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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

REPORT 1983

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IFPRI REPORT 1983

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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INTRODUCTION

The International Food Policy Research Institute (IFPRI) conducts policy research on the complex problems associated with food production, consumption, and trade in the developing countries. The pressing need for such policy analysis is clear. In many Third World countries the demand for food is currently increasing faster than the ability of these countries to produce it. In the short run, this forces many developing countries to increase their food imports. In the long run, it creates a favorable environment for these countries to adopt new and improved food production technologies. In any case, food production and food prices are likely to be unstable in many developing countries over the next few decades. High food prices will continue to have a deleterious impact upon the poor, who spend the bulk of their income on food. Under these circumstances, misguided national and international food policies will be costly, both to the developing world as a whole and to the poor.

In order to identify and analyze effective strategies for meeting food needs in the Third World, IFPRI's research program focuses on six major questions. Because the pressure on Third World food supplies is expected to be so great, these six questions are concerned with meeting both the short- and long-term food needs of low-income countries and people. They are thus vital to the efficient use of the resources of the Consultative Group on International Agricultural Research (CGIAR).

The six questions are:

1. What food policy adjustments are needed in response to rapid growth in food import demand by developing countries?
2. What policies will allow technological change to play its central role in raising food production in developing countries?
3. What combination of farm producer incentives can achieve growth and equity simultaneously?
4. What relative weight should be given to alternative agricultural commodities in future production patterns?
5. What policies are needed for technological change in agriculture to stimulate the growth in income and employment necessary to alleviate rural poverty?
6. How can food security be provided to the world's poorest people in the face of unequal distribution of income, fluctuating production, and high costs of storage?

Research on these questions is administered through four programs: Food Trends Analysis, Food Production Policy and Development Strategy, Food Consumption and Nutrition Policy, and International Food Trade and Food Security. This report describes the research activities undertaken in these programs during 1983. The results are reported in six research reports, six issues of *IFPRI Abstract*, and three issues of the newsletter, *IFPRI Report*.

During 1983 IFPRI publications also included two special publications: *Nutrition-related Policies and Programs: Past Performances and Research Needs*, a review of government schemes for improving nutrition and suggestions for needed research, and *Contingency Planning for Famines and Other Acute Food Shortages: A Brief Review*, a discussion of how the international agencies deal with acute food shortages and suggested areas of future research. In addition, for World Food Day, IFPRI published a special issue of *CARE Briefs* on "Confronting World Hunger."

Also published were two working papers resulting from research in the Rice Policies in Southeast Asia Project and a brochure, *Senior Research Staff 1983-1984*.

In February IFPRI held its Board of Trustees meeting for program review in Damascus, Syria. This is the fourth year this annual meeting was held in a Third World country. Prior to the meeting IFPRI researchers and Board members met with policymakers and economists from a number of Arab countries to discuss food problems specific to the region.

This year the director's annual food policy statement discusses the controversial issue of food aid and how food aid can make a contribution to a strategy of growth through employment.

For the second year the annual report contains a section on outreach with a discussion of IFPRI's collaboration with other centers in the CGIAR and with local institutions in the Third World. In 1983 these collaborating institutions were located in Bangladesh, Egypt, India, the Ivory Coast, Kenya, Nepal, Nigeria, the Philippines, Senegal, Sri Lanka, Syria, Sudan, Upper Volta, Zaire, and Zimbabwe. Also described is the first major international conference to be conducted under the auspices of the Policy Seminars Program. Held in Zimbabwe, the conference brought researchers from 12 African countries and the international community to discuss research and policy issues related to agricultural growth in Sub-Saharan Africa.

FOOD AID, EQUITY, AND AGRICULTURAL GROWTH

INTRODUCTION Food aid has been an important, albeit controversial, component of development assistance for more than a quarter of a century. At its height in the early sixties, food aid comprised 15 percent of net official resource transfers from OECD countries to developing countries. Although its importance has declined since then, food aid still accounts for about 10 percent of official resource flows to developing countries.

Food aid has drawn fire from a wide range of critics, including field practitioners, journalists, churchmen, and academics. Whatever their perspective, these critics all share the belief that food aid encourages the neglect of agriculture and places more resources in the hands of the exploitative classes, at the expense of the majority of the rural population. As Nobel Laureate T. W. Schultz put it, "Aid in kind . . . has the effect of increasing the capacity of the government that receives such aid to continue discriminating against its own agriculture. . . ." A more extreme version of this view is reflected in the polemical writings of Francis Moore Lappé, who considers that all development assistance "actually increases hunger and repression by reinforcing the power of national and international elites who usurp the resources rightfully belonging to the hungry."

Food aid is also controversial within the CGIAR system. On the one hand, it is alleged that food aid may be used to depress agricultural prices and thus slow the spread of a new production-increasing agricultural technology. On the other hand, it is argued that food aid can be used to provide immediate increases in food supplies to low-income countries and to lay the foundation for the building of the rural infrastructure.

Despite the controversy, food aid remains a major element of both bilateral and multilateral foreign assistance pro-

grams. It continues to receive substantial political support from farm groups in developed countries because it is an outlet for commodity surpluses. At the same time, it also receives moral and intellectual support from a wide range of thoughtful people who, though acknowledging the validity of many of these criticisms, still believe that food aid can make a positive contribution to equitable economic growth.

To show how food aid can contribute to such growth, two propositions may be argued. The first is that food aid adds to international resource transfers. Since the international market for food operates reasonably efficiently, it is not enough to demonstrate that food aid favors equitable growth. If food aid is simply a subtraction from financial assistance, the equivalent financial assistance will be able to provide even food more efficiently. The second proposition is that food aid can help increase the rate of economic growth and so facilitate the increased economic and political participation of the poor. Even if food aid is largely an addition to financial aid, it still may not make a net contribution to growth if it distorts the growth process or if it contributes to the misallocation of economic resources.

FOOD AID AS AN ADDITION TO FOOD SUPPLIES

It is advantageous to farmers to segment markets, that is, to provide food at a low price to consumers with relatively elastic demand and at a higher price to those with relatively inelastic demand. Farmers' gross receipts will be higher as a result. If the supply of food is inelastic, farmers' gain from that process will be permanent.

The price elasticity of demand of working class people in low-income countries for food is about -0.8, and for cereals alone it is about -0.5 or -0.6. These elasticities reflect the considerable importance that the poor attach to food in their daily budgets. In contrast, the price elasticity of demand for food for the top few deciles of the income distribution is -0.1 or less. If a certain quantity of a given supply can be reserved for low-income people at a low price, their consumption will jump sharply. The smaller supply remaining for the more well-to-do will be sold at prices that more than compensate for the lower prices paid by lower-income consumers. Indian foodgrain procurement policy has been based on this principle. A portion of farmers' (or rice millers') output is procured at a below market price and is then provided to low-income consumers at a low price.

If food aid is to serve segmented markets, the domestic policy measures of the recipient country must ensure that consumption by low-income consumers increases. Merely using food aid as a substitute for commercial imports will not accomplish this objective. Policies to ensure increased consumption by low-income consumers typically include food subsidies, explicit employment schemes, and general efforts to expand employment. These policies will be discussed below.

Donor countries sometimes try to make sure that the food aid they provide is genuinely an addition to food supplies and not merely balance-of-payments support for previously planned imports. They do this by setting the condition that a recipient country must meet its usual marketing requirements commercially before becoming eligible for aid. Such conditions are at best difficult to administer.

FOOD AID, GROWTH STRATEGY, AND EMPLOYMENT

Substantial IFPRI research documents the benefits of low priced food for poor people. Since poor people typically spend between 60 and 90 percent of their increments to

income on food, low priced food raises their real incomes significantly. Low priced food also improves the nutritional status of children more than other forms of income.

