

TOWARD A SUSTAINED AGRICULTURAL ECONOMY

Remarks on the Occasion of the Presentation of the General Foods World Food Prize on October 4, 1988

by Robert F. Chandler, Jr.

I have never felt more deeply honored, nor so generously rewarded, than as the fortunate recipient in 1988 of the General Foods World Food Prize. My lasting gratitude extends not only to those directly responsible for my selection but, also, to the host of others, men and women alike, who over the years have supported and strengthened whatever role I have played in international development. As this audience well knows, I was awarded the Prize primarily as the founding director of the International Rice Research Institute (IRRI) in the Philippines - the institution that spearheaded the Green revolution in rice, especially in Asia where 90 percent of the world's rice is grown and consumed.

I was fortunate to have been selected as the first leader of IRRI's research and training program and to have played a role in its planning, organization and implementation. The almost 13 years that my wife Sunny and I spent in the Philippines were among the most satisfying and rewarding of our lives. Obviously, credit for the success of IRRI should be shared with many people and organizations, especially the Rockefeller and Ford Foundations, the government of the Philippines and the young, capable international staff that got it off to such a good start.

I am not going to attempt to match the eloquence and wisdom of my friend of long acquaintance, Dr. M. S. Swaminathan, who in 1987, as the first and highly deserving recipient of the World Food Prize, described so memorably the interrelation of ecological, social

economic and agricultural elements in any lasting solution of world poverty and hunger. Instead, I shall deal more with facts and figures which reveal current progress as well as problems which face us on the food and population front.

As news commentators say, "There is good news today and there is bad news." So it is with food and population: developments to cheer and developments to deplore. Let us look first at the good news about the production of rice and wheat, the world's two most important food crops.

In 1965, just before the wide distribution of modern rice varieties with high yield potential, production in the 18 Asian countries that grow and consume most of the world's rice was 233 million metric tons. By 1986, 21 years later, that figure had jumped to 432 million tons, an increase of 84 percent. Eight of those countries had more than doubled their production.

Moreover, during the same period, the human population in the 18 countries had advanced from 1.7 to 2.7 billion, an increase of 59 percent. For the first time in modern history Asian per capita rice production had markedly increased. Previously, for decades, harvests had either kept pace with population growth or had fallen behind.

The 84 percent increase in production in Asia was due more to augmented yields than to increases in area devoted to rice. The gain in yield was 60 percent, while the land area planted to rice expanded by only 14 percent. Moreover, since 1977 neither China nor India, the world's two largest rice-growing countries, has shown any increase in area planted to rice. This means that additional land suitable for rice is no longer available and that future gains in harvest will have to

come from increased yields on land already devoted to that crop.

In Africa, the situation is quite the opposite. During the 20-year period from 1965 to 1985, rice yields on that continent rose only from 1.68 to 1.80 metric tons per hectare, a gain of a mere 7 percent, whereas the land area planted to rice expanded by 60 percent. Although Africa produces only 10 million metric tons of rice annually (compared with over 430 million in Asia), rice is still the cereal grain that is growing the fastest in production - faster than sorghum, millet or maize, Africa's traditional cereal crops. Indeed, rice is so popular in most African countries that large quantities are imported, mainly to satisfy the demands of urban populations.

As we know, even greater strides have been made with wheat. In the first five years after the semi-dwarf wheats were widely planted in India and Pakistan, for example, production was doubled. The Green Revolution in wheat was sparked by Nobel laureate Dr. Norman Borlaug of CIMMYT, whose capable, devoted and untiring efforts influenced many a government to realize the potentialities for greatly increasing the production of that crop.

As is widely recognized, the principal reason for the improved production of both rice and wheat was the revolutionary development of varieties that were short, stiff strawed, non-lodging, heavy tillering and fertilizer responsive, and, in addition, had resistance to most major insect pests and diseases. Since the introduction of these new varieties, there has been a substantial increase in the use of chemical fertilizer and in the development of new irrigation systems. In every country that was able to increase markedly its production of either rice or wheat, the political leaders not only had gained an

understanding of the importance of agricultural development but had become highly committed to an action program.

In fact, enough cereal grain is being produced to feed the world (at current inadequate levels of nutrition), but national and individual poverty and food distribution problems continue to cause about 500 million people to suffer from malnutrition. The situation, however, would be much more critical were it not for the creation and widespread adoption of modern varieties of rice and wheat.

Although, through increased food production, further progress will be made in alleviating the closely related scourges of hunger and poverty, there are limits to what can be done unless man is able to control his numbers.

The population problem, more than any other element, threatens the well-being of mankind. World population has passed the 5 billion mark. Each year adds more than 80 million people to the total, more than 60 million of whom will be living in Asia, Latin America and Africa, the regions least able to accommodate them.

The only "good news" on the population front is that since 1970 the population growth rate has been declining, a reversal of all previous trends since records have been kept. Other than in the prosperous, industrialized nations that have essentially stabilized their populations, the decreases have occurred mostly in Asia - primarily in China, Korea, Taiwan and Singapore. China, with one-third of the inhabitants of Asia, has reduced its population growth rate to 1.2 percent annually, an almost incredible achievement. Offsetting that historic advance is the fact that, on the average, African populations are still growing at the rate of 2.8 percent and Latin American at 2.4 percent.

