By century's end, the '60s and '70s may seem "a golden age"

POPULATIONS & PROSPERITY

by Lester R. Brown

For most of humanity the third quarter of the century was a period of unprecedented prosperity. The world's output of goods and services, expanding 4 per cent or more annually, tripled in less than a generation. Growth seemed commonplace—and was soon built into consumer aspirations, corporate earnings projections, and government revenue expectations. Few stopped to calculate that if the 4 per cent rate of economic growth remained steady, there would be a fiftyfold expansion in just a century. And even fewer considered the pressure this would put on the earth's resources.

Overall, global economic growth remained more than double that of population growth, and from midcentury to 1973 living standards were on the rise. Cheap energy quite literally fueled this record economic expansion. Oil, a versatile and readily transportable fuel, works equally well to generate electricity, power machinery, and provide a chemical feedstock. Because cheap oil played such a central role in the economic boom, the dramatic price jumps of the '70s had a pervasive effect on overall economic growth. At $2 per barrel, oil was a minuscule cost in the production of goods and services. Since 1973, with billions of dollars drained off for higher energy costs, less capital has been available to underwrite economic expansion.

The oil industry itself is a major part of the world economy. As oil demand declines due to higher prices, the resulting downturns in oil production, refining, and petrochemical production, and in their marketing and distribution, play a prominent part in slowing world economic growth. Also affected are a number of oil-dependent industries, of which none has been harder hit than the automobile industry. Between 1950 and 1973 world automobile production expanded by an average of 5.8 per cent per year. With oil averaging $12 a barrel between 1973 and 1979, the growth in auto production slowed markedly to just over 1 per cent per year. When the world oil price was pushed to over $30 in 1979, the slowdown in production became a decline, with output falling from 31 million automobiles in 1979 to 27 million in 1982.

Occasional modest upturns in world auto output are likely between now and the end of the century, but the industry probably will never resume the robust growth of the 1950-73 era. Nor will the auto parts and machine-tool industries, as well as industries supplying raw materials for their manufacture—steel, rubber, and glass. Downturns in these basic industries have contributed to slowing economic growth in all the world's leading industrial societies.

DIMINISHING RETURNS

Just as sharp increases in postwar consumption depleted oil supplies, so growing demand has severely taxed the world's renewable resource systems. The annual growth in grain production, for example, has declined by a third since 1973. Given the importance of agriculture in the world economy, this decline has undoubtedly slowed overall economic growth. But the effects go far beyond agriculture itself, causing declines in the food-processing and marketing industries as well.

Efforts to expand food production involve cultivating additional land and increasing the output of existing croplands. But farmers are beginning to experience diminishing returns in both areas. In countries as diverse as sparsely populated Canada and densely populated China, the quality of newly plowed land is far below that of settled lands. In Canada an estimated 233 hectares of new cropland in the western provinces is required to replace each 100 hectares of top-quality land lost to urban spread in the east. In China the problem is even worse. Lesley T. C. Kuo, a specialist in Chinese agriculture, reports that "The use of one acre of cultivated land for construction purposes must be offset by the reclamation of several acres of wasteland."

In attempting to boost grain output during the 1960s and '70s, the Chinese expanded their cultivated area, but much of the newly plowed land would not sustain cultivation. To correct this problem China has pulled back from the marginal lands, reducing its cultivated area by about 6 per cent between 1978 and 1982. Experience in the Soviet Union parallels that in China. Since 1978 the area planted to grain in the USSR has fallen by 5 per cent. Both of these nonmarket economies have discovered that eventually the returns on investment in cultivated-land expansion will fall sharply.

Since midcentury the increase in world food output has relied heavily on the expanded use of chemical fertilizer. Not only has this energy-intensive substance become more costly, but returns on the use of additional fertilizer are diminishing, particularly in agriculturally advanced coun-

Lester R. Brown is President of Worldwatch Institute in Washington, D.C.

tries. The trend throughout the world is unmistakable: During the '50s the application of an additional ton of fertilizer yielded an additional 11.5 tons of grain; during the '60s the fertilizer/grain response ratio dropped to 1:8.3; by the '70s it had falled to 1:5.8.

In many locations the demands on fisheries, forests, and grasslands likewise are becoming unsustainable. The world fish catch, which tripled between 1950 and 1970, has increased little since then—about 1 per cent annually. World beef production, after increasing by some 55 per cent between 1950 and 1976, has come to a halt. With overgrazing now commonplace, the world's herders, farmers, and ranchers find it more and more difficult to expand their herds to match population growth.

