the topic.

The first is that there is no accurate method for forecasting the future rate of population growth for a country or a region, much less the world. Demographers have no procedure for reliably predicting birth rates or death rates into the future. Consequently, long-term projections can only coincide with actual trends by complete

chance. (This shortcoming as a predictive science is widely acknowledged by demographers,¹⁰ but it has not—and cannot—be corrected.) Demographers have no way of knowing how fast a population will be growing a generation or two hence—or whether it will be growing at all. Long-term projections typically assume that the rate of growth will settle at zero, but this is little more than convention adopted for simplicity's sake. There are no theoretical grounds for preferring that hypothesis to an alternative—say, that *negative* rates of growth are the prospect for post-industrial populations. We may note that a number of countries—Austria, Denmark, Germany, and Switzerland among them—have reported bouts of negative population growth over the past generation.¹¹ More recently, the collapse of the Soviet empire has apparently thrown the former Warsaw Pact area into negative population growth.¹² That this event was completely unforeseen—and that demographers have no idea how long this new regional pattern will continue—should further caution us against the presumption that there is a “natural” trajectory for the growth of modern populations, explicable through theory and identifiable in advance. In short, when we look at the “demand side” of the population-resources equation, we really have very little idea of the “limits to growth.”

The second point is that population trends and demographic data provide no basis for defining “overpopulation.” Familiar as the term may be, the fact remains that the concept cannot be described consistently and unambiguously by demographic indicators.

What are the criteria by which to judge a country “overpopulated”? Population density is one possibility which comes to mind. By this measure, Bangladesh would indeed be one of the contemporary world's most “overpopulated” countries—but it would not be as “overpopulated” as Bermuda. By the same token, the United States would be more “overpopulated” than the continent of Africa, West Germany would be every bit as “overpopulated” as India, Italy would be more “overpopulated” than Pakistan, and virtually the most “overpopulated” spot on the globe would be the kingdom of Monaco!¹³

Rates of population growth offer scarcely more reliable guidance for the concept of “overpopulation.” In the contemporary world, Africa's rates of increase are the very highest. Yet rates of population growth were even higher in North America in the second half of the eighteenth century.¹⁴ Would anyone seriously suggest that frontier America suffered from “overpopulation?”

What holds for density and rates of growth obtains for other demographic variables as well: birth rates, “dependency ratios” (the proportion of children and elderly in relation to working age groups), and the like. If “overpopulation” is a demographic problem, why can't it be described unambiguously in terms of population characteristics? For a simple reason: “overpopulation” is a problem that has been misidentified and misdefined.

The images evoked by the term “overpopulation”—hungry families; squalid, overcrowded living conditions; early death—are real enough in the modern world. *But these are properly described as problems of poverty.* As a human characteristic, poverty, like all other possible human attributes, is represented in individual members of a population. It is an elementary lapse in logic—a fallacy of composition—to conclude that poverty is a “population problem” simply because it is manifest in human populations.

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FERTILITY AND CONTRACEPTION

At the end of eighteenth century—ironically, just around the time of Malthus' first famous pamphlet on population—completely new pattern population pattern was introduced to the world. This was sustained fertility decline: long-term shifts toward smaller family size, driven and enforced by changing parental attitudes.

The phenomenon of sustained fertility decline was first evident in France, where it seems to have gotten underway by the time of the Jacobin Revolution. Sustained fertility decline subsequently spread to the rest of Europe, and the areas of overseas European settlement, during the course of the nineteenth century. By the early decades of the twentieth century, fertility levels in several European populations had fallen temporarily below the level of net replacement: to levels so low, in other words, that their continuation would eventually result in national population decline (barring offsetting improvements in mortality or inflows of immigrants). By the early post-war era, it was clear that sustained fertility decline was not exclusively a European phenomenon: populations in East Asia (Japan), Western Asia (Cyprus), the Caribbean (Bahamas, Puerto Rico), Latin America (Costa Rica) were also embarked upon it. By the mid 1990s, sustained fertility decline has come to be characteristic of the great majority of the world's populations.

Perhaps the clearest and most intuitively meaningful measure of fertility is the "total fertility rate" (TFR): the average number of births per woman over the course of the childbearing ages.¹⁵ Figure 2 presents the United Nations' estimates and projections of global and regional TFR trends over the postwar era.

According to these numbers, the total fertility rate for the world as a whole dropped by nearly two-fifths percent between 1950/55 and 1990/95, from about 5 children per woman down to about 3.1 children per woman. (By way of perspective, the current projected global TFR would be somewhat lower than that of the United States in the early to mid 1960s.) Over these four decades, fertility in the more developed regions is believed

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to have dropped by nearly two fifths, from 2.8 down to 1.7 children per woman. Proportionately and absolutely, the fertility drop for the less developed regions as a group is thought to have been even greater: There the TFR is estimated to have fallen from 6.2 to 3.5, or by well over 40 percent.

Fertility patterns, of course, differ markedly among low income countries, and even among entire regions. The total fertility rate is believed to have been almost halved between the early 1950s and the early 1990s for both Latin America and the Caribbean (5.9 to 3.1) and Asia (5.9 to 3.0). The situation in Africa to date has been completely different. The TFR for the continent as a whole in the early 1990s is projected at 5.8—nearly twice the current projected Asian or Latin American levels, and well over three times the level in the world's more developed regions. The continent as a whole, moreover, seems to have witnessed very little in the way of sustained fertility decline over the past four decades. Although sustained drops in fertility have been noted in some of the Arab countries in Northern Africa, only one sub-Saharan country on the continent proper (South Africa) is thought to have experienced a decline in fertility of as much as one third between the early 1950s and the early 1990s. By contrast, in a number of sub-Saharan countries fertility levels are thought to have been *higher* in the early 1990s than they were in the early 1950s.¹⁶

Sub-Saharan Africa thus constitutes an enormous exception to the fertility trends evident in nearly all the rest of the contemporary world. Three points, however, should be emphasized here. First, there is no scientific

method for accurately predicting the onset of sustained fertility decline for any population: A revolution in family size may not begin in most African countries for some time; alternatively, it may begin tomorrow (or, given the limits of our statistical knowledge, it may even already be underway).¹⁷ Second, once initiated, sustained fertility declines have in many instances been extraordinarily rapid in the postwar era. (Costa Rica and Thailand, for example, cut their TFRs by half or more in only twenty years; over the course of twenty five years, Colombia's TFR fell by nearly 60 percent and Hong Kong's by over 75 percent.¹⁸) Third, there is no evidence of any "natural" tendency for sustained fertility declines to halt at the level of net reproduction; to the contrary, many modern populations have entered into extended periods of sub-replacement fertility. Nearly all of Europe has been below net-replacement fertility for the past two decades. Nor are European populations unique in this regard. Japan has been below the net replacement level for nearly four decades; Taiwan, South Korea, Hong Kong and Singapore all report sub-replacement fertility today; and sub-replacement fertility levels are currently believed to be characteristic of such otherwise different Caribbean societies as Cuba and Martinique.¹⁹

Rapid fertility declines in low income countries in the postwar era have been facilitated by the postwar period's revolution in contraceptive technologies. Medical breakthroughs since the end of the Second World War have brought forth such products and services as the birth control pill, the intrauterine device (IUD), injectable contraceptives, and the routine sterilization procedure; technological advances have significantly improved such pre-existing products as the condom and the diaphragm. With the advent of these new opportunities for contracepting, motivated populations in low-income settings have in many cases effected dramatic shifts in family planning behavior in only a few years.

These shifts in attitude and behavior are indicated by the fertility survey data presented in Figure 3. Like other forms of polling, these survey data have limitations and defects; nevertheless they are illustrative. Between the mid-1960s and the late 1980s, the proportion of couples of reproductive age deliberately practicing contraception is reported to have risen from less than 10 percent to nearly 80 percent in South Korea. South Korea, of course, may be viewed as an exception in light of its exceptional economic performance in recent decades; yet in such places as Colombia, Ecuador, Paraguay, Turkey, and Thailand rapid shifts in contraceptive behavior are also reported. One may note from Figure 3 that acceptance and utilization of modern contraceptive methods is common to populations of distinctly different income level, educational attainment, religion, and cultural or historical background. The extent to which modern contraceptive practices have already been embraced in various low income locales may sometimes seem surprising: as of 1988/89, for example, survey results reported a greater prevalence of modern method use for India than in Italy a decade earlier!

It is currently conventional for population specialists and family planning authorities to ascribe a decisive role in contemporary fertility reductions to the new modern methods of contraception. Such mechanistic faith is misplaced. The availability of modern methods of contraception is neither a necessary nor a sufficient condition for sustained fertility declines. Fertility in most of Europe, after all, dropped substantially during the nineteenth century—long before modern contraceptives were even imagined. As already mentioned, fertility in some Western countries had fallen below the replacement level before the modern contraceptive revolution. Conversely, the fact that modern contraceptives are available does not assure their widespread use. After a quarter of a century of government-sponsored family planning efforts, for example, less than 10 percent of the

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couples surveyed in Pakistan in 1990/91 said they were using modern contraceptive methods.

If modern contraceptive technology were the decisive factor in determining national fertility levels, we would expect TFRs to track closely with modern contraceptive utilization rates. It does not. In the aforementioned case of Pakistan, the TFR around 1990 is believed to have been over 6 births per woman. Bulgaria's utilization rate for modern contraceptives in 1977 was reportedly just about the same as Pakistan's today—yet in the late 1970s the Bulgarian TFR was around 2.2!

The reason fertility levels can differ by a factor of three when levels of usage for modern contraceptive methods are virtually identical, of course, is that parental preferences rather than medical technology are the decisive factor in determining a society's average family size. If this would seem an obvious point, it is nevertheless an idea that supporters of the international birth control movement have typically ignored.²⁰

One recent World Bank study has estimated that at least 90 percent of the variations in fertility levels between developing countries in the postwar era can be explained by differences in the desired levels of fertility reported by local women.²¹ If this is correct, the prospects for *voluntary* reductions of current fertility through expansion

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of *voluntary* family planning programs in low-income regions are at best marginal. One may note, of course, that in traditional societies extremely effective methods of birth control have always been at the disposal of motivated couples. To be sure: many modern methods may be more pleasant than such traditional means as abstinence and infanticide, but none are more effective.

What explains the shift to lower desired levels of fertility on the part of parents? The truth is, we do not really know. "Modernization" is often said to be the engine powering sustained fertility decline. But if that were truly so, why would France—poor, rural, agrarian and largely illiterate at the time—have been the first country in the world to begin the process? Some sociologists and economists have argued that the transition from high to low levels of fertility is explained by the advent of new familial arrangements whereby wealth begins to flow from parents to their children, or by the rising value of (and opportunity costs attendant upon) human time.²² Other seemingly reasonable theories have

been offered as well. "The problem," as Charles Tilly once observed about fertility decline as an historical phenomenon, "is that we have too many explanations which are individually plausible in general terms, which contradict each other to some degree, and which fail to fit some significant part of the facts."²³

MORTALITY AND HEALTH

From the standpoint of the individual, there is no pre-ordained "optimum" for fertility. The situation is quite different for health and mortality: apart from pathological cases, the desire for long and healthy lives is all but universal. In this respect at least, the twentieth century has been a tremendous success, for it has witnessed an unprecedented worldwide explosion of health which has dramatically and nearly continuously improved survival chances for every population on the face of the earth.

The dimensions of the twentieth century's health explosion are framed by a few basic figures. At the start of our century, a rough guess would place global life expectancy at birth at about 30 years.²⁴ By the early 1990s, global life expectancy is thought to have risen to about 64 years—more than doubling over these nine decades. Since it is further believed that mankind's life expectancy in earlier times could not have been much lower than

20 over any long period without raising the prospect of extinction,²⁵ it would seem that over three-fourths of the total improvement in human longevity since the origin of our species has been achieved since 1900.

This worldwide health explosion explains the global “population explosion.” Rapid population growth commenced not because human beings suddenly started breeding like rabbits, but rather because they finally stopped dying like flies. As we have already seen, fertility rates in almost all regions of the world are either declining, or currently below replacement. To the extent that fertility levels may have risen in recent decades in some areas, especially in sub-Saharan Africa, these increases may also speak to improvements in health. In many pre-industrial societies, after all, infertility was a prevalent biological condition—and was perceived locally as *the* serious “population problem.”²⁶

Most of the improvement in global life expectancy in our century is believed to have taken place since the end of World War II. Figure 4 presents the United Nations’ estimates and projections for the four decades from 1950/55 to 1990/95. By these calculations and assumptions, life expectancy at birth for the world as a whole increased by 18 years, or nearly two fifths, over these four decades—even though the share of world population comprised by low-income, lower-life expectancy societies has risen steadily between 1950 and 1995. In the world’s more developed regions, life expectancy at birth is thought to have increased by less than a decade over those years; for the less developed regions as a whole, it is thought to have risen by over two decades—which is to say by over half since the early 1950s.

Reductions in mortality over the postwar period have generally been much more rapid in the less developed regions than in the more developed ones.

In the low-income regions, improvements in life expectancy varied by country, and by region. For Asia, life expectancy is thought to have increased by about 23 years between 1950/55 and 1990/95; for Latin America and the Caribbean, the increment is placed at about 17 years, whereas Africa is said to have enjoyed an increase in life expectancy at birth of “only” about 15 years. Of the low-income areas’ most populous countries, China’s life expectancy is thought to have risen by about 28 years; India’s, by about 22; Indonesia’s, by about 25; Brazil’s, by about 15; Pakistan’s, by about 23; Bangladesh’s, by about 19; Nigeria’s, by about 14. Only one region of the world appears to have experienced long-term stagnation or retrogression in health progress during the postwar era: this was the Soviet bloc’s Warsaw Pact states. In Eastern Europe, life expectancy is thought to have risen by only 1 year between the late 1960s and the late 1980s; in the Soviet Union, life expectancy at birth is believed to have been slightly *lower* in the late 1980s than it had been in the early 1960s.²⁷ The problems of this region, it seems fairly clear, are to be explained not in terms of Malthusian mechanisms, but rather by the systemic and structural defects of Soviet Communist governance.²⁸

Life expectancy at birth is strongly affected by the survival chances for babies. Worldwide improvements in life expectancy reflect a corresponding worldwide improvement in prospects for child and infant survival. Figure 5 traces these patterns over the postwar era. For the world as a whole, the infant mortality rate—that is to say, the number of babies dying in the first year of life for every 1,000 born—is thought to have fallen by nearly 60 percent. In the more developed regions, the drop is estimated to have exceeded 80 percent; in the less developed regions, it is thought to have exceeded 60 percent. (The reason that the world’s total drop in infant mortality rates is lower than that estimated for either large region is because the less developed regions, with their much higher infant mortality rates, have accounted for a progressively larger share of the postwar world population.)