While food aid may indeed promote equity, there are no guarantees that it will be used to pursue an equitable strategy of growth. Food aid may, for example, be used as a palliative in an otherwise inequitable strategy of development. It might even be used to make such a strategy of development politically acceptable. Thus we need to see how the provision of food aid can make an equitable strategy of growth both possible and desirable.

WAGE GOODS AND DEVELOPMENT STRATEGY

Food aid's contribution to an equitable strategy of development largely hinges on whether or not a scarcity of food impedes the mobilization of labor. A large body of development literature maintains that factor proportions are technologically fixed during the development process, and that existing food supplies can support a labor force that necessarily expands only slowly, concomitantly with an increase in capital stock. According to this view, the process of economic growth is highly inequitable in the short run because it provides for only slow growth in employment and food production. In this view food aid has no appreciable effect on economic growth.

In fact, both assumptions of this body of literature are wrong. On the one hand, factor proportions are not fixed. Whereas there are no alternatives to highly capital-intensive processes for making steel or petrochemicals, labor-intensive processes can be used to make a wide range of consumer goods and simple machine tools and in small-scale manufacturing enterprises in general. At the same time, wage goods—particularly food—do place a significant constraint on labor mobilization. It is the centrality of wage goods in the whole development process that focuses attention on the potential value of food aid.

It is now clear that the process of labor mobilization for economic growth depends on the working of two interacting markets—the labor market and the food market. As labor is mobilized and receives a larger share of the total wage pool, it spends most of that increased income on food. Increased supplies of food are therefore needed to prevent the type of wage increases that would reduce the demand for labor. In countries where foreign exchange reserves are limited, food aid can play a critical role in relieving the resulting pressures on food supplies.

The dynamics of these relations can be easily seen in food-for-work programs, which link employment and payment of food directly. Such programs are attractive to donors because their benefits for the poor are highly visible. These programs ensure that the food will be given where it is needed and that highly labor-intensive activities will be pursued.

In Asia, South Asia in particular, there is a large stock of labor that can be mobilized readily for growth. The addition of wage goods would pull that labor from agriculture with little or no decline in agricultural production. In Africa, however, the situation is more complex. In most African countries, one can expect a nearly proportionate decline in agricultural output as labor is withdrawn from agriculture. This is because the agro-climatic conditions that dominate African agriculture tend to reduce labor productivity and to cause a lack of surplus labor. Thus, to have the same effect on growth in employment in Africa, more food aid is required.

There is currently a widespread view that food aid is deleterious to agriculture in Africa. This view overlooks the low priority that agriculture has in the basic development strategy pursued in much of Africa. The poor performance of agriculture that results is then erroneously attributed to the impact of food aid. Correcting these policies goes way beyond food aid to priorities in the uses of foreign

aid more generally, to priorities in the use of commercially earned foreign exchange, and to basic capital allocations. Given the extraordinarily difficult problems of development in Africa, and the steadily rising food imports to that area of the world, a more constructive view of the role of food aid is greatly needed.

AGRICULTURE AND DEVELOPMENT STRATEGY

It is easy to conceive of an increase in the labor intensity of production. To achieve such an increase, however, is more difficult. But a technologically dynamic agricultural sector can make an important contribution to such an increase. Technological change in agriculture increases the income of small landowning peasants, who in Asia typically spend 40 percent of their increments to income on locally produced, nonagricultural goods and services. Since these goods and services are highly labor intensive, their production provides new sources of employment and income growth for the poor.

Past research indicates that the employment and income linkage effects of technological change in agriculture are much weaker in Africa than in Asia. This is partly because incomes in food producing areas of rural Africa are lower than in Asia, partly because the infrastructure in Africa is poorer, and partly because the agroclimatic environment in Africa results in lower labor productivity and a more even distribution of income.

While both food aid and domestic agricultural production add to the supply of wage goods, the latter tends to stimulate important labor-intensive activities. Its contribution to growth is therefore greatly superior to that of food aid. For this reason it is important that food aid encourage—rather than diminish—the rate of growth of domestic agricultural production.

Any discussion of the disincentive effects of food aid on local agricultural production usually focuses on their untoward effects on food prices. These effects can be minimized, however, if two conditions are met. First, employment must be created for low-income people with a high propensity to spend on food. Second, food aid must be tied to other forms of assistance so that it facilitates long-term agricultural development. An important disincentive effect of food aid occurs when that aid is used to solve short-run problems of food supply, thereby allowing politicians to turn their attention to matters other than those pertaining to agricultural development. Thus, linking food aid positively to other assistance may be more effective than simply attaching conditions to food aid alone.

In any case food aid can be used directly to facilitate growth in agriculture. Improved communications infrastructure is one of the most pressing agricultural development needs, and it can be highly labor intensive. In effect, the decrease in the cost of food production caused by food-for-work programs that build rural infrastructure is larger than the potential depressing effect of food aid on producer prices. An improvement in infrastructure is essential if the multiplier effects of agricultural growth are to expand employment in other sectors.

INSTABILITY

The most unfortunate feature of a strategy of growth oriented toward employment and agriculture is that it has an increased vulnerability to weather-induced fluctuations and recessions. Because of the large size of agriculture in most developing countries, sudden changes in weather or rainfall patterns can cause major fluctuations in the gross national product of a country. The indirect effects of weather fluctuations are even more important through their effects on the demand for output from the nonagricultural sector and on the supply of wage goods.

Compounding this problem is the fact that global fluctuations in food prices and supplies will probably increase in the future. The apparent reluctance of

the United States to continue holding large stabilizing stocks means that production instability is likely to be greater in the future. These forces may be somewhat offset by the increasing internationalization of grain trade, which increases the speed with which food can be shipped from one part of the world to another. In this respect the creation of the cereal import facility at the International Monetary Fund represents a major innovation that greatly facilitates the pursuit of an agriculture-oriented strategy of development.

Highly unstable food supplies and prices not only have an unfavorable direct effect on people, but they also impede employment growth. When food prices are highly volatile, labor-intensive industries find themselves confronted with labor unrest, as the real incomes of their workers fluctuate widely. In India large changes in the real incomes of workers have caused the proportion of rural people living beneath the poverty line to fluctuate between 40 and 60 percent during the past two decades. These wide changes are caused primarily by weather-induced fluctuations in agricultural production and related employment and food price changes.

Food aid can do much to reduce this type of instability. It can effectively compensate for poor harvests. It can also be used to build the large working stocks needed by countries that have poor crop-reporting services and cannot move quickly into world markets when crops are poor. Finally, the staffs of food aid agencies, with their specialized knowledge, can collaborate with other assistance agencies to help establish institutions in developing countries that are more responsive to fluctuating agricultural conditions. Government crop-reporting services and the staffs to analyze crop conditions reports are at best rudimentary in many developing countries, particularly those in Africa. One effect of this is that much larger stocks are needed. The analytical capabilities of food aid agencies can help build the lobby and provide the technical advice to gradually change this.

CONCLUSION

Three demands should be met by the food aid donor and two by the recipient if food aid is to make an effective contribution to a strategy of growth based on employment generated through rural development.

The donor must provide reliable amounts of food aid so that long-term development programs can be built on it; provide large amounts of food aid—a significant effect on employment cannot be expected unless some measurable percentage of the country's existing food supplies is added; and recognize the conditions of effective food aid use so that, for example, efforts can be made to provide other resources needed for the effective use of labor and to provide administrative rules necessary to attract a productive labor force.

The recipient, in turn, must give priority to agricultural development to ensure that a long-term, high-employment strategy of economic growth can work and pursue policies that spread capital supplies as evenly as possible over the labor force in order to maximize employment growth. These two demands require attention to exchange rate policies, domestic price policies, and to the type of technological changes in agriculture needed to stimulate growth.

These requirements for both donor and recipient demand high analytical skills in technical departments developing and administering such a food aid strategy. Given the large cereal exports developed countries have generated, and the potentially favorable impact of such exports on most developing countries, a commitment to such a strategy should be attractive and feasible to donor and recipient alike.

