World Food Resources

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Preface

During the past quarter century, public debate has repeatedly centered around the question of how to feed the burgeoning human family, now adding more than 75 million new members each year. Most analyses have focused on either how to raise more food or how to stem the rising population tide. The issue calls for a broader response, one that will inspire programs and actions aimed at a more acceptable balance; reducing the great inequities between the satisfied and the hungry, the rich and the poor. This book takes you behind the scene to survey how, through agriculture and fisheries, man procures the variety of plant and animal commodities which in turn after primitive or elaborate processing all become food. In the distribution of these riches, world trade emerges as an important modifier. Cities and increasing urbanization throughout the world require a profound restructuring of present marketing practices. The nutritional aspects of world feeding are given main emphasis, a matter frequently overlooked in development programs and agricultural planning. Finally, food is discussed as the key element of the present ecology crisis.

Man's quest for food and feed is both epic and drama. This book strives not only to render deeper relief and new coloring to the world food parorama, but also to open wider perspectives in this all-embracing matter. The staggering deficits mirrored in a widening Hunger Gap remain the overriding predicament.

Special thanks are due my wife Greta for constructive editing, tedious checking of tables and charts, and assiduous help in all stages of the preparation of this book.

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Introduction

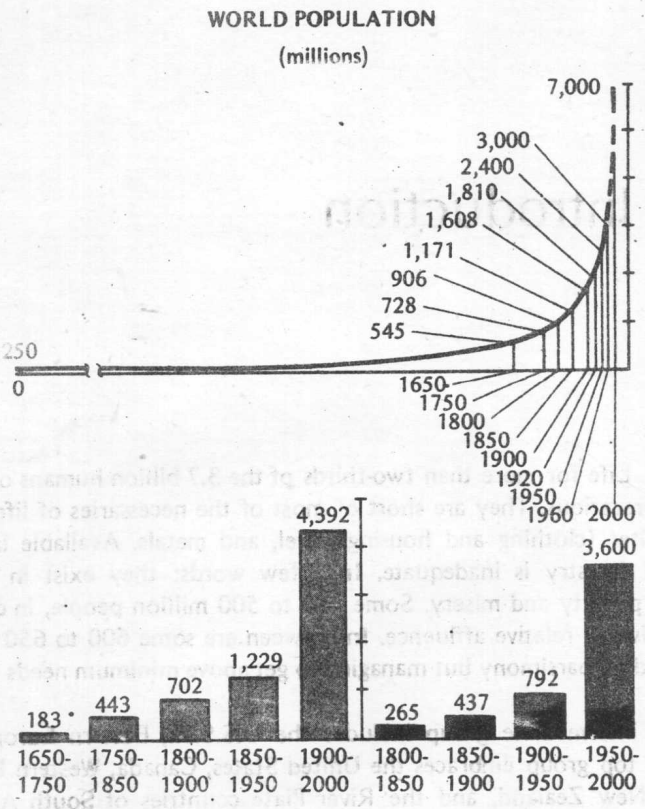
Life for more than two-thirds of the 3.7 billion humans on Earth is highly precarious. They are short of most of the necessaries of life: food, water, shelter (clothing and housing), fuel, and metals. Available land for tillage and forestry is inadequate. In a few words: they exist in various degrees of poverty and misery. Some 450 to 500 million people, in contrast to these, live in relative affluence. In between are some 600 to 650 million partly ruled by parsimony but managing to get above minimum needs in most regards.

This intermediate group includes the U.S.S.R., Eastern Europe, and Japan; the top group embraces the United States, Canada, Western Europe, Australia, New Zealand, and the River Plate countries of South America. Together, these groups constitute the *satisfied world*. The *hungry world* covers most of Latin America, Africa and Asia. Around 10 percent within this deficient sphere enjoy good standards, while 10 to 15 percent of the population living in the well-to-do countries suffer from shortages (15 to 20 percent in the United States). Each country has its geographical discrepancies and its internal gaps in socioeconomic structure.

The world has close to one billion children below fourteen years of age. No fewer than 650 million of these will never reach adulthood because of malnutrition and its detrimental health effects. Any marked improvements within this sphere accordingly have far-reaching repercussions on human numbers.