For some large populations, the drop in infant mortality rates over the postwar period have been little short of remarkable. Hong Kong, for example, is said to have witnessed a decline from 79 to 7 between the early 1950s and the early 1990s—a drop of over 90 percent. But even troubled areas within the low-income expense seem to have made tremendous strides. Over the past four decades, for example, Bangladesh is thought to have experienced a drop in infant mortality rates of 40 percent, and African infant mortality rates are believed to have been cut roughly in half.

Although activists in the international population and environmental movements do not typically comment on the significance of this international revolution in health conditions, its economic implications are major and immediate. First and foremost, better health and extended longevity constitute a self-evident

There can be little doubt that the per capita food production for the world as a whole has increased markedly over the past sixty years—and that per capita food availability has risen in every major region of the world.

improvement in the human condition—one of tremendous value to the persons concerned. Careful if necessarily speculative explorations have shown that the reduction of mortality levels confers a benefit upon individuals for which they would be willing to spend considerable sums—if they could.²⁹ Conventional systems of national accounts, of course, do not count improvements in mortality as a positive item in the economic ledger—unless, of course, they occur among animals.

Second, it appears that reductions in mortality over the postwar period have generally been much more rapid in the less developed regions than in the more developed ones. For all the talk of a “widening gap” between rich and poor countries, it would appear that one easily measurable and pre-eminently important material difference has been narrowing steadily and appreciably.

productivity potential, of course, may not be able to capitalize upon their new capabilities for a variety of reasons. An adverse “business climate” or “policy environment” can reduce rates of return on “human capital” just as surely as on “physical capital.” Even so, the fact is that the same forces which have powered the modern “population explosion” have also eased the constraints upon attaining higher levels of per capita output in contemporary Africa, Asia, and Latin America.

Finally, improvements in health and longevity augur well for improvements in a population’s productivity. It is not simply that a healthier population will be able to work harder. As Nobel economics laureate Theodore Schultz has argued, improvements in health and mortality increase the attractiveness of investments in “human capital.”³⁰ Populations with enhanced

FOOD AND AGRICULTURE

Medical advances, innovations in transport and communications, and improvements in administrative capacity are among the factors that have contributed to the dramatic worldwide reductions in mortality levels of the past two generations. (Indeed, thanks to technological progress it has become possible to “purchase” longer life at an ever lower price—a truth underscored by the fact that the current *global* life expectancy is estimated to be only about three years shorter than was that of the United States in 1950.³¹) Improvements in worldwide health and mortality also owe much to the tremendous improvement in recent generations of the world food situation.

Other studies in this series will examine world agricultural trends in greater detail. But since food supplies are so often viewed as the limiting constraint on the growth of human populations, a discussion of world population patterns which does not touch upon food and nutrition may seem to some critically incomplete.

As noted earlier, estimates of agricultural output and consumption are still subject to large margin of error. Such uncertainties notwithstanding, there can be little doubt that the per capita food production for the world as a whole has increased markedly over the past sixty years—and that per capita food availability has risen in every major region of the world. Figure 6 presents the time series statistics compiled by the FAO and its predecessor organizations on estimated daily per capita calorie availability. By these figures, the global per capita calorie availability rose by nearly a third between the 1930s and the late 1980s. For the less developed regions of Africa, Asia, and Latin America as a whole, *per capita* food supplies are estimated to have risen by more than 40 percent. By these numbers, per capita food availability for the less developed regions would now appear to have reached the level the more developed countries had attained in the years just before World War II. Once again, trends in the “Third World” differ by region. Yet even in Africa, per capita food supplies are estimated to have been somewhat higher in the late 1980s than a generation earlier—and nearly one-fourth higher than they had been before World War II. Note that, at least by this measure, nutritional progress in sub-Saharan Africa was apparently rapid until the early 1960s, but that it decelerated sharply thereafter.

Per capita output and income have multiplied several-fold over the course of our century.

Between the early 1960s and the late 1980s, according to the FAO’s estimates, per capita food supplies rose by about 18 percent for the world as a whole, and by about 28 percent for the less developed regions. Estimates from the USDA differ in particulars, but paint a broadly similar picture [see Figure 7]. According to the USDA, food supplies per person rose by 17 percent over this period for the world as a whole, and by 25 percent in the less developed regions. Like the FAO, the USDA identifies sub-Saharan Africa as the region with the least nutritional progress between the early 1960s and the late 1980s, although both organizations see slight improvements in the sub-Sahara over those decades.

Other studies in this series will deal with the scientific and technical foundations of the improvement in the world’s food and agricultural situation. For now it will suffice simply to note that a dramatic improvement in the world’s food situation has in fact occurred; that it has taken place steadily over consecutive generations; and that this period of sustained improvements coincided with the most rapid episode of global population growth in human history.

The real price of foodgrains has been gradually and significantly declining.

Two features of the world agricultural situation deserve additional comment. First, increases in per capita food production in the less developed regions have been distinctly more limited over the past sixty years than their increases in per capita food availability. This discrepancy has sounded alarm bells in some quarters, where it is interpreted as proof that the world’s faster growing populations are already embarked upon an unsustainable trajectory of resource consumption. A much more pedestrian explanation accounts for the discrepancy more satisfactorily: it has to do with changing patterns of the world’s food trade. In the pre-war era, under arrangements often coincident with colonial rule, the world’s less developed regions were net food exporters to the world’s more developed regions; after World War II, the low-income countries became net cereal importers from the OECD countries. The world grain trade has expanded enormously: from roughly 40 million metric tons of total volume in 1934-

38³² to over 100 million tons by the mid-1960s, and to well over 200 million tons by the early 1990s.³³ Purchases by low-income populations have been a driving force behind this expansion, and low income countries have used their cereal imports to improve the local diet.

One may of course question the wisdom of this strategy—critics have detailed the diverse costs of “urban bias” and agricultural neglect in the Third World³⁴—but from a financial standpoint it has been incontestably affordable. By the World Bank’s estimate, for example, the developing countries imported over 110 million metric tons of grain in 1991—but food purchases as a whole (including purchases of many goods besides cereals) accounted for only 10 percent of the group’s total 1991 import expenditures.³⁵

Per capita output in Western Europe, North America and Australia increased more than thirteen-fold between 1820 and 1989.

And why have massive grain imports proved to be so affordable for less developed countries? The second noteworthy feature of the international grain trade clarifies the first. In the international marketplace over the postwar era, *the real price of foodgrains has been gradually and significantly declining.* To be sure, international food commodity prices fluctuate unpredictably, and they have at times doubled or tripled virtually without warning (as they did during the so-called “World Food Crisis” of the early 1970s, although largely as a response to precipitous and ill-advised governmental interventions³⁶). But there is a strong tendency evident in the long-

run relative prices of foodgrains, and it is unmistakably downward. Over the course of the twentieth century, according to a careful study conducted by the World Bank and published in 1988, the relative price of foodgrains dropped by over 40 percent.³⁷ The trend in real grain prices has continued downwards in the years since that study was completed. In short, food has been getting cheaper. By the information that prices are meant to convey, foodgrains have become a *less* scarce resource over the course of our century—despite more than a tripling of world population, and an even greater increase in international demand for these commodities.

INCOME AND PRODUCTIVITY

Compared with counting a nation’s population or estimating a country’s crop output, the task of measuring national income is fraught with difficulty. A country’s production of goods and services can only be totaled through some common standard of value—and the valuation problem is much more vexatious than we might suppose from the promiscuous use of economic statistics in daily news accounts, academic studies, or official policy papers. Even so, a few overarching global trends in income and productivity are unmistakable:

- 1) per capita output and income have multiplied several-fold over the course of our century;
- 2) improvements in the efficiency with which resources are put to use has been a driving force in modern economic growth; and
- 3) the role of human skills has grown steadily more important in the modern production process, while the role of natural resources and physical equipment has steadily diminished.

Perspective on the worldwide rise in per capita output in the modern era is provided by Table 1. The numbers in this table were assembled by Angus Maddison, currently of the University of Groningen and for many years the director of the OECD’s Development Research Centre. This sample of forty three countries represents about three-fourths of the world’s population, and perhaps somewhat more of its economic output. In view of the statistical gaps for a number of the countries over the long period covered, some of these estimates should be seen as heroic, if informed, guesses; certainly these calculations were not meant to be trusted down to the

last dollar. They are, however, broadly informative, and the story they tell is dramatic.

By Maddison's figures, per capita output in Western Europe, North America and Australia increased more than thirteen-fold between 1820 and 1989. Per capita output for this group roughly doubled in the seventy years between 1820 and 1890; it more than doubled over the next sixty years; and in the four decades between 1950 and 1989 it nearly tripled.

Steady economic growth may have begun earlier in these Western European countries and overseas settlements than in the rest of the world, but Maddison's figures demonstrate that the latecomers have often availed themselves of what Alexander Gerschenkron termed the "advantages of backwardness"³⁸ and embarked upon extremely rapid "catch-up growth." Between 1950 and 1989, for example, Spain and Portugal (countries, we may now forget, that were widely regarded as desperately poor not so long ago) both saw their per capita output levels more than quadruple. In other regions, catch-up growth has been even more dramatic. Between 1950 and 1989, for example, per capita GDP is estimated to have increased in South Korea more than eight-fold, and in Taiwan by a factor of ten. Thailand's per capita product has more than doubled in the relatively brief span between 1973 and 1989, increasing by an average of over 5 percent a year. But distinctly lower rates of growth, if sustained over time, can produce extraordinary transformations: Between 1913 and 1989, for example, Japan's rate of per capita growth averaged about 3.5 percent a year—or a 1,200-plus percent increase in per capita production over the period as a whole.

In recent decades, sub-Saharan Africa would appear to have become an island of economic regression in a global sea of economic growth.

By definition, of course, not all countries are success stories. For this very reason, it is worthwhile examining the economic performance of some of the populations that have fared less well to date in the race toward mass affluence. [See Figure 8] Consider Latin America and the Caribbean. Maddison's sample includes three quarters of that region's population. By the numbers of Table 1 and Figure 8, these countries appear to have tripled their per capita output between 1913 and 1989, and to have nearly doubled per capita product between 1950 and 1989. Even though the region spent most of the last decade in a depression sparked by its "debt crisis," per capita output for this Latin American grouping is said to have been higher in 1989 than it was in 1973.

Long-term economic progress is also evident in the populous, low-income reaches of Asia. Poor as it may still be today, India's per capita GDP is thought to have doubled between 1950 and 1989. For Pakistan, per capita output may have more than doubled over those same years, and for Indonesia it may very nearly have tripled. (In China, by these figures, per capita income would have more than quintupled; special caution is appropriate for numbers on centrally planned economies, but there can be no doubting the brisk growth in that nation—especially in more recent years.) Bangladesh stands alone in Table 1 as a country estimated to have enjoyed no significant improvement in per capita output levels over the course of the twentieth century.

And what of today's troubled Africa? It is in the nature of economic data that reliable statistics are likely to be scarcest in precisely the regions that are of greatest humanitarian concern. The seven African countries in Maddison's sample comprise a little than 40 percent of the continent's population, and less than half of the population of the sub-Sahara. The representativeness of these estimates and guesses is a question which cannot be answered without further research. For these seven countries, nevertheless, Maddison indicates a near-tripling of average per capita output between 1913 and 1989. In 1989, by his estimates, the average per capita output for these seven countries was roughly similar to that of Germany in 1890; this average, however is

strongly influenced by South Africa's performance.

According to Maddison's estimates, this sample of African countries on average stagnated over the past two decades; in four of the six sub-Saharan countries, per capita output is said to have declined between 1973 and 1989. In recent decades, by such estimates, sub-Saharan Africa would appear to have become an island of economic regression in a global sea of economic growth. This reversal is all the more puzzling and troubling in that substantial economic gains were apparently registered in Africa earlier in the century. We will return to this problem in the final section of this paper.

How have contemporary economies managed to achieve these significant and sustained increases in their levels of per capita output? Perhaps surprisingly, mobilization of labor, capital, and land—the familiar “factors of production” from classical economic treatises—are of little help in explaining the transformation. More than a generation ago Simon Kuznets demonstrated that the increase *per se* in hours worked and capital stock amassed could not account for the tremendous increase in output per capita in developed countries over the previous century. By his computations, something like four-fifths of their per capita growth had to be explained by other factors.³⁹ Subsequent exercises in “growth accounting” have come up with different figures for given regions and historical periods, but they have generally affirmed the great importance of *qualitative* improvements to the modern process of economic growth: that is to say, improvements in the skills of the workforce and the quality of the capital it uses; improvements in the technology utilized, the scale of operations, and the methods of organization selected; improvements in the risk environment under which potentially productive resources are allocated. In the United States between 1929 and 1982, according to one careful analysis, “total factor productivity” in the American economy more than doubled.⁴⁰ Over the twentieth century, of course, the United States has been the world's leading economy in terms of productivity levels—the economy nearest to the limits of the technologically possible. That such improvements were practicable for the United States only indicates how much greater the opportunities for technology-and-skills-driven growth were for countries at lower initial levels of productivity.

Despite rapid world population growth, global improvements in per capita output levels have been unprecedented in the twentieth century, and show no sign as yet of stopping.

The rise toward mass affluence highlights another general trend: the tendency for human resources to matter more, and for natural resources to matter less, over the course of economic development. Land is a case in point. Around 1870, by Maddison's estimates, nearly 40 percent of the gross domestic product of what are now the OECD countries accrued from agriculture, and farmland figured very prominently in the overall capital stock of the countries in question.⁴¹ By the late 1980s, agriculture accounted for only about 4 percent of the OECD countries' total output, and farmland had become a relatively minor component of these nations' capital holdings. Similar tendencies can be seen in Asian and Latin American economies today.⁴² Gradual diminution of the importance of natural and physical resources in the modern economy further suggested by many other changes,

including the rise over time and among countries in the share of national product accruing to human beings through wages, salaries, and entrepreneurial incomes. While the twentieth century has witnessed declines in the real prices of many commodities,⁴³ it has seen a tremendous increase in the real price of one non-renewable resource: human time.