And just as diminishing returns are affecting food production, so too they are beginning to affect energy production. This is as true for efforts to develop new petroleum resources as it is to exploit existing ones more intensively. With a few notable exceptions, such as the South China Sea and the Arctic, the most promising prospects for discovering new oil fields already have been thoroughly investigated. Geological data indicate that new finds will be relatively meager and invariably located in remote and inhospitable areas. Gennardi Pisarevsky, an official of the Soviet Union, now the world's largest oil producer, reports that "Over the past fifteen years the average pumping distance of one ton of oil in the USSR has increased from 650 to 2,000 kilometers....Offshore drilling, which accounts for a substantial and growing share of the total exploration effort, can cost several times more per barrel than drilling on land."

While the chances of discovering new oil grow smaller, the cost of pumping oil from older fields climbs. Secondary and tertiary recovery techniques, which extract residual oil in fields where conventional pumping no longer works, cost more than primary methods and yield substantially less net energy. With regard to the Soviet Union, Pisarevsky notes: "More than 10 per cent of the production cost goes to maintain bed pressure: at present, 80 percent of the fuel is produced by pumping water, gas, or air into the oil layers."

POPULATIONS AND GROWTH

A *Wall Street Journal* survey of European economic analysts at the end of 1982 indicated that many expected the prolonged recession of the early '80s to have a permanent impact on the world economy. Whereas recovery from earlier recessions translated into a 4-6 per cent growth rate, most European analysts apparently saw recovery from the current recession in terms of 1-2 per cent growth.

For the Third World the prospects are even grimmer. Adebayo Adedeji, executive secretary of the Economic Commission for Africa, writes that "not only are the forecasts for the immediate future gloomy, but the prospects for development and economic growth in Africa up to the end of the century are heartrending. Indeed, if these projections are to be believed, the 1960s and 1970s may, by the end of the century, appear in retrospect to have been a golden age." Adedeji's assessment is matched by the World Bank's projections for Africa, which indicate a sustained decline in per capita income for much of the continent during the 1980s. For the first time in its history the World Bank is projecting a decline in living standards for a major region of the world.

Slower economic growth will affect all countries, but the effect will vary widely according to the national rate of population growth. For West Germany or Belgium, which have attained zero population growth, a 2 per cent growth rate will still raise incomes 2 per cent annually. For countries such as Kenya and Ecuador, among twenty-nine nations with populations expanding at 3 per cent or above, a 2 per cent economic growth rate will produce steady declines in incomes and living standards.

This group of twenty-nine countries, almost all in Africa, the Middle East, and Central America, have a combined population of 394 million. Within this group, countries with exportable surpluses of oil will be tempted to neglect population policy, with the result that their populations will continue to multiply rapidly, sustained by the imported resources financed by oil exports. Over the longer term, however, as oil reserves dwindle and the exportable surplus disappears, these countries may find that the carrying capacity of local resources is far too small to support the demands of its increased population. Iran and Nigeria, where oil production and exports have already peaked, illustrate well the risks that oil-producing countries with rapidly expanding populations face over the long term.

Already economic growth has fallen behind population growth for many countries. The World Bank reports that per capita income declined in eighteen countries during the period 1970-79. In a few cases this was caused by the disruption of economic activity associated with political instability; but in the great majority, population growth simply outstripped growth in economic output. Plagued by the fastest population growth in history, as well as by widespread soil erosion and desertification in the countryside, the continent of Africa has seen food production fall 14 per cent per capita since 1970.

Given the prevailing economic conditions of the early 1980s, the number of nations with declining per capita income is likely to grow dramatically. In a report published in late 1981 the World Bank projected a decline in the average income of twenty-four low-income countries in sub-Saharan Africa, with a total population of 187 million. For eleven other countries in the region, all middle-income oil importers, the Bank projected a standoff at best between population growth and economic growth.

Thus far the decline in per capita income has been confined largely to countries in Africa, but the conditions that led to those declines are now unfolding in other parts of the world. Rapid population growth, combined with widespread physical deterioration of the countryside, including both soil erosion and desertification, are common to the Andean countries, northeastern Brazil, Central America, and the Indian subcontinent. Demand for economic and social policies that meet basic human needs will no doubt grow; but such policies will be far more difficult to implement now than when rapid economic growth was seen as the rising tide that raised all ships. As economist Herman Daly observes so perceptively, turning our focus to meeting basic human needs will "make fewer demands on our environmental resources, but much greater demands on our moral resources." WV