All estimates and projections agree that there is little likelihood the globe will have fewer than 6 billion people by year 2000. Even this figure is predicated upon the assumption that some degree of success can be attained in current measures to curb the population growth. This is highly conjectural and most indications point to 7 billion.

The overpopulation in the rural areas of the hungry world is now so



Global population growth from the beginning of the Christian era (with a quarter billion). Note that wars, plagues, and other calamities made no kinks in the general trend of the growth curve. The explosive increase during the last hundred years is best evidenced by the rapid mounting of the increment, as measured in 100-year periods (left section) or 50-year periods (right section), respectively.

critical that it drives the flow toward the cities with added force. Subsistence farms, rarely exceeding three acres and often half that size, offer bleak opportunities for further splitting to accommodate for the next generation of youngsters, soon becoming prospective parents. Almost nowhere are industrialization and urbanization catching up with the added numbers. Yet, cities are almost the only remaining recourse for these unfortunates, in the poor world in excess of 400 million in the 1970's, and these superfluous millions flock into them. The level of gainful employment in expanding industries and services is extremely restricted; only a fraction of those reaching the labor force have a chance. Education and public health are in addition greatly

inadequate to prepare the young for jobs. As a result the cadres of unemployed swell, the slums expand. One-fourth of the human family is now estimated to belong to the growing armies of squatters.

This is in a nutshell the status of major portions of the human family. Most noteworthy is the fact that these conditions prevail despite extraordinary measures taken almost everywhere to cope with these calamities by international agencies and foundations, by many governmental bodies, and by a wide array of private activities. Several of these endeavors have been most impressive both in magnitude, tenacity, and perseverance, yet they emerge as having been inadequate to stop effectively the insidious growth of misery. Protein shortages are alarming, yet additional millions are affected by lack of fat, of several minerals, and in particular of vitamins C, A, B_1 (thiamine), and folic acid. Anemias and other blood diseases are prevalent. Intestinal parasites sap the stamina of hundreds of millions. In many countries livestock suffers as much as man through these undermining health hazards.

This ominous trend needs to be reversed. We Westerners cannot expect to remain seated comfortably at ringside while this tragedy unfolds on the world scene. Our food deliveries have mostly been like crumbs falling from the rich man's table. Far more extensive measures, both in time and size, are needed to stem the tide and reduce the enormous dimensions of human misery, not the least in terms of the availability of food.

Two-thirds of those now living will experience a world population exceeding 6 billion. Young people now in school will find their entire lives influenced by this calamity. Within the decade of the 1970's wide-ranging crash programs will have to be initiated if mankind and civilization are to be saved. Only by acting now do we have the slightest chance of moving into the twenty-first century with a population curve level or declining, thus opening up the chance in the next century to reduce human suffering and to improve the lot of man.

This book is designed to bring the global food issue into focus, starting out by reviewing which commodities constitute the basis for our foods. This is done by surveying what the farmlands, the oceans, and the freshwaters deliver to man's larder. This survey is followed by an analysis of the basic prerequisites for crop and livestock production as circumscribed by climate, soils, water, and minerals. Due attention is given to man's foes in the shape of weeds, pests, parasites, and diseases as they threaten these invaluable resources. The oceans, lakes, ponds, and rivers as food producers are analyzed in a similar way. The unique and fragile circumstances for man's quest for food in the tropics and the intimate relationships between food and water are presented in separate chapters. This first section ends by summarizing current advances toward large-scale agriculture and toward ocean cultivation.

The second section of this book describes how this array of commodities is converted into foods and food products through various kinds of processing. Such treatment is in most instances indispensable to making plant products digestible to man. Preservation and storage are key functions in this third dimension of food. The global household is, both in the satisfied and poor worlds, suffering huge losses through waste and spoilage. A relentless battle is raging—with minor let-ups in cold or dry seasons—against rodents, insects, yeasts, molds, and other hostile agents. Many chemical and technical devices aid man in this warfare defending his domain.

To what degree domestic production in some countries is supplemented through global trade in foods and commodities is the theme of a special chapter. This also discusses technical advances—transcontinental railroads, highways, transoceanic shipping—that for the first time in history have made long-distance feeding feasible on a major scale in this century.