If the neo-Malthusian view of the world were capable of explaining and predicting events, we should have expected the world economy to be shaped by two trends in our century: 1) a gradual global economic slowdown,

as poor but fast-breeding countries come to comprise an ever greater of total world population, and as rapid population growth pressed the world economy against natural resource constraints; and 2) a gradual widening of income differences within contemporary societies, as poorer elements outbred more educated and affluent groups. Neither of these corollaries of the neo-Malthusian worldview corresponds with observed realities in our age. As we have already seen, despite rapid world population growth, global improvements in per capita output levels have been unprecedented in the twentieth century, and show no sign as yet of stopping. As for income distribution, serious arguments today proceed about trends in particular countries over specific periods, but no serious study has *ever* suggested a steady worldwide “deterioration” of intracountry income distribution. In this respect as in others, contemporary neo-Malthusian doctrine can be seen as a theory still in search of facts.

SETBACKS, DISASTERS, AND CATASTROPHES: A POPULATION-RESOURCE PROBLEM?

Despite the positive general direction of the health, food, and income trends outlined in this chapter, the twentieth century has been punctuated by tragedies involving loss of life on a massive scale. It has also seen economic setbacks that have lasted decades, and affected hundreds of millions of people. Do these episodes finally provide the facts that neo-Malthusian theorists have been searching for? Are the economic reversals and demographic catastrophes of our era a consequence of population-resource pressures?

To approach this question, we should examine three modern phenomena: 1) the major famines of the twentieth century;⁴⁴ 2) the recent economic slump in Latin America; and 3) sub-Saharan Africa’s recent and extended economic and agricultural malaise. Before analyzing the causes of modern catastrophe, however, we should mention a seldom-noticed but nonetheless important characteristic of their aftermaths. In the modern era, recovery from catastrophes has typically been amazingly quick. The experiences of Japan and China make the point [see Figures 9 and 10]. Japan suffered the devastating destruction attendant upon complete defeat in a total war; China endured the worst famine of the twentieth century—a famine that may have cost as many as 30 million lives.⁴⁵ Yet as can be seen from the accompanying tables, the impact of these cataclysmic events on levels of national life expectancy, while terrible, was also brief. Recovery to pre-disaster levels of life expectancy required only a few years; thereafter, both societies were able to manage rapid improvements to levels never previously attained. (Japan in fact enjoys the longest life expectancy at birth of any contemporary society.) Note that recovery was as rapid and vigorous for a low-income society like China as for the more technologically sophisticated nation of Japan. Rapid and permanent recovery from disaster, moreover, is not characteristic of Asian societies alone. Despite the appalling losses from its brutal civil war, for example, Spain’s health and economic progress has been rapid over the post-World War II era. By the same token, the Netherlands suffered through a serious famine in 1944/45,⁴⁶ but this evidently has not prejudiced her postwar advance.

Our century has recorded at least three famines which are thought each to have claimed the lives of at least several million persons. In each of these tragedies the hand of the state figured prominently.

Our century has recorded at least three famines which are thought each to have claimed the lives of at least several million persons. These were the Soviet famine of 1934, the Bengal Famine of 1943, and China’s “Three Lean Years” of 1958-61. More recently, famine in Ethiopia is said to have taken a toll of hundreds of thousands.⁴⁷ Did these result from population pressures?

In a tautological sense it is true that famines represent a critical imbalance between a stricken population and the food resources available to it. In the cases mentioned above, moreover, it is true that local fertility levels were high, and rates of natural increase were generally rapid, in these diverse settings just before the onset of their famines. But to describe these tragedies as demographically induced is to ignore the actual histories of each episode. For in each of these tragedies the hand of the state figured prominently; in the final analysis,

Sub-Saharan Africa's pervasive agricultural and economic decline followed on the heels of decolonization.

the millions who perished were killed by the direct actions of their own governments.

The Soviet famine of 1934, for example, was the consequence of the official collectivization campaign in the Ukraine; Stalin specifically intended to use starvation as a weapon to break Ukrainian resistance to his policies, which is why Robert Conquest has termed the hunger a "terror-famine."⁴⁸ The Bengal Famine of 1943 took place at a time when local harvests were quite good—but when British officials, fearing a possible Japanese invasion from neighboring

Burma, had systematically removed local grain supplies.⁴⁹ The Chinese famine followed immediately upon Mao's "Great Leap Forward," a collectivization campaign that inadvertently shattered the agricultural system in a low-income population.⁵⁰ Mass starvation erupted in Ethiopia in the 1980s after its Communist government inflicted a series of harsh and injurious policies on a population whose living standard was typically only slightly above the subsistence level.⁵¹

In each of these instances, the reckless or intentionally punitive policies embraced by presiding governments would have been expected to result in massive loss of life—*no matter what the local fertility level or population growth rate*. If the famines in these diverse countries are to be described as "population problems," it is only to the extent that their problems were precipitated by their distinctly delimited populations of *rulers*.

What about the economic difficulties of Latin America and the Caribbean over the past decade? According to most available estimates, per capita output in this region was lower in the early 1990s than it had been a decade earlier. Is Latin America's prolonged economic slump an instantiation of population-resource pressures?

Viewed solely by its forensics, the Latin American case is not easily presented as an example of demographically-induced depression. Latin America's economic slump, after all, did not take place until the early 1980s—by which time both fertility levels and population growth rates had been declining for nearly two decades. During previous decades of much higher demographic growth rates and TFRs, Latin America's pace of economic growth had been steady and quite rapid. The outlines of Latin America's slump, moreover, are hardly suggestive of an "overshoot" of sustainable consumption levels. As may be seen in Figure 8, Latin America's per capita output plunged in the early 1980s, and has been recovering since then. The curve will be familiar to anyone who knows the phrase "business cycle."

What prompted the economic plunge in the early 1980s? The drop can be explained without any reference to population trends. Latin America was shaken by a "debt crisis"—an economic dislocation set in motion by heavy government borrowings committed to economically questionable purposes, and sparked by a sudden shift in international capital markets from negative to sharply positive real interest rates in the late 1970s and early 1980s.⁵² Many East Asian states were also heavy borrowers in the 1970s, but they were generally able to weather the storm of the early 1980s because they had begun by allocating their loans to economically productive projects, and embraced disciplined programs of macroeconomic adjustment when the storm struck.⁵³ Performance of Latin America's economies has varied over time and among countries since the initial

“debt shock”—and these distinctions have had more to do with the extent to which degree to which sitting governments have been willing to restrain *dirigiste* impulses and unleash competitive economic forces than to any observable demographic differences among these affected societies.

What, finally, of the sub-Saharan quandary? No other region of the modern world has such a poor record of economic performance; no other region has such high fertility rates, or such a rapid pace of population growth. To those for whom such fundamentals frame an airtight case, alternative explanations may seem superfluous or distracting. Yet it is difficult to see how one can examine the performance of economic systems without taking into account their general political environments or the specifics of governmental policies and practices.

Sub-Saharan Africa’s pervasive agricultural and economic decline followed on the heels of decolonization. For the sub-Sahara, one may recall, decolonization and independence happened all at once, over a matter of a relative handful of years in the late 1950s, the 1960s, and the early 1970s. Why the initial decades of self-rule should have resulted in so many failures of governance in such different cultural settings, and with separate colonial traditions, is a question which will doubtless concern historians for years to come. But the fact of this pervasive failure of sub-Saharan governance is scarcely open to dispute. Over the past three decades civil strife and ethnic tensions have been the rule, not the exception, in sub-Saharan politics; the state has been deployed as an instrument of tribal warfare on more than a handful of occasions. To the extent that colonial rule bequeathed traditions of accountable government or rule of law—legacies admittedly uneven among the European imperialists in Africa—such heritages were commonly ignored or overturned by new rulers. The new governments in the sub-Sahara typically squeezed the farmer through punitive prices and taxes, and discouraged exports through perennially overvalued exchange rates. Primary education was often ignored in favor of public subventions for the higher schooling of elites. Budget discipline in this group of countries rapidly eroded, and accounting for official expenditures generally evolved from a routine procedure into a murky and contentious issue.⁵⁴ Under such circumstances, does one really need any demographic details to make an informed prediction about likely economic outcomes?

To hold that bad governments are immutable, but that their subjects’ family size preferences should not be accepted as final, is to enter a perilous ethical realm.

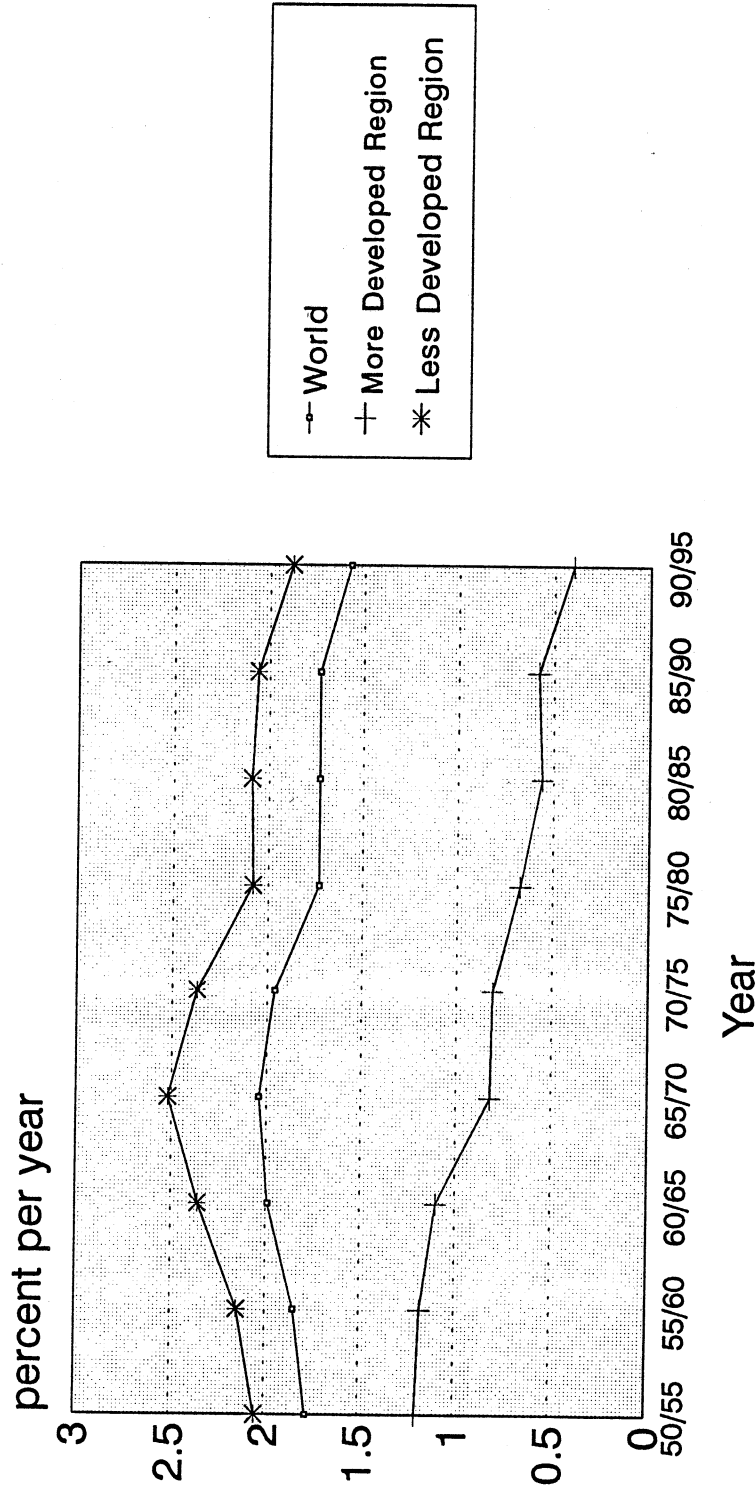
Does this quick survey demonstrate that population trends played no role whatever in the troubles of the contemporary era? Not at all. The impact of population change on social conditions and economic performance may be complex and as yet poorly understood, but it clearly entails challenges as well as opportunities. Individuals, groups, and countries do not always respond successfully to the challenges they face. Whatever else it may portend, population growth is clearly a form of social change; nations and governments that cope poorly with change are unlikely to deal adeptly with the disequilibria that more rapid rates of population growth necessarily bring. It may be that rapid rates of population have amplified the magnitude of state-sponsored famines, or the dimensions of economic failure under severe misrule. But the presumption that population growth is the determining factor in these episodes can only be maintained by resolutely ignoring the actual practices and policies of existing regimes. To hold (if implicitly) that bad governments are immutable, but that their subjects’ family size preferences should not be accepted as final, is to enter a perilous ethical realm. More than that, it is to declare opposition to the entire purpose of modern economic development, which is, after all the extension of human choice.