John W. Mellor
Washington, D.C.

FOOD TRENDS ANALYSIS PROGRAM

Research in the Food Trends Analysis Program provides the backdrop for defining the Third World's food problems. It contributes to the process of identifying the issues that need to be studied in order to answer the policy questions that form the basis of IFPRI's research priorities. Building on agricultural and economic data furnished by other international organizations—especially the Food and Agriculture Organization of the United Nations (FAO)—studies in the Trends Program center on the analysis of historical trends of food production, consumption, and trade in developing countries; the factors underlying these trends; and the projections of future food gaps based on past trends of production and per capita consumption and income in these countries.

Studies attempt to identify the areas where critical food problems may occur as well as their causes, to indicate the likely magnitude of food gaps, and to examine the implications of such food gaps on policies at both national and international levels. These diagnostic efforts assist in defining the areas for further research and call attention to the food problems of Third World countries. Two ongoing research activities are of primary concern: the food gap in Third World countries and an assessment of Chinese agricultural statistics.

FOOD GAP ANALYSIS

As part of the broad analysis of food gaps in developing countries, research during 1983 concentrated on the use of feedgrains in the Third World, the food situation in Sub-Saharan Africa, and food demand in North Africa/Middle East.

USE OF FEEDGRAINS IN DEVELOPING COUNTRIES

During 1983 research was undertaken on the use of cereals for animal feed in the Third World. Preliminary results indicate that the use of cereal grains and by-products as animal feed rose by 70 percent between 1961-65 and 1973-77, representing an average annual growth of 4.5 percent. One-half of the total increase was in Latin America, where the amount of cereals fed to livestock and poultry doubled to 33 million metric tons during the period. The increase in Asia was nearly 8 million tons, or a quarter of the aggregate increase for developing countries. Thirty percent of the increase in Asia was for rice bran, which in the mid-1970s formed almost half of the use of cereals for feed in the region. North Africa/Middle East recorded a moderate growth in cereal feed use of 3.8 percent a year, while Sub-Saharan Africa showed an average annual growth rate of 3.2 percent.

The analysis shows that in 1979 Third World countries (excluding China) used about 93 million tons of cereals for livestock feed. Coarse grains comprised 59 million tons, and the rest was equally shared by paddy rice and wheat. About 83 percent of the paddy rice and 75 percent of the wheat was in the form of by-products, including cereal bran. For coarse grains, about 90 percent was fed directly as grain to animals.

Among the developing regions, Latin America led in the use of cereals for animal feed with about 38 million tons, or two-fifths of the total, of which 85 percent was made up of coarse grains. Asia accounted for nearly a third, but almost half of this was paddy rice, including bran. Asia accounted for about 90 percent of

rice bran used for animal feed in developing countries. In the North Africa/Middle East region, coarse grains represented two-thirds of the cereals fed to livestock and poultry. The lowest feed use among the regions was reported for Sub-Saharan Africa, which accounted for 4 percent of the total for Third World countries.

Past trends indicate that although the amount of cereals used for animal feed in many Third World countries is low in relation to the direct consumption as food, the demand for cereals for animal products is expanding faster than the growth of output of livestock products. In view of the observed rapid growth in the consumption of animal products and the change in the composition of these products with rising per capita incomes in many developing countries, the demand for cereals as feed is expected to continue to grow in the coming decades.

SUB-SAHARAN AFRICA

One of the two completed regional studies that are part of the Program's food gap analysis for developing countries examines the food situation in Sub-Saharan Africa as reflected by trends in the production, consumption, and trade of the basic food staples in the region between 1961 and 1980. The study also develops food output and demand projections to 2000 on the basis of past production and income trends in Sub-Saharan Africa and, in addition, looks into the major factors that directly affect the region's food demand-supply situation, such as population growth and agricultural input use. Research findings are presented for groups of countries classified according to geographical areas, 1980 per capita income, and 1976-80 food sufficiency ratios.

In 1980, Sub-Saharan Africa accounted for about 10 percent of the population and 9 percent of the output of major food crops in developing countries (including China). Between the early 1960s and the late 1970s, the region's population expanded at an average annual rate of 2.8 percent while its production of basic food staples increased at only 1.7 percent a year, which represented an actual decline in per capita output in the region. The United Nations projects population to increase at a still faster rate in the coming years and thus it will continue to exert increasing pressure on the region's food supply. The West Africa subregion, which accounts for nearly half of the people and food output of Sub-Saharan Africa, had the fastest population increase, almost 3 percent a year, and the slowest growth in the production of major food crops, less than 1 percent a year. Increases in food output also lagged behind population growth in Eastern and Southern Africa but outpaced population expansion in Central Africa.

Area expansion at the rate of 1.5 percent a year provided about 96 percent of the growth of food output in the whole region during 1961-80 as crop yields were nearly stagnant or even declined. Growth of harvested area accounted for 90 percent of the growth of cereal output and, because of decreases in output per hectare, for the total increase in noncereal output. The growth of food production in West Africa and in Central Africa resulted from area expansion as both experienced declines in output per hectare. In Eastern and Southern Africa about three-quarters of the increase in food output came from area expansion and only one-quarter from improvements in crop yields.

Although West Africa reflected the food production performance of Sub-Saharan Africa on the basis of the 20-year trend, the changes in regional food output reflected by the trends for the two 10-year subperiods appear to be influenced significantly by the trends in Central Africa and Eastern and Southern Africa. The decline in the growth of food production in Sub-Saharan Africa between the 1960s and the 1970s could be traced to the deceleration of output growth in these two subregions where major slowdowns in area expansion and drastic declines in crop yields occurred during 1971-80. By contrast, although slow, the growth of output of the basic food staples

in West Africa accelerated between the two 10-year periods because of the improved output performance in millet/sorghum.

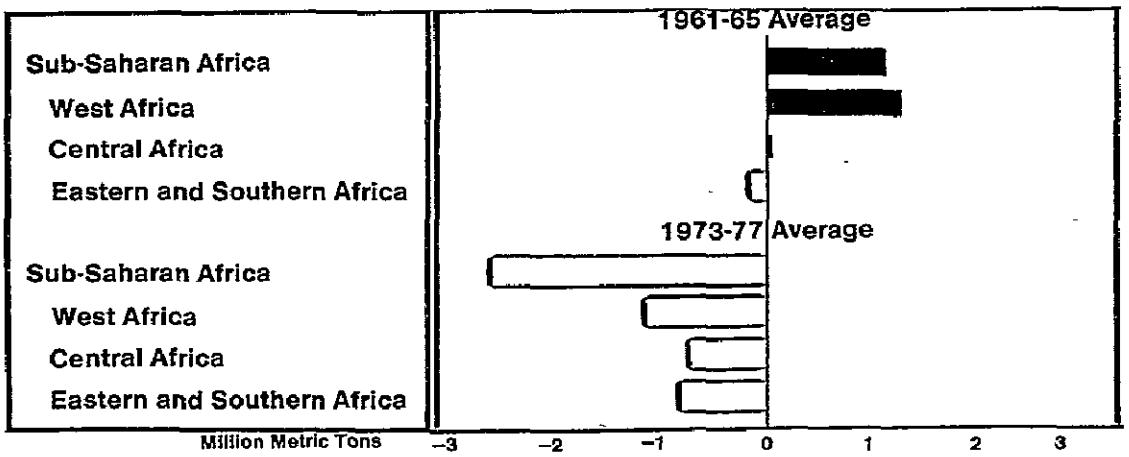
The 2.4 percent average annual growth in the consumption of basic food staples in Sub-Saharan Africa between the early 1960s and the mid-1970s was almost half a percent slower than population growth. Most of this increase resulted from the direct use of these commodities for food. In all but Central Africa, growth of direct use of the basic food staples for food lagged behind population increases, suggesting that average per capita food availability declined in most of the region. Despite relatively rapid growth in feed use—more than 3 percent a year from the early 1960s—the levels of use of these commodities for animal feed in Sub-Saharan Africa were low. Feed use in total consumption was only 6 percent in the mid-1970s. The relative shares of major food crops for feed use in total domestic utilization during the later period were 4 percent in Central Africa, 5 percent in West Africa, and 8 percent in Eastern and Central Africa.