Finally, a third section discusses, against the background of man's nutritional needs, crucial repercussions as to public health with particular emphasis on the protein issue, and the relationships between food and the population explosion. A separate chapter traces the neglected key role that food plays directly and indirectly in the current ecological crisis.

There is an urgent need to switch mankind's priorities. But still more imperative is a fundamental reorientation of economics. We not only need a complete and better accounting of our costs, but further we will be forced to much better global economizing and householding on behalf of entire mankind. Man will need to formulate entirely new programs, taking cognizance of the parsimonious conditions ruling life on our limited spaceship. The current frivolity and ignorance will lead us into early disaster—the first signs of which currently are becoming evident in our ecological dilemma. Yet, the global food and water crisis more clearly mirrors the urgent demand for responsive action and responsibility toward others—not only toward ourselves, a minority favored with more land, soil, and water than almost any other peoples. For we Americans constitute, together with the Canadians, a mere 7 percent of the world's population.

It should be occasion for serious reflections that the affluent world, in its armament race between the United States and the Soviet Union together with their allies and satellites, uses more money for those purposes than the entire developing world totally produces. This supreme irresponsibility has had a contagious effect. Many poor countries divert more money to nuclear reactors than the total they use for such other scientific disciplines as agriculture, medicine, public health, or technology.

For such a revitalized program we need to bring into focus, far better than hitherto, the true magnitude and nature of the present world crisis. This

will require a massive reeducation within our own midst about prerequisites for human survival in terms of tilled soils, water, fertilizers, and minerals.

We further need to recognize the self-evident limitations of our spaceship, Earth. Such restrictions are felt all the way down to the individual farm. Earth can never feed limitless numbers, nor can individual communities countries, states, nations, or continents. There are rather well-defined limits to how big you can make the cake; and the larger the number that has to share it, the less to each. Gains have in general lagged behind long-range increases in human numbers.

The Technical Aid Programs and various Peace Corps activities have taught us valuable lessons, in particular as related to the many disturbing and detrimental conditions facing crops, livestock, and man in the hungry world. These have had a sobering effect on the euphoria which went with early aid programs. We have further discovered that good lessons could be gleaned from our failures—farms in developing countries are frequently better adjusted within their narrow ecological margins than was earlier recognized. Many of our procedures are deeply disturbing to life's basic frameworks, either through toxic pollutants moving into air or water, or through unmanageable accumulations of waste.

We are now discovering that we have not contrived, and far less explored, all possibilities. We are starting to realize that our western technical civilization is no universal remedy for the world's ills. Its enormous wastefulness in resources—whether water, soil, fuel or metals—cannot be copied on a global scale. Furthermore it carries the dubious feature of economizing with the only resource truly available in surplus, namely man.

Section I

Production

1 Food Commodities

The Earth provides us with food chiefly through agriculture and fisheries. Around the globe shellmounds testify to the fact that major parts of mankind in its infancy lived from snails, mussels, and oysters. During the next stage of human development other animals were hunted and seeds of wild plants were gathered. Through trial and error those that were nutritious and wholesome were selected. Gradually, game and fish were in this manner supplemented with wild nuts, berries and fruits, chiefly from trees and bushes, as well as with seeds from certain grasses, the precursors of cereals. Nowadays agriculture carries almost the entire burden of supplying man with sustenance from the land. Only via pastures does wildlife still render food in certain regions of the globe. Animal husbandry leans to an overwhelming and growing degree on specially cultivated feed crops which thus are converted into meat, milk, and eggs. Fish and other aquatic animals graze, directly or indirectly, the pastures of the seas and other waters as discussed in a separate chapter of this book. All living organisms depend on the production of the plants, and despite tremendous technical progress practically all our food originates from such sources. In the Bible this basic truth is expressed in the revealing sentence: "All flesh is grass."

Plant products provide the total human household with nine-tenths of its caloric intake, and this share will in all likelihood increase as population figures mount. It becomes less and less feasible to take the costly road via animals with the large and unavoidable nutritional losses involved. Obviously only part of what a cow, a pig, or a hen consumes is converted into milk, meat, or eggs. The major part of the feed is required to sustain the life processes of the animal and for the build-up and maintenance of bone structure, skin, and other bodily organs which do not serve man as food.