ABOUT THE AUTHOR

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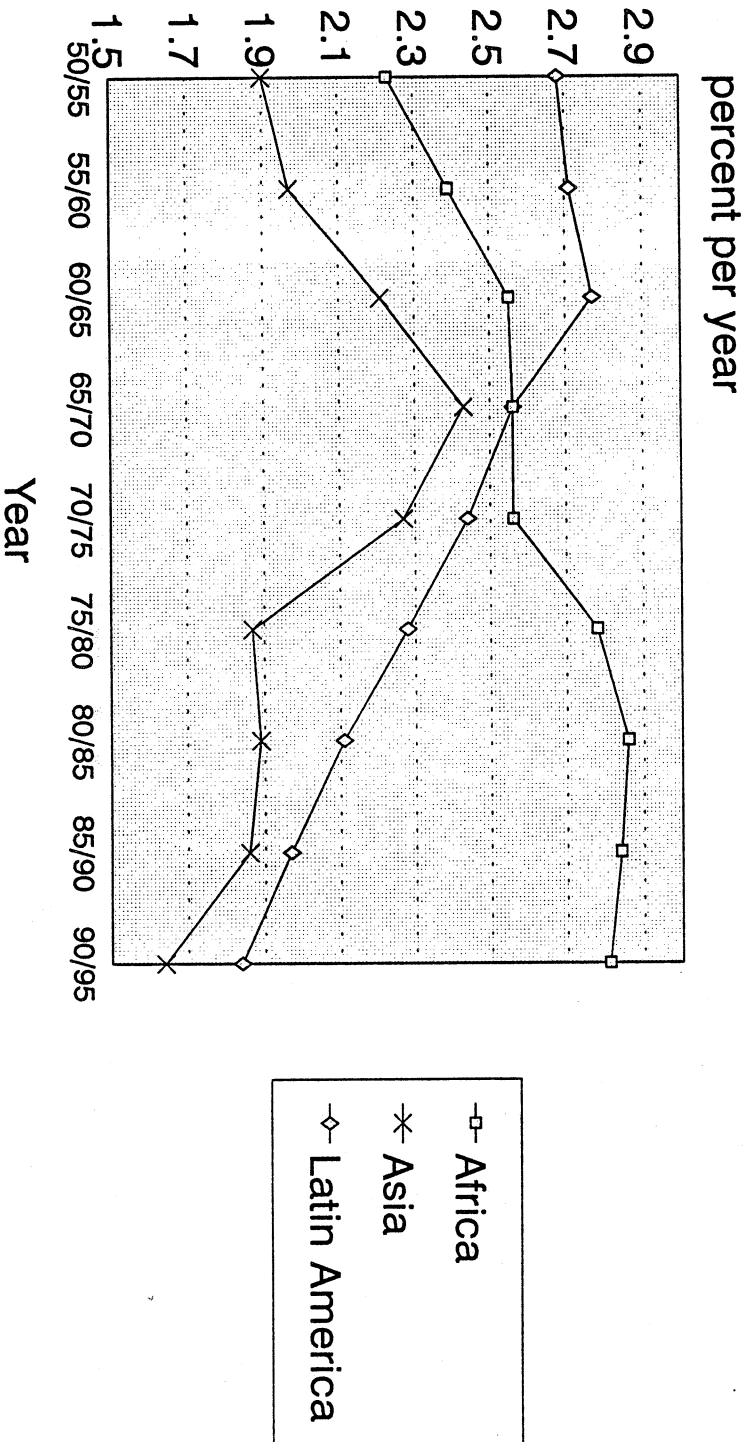
Tables and Figures

Figure 1A--Estimated and Projected Rates of Population Growth for the World and Selected Regions, 1950/55-1990/95



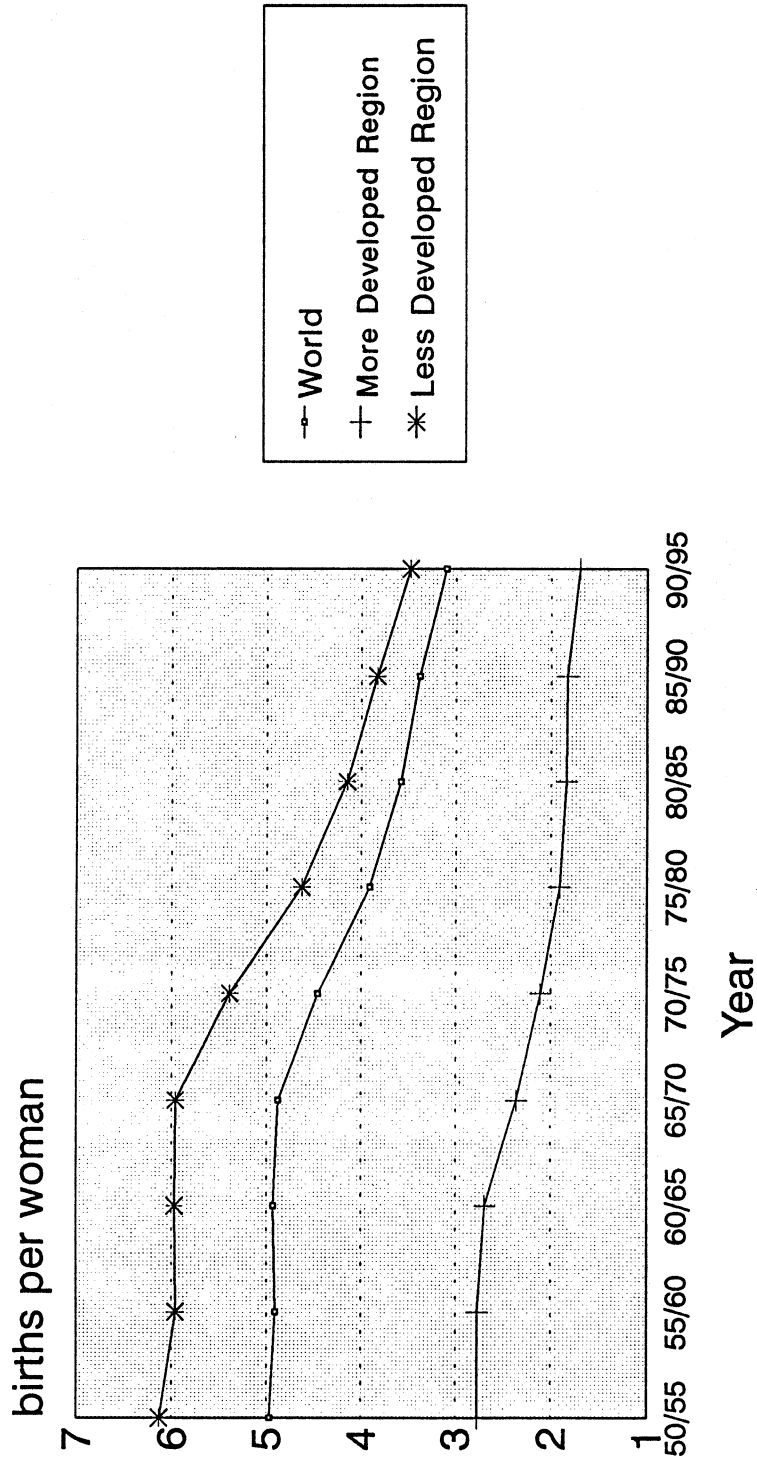
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 56, 60.
Note: "medium variant" projections used for 90/95.

Figure 1B--Estimated and Projected Rates of Population Growth for Selected Regions, 1950/55-1990/95



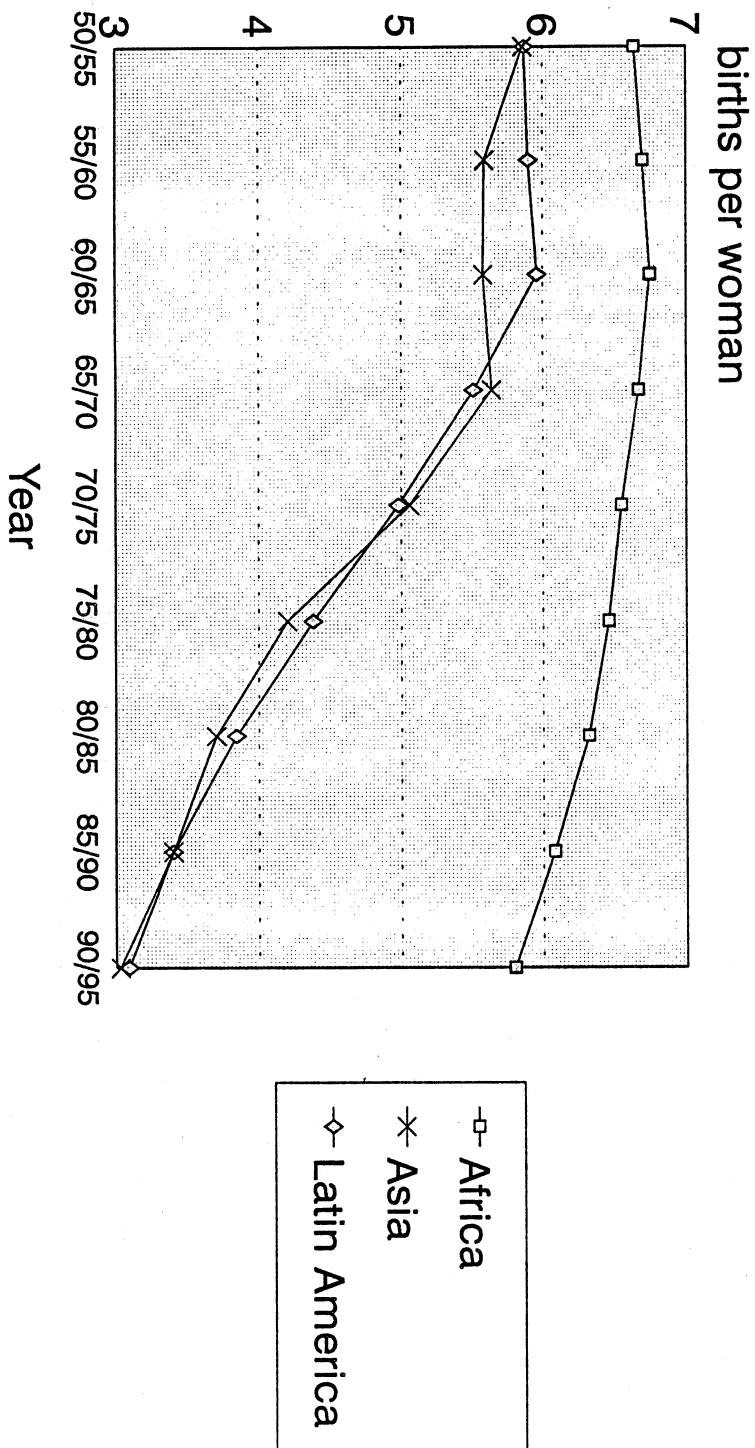
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 56-8, 62, 64.
 Note: "medium variant" projections used for 90/95.

Figure 2A--Estimated and Projected Total Fertility Rates for the World and Selected Regions, 1950/53-1990/95



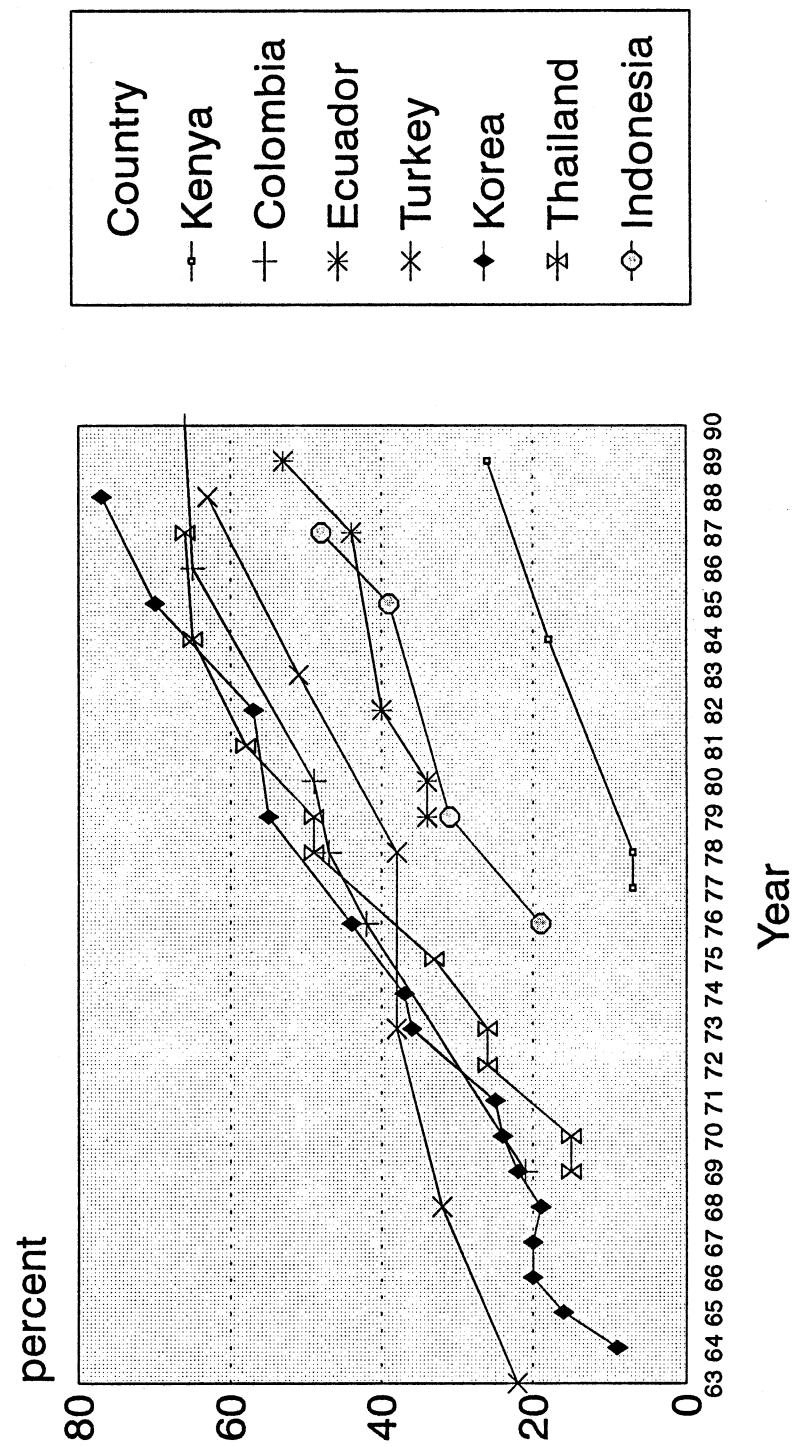
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 122, 126.
 Note: "medium variant" projections used for 90/95.