In 1961-65 Sub-Saharan Africa had average yearly net exports of 1.2 million tons of basic food staples, mostly groundnuts, but slowdowns in food production growth and rapid increases in consumption that followed eroded this favorable trade position and by 1973-77 the region was a net food importer averaging more than 2.5 million tons of these commodities annually (Figure 1). The region's food exports declined by 4 percent a year while the growth of its food imports averaged 7 percent a year.

This shift in the food trade position was due largely to the adverse changes of the food situation in West Africa, which accounted for all of Sub-Saharan Africa's net food exports in 1961-65 but for 45 percent of its net food imports in the mid-1970s. Although these trends in the food trade of Sub-Saharan Africa are alarming, average net food imports during 1973-77 represented less than 4 percent of total consumption and were relatively small compared with other net food importing regions in the Third World.

Assuming that country production trends of 1961-80 continue, the output of basic food staples in Sub-Saharan Africa is projected to reach 110 million tons by the end of the century. This would result in a shortfall of 40 million tons if

Figure 1
Net exports of major food staples in Sub-Saharan Africa, 1961-65 and 1973-77 averages



Source: Leonardo Paulino, "The Evolving Food Situation in Sub-Saharan Africa," paper presented at the Conference on Accelerating Agricultural Growth in Sub-Saharan Africa, Harare, August 1983.

matched with projected demand based on the trend growth rates of income during 1966-77 and United Nations population projections. The shortfall would be 10 times the estimated average annual deficit of basic food staples in the region during 1976-80 as reflected by the yearly net trade. More than three-fifths of the aggregate food shortfall in countries with food deficits in Sub-Saharan Africa would be accounted for by West Africa. Central Africa is projected to achieve a net surplus of about 1 million tons of these commodities, which would be a shift from its food position during 1976-80. Eastern and Southern Africa has a projected net deficit of 13.5 million tons or about half the projected net deficit of West Africa.

An examination of the levels of agricultural input use in Sub-Saharan Africa based on data provided by FAO reveals that the region has underutilized modern technology in agriculture. Major increases in food production in the region will need significant increases in crop yields and faster expansion of crop area, both of which will require improvements in agricultural technology.

In Sub-Saharan Africa only 1 percent of the total land area under crop production was irrigated in the late 1970s. Central Africa had very little irrigated land and less than 1 percent of West Africa's cropland area was irrigated during 1976-80. Relatively more productive Eastern and Southern Africa had 2 percent of its crop area irrigated in that period.

Although the use of chemical fertilizers in the region shows a fourfold expansion between the early 1960s and the late 1970s, the average annual consumption in 1976-80 of about 6 kilograms per hectare of cropland was much less than in other parts of the developing world. With only few exceptions, countries in the region had fertilizer use levels of between 1 and 10 kilograms per hectare during that period.

In the case of agricultural mechanization, the estimated 100,000 tractors of all sizes in Sub-Saharan Africa during 1976-80 represented less than one unit per thousand hectares of the land area under crops. About one-half of the countries in the region averaged less than half a tractor unit per thousand hectares, one-third of the countries had between 1 and 5 tractors per thousand hectares, and only a few countries exceeded 10 tractors per thousand hectares.

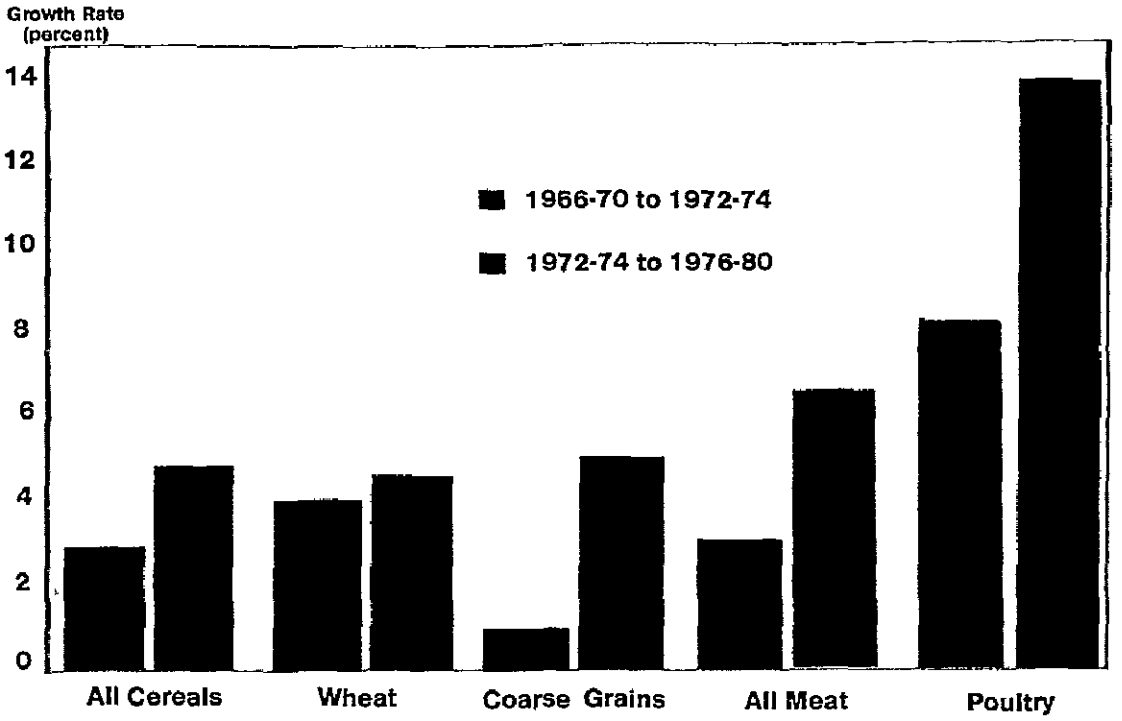
NORTH AFRICA/ MIDDLE EAST

Results of a regional study on the dynamics of food demand in North Africa/ Middle East indicate that the future output of major crops will not be adequate and that the region will become the major Third World importer of basic food commodities.

The food situation in North Africa/ Middle East altered dramatically during the second half of the 1970s. Much of the rapidly increasing food demand in the region has been generated by the dissemination of oil revenues after 1973. Between 1973 and 1980, the average per capita income of the oil-exporting group, which includes Algeria, Iran, Iraq, Kuwait, Libya, Oman, and Saudi Arabia, increased to more than U.S. $5,000, implying an annual average growth rate of 8.1 percent. During the same period, though to a much lesser extent, the average per capita income of the labor-exporting group of countries, including Egypt, Jordan, Lebanon, Yemen Arab Republic, and the People's Democratic Republic of Yemen, rose at an average annual growth rate of 4.7 percent, to U.S. $607.

This growth has reinforced a substantial rise in urbanization and labor migration, resulting not only in increased demand, but also in an upward shift in consumption of the major food commodities (Figure 2). Thus, the overall consumption growth of basic staples, already high at 3.9 percent annually over the entire study period (1966-70 to 1976-80), appears to have accelerated much faster in more

Figure 2
Average annual growth rates of the consumption of cereals and meat in the Middle East and North Africa, before and after the 1973 increase in oil prices



Source: Nabil Khaldi, "The Dynamics of Food Demand in the Middle East/North Africa," Washington, D.C., International Food Policy Research Institute, forthcoming, p. 25.

recent years, at an average rate of 4.9 percent annually. Changes were more dramatic, however, in the consumption of primary livestock products. Meat and poultry rose at annual growth rates of 6.6 and 14 percent, respectively, compared to 5 and 11 percent between 1966-70 and 1972-74.