United Nations experts predict that by the year 2000 the population growth rate will be reduced from the current 1.7 percent to 1.5 percent. However, because population expands exponentially, rather than arithmetically, the number of people to be added in the year 2000 will be 92 million, in contrast to the 80-million addition in 1988. This forecast is based on the U.N. estimate that the earth will harbor 6.15 billion at the end of the current century.

In 1945, the eminent demographer, Dr. Frank Notestein, propounded the theory that there are three stages of population growth as countries develop socially and economically. These demographic transition stages are as follows:

Stage 1. High birth rate and high death rate, during which populations increase very slowly. For example, between the years 1650 and 1700 world population grew only from 510 to 625 million, an average of but 230,000 per year.

Stage 2. High birth rate and low death rate, the stage that much of the Third World is in today. The control of malaria, yellow fever and polio, for example, and the improvement in nutrition have greatly increased human survival in the poorer countries; but birth rates remain high.

Stage 3. Low birth rate and low death rate, the final stage in the transition, the one that the U.S.A., Canada and Western Europe are in today and the one that we would hope the entire globe would reach eventually.

The fear that the population watchers among us have today is that many of the Third World countries will not be able to move out of Stage 2 (high birth and low death rates) into Stage 3 (low birth and death rates). They will be caught in what Lester Brown of the

Worldwatch Institute calls the "demographic trap." Not being able to achieve the social and economic gains that usually reduce birth rates, the population expands to the point where demand exceeds the sustainable yield of cropland, forests, grassland and even aquifers supplying fresh water. Finally, death rates rise again and conditions revert to Stage 1 (equally high birth and death rates) where life becomes intolerable, dominated by chronic hunger, frequent famine, and social conflict, even civil war.

There are those who contend that population control is not important, that people are a resource and that to limit their numbers is to reduce the opportunities for human development. Others claim that there is an ample supply of uncultivated land and other natural resources and all that is needed is to exploit them. It is difficult to understand how such a view of seemingly infinite reserves can long be held in this finite world.

There are limits to the available quantities of arable land, of fresh water supplies for irrigation, of areas that can be devoted to forests, and of food resources of the oceans. Furthermore, solar radiation and average world precipitation cannot be increased by man, and, despite the signal advances made in augmenting the yield potential of food crops, there are limits to the genetic improvement of both plants and animals.

Notwithstanding these inevitable restrictions, we must continue to intensify our struggle to bring a better life to the poverty-stricken people of the Third World. It must be said, however, that the job cannot be done by the richer nations alone. The afflicted countries must come to realize that their survival depends upon their own national efforts. They must fully and wisely utilize not only foreign financial and pro-

fessional assistance but their own resources, both human and natural.

Development, as we know too well, is a slow and complex process. Nevertheless, we have available today, as never before, the technology and knowhow to apply toward increasing food production. We can all agree that what is needed is less rhetoric and more action.

Yet I must rely on even more words to list here what many of us in international agriculture have long seen as some of the most essential actions that food-deficient nations must take if they are to develop a sustained agricultural economy. With the combined use of foreign assistance and their own resources, they must make maximum use of available water resources for irrigation; improve and extend farm to market roads; build schools and strengthen institutions of higher education; provide rural credit for qualifying farmers; establish production incentives, such as price supports and subsidized inputs; improve the chain of communication from agricultural researcher to extension specialist to farmer; provide adequate financial support for both agricultural research and extension; and, finally, develop a widespread system of on-farm applied research and demonstration plots with improved varieties and technology.

From my experience in Asia and Africa, I am convinced that farmers will use new varieties and crop management methods if they can see for themselves a 50 to 100 percent gain in yield on their own fields or on those of a neighbor. Many development specialists maintain too conservative a view, in my opinion, and are overly reluctant to expose the farmer to modern techniques, thinking that he cannot afford to use them. In reality, if he is not to be mired in a succession of inadequate harvests, he cannot afford not to use them.

Although I favor maximum use of organic plant residues and compost, I contend that in the long run, Africa, for example, cannot feed its ever-expanding population without the use of abundant quantities of

chemical fertilizer (we need only to look at pragmatic China to support this contention), nor without making much better use of its water resources than at present. Furthermore, prosperity will continue to elude the average African farmer until a substitute is found for the hand hoe, the labor-intensive tool that is still the principal implement for land preparation.

In addition, relief must be found for the estimated 250 million people in the tropics and subtropics that are barely ekeing out a living from shifting cultivation. Research must be accelerated to develop a sustained crop-and-tree production system that will eliminate the terrible destruction of forest resources now occurring under slash-and-burn agriculture.

Considering the rate at which the population is still expanding in the poorer countries and the knowledge that the number of people added during the early part of the next century will be even larger than it is today, I predict that world population will at least double before it becomes stable. If this forecast is true, it will require a herculean effort, with an enormous commitment of financial and human resources, to maintain this planet as an acceptable place in which to live.

We are meeting the challenge of outer space; we commit huge sums for national defense. We can meet, I feel certain, the challenges of our planet.

I appreciate your coming to this ceremony, and I thank you for your patient attention.