Figure 2B--Estimated and Projected Total Fertility Rates for Selected Regions 1950/55-1990/95



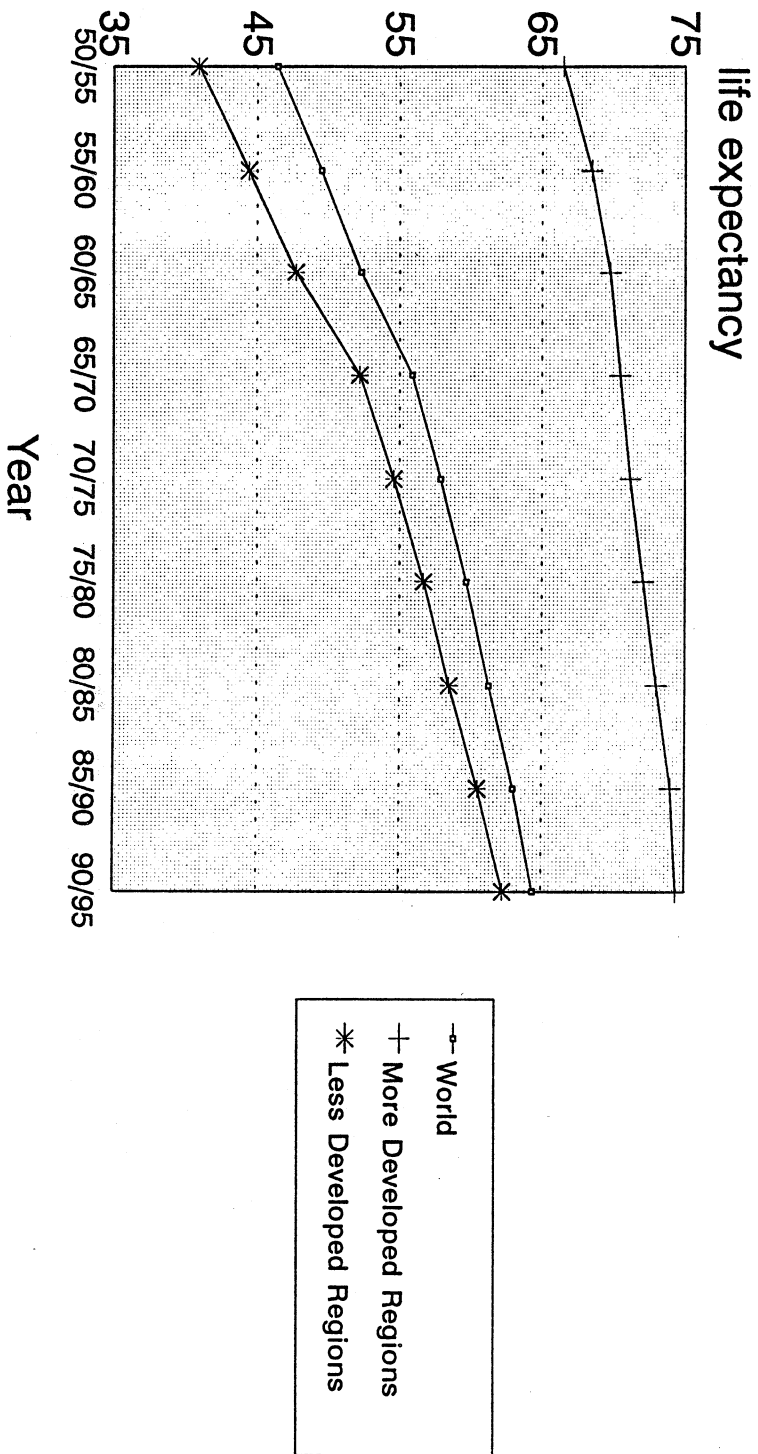
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 122, 124, 136, 130.
 Note: "medium variant" projections used for 90/95.

Figure 3--Reported Prevalence of Contraceptive Practice Among Couples of Reproductive Ages: Selected Countries, 1963-1990



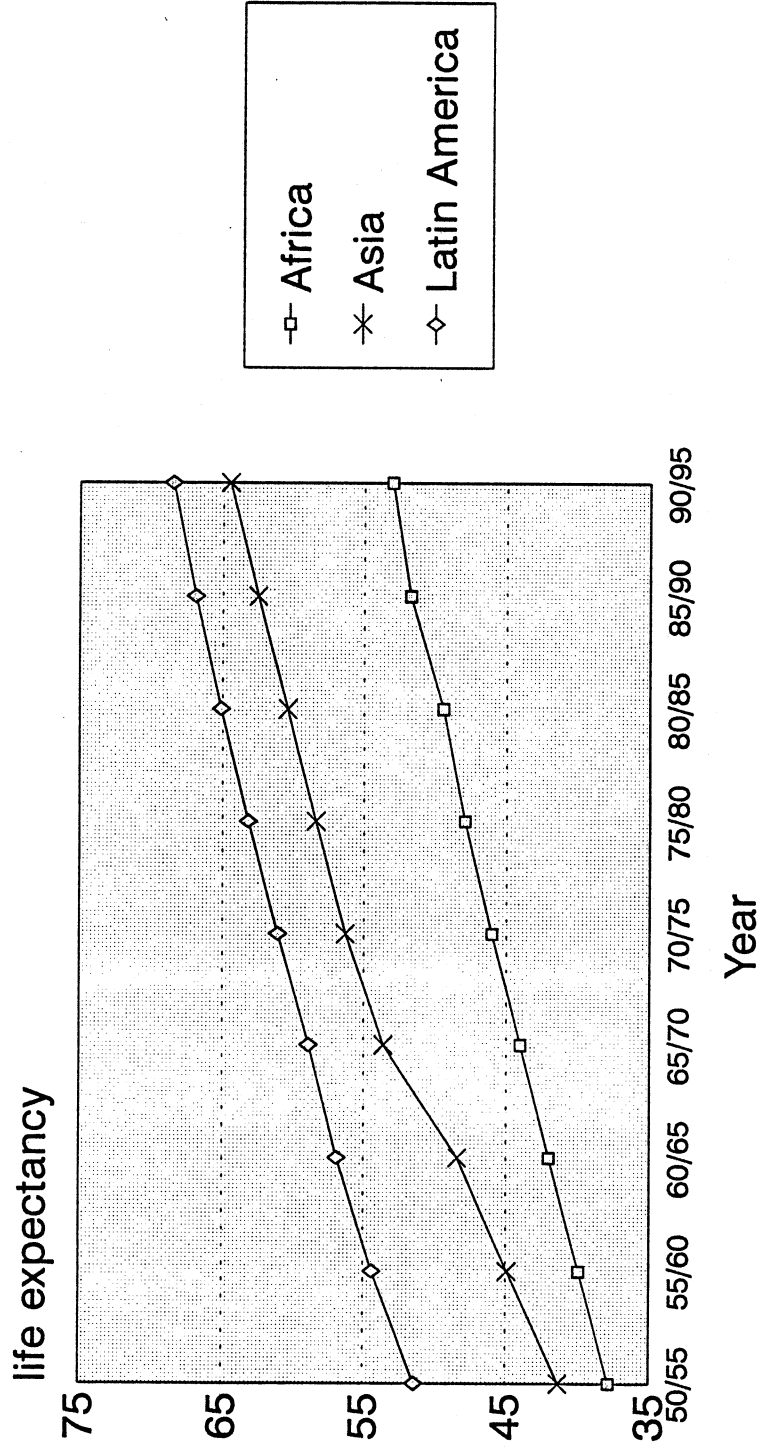
Source: Family Planning and Child Survival Programs (New York: The Population Council, 1992), pp. 56-62.

Figure 4A--Estimated and Projected Life Expectancy
At Birth for the World and Selected Regions
1950/55-1990/95 (years)



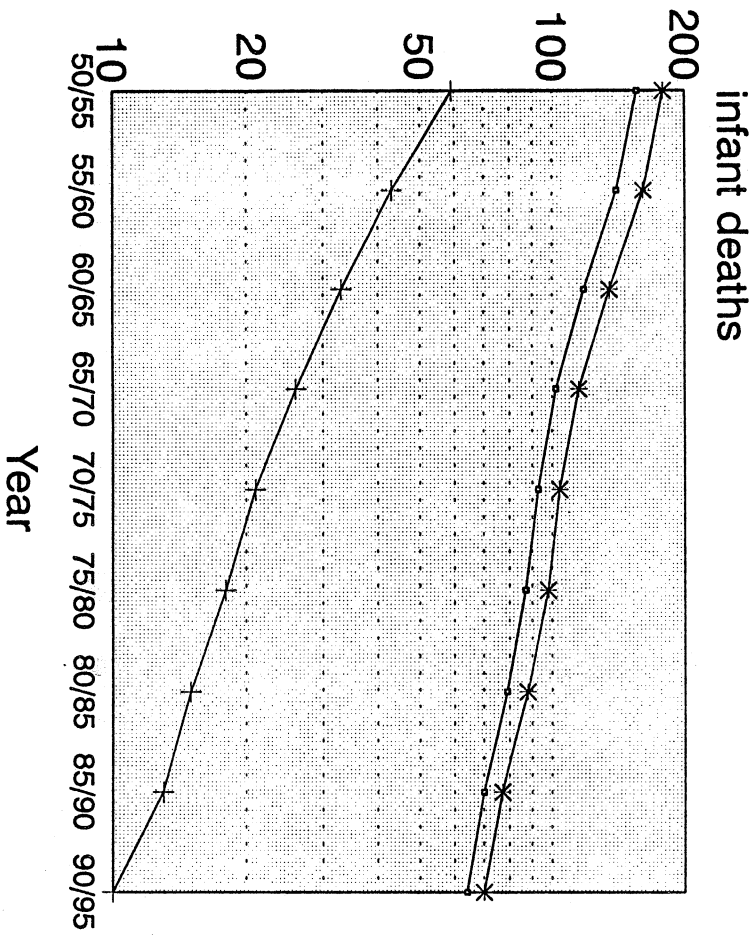
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 166, 180.
Note: "medium variant" projections used for 90/95.

Figure 4B--Estimated and Projected Life Expectancy
 At Birth for the World and Selected Regions
 1950/55-1990/95 (years)



Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Social and Economic Information and Policy Analysis, 1994), pp. 166, 169, 175, 180, 186.
 Note: "medium variant" projections used for 90/95.

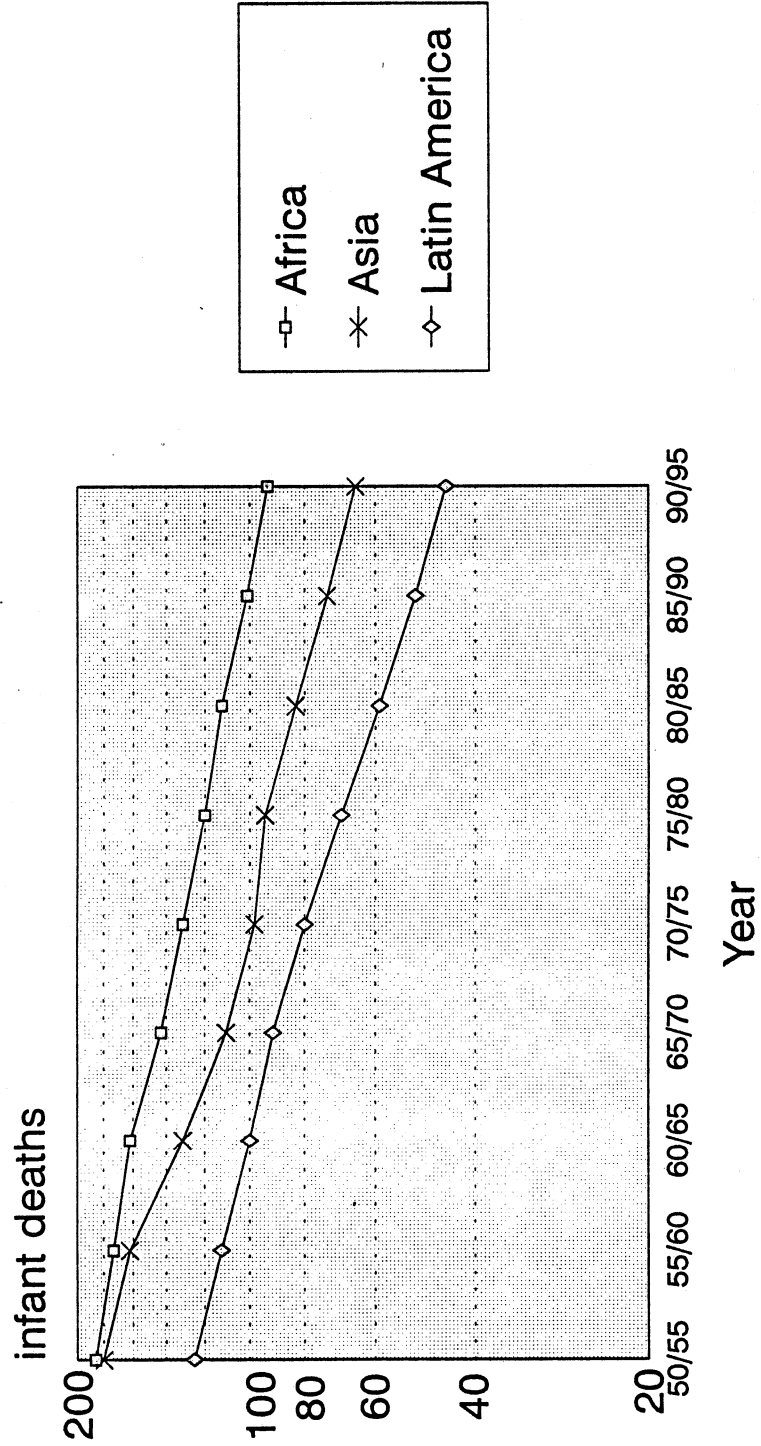
Figure 5A--Estimated and Projected Infant Mortality Rates for the World and Selected Regions, 1950/55-1990/95 (deaths per 1,000 births)



○ World
 + More Developed Region
 * Less Developed Region

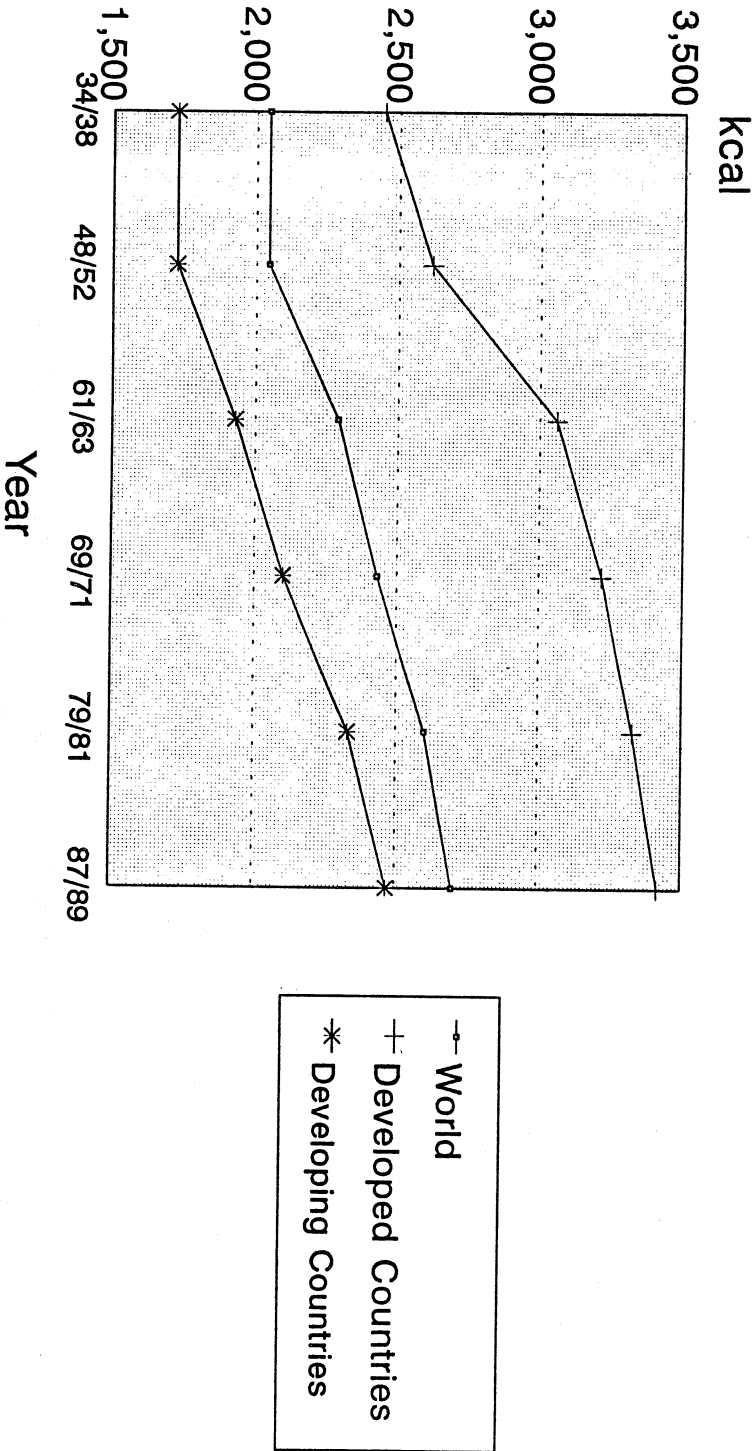
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis), pp. 206, 210.
 Note: "medium variant" projections used for 90/95.