Study findings also suggest that while the growth of the domestic output of basic staples has kept pace with that of population in the region as a whole, it has fallen considerably behind in most of the oil- and labor-exporting countries. Of the major food crops, only the expansion of wheat was sufficient to match population growth, particularly in Afghanistan, Cyprus, Morocco, Sudan, Syria, Tunisia, and Turkey, the major food producing countries. Coarse grains production lagged considerably behind for all country groups. Although poultry and egg production expanded rapidly, the growth of production of other meats and milk remained behind population growth.

With virtually little or no coherent policy integrating domestic livestock production with crop production, increases in the utilization of coarse grains for feed use have become heavily dependent on imports. The rapid expansion in commercial poultry and dairy farms in the late 1970s caused import requirements to rise at faster rates than was experienced for all other cereals. If this pattern of domestic utilization continues, coarse grain consumption will dominate the deficits in food staples. The 4.8 million ton deficit of 1980 will more than double by 1985. Thereafter, with the rapid growth in demand for livestock products, the deficit will surpass that anticipated for

wheat, 16 million tons beginning in the 1990s. Eventually, by the year 2000, the deficit in coarse grains, nearly 35 million tons, can be expected to comprise the major portion of staple crop deficits.

Expanding coarse grain deficits will not be limited to the oil- and labor-exporting countries as in the past. Even among the major food producing countries, which will continue to dominate the supply of food commodities in the region, projected wheat surpluses will be offset by the increasing levels of coarse grain deficits—from less than 1 million tons in 1980 to 16 million by the year 2000.

Advances based on available technology may provide a significant comparative advantage for food production in the region, particularly in the major producing countries. Field estimates suggest that potential yields of barley could increase by 20 to 80 percent above what is projected for 1990, while those of sorghum, the predominant crop of Sudan, could double over the same period. Assuming no significant change in the projections of area harvested, these potential yields, if realized, could raise the output of coarse grains in the major producing countries by about 9 and 13 million tons over the projected levels in 1990 and 2000, respectively.

Research results indicate that by focusing on the increase of domestic grain supply for human consumption, particularly wheat, existing food policies in North Africa/Middle East may not have adequately adapted to the dynamics of demand in the region. Consequently, barring the possibility of substantial gains in productivity through the improvement of agricultural practices and large increases in capital outlays for agricultural production, self-sufficiency is not likely. If past trends continue until the end of the century, the region may face a deficit of more than 52 million tons in basic staples, more than 5 million tons in meat, about 25 million tons in milk and 0.2 million tons in eggs. These deficits represent a threefold increase in staples and fivefold increase in meat and milk above the 1980 level.

CHINA In 1983 analytical work continued on national and provincial data for the People's Republic of China. An abbreviated national data study was published at the close of 1982. Continued examination of national data included basic series published in the various editions of the Statistical and Agricultural Yearbooks of China, 1981 to 1983, as well as several other data sources. These voluminous compendia added significantly to the fund of quantitative materials available for analyzing Chinese agricultural development. Work in previous years, however, proved instrumental in quickly interpreting data categories and determining their consistency. In October a program of coordination on Chinese statistical issues was initiated with FAO's Basic Data Unit for regular dialogue and review of FAO series for China.

Analysis of Chinese official series was supplemented by examination and analysis of heterogeneous materials relating to the production, utilization, and trade of several specific Chinese farm commodities of importance to the centers of the CGIAR and for which China has published no series. Research was conducted at the request of the Centro Internacional de Agricultura Tropical (CIAT) on cassava and edible beans, and data on white potatoes was compiled at the request of the Centro Internacional de la Papa (CIP). A paper summarizing analytical aids and trends for Chinese tuber crop production (aggregated and disaggregated by crop) was completed. Considerable attention was given in the first half of the year to livestock and meat, poultry, and dairy production statistics.

Work on Chinese provincial data included the completion of a draft providing irrigated area series by province, guides for interpreting that data, and a variety of cross-sectional quantitative estimates for Chinese provinces relating to irrigation.

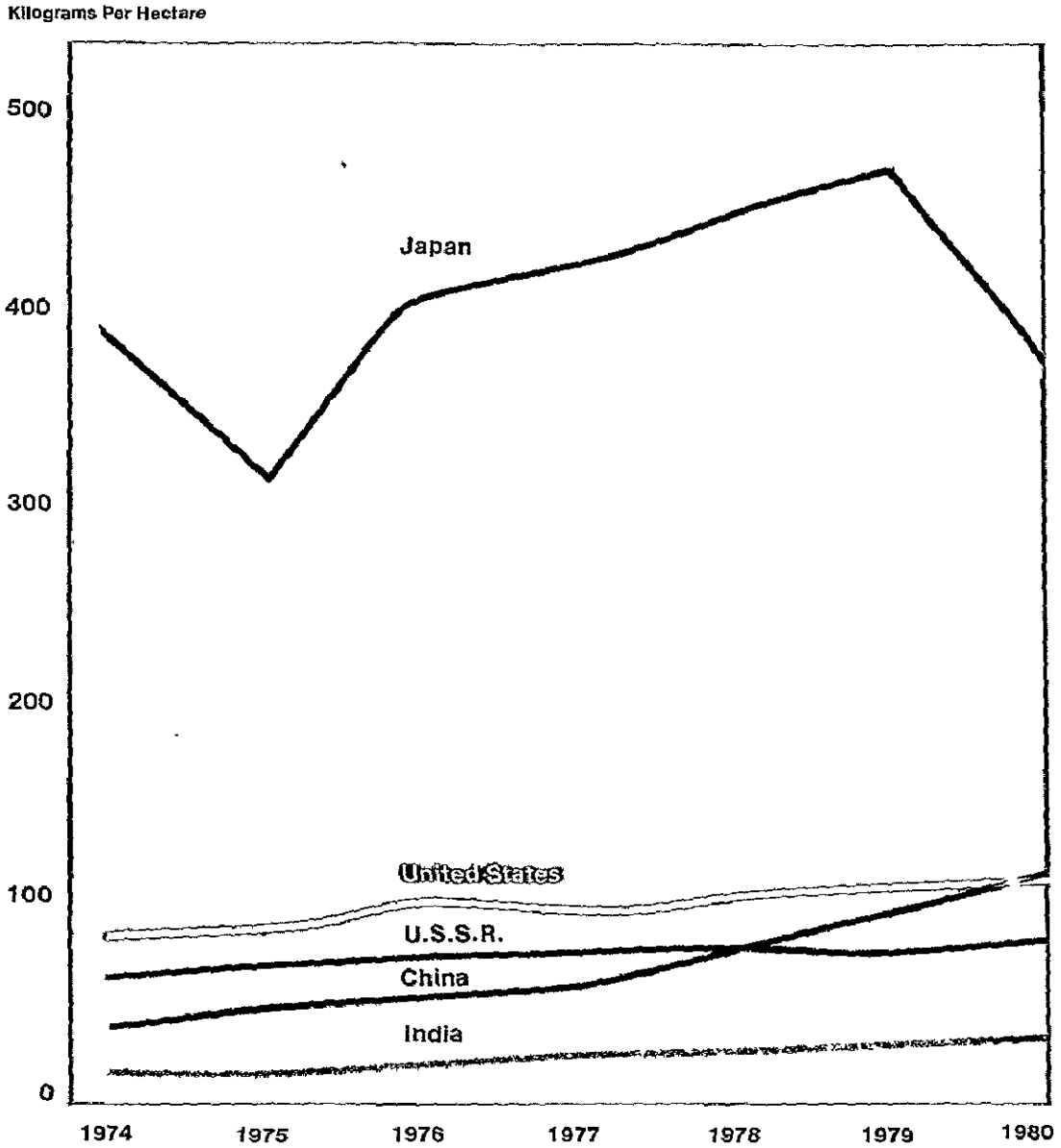
Considerable work was also done to consolidate provincial fertilizer data. Some of this material, as well as the provincial irrigation data and accumulated analysis of national material on fertilizers, was useful in preparing a background paper for the World Bank on the prospects for chemical fertilizer demand in China. Work analyzing intersectoral flows of resources and Chinese economic development was initiated in 1983.