Figure 5B--Estimated and Projected Infant Mortality Rates
for the World and Selected Regions, 1950/55-1990/95
(deaths per 1,000 births)



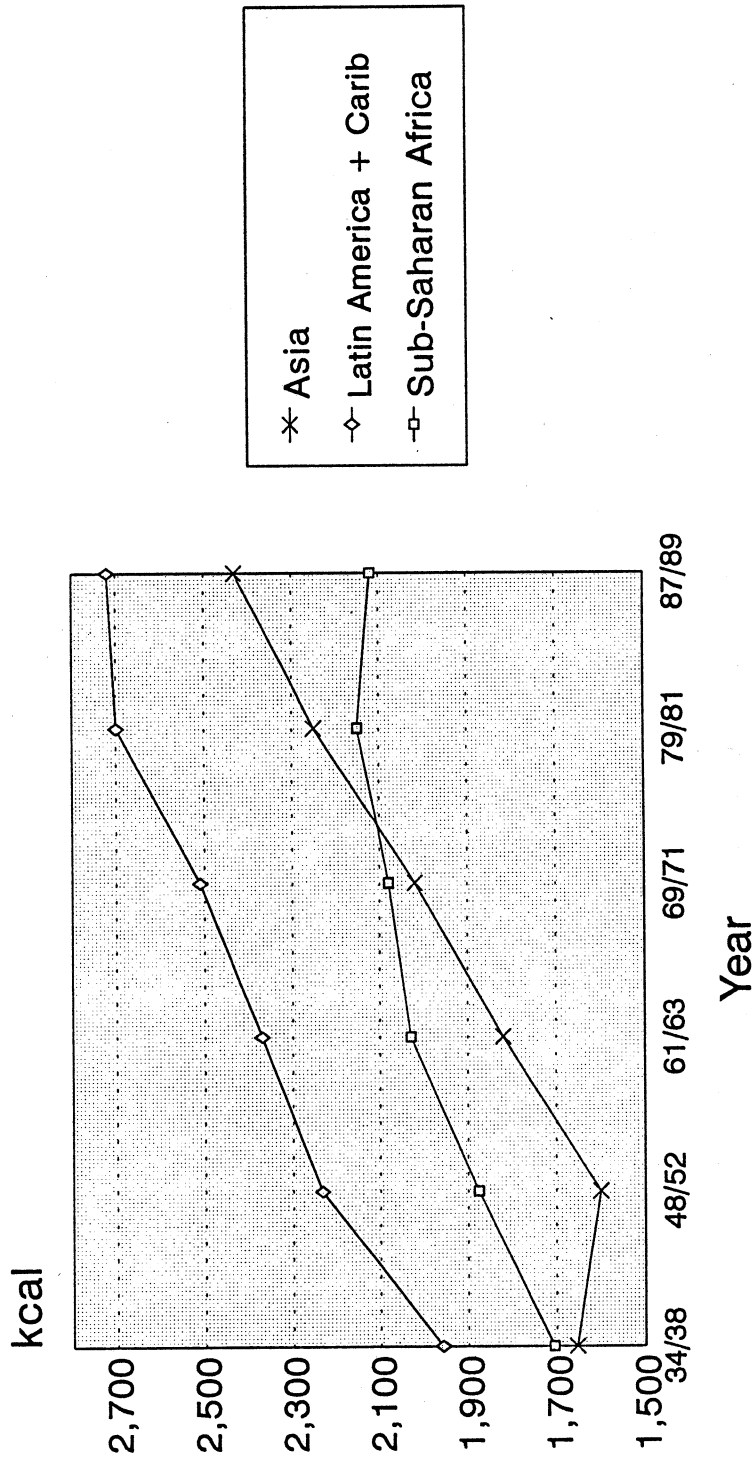
Source: United Nations, World Population Prospects: The 1994 Revision (New York: UN Department for Economic and Social Information and Policy Analysis, 1994), pp. 206, 208, 210, 214.
Note: "medium variant" projections used for 90/95.

Figure 6A--Estimated Food Supplies for Direct Human Consumption, 1934/38-1987/89 (kilocalories, per person, per day)



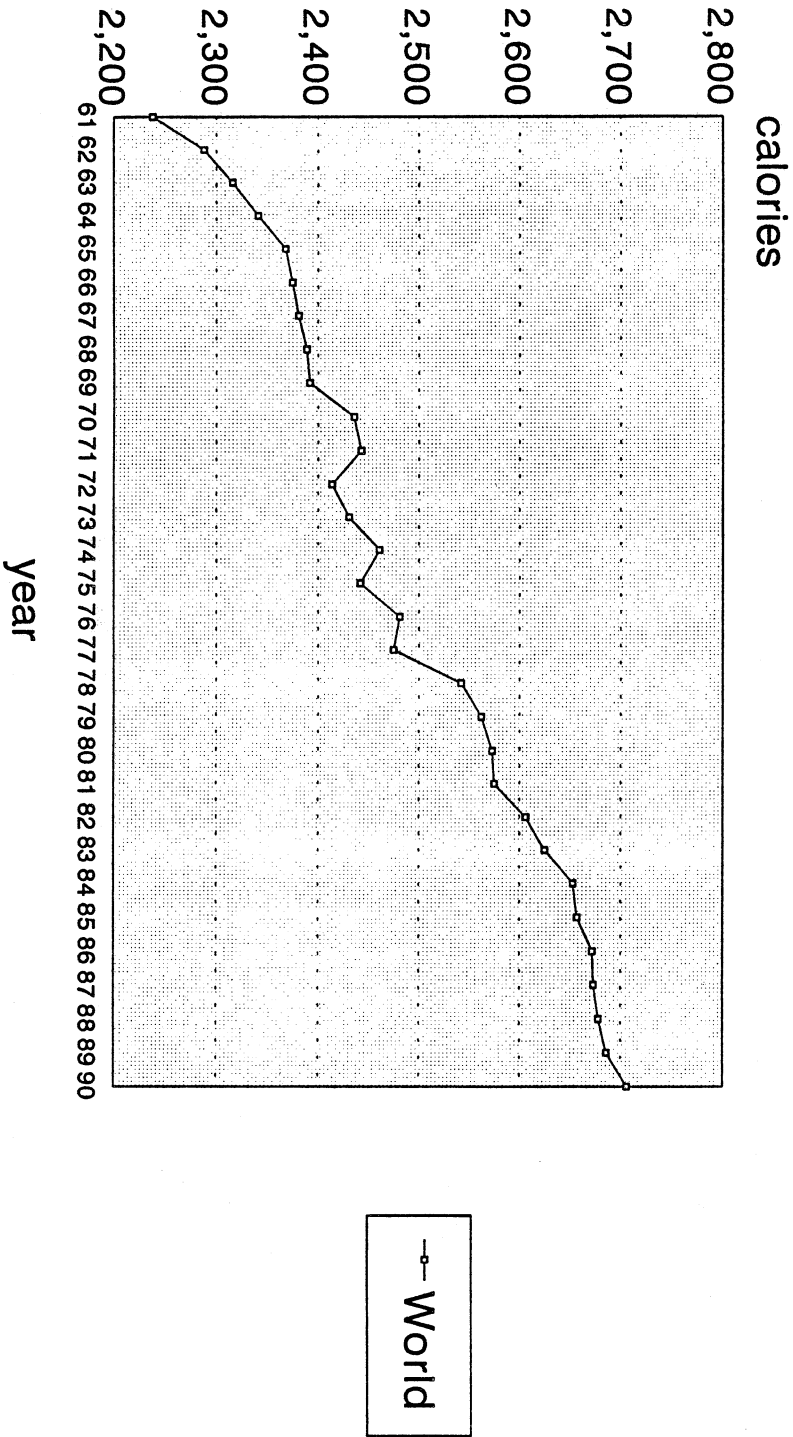
Sources: FAO, State of Food and Agriculture 1991, p. 14; Simon Kuznets, Population, Capital and Growth (New York: W.W. Norton and Co., 1973), p. 60.

Figure 6B--Estimated Food Supplies for Direct Human Consumption, 1934/38-1987/89 (kilocalories, per person, per day)



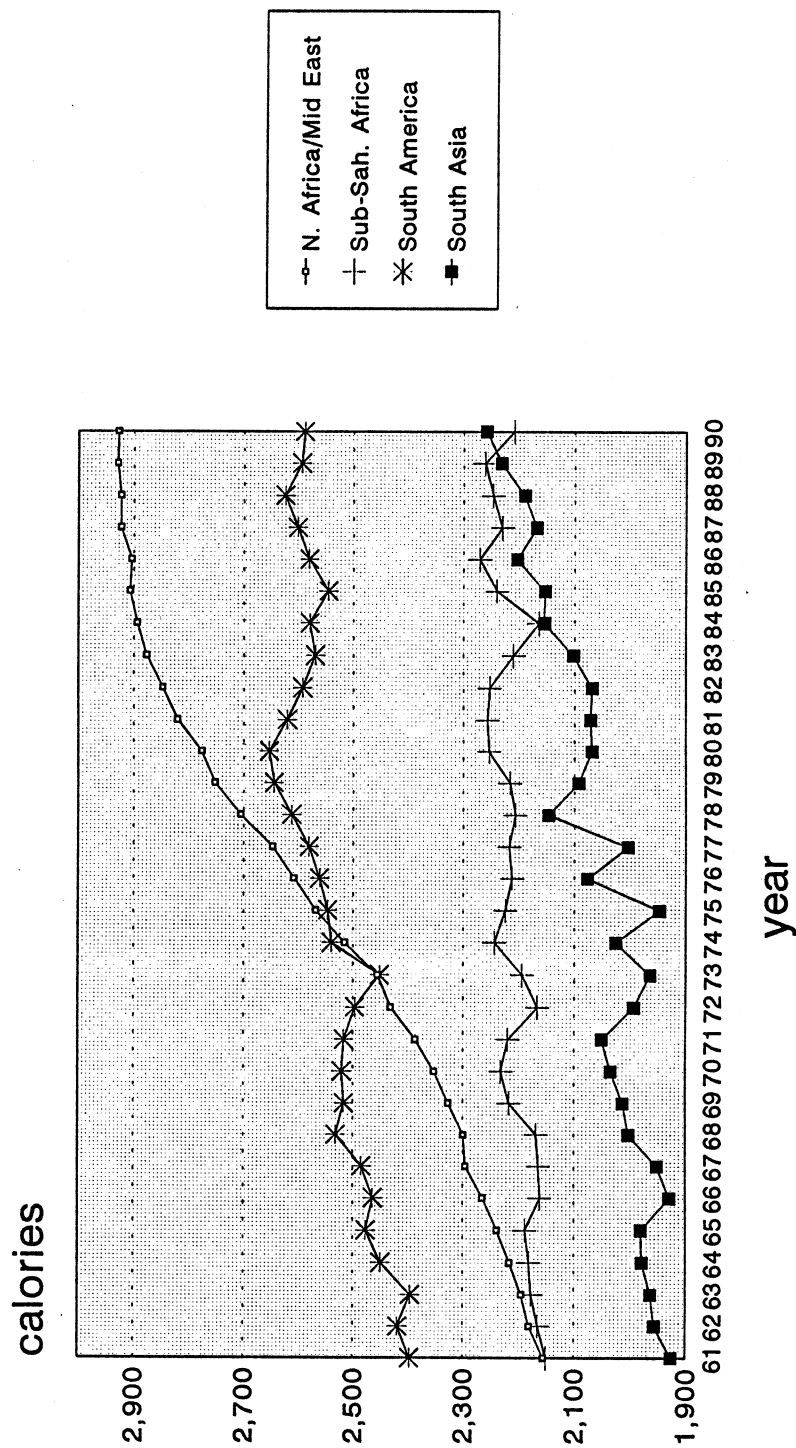
Sources: FAO, State of Food and Agriculture 1991, p. 14; Simon Kuznets, Population, Capital and Growth (New York: W.W. Norton and Co., 1973), p. 60.