One of the clear conclusions from the analysis of collected data on fertilizer and irrigation is that fertilizer application in China is heavily skewed toward irrigated lands (especially where yields are high and stable), toward a few crops such as rice and irrigated wheat, and toward developed and urbanized provinces. Fertilizer trade among provinces has recently increased, but trade flows are still minimal. Relative farmgate prices for fertilizer have fallen from an extremely high level in the 1950s to prices that are closer to those of other developing countries.

During the period 1976-82, China had the fastest growth in fertilizer application (from 6 to 15 million tons of nutrients per year) of any country for any comparable period. This growth is also remarkable when compared with the growth shown by other countries using large amounts of fertilizer (Figure 3). This immense quantity of additional fertilizer has been absorbed through lowering the relative prices, restricting nonagricultural income-earning opportunities, and by allocating subsidized fertilizer to various units as a reward for performance. Over time, smaller proportions of these subsidized allocations have gone to farm units exhibiting high marginal yield response to fertilizer application.

To productively absorb large quantities of additional fertilizer, further price cuts and expansion of the present subsidy program will have relatively little effect without an aggressive program of marketing in unirrigated areas, where total fertilizer requirements are lower but marginal requirements are much greater than on currently fertilized lands. Development of the marketing system for unirrigated lands must include an extensive network of field tests and extension work because farmers in many of these target localities are relatively unfamiliar with the use of chemical fertilizer. It will also require expansion of the agricultural credit network to these cash-poor localities. Finally, efficient transport and storage facilities must be developed.

Figure 3
Consumption of fertilizer in selected countries, 1974-80



Sources: Food and Agriculture Organization of the United Nations, *FAO Fertilizer Yearbook*, various issues (Rome: FAO, various years); and Bruce Stone, "An Examination of the Prospects for Demand for Chemical Fertilizers in the People's Republic of China," paper presented at the World Bank, Washington, D.C., January 3, 1984.

Notes: For countries other than China, the amount of chemical fertilizers applied is divided by arable land, which includes land under temporary and permanent crops (ignoring multiple cropping), temporary meadows for mowing or pastures, and land left fallow temporarily. For China, the amount of chemical fertilizers applied is divided by the sum of cultivated area, area under mulberry, tussah, tea, and fruit orchards, and economic forests.

FOOD PRODUCTION POLICY AND DEVELOPMENT STRATEGY PROGRAM

Research in the Food Production Policy and Development Strategy Program is based on three complementary premises: the process of growth must be consciously guided to ensure maximum impact upon the poor; the forces governing agricultural growth are directly and indirectly related with other sectors; and technological change is central to the process of acceleration in agricultural production.

During 1983 members of the Production Program conducted research in three broad areas: specific production policies, production strategies, and growth and development strategies involving linkages between agricultural and nonagricultural sectors.

SPECIFIC PRODUCTION POLICIES

Research in this area focused on key inputs relating to the adoption of improved technology in agriculture. Policies regarding the flow and impact of resource allocations to agricultural research represented the primary research foci.

AGRICULTURAL RESEARCH

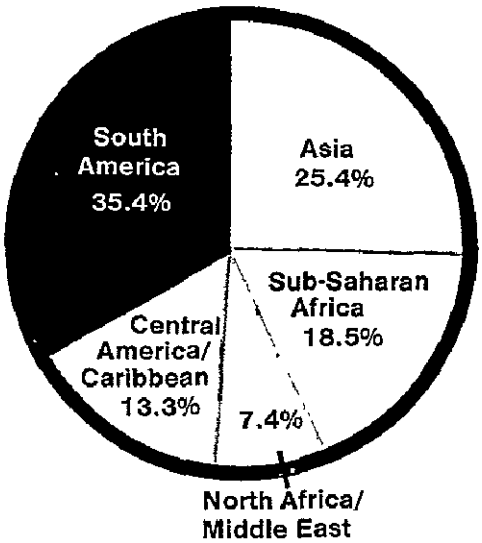
The development and application of new knowledge is central to the improvement of agricultural production in the developing world. This is the main reason for the expenditure of scarce financial and human resources on agricultural research in the Third World. Much evidence exists to suggest that well-planned and targeted agricultural research yields high rates of return.

IFPRI research in this area focuses on allocation and management issues through country case studies and global analyses. Such work can be helpful to a wide variety of national and international policymakers and donor agencies.

During the year, work continued on analyzing the growth in national agricultural research systems in 67 developing countries. In these countries aggregate expenditure on agricultural research rose two and a half times, from $600 million (1980 constant dollars) in 1970 to $1.5 billion in 1980. The number of scientists also nearly doubled, from 18,700 in 1971 to 36,000 in 1980. Yet despite these significant gains, real problems still exist in the distribution of research resources between countries. Almost 80 percent of all Third World agricultural research resources are concentrated in about 20 relatively large countries located mainly in Asia and Latin America (Figure 4). Many of the smaller (and poorer) countries in Sub-Saharan Africa, Central America, and the Caribbean could not support a national system capable of handling all their potential agricultural research needs even at a substantially larger rate of expenditure.

This study shows that distributional problems are only one of several emerging problems threatening national agricultural research systems in the 1980s. Other problems include the instability of funding, especially that of operational

Figure 4
Distribution of expenditures on agricultural research in developing countries, by region, 1980



Source: Peter Oram and Vishva Bindlish, "Investment in Agricultural Research in Developing Countries: Progress, Problems, and the Determination of Priorities" (Washington, D.C.: International Food Policy Research Institute, forthcoming), Table 4.

Note: The data used are for 67 countries, whose population makes up 89 percent of the population of all developing countries.

expenditures; fragmentation of research responsibilities between ministries; and weak links between research and the on-farm application of new techniques. Many of these problems stem from inadequate planning and management.

At the request of the CGIAR Secretariat IFPRI completed a substantive bibliography containing more than 450 entries covering different aspects of the impact of agricultural research. This search revealed that the Asian experience (particularly that of South Asia and the Philippines) dominated the literature, with over 50 percent of the entries. Less than 5 percent of the entries dealt with Africa. On political, ecological, and environmental effects the literature on agricultural research is overwhelmingly dominated by Asia.

In Asia, IFPRI continued work on an intensive case study of the allocation of agricultural research and extension resources in Nepal. Work on these topics is quite timely in Nepal. During the period 1970/71 to 1980/81 total cereal grain production in Nepal increased by only 0.95 percent a year. In addition, production and productivity in the hills declined at a faster rate than in the Tarai. Preliminary results from this study suggest that the lack of clearly articulated research goals and policies may represent a significant constraint to the development and dissemination of new agricultural technologies.

IRRIGATION AND FERTILIZERS

Research on irrigation and fertilizer policies has been conducted as part of the collaborative Rice Policies in Southeast Asia Project, which is described in the Regional Projects section.

PRODUCTION STRATEGIES

Determining the effects of various policy choices is crucial for many developing countries because of sharp conflicts in policy objectives and the need for the appropriate use of resources. For example, a policy to increase the market supply of foodgrains may be severely constrained by risks at the farm level. And policies to increase agricultural output by raising producer prices may be unsuccessful because inadequate marketing structures are unable to translate potential capacity into actual production. A number of research projects in the Food Production and Development Strategy Program are therefore designed to explore the crucial elements that can contribute to an overall strategy for increased agricultural production.

PRODUCT MIX AND PRODUCER INCENTIVES IN THE SAHEL

Poverty and concern for food security are extensive in the West African Sahel. Communications in much of the region are poor, production variability is high, and price swings can be quite large. Many Sahelian countries are importing wheat and rice, even though domestic cereal production comprises mainly coarse grains. Under these circumstances, improved incentives for food production and substitution in production and consumption between millet/sorghum and other foodgrains represent the two basic policy questions in this region. IFPRI has begun studying these questions through two ongoing research projects.

The first project examines the nature of the interactions among food consumption, production and sales decisions, and the role of seasonal food price variations in West Africa. The second project focuses on examining the implications that substitution in production and consumption between millet, sorghum,and other foodgrains have for policy in semiarid West Africa. Preliminary results available for the first project suggest that there are important seasonal differences in price integration among local foodgrain markets. Typically, price integration among markets is greater in the post-harvest season than in the harvest season. This suggests that policymakers need to consider measures to improve harvest season market integration between regions of low and high potential experiencing differential rates of technological progress in food production. Harvest season food prices are typically lower; such policies would encourage farmers in the areas of lower potential to rely more on food from the regions of higher potential as they diversify into other pursuits. Such interventions could include better harvest season transport, information grading, and distribution.

LABOR PRODUCTIVITY IN AGRICULTURE

Labor is perhaps the single most important input in agricultural production in most developing countries. The role of labor in combination with land and other factors of production has often been cited as having a significant bearing on the different rates of agricultural growth between labor-surplus Asian countries and land-surplus African countries. If it is true that although an expanded cultivable land base represents the best way to significantly increase African foodgrain production, labor may become an important bottleneck. This calls for the study of labor-leisure choices made by African farmers, and the feasibility of mechanization (including animal traction) in Africa.

This interaction of these forces in Sub-Saharan Africa is currently being examined at IFPRI. Data sets from Sierra Leone, Upper Volta, and Nigeria are being used to identify the interaction of labor-leisure choice with labor productivity. Results from this study are expected to improve the policy basis for modernizing agricultural technology.

INSTABILITY IN FOODGRAIN PRODUCTION

In recent years many developing countries have achieved impressive rates of growth in national foodgrain production. Much of this growth can be attributed to the increasing use of new technological inputs in agriculture. But at the same time, the variability of foodgrain production around the trend also has increased. This increased instability is reflected in increased market and price instabilities, which pose difficult problems for farmers and poor consumers alike.

Some experts have blamed this tendency toward increased production instability on the improved seed/fertilizer technologies and have argued that plant breeders should focus less on maximiz-

ing average yields and more on reducing yield sensitivity to environmental stress. Such recommendations may prove costly for future growth in foodgrain production and cannot be pursued realistically until more thorough studies of the different sources of increased production instability have been undertaken.

Following a 1982 study of instability in foodgrain production in India, IFPRI is using statistical identities to decompose the variance of foodgrain production in several developing and developed countries. Similar work is also being pursued for the world as a whole. Preliminary results from these studies suggest that in countries where yields have increased the most, increased yield variability has been an important component of the increase in the variance of national foodgrain production (Table 1). But not all of this increased yield variability can be attributed to the new technologies. Part of the variability is due to the impact of increased price fluctuations on the year-to-year use of new technological inputs. Fluctuations in the supply of fertilizer and electricity for irrigation may also be important for developing countries like India.

Another important change accompanying yield increases is a trend toward more positively correlated yields between regions within countries. This is particularly true for maize in the United States, where increased yield correlations between states account for nearly half the increase in variance of national cereal production since the mid-1960s. It is also true to a lesser extent for rice and wheat in India. This problem may reflect the narrowing of the genetic base following the widespread adoption of high-yielding varieties, and their susceptibility to similar kinds of disease and weather factors.

Increased variability in the area sown to individual crops has also been an important source of increased variability in national cereal production in some countries. Australia and Brazil provide dramatic examples of this phenomenon, primarily as a result of their expansion of cereal cropping into high risk areas.

Table 1
Changes in total cereal production, selected countries

Country	Average Production			Variability[a]		
	First Period	Second Period	Change	First Period	Second Period	Change
	(1,000 metric tons)		(percent)	(1,000 metric tons)		(percent)
Australia	8,295	16,929	104.1	1,462.6	3,448.8	135.8
Brazil	12,613	24,873	97.2	768.6	2,657.3	245.7
India	64,329	94,273	46.5	3,016.5	5,529.0	83.3
United States	154,020	231,075	50.0	8,666.4	5,987.4	84.5
U.S.S.R.[b]	107,927	176,031	63.1	14,030.5	6,996.4	78.2
World	956,159	1,338,703	40.0	24,826.4	8,956.0	56.9

Source: Based on calculations by Peter B. R. Hazell, 1983.
Notes: The first and (second) periods are as follows: Australia, 1950/51-1965/66 (1966/67-1981/82); Brazil, 1947-66 (1967-80); India, 1952/53-1964/65 (1967/68-1977/78); United States, 1950-66 (1967-80); U.S.S.R., 1950-65 (1966-82); and World, 1960/61-1970/71 (1971/72-1982/83).
[a] Change in variability is measured as the standard deviation of the detrended data.
[b] Figures include tubers and pulses, although these account for less than 10 percent of production.

GROWTH AND DEVELOPMENT STRATEGIES

Understanding the process of development is essential for designing development strategies that can accelerate economic growth with distributive justice. Studies of the interrelationships of various sectors of an economy, particularly the role of agriculture in generating multiplier effects for growth through intersectoral linkages, provide the basic elements for understanding the development process.

GROWTH LINKAGES

In a setting of dynamic technological change in agriculture, the agricultural sector can stimulate growth in income and employment in many sectors of the economy. There are two types of linkage mechanisms that produce these growth effects: resource transfers, which comprise the flows of food and raw materials, capital, foreign exchange, and labor from the agricultural to the nonagricultural sectors; and demand linkages, which comprise farmers' demands for farm inputs and marketing and processing facilities and rural household demands for consumer goods and services.

IFPRI's work in the first area includes a series of historical, quantitative studies of the intersectoral resource flows that occur between agriculture and the rest of the economy during the process of economic growth. These research efforts endeavor to clarify how agricultural investment and technological change contribute to long-term national economic growth. IFPRI has already completed studies on the interaction of these relationships in Japan, Argentina, and India. New work is now underway for Chile and the Indian Punjab.

In the area of demand linkages, IFPRI's work has stressed the linkage effects of household consumption patterns. An earlier study in Malaysia in which IFPRI research staff participated found that each dollar of income generated among farmers by an irrigation project generated a similar amount for the region through the indirect effects. This research also showed that intermediate demands for agricultural inputs and services were responsible for only a small part of the indirect gain; the larger share arose from increased farm incomes generating rural household demands for consumer goods and services. Related research continues in Tamil Nadu, India, to determine if similar results would occur under different social and economic conditions.

An important focus of IFPRI's growth linkage work is to identify ways in which government policy can be used to enhance the secondary growth effects of increases in agricultural output in rural areas. Projects to investigate several aspects of the rural linkage question continued during 1983.

Investment in infrastructure is one area of investigation. Work on Bangladesh explores the role of such investment in an effort to determine the levels necessary for agricultural growth. Investment in irrigation, roads, and transport systems helps increase agricultural productivity, and investment in roads, banks, and markets is necessary to stimulate the development of the local economy.

In 1983 IFPRI completed a study of the multiplier effects of rural household expenditures in Malaysia and Nigeria. In Research Report 41, *Rural Growth Linkages: Household Expenditure Patterns in Malaysia and Nigeria,* Peter Hazell and Ailsa Röell show that most of the multiplier effects arising from increased farm incomes occur within the rural areas. These multiplier effects focus on such consumer-oriented sectors as transport, entertainment, health, and housing, and on locally produced fruits, vegetables, and dairy products. The goods and services produced in those sectors tend to be labor intensive, thereby providing new rounds of employment and income growth for the rural poor.