Figure 7A
 USDA Estimates of Available Food Supplies for the World
 (calories per person, per day)



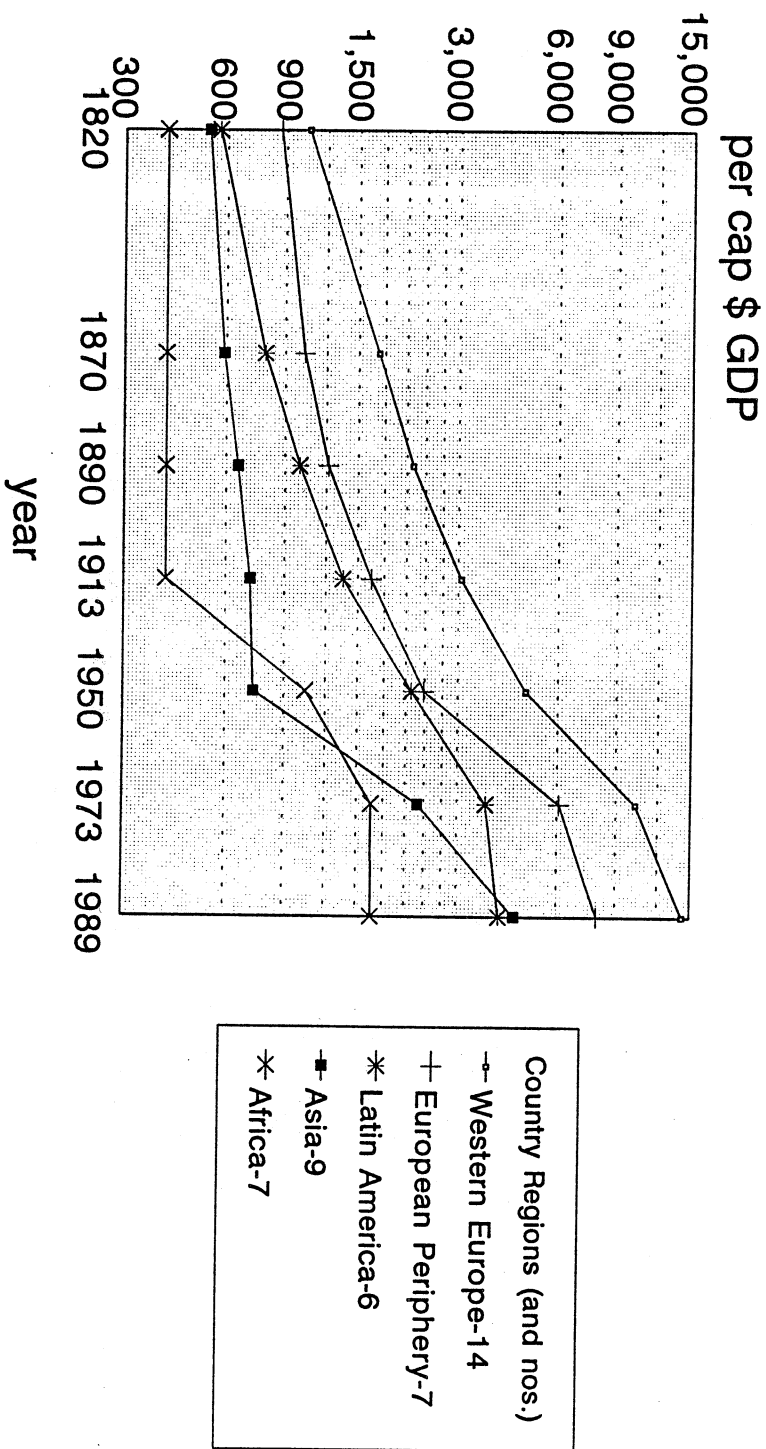
Source: U.S. Department of Agriculture, "World Agriculture: Trends and Indicators" (Washington, D.C.: USDA Economic Research Service, 1994)

Figure 7B
 USDA Estimates of Available Food Supplies
 For Selected Regions



Source: U.S. Department of Agriculture, "World Agriculture: Trends and Indicators" (Washington, D.C.: USDA Economic Research Service, 1994)

Figure 8--Maddison's Estimates of Average Regional Per Capita GDP in a Sample of 43 Countries, 1820-1989 (\$ at 1985 relative prices)



For country breakdown, see accompanying table; for Africa, 1820-1917, rough estimates assuming no progress in nineteenth century.
 Source: Angus Maddison, see accompanying table.

Table 1

Maddison's Estimates of Per Capita GDP
In a Sample of 43 Countries, 1820-1989
(\$ at 1985 relative prices)

	1820	1870	1890	1913	1950	1973	1989
<i>The West European capitalist core and its offshoots (14 countries)</i>							
Austria	1,048	1,442	1892	2683	2869	8697	12519
Belgium	1,025	2,089	2654	3267	4229	9417	12875
Denmark	980	1,543	1944	3014	5227	10527	13822
Finland	639	933	1130	1727	3481	9073	14015
France	1,059	1,582	1955	2746	4176	10351	13952
Germany	902	1,251	1660	2506	3295	10124	13752
Italy	965	1,216	1352	2079	2840	8631	12989
Netherlands	1308	2,065	2568	3179	4708	10271	12669
Norway	856	1,190	1477	2079	4541	9347	15202
Sweden	1008	1,401	1757	2607	5673	11362	14824
United Kingdom	1450	2,693	3383	4152	5651	10079	13519
Australia	1250	3,143	3949	4553	5970	10369	13538
Canada		1,330	1846	3515	6112	11835	17236
United States	1219	2,244	3101	4846	8605	14093	18282
Average	1055	1,723	2191	3068	4813	10298	14228
<i>European periphery (7 countries)</i>							
Czechoslovakia	836	1153	1515	2075	4365	6980	8538
Greece				1211	1456	5781	7564
Hungary		1139	1439	1883	2481	5517	6722
Ireland				2003	2600	5248	8285
Portugal		833	950	967	1608	5598	7383
Spain	900	1221	1355	2212	2405	7581	10081
Soviet Union		792	828	1138	2647	5920	6970
Average	868	1028	1217	1641	2381	6089	7931
<i>Latin America (6 countries)</i>							
Argentina		1039	1515	2370	3112	4972	4080
Brazil	556	615	641	697	1434	3356	4402
Chile			1073	1735	3255	4281	5406
Colombia				1078	1876	2996	3979
Mexico	584	700	762	1121	1594	3202	3728
Peru				1099	1809	3160	2601
Average	570	785	998	1350	2180	3661	4033
<i>Asia (9 countries)</i>							
Bangladesh				519	463	391	551
China	497	497	526	557	454	1039	2538
India	490	490	521	559	502	719	1093
Indonesia	533	585	640	710	650	1056	1790
Japan	609	640	842	1153	1620	9524	15336
Korea			680	819	757	2404	6503
Pakistan				611	545	823	1283
Taiwan			564	608	706	2803	7252
Thailand		741	801	876	874	1794	4008
Average	532	591	653	712	730	2284	4484

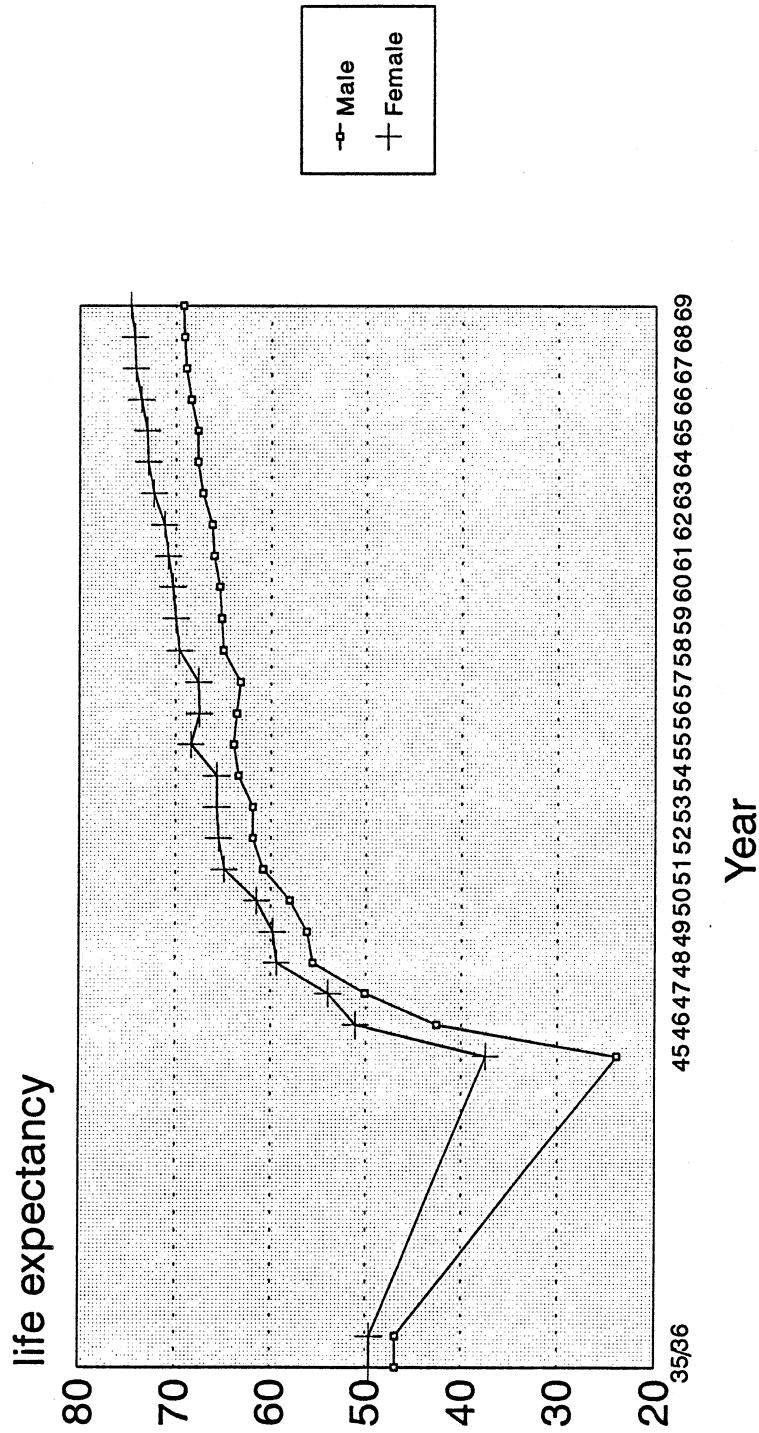
(Table 1 contd.)

	1820	1870	1890	1913	1950	1973	1989
Cote d'Ivoire					888	1699	1401
Ghana				484	733	724	575
Kenya					438	794	886
Morocco					1105	1293	1844
Nigeria					608	1040	823
South Africa				2037	3204	5466	5627
Tanzania					334	578	463
Average	400	^a 400	^a 400	^a 580	^a 1044	1656	1660

Note: ^a = Rough guesses, assuming no progress in nineteenth century.

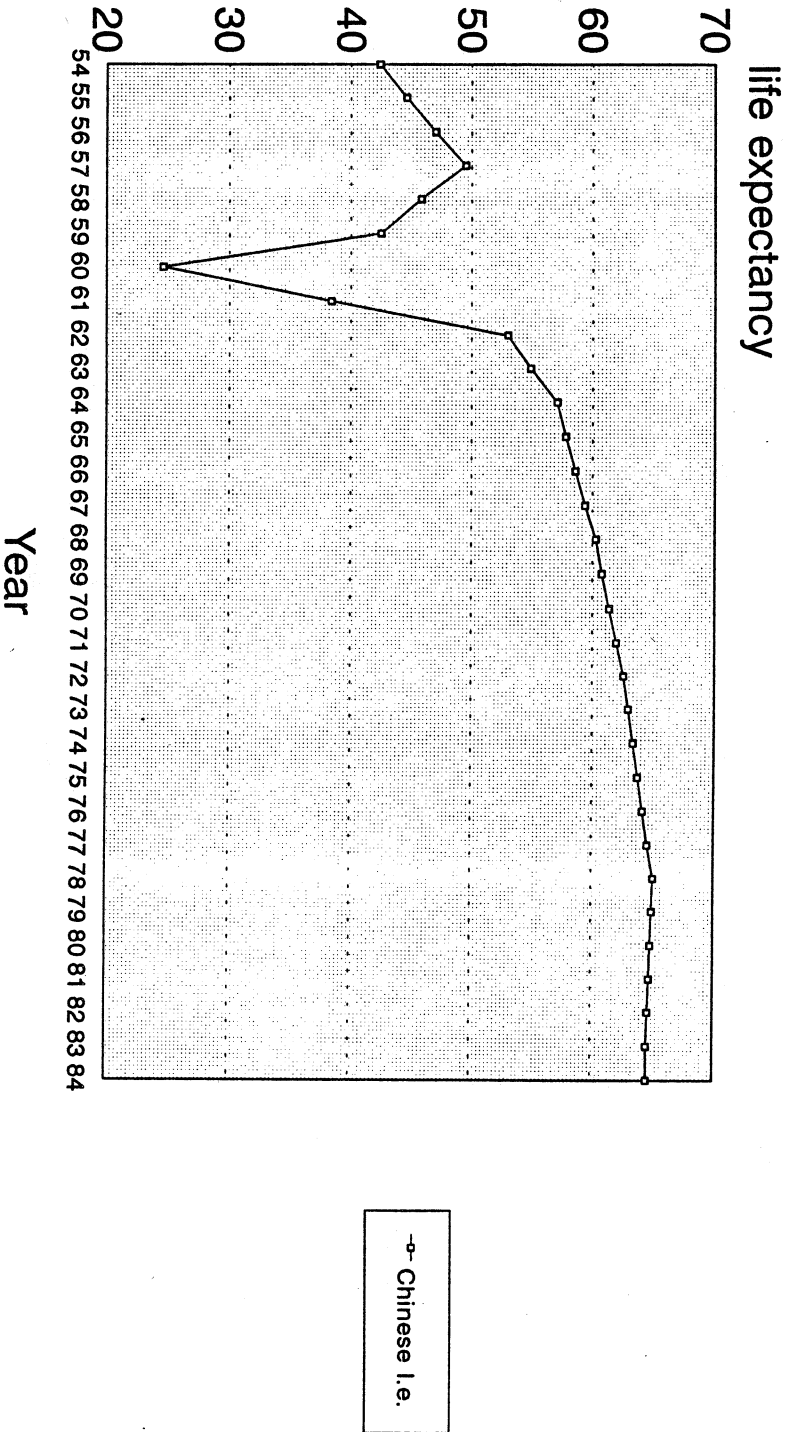
Source: Angus Maddison, "Explaining the Economic Performance of Nations, 1820-1989," William J. Baumol, Richard R. Nelson, and Edward N. Wolff, eds., Convergence of Productivity: Cross-National Studies and Historical Evidence, (New York: Oxford University Press, 1994), p. 48.

Figure 9--Recovery From Disaster:
Estimated Male and Female Life Expectancy at Birth:
Japan 1935/36-1969 (years)



Source: United Nations, Demographic Yearbook 1953 (New York: United Nations, 1953), p. 330; Government of Japan, Management and Coordination Agency, Japan Statistical Yearbook (Tokyo: Statistics Bureau) various issues.

Figure 10--Recovery From Disaster
 Estimated Life Expectancy at Birth:
 China, 1954-1984 (years)



Source: Judith Banister, China's Changing Population (Stanford, CA: Stanford University Press, 1987), p. 352

ENDNOTES

¹ The familiar term “Malthusian” implies that Malthus himself propounded a single and definite thesis over the course of his life. This was not the case. In reality, Thomas Robert Malthus offered different views of the world’s population prospects in the seven editions of the famous treatise he prepared. Even between the first (1798) and the second (1803) editions of his essay, in fact, steely certainty that humanity would be unable to cope with its tendencies for population growth gave way to a guarded optimism that the population problem could indeed be managed. For more background, see Thomas Robert Malthus, *On Population*, Edited and introduced by Gertrude Himmelfarb (New York: The Modern Library, 1960).

² For a brief survey of pre-“Malthusian” population doctrines, see United Nations, *Determinants and Consequences of Population Trends* (New York: United Nations Department of Social Affairs, 1973), Volume I, Chapter 3.

³ One document which offers a thoughtful—and careful—review of the current state of knowledge about the relationship between population growth and economic development is National Research Council, *Population Growth And Economic Development: Policy Questions* (Washington, D.C.: National Academy Press, 1986).

⁴ Simon Kuznets, *Modern Economic Growth* (New Haven: Yale University Press, 1966), p.38.

⁵ United Nations, *World Population Prospects: The 1994 Revision* (New York: United Nations Department of Economic and Social Information and Policy Analysis, 1994), pp. 11-12.

⁶ *Modern Economic Growth*, pp. 35, 38. By the figures cited here, the pace of population growth in the twentieth century would be nearly ten times as fast as the average for the eight centuries between A.D. 1000 and 1800.

⁷ *World Population Prospects: The 1994 Revision*, p. 11.

⁸ *Modern Economic Growth*, pp. 36-40.

⁹ For some useful background, see Dennis Hodgson, “The Ideological Origins Of The Population Association Of America,” *Population and Development Review*, Vol. 17, No. 1 (1991), pp. 1-34.

¹⁰ See, for example, Nathan Keyfitz, “The Limits of Population Forecasting,” *Population and Development Review*, Vol. 17, No. 1 (1991), pp. 1-34.

¹¹ *World Population Prospects*, pp. 57-58.

¹² For more details, see Nicholas Eberstadt, “Demographic Disaster: The Soviet Legacy,” *The National Interest*, No. 36 (Summer 1994), pp. 53-57.

¹³ Data drawn from *Demographic Yearbook 1991*, pp. 103-111.

¹⁴ *Modern Economic Growth*, p. 38.

¹⁵ Unlike the “birth rate” (the number of births per thousand persons in the general population), the “total fertility rate” is unaffected by the age-sex structure of a population. Two populations could have identical TFRs but very different birth rates if, for example, if older persons accounted for a large share of the overall population in one but not the other.

¹⁶ Among these places, according to the United Nations: Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Cote d’Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau, Liberia, Malawi, Mozambique, Niger, Sierra Leone, Uganda, Zaire, and the offshore islands of Comoros. *World Population Prospects: The 1994 Revisions*, pp. 122, 126.

¹⁷ For speculations along the last line, see Allen C. Kelley and Charles E. Nobbe, “Kenya At The Demographic Turning Point? Hypotheses And A Proposed Research Agenda,” *World Bank Discussion Papers*, No. 107 (1990), and Charles F. Westoff, “Age At Marriage, Age At First Birth, And Fertility In Africa,” *World Bank Technical Paper Series*, No. 169 (1992).

¹⁸ *World Population Prospects: The 1994 Revision*, pp. 122-124.

¹⁹ *Ibid.*, pp. 123-130.

²⁰ Two notable exceptions are Kingsley Davis, “Population Policies: Will Current Programs Succeed?” *Science*, Vol. 158 (November 10, 1967), and Charles F. Westoff, “Is the KAP-Gap Real?” *Population and Development Review*, Vol. 14, No. 2 (1988), pp. 225-232.

²¹ Lant H. Pritchett and Lawrence H. Summers, “Desired Fertility and the Impact of Population Policies,” *World Bank Policy Research Working Papers*, No. 1273 (March 1994).

²² John C. Caldwell, “Toward a Restatement of Demographic Transition Theory,” *Population and Development Review*, Vol. 2, Nos. 2 and 3 (1976), pp. 321-366; Theodore W. Schultz, “The High Value of Human Time: Population Equilibrium,” *Journal of Political Economy*, Vol. 82, No. 2, Part II (1973), pp. S2-210.

²³ Charles Tilly, “The Historical Study of Vital Processes,” in Charles Tilly, ed., *Historical Studies of Changing Fertility* (Princeton, NJ: Princeton University Press, 1978), p. 3.

²⁴ Samuel Preston, *Mortality Patterns In National Populations* (New York: Academic Press, 1976), p. 3.

²⁵ Alternative possibilities for a stable and stationary populations structures are computed in Ansley J. Coale and Paul Demeny with Barbara Vaughan, *Regional Model Life Tables And Stable Populations*, 2nd Ed., (New York: Academic Press, 1983). In the various “models” outlined, for example, zero population growth requires an average of six to seven live births per woman over the childbearing ages when female life expectancy at birth averages 20 years.

²⁶ See, for example, Odile Frank, "Infertility In Sub-Saharan Africa: Estimates And Implications," *Population And Development Review*, Vol. 9, No. 1 (1983), pp. 137-144.

²⁷ World Population Prospects: The 1994 Revisions, pp. 172, 192.

²⁸ For more details, see Nicholas Eberstadt, "Mortality And The Fate Of The Communist States," *Communist Economies And Economic Transformation*, Vol. 5, No. 4 (1993), pp. 499-520.

²⁹ See, for example, Dan Usher, *The Measurement of Economic Growth* (New York: Columbia University Press, 1980), Chapter 5, and Sherwin Rosen, "The Value of Changes in Life Expectancy," *Journal of Risk and Uncertainty*, Vol. 1, No. 3 (1988), pp. 285-304.

³⁰ Rati Ram and Theodore W. Schultz, "Life, Health, Savings and Productivity," *Economic Development and Cultural Change*, Vol. 27, No. 3 (1979), pp. 399-421.

³¹ According to UN projections, life expectancy at birth for the world as a whole would be just over 64 for the 1990-95 quinquennium; for the United States in 1950, life expectancy at birth was just over 68. *World Population Prospects: The 1994 Revision*, p. 180; U.S. Bureau of the Census, *Statistical Abstract Of The United States 1968* (Washington, D.C.: Government Printing Office, 1968), p. 54.

³² UN Food and Agriculture Organization, *The State of Food and Agriculture 1948* (Washington, D.C.: FAO, 1948), pp. 146, 150.

³³ The USDA, for example, currently estimates the total world grain trade for 1992/93 to have been about 241 million metric tons. USDA, *World Agricultural Supply And Demand Estimates*, June 9, 1994, p. 4.

³⁴ For example, Michael Lipton, *Why Poor People Stay Poor: A Study of Urban Bias In World Development* (Cambridge, MA: Harvard University Press, 1977).

³⁵ World Bank, *World Development Report 1993* (New York: Oxford University Press, 1993), pp. 245, 267.

³⁶ See D. Gale Johnson, *World Agriculture In Disarray, 2nd Ed.* (New York: St. Martin's Press, 1991).

³⁷ Enzo R. Grilli and Maw Cheng Yang, "Primary Commodity Prices, Manufactured Goods Prices, And The Terms Of Trade: What The Long Run Shows," *World Bank Economic Review*, Vol. 2, No. 1 (1988), pp. 1-47.

³⁸ Alexander Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge, MA: Harvard University Press, 1962), Chapter 1.

³⁹ *Modern Economic Growth*, Chapter 3.

⁴⁰ Edward F. Denison, *Trends in American Economic Growth, 1929-1982* (Washington, D.C.: Brookings Institution, 1985), pp. 11, 16.

⁴¹ Angus Maddison, *The World Economy in the Twentieth Century* (Paris: OECD, 1989), p. 20.

⁴² Angus Maddison, "Explaining The Economic Performance Of Nations, 1820-1989," in William J. Baumol, Richard R. Nelson, and Edward N. Wolff, eds., *Convergence Of Productivity: Cross-National Studies And Historical Evidence* (New York: Oxford University Press, 1994), p.48.

⁴³ Grilli and Maw.

⁴⁴ Famines, of course, are not the only terrible events of the modern era to exact loss of life on a massive scale. Warfare in the twentieth century has cost tens of millions of lives, and ethnic or racial hatreds many millions more. Although the proposition that population pressure provides the impetus for war and mass extermination campaigns can be encountered—sometimes in the letters section of our daily newspapers—it need not be discussed here.

⁴⁵ See, for example, Basil Ashton et. al, "Famine in China, 1958-61," *Population and Development Review*, Vol. 10, No. 1 (1984), pp. 613-645.

⁴⁶ See, for example, Nicky Hart, "Famine, Maternal Nutrition And Infant Mortality: A Re-Examination of the Dutch Hunger Winter," *Population Studies*, Vol. 47, No. 1 (1993), pp. 27-46.

⁴⁷ Asmerom Kidane, "Demographic Consequences of the 1984-1985 Ethiopian Famine," *Demography*, Vol. 26, No.3 (1989), pp.515-522. The "Sahelian famine" of the early 1970s is an event which received considerable coverage in the popular press and in population-environment circles; subsequent examinations, however, have concluded that the drought in West Africa did not result in any significant increases in local mortality levels. See, for example, John C. Caldwell, "Desertification: Demographic Evidence", *ANU Occasional Paper No.37* (Canberra: Australian National University, 1984).

⁴⁸ Robert Conquest, *The Harvest of Sorrow: Soviet Collectivization and the Terror-Famine* (New York: Oxford University Press, 1986).

⁴⁹ For more information, see Amartya K. Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (New York, Oxford University Press, 1986).

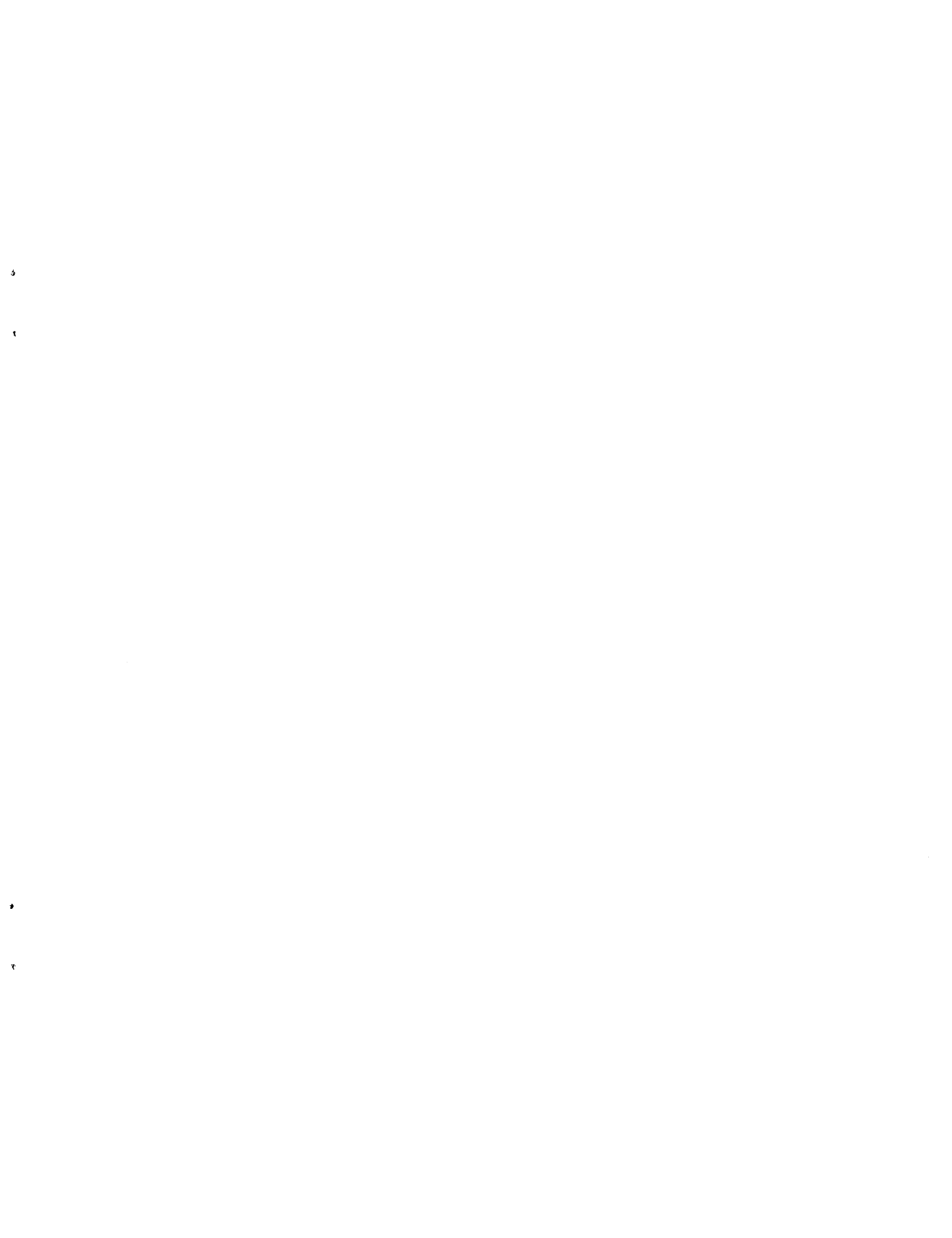
⁵⁰ For an analysis of Mao's policies and their results, see Nicholas R. Lardy, "The Chinese Economy Under Stress, 1958-1965," in Roderick MacFarquhar and John K. Fairbank, eds., *The Cambridge History Of China*, Volume 14, Part I (New York: Cambridge University Press, 1987), pp.360-397.

⁵¹ For background on this tragedy, see Francois Jean, *Ethiopie: Du Bon Usage De La Famine* (Paris: Medecins Sans Frontieres, 1986), and Edward W. Desmond, "Nengistu's Ethiopia: Death By Policy," *Freedom At Issue*, March/April 1986, pp. 18-22.

⁵² For background, see Roland Vaubel, "The Moral Hazard of IMF Lending," *The World Economy*, Vol. 6, No. 3 (1983), pp. 291-303.

⁵³ For an exposition of the contrasts, see Jeffrey D. Sachs, "External Debt And Macroeconomic Performance In Latin America And East Asia," *Brookings Papers On Economic Activity*, 1985, No. 2, pp.523-564.

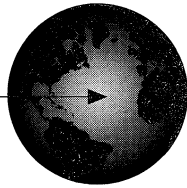
⁵⁴ For two circumspect official critiques of sub-Saharan Africa's pervasive policy problems, see World Bank, *Sub-Saharan Africa: From Crisis To Self-Sustaining Growth* (Washington, D.C.: World Bank, 1989) and *World Bank, Adjustment In Africa: Reforms, Results, And The Road Ahead* (Washington, D.C.: World Bank, 1994). The latter report argues that differences in economic performance among the sub-Saharan states can be explained by differences in their official policies and business climates—although by implication these particulars are far from optimal today even in the “best” sub-Saharan economies.



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