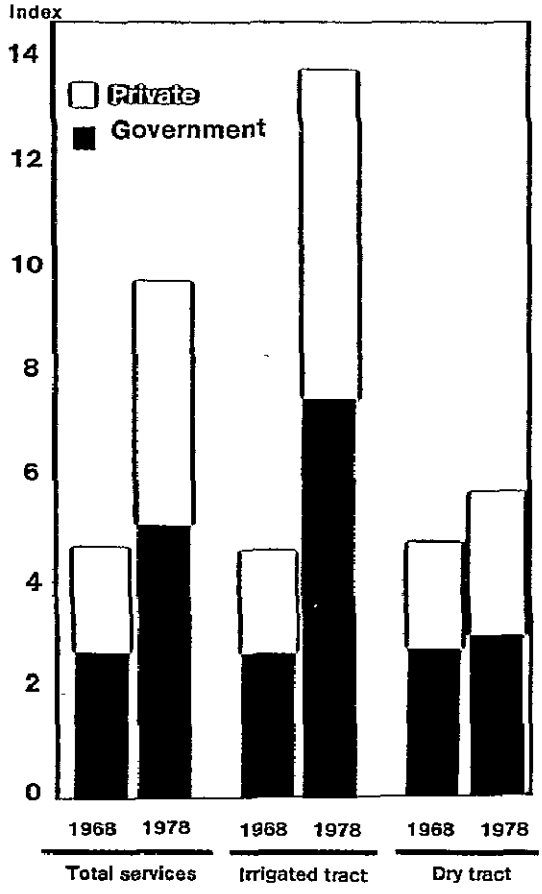
This work shows that larger shares of incremental income are spent on locally

produced nontradable goods and services as incomes increase. Because the demand for these goods and services creates the largest multiplier effects within rural areas, a successful rural development strategy may require renewed emphasis on increasing the incomes of middle-income farm households. This is not to say that lower-income households should be neglected, but rather to suggest that the best hope for helping the rural poor is to indirectly generate increases in employment and wages in the local nonfarm economy.

Although the crucial importance of farmers' access to farm inputs and agricultural marketing and processing facilities is well-established, much less is known about the importance of their location and about the effects of farmers' access to rural goods and services for household consumption.

During 1983 IFPRI completed a study of the relationship between agricultural growth and the development of rural services and marketing outlets in Andhra Pradesh, India. In this study, *Service Provision and Rural Development in India: A Study of Miryalguda Taluka,* Research Report 37, Sudhir Wanmali shows that increases in agricultural productivity do not take place without the timely development of key rural services. Since the private sector is initially reluctant to invest in rural areas, governments may need to take a leading role in the supply of such services as transport, marketing, and the development of rural infrastructure. According to this study, the government's provision of such services encourages the private sector to grow in the countryside, thereby facilitating the broader processes of rural socioeconomic development (Figure 5).

Figure 5
Indexes of the services provided in Miryalguda Taluka, 1968 and 1978



Source: Sudhir Wanmali, *Service Provision and Rural Development in India: A Study of Miryalguda Taluka,* Research Report 37 (Washington, D.C.: International Food Policy Research Institute, 1983), p. 48.

FOOD CONSUMPTION AND NUTRITION POLICY PROGRAM

Research undertaken by the Food Consumption and Nutrition Policy Program stresses how the incomes, food consumption, and nutrition of low-income people are affected by certain policy measures.

During 1983 the Food Consumption and Nutrition Policy Program continued research on various food policies related to consumption and nutrition, including food subsidies in Egypt, Sri Lanka, Mexico, and Sudan; price policies in Thailand and Zambia; and a food-for-work project in Bangladesh. Efforts were also initiated on integrative analyses of the various completed case studies.

FOOD SUBSIDY POLICIES

Most developing countries are searching for additional information to assist in assessing the policies aimed at reaching the poor and malnourished, while avoiding grave effects on the foreign exchange balance, government spending, and domestic food production. Research on food subsidies in Egypt, Sri Lanka, Mexico, and Sudan was a principal part of the Food Consumption and Nutrition Policy Program's work during 1983.

FOOD SUBSIDIES IN EGYPT

A component of the Program's continued research on food subsidies and transfer schemes in Egypt, which is funded by the U.S. Agency for International Development, looks at subsidies from diverse perspectives: their effects on consumption, on income distribution, on producers, on Egyptian agriculture as a whole, and on trade. The study also examines the administrative structure and the macroeconomic consequences of Egypt's subsidies. It is designed not only to assist policymakers in Egypt, where governmental involvement in retail food pricing and distribution is extensive, but also to provide a framework for investigating the benefits and consequences of consumption-oriented policies in general.

The 1982 *Annual Report* discussed the results of earlier phases of the study, which described the structure of the subsidy system and reported on preliminary results of analysis of the effects of food subsidies on foreign exchange and trade and on domestic agriculture. Much of this work was completed in 1983.

Because the subsidy system entails major fiscal costs and the low domestic prices for foods contribute to the large foreign exchange requirements for food imports, the subsidy system affects other sectors of the economy. Although growth of public investment outstripped the growth of consumer and producer price subsidies in the period 1970-81, and total resources available to the Egyptian economy have grown seven times faster than real expenditures on subsidies—LE 270 per capita in 1981 Egyptian pounds compared to LE 40 for subsidies—subsidy payments do contribute to the government deficit. In *Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade,* Research Report 40, Grant M. Scobie revealed that the increase in the deficit that would come about following a 10 percent increase in the annual subsidy bill would lead to an increase in the rate of inflation of 5 percent of the initial rate.

In addition, such an increase in expenditures on subsidies would bring about a 2 percent decline in international assets and a 3 percent decline in the shadow exchange rate for the Egyptian pound.

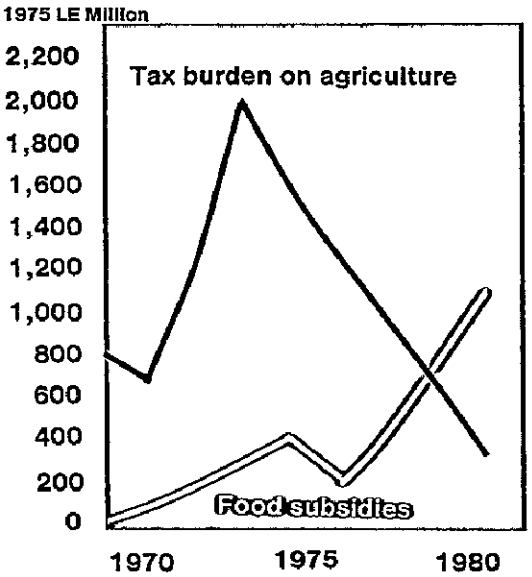
This report also indicates that because the government tries to keep food imports stable, industrial output and investment are destabilized. A decrease of U.S. $1.00 in foreign exchange would reduce imports of food and other consumer goods by only 16 cents, while imports of industrial raw materials would decline by 40 cents and capital goods by 34 cents. It is estimated that a 10 percent decrease in foreign exchange would reduce industrial output by 6 percent and investment by 4 percent. Similarly, a 10 percent increase in the cost of imported food would result in a 1-2 percent fall in industrial output as imports of raw materials are crowded out.

In *The Effects of Food Price and Subsidy Policies on Egyptian Agriculture,* Research Report 42, Joachim von Braun and Hartwig de Haen find that indirect taxes on agriculture were decreasing at the same time that food subsidies were growing (see Figure 6). Still, the implicit transfer of income from producers to consumers due to depressed grain prices equaled about 40 percent of the total fiscal food subsidy bill in 1980. This is mainly a result of the price and procurement policies for wheat and rice. However, the ratio between the implicit income transfer from farmers to consumers and from the government budget to consumers was much higher in the 1960s and 1970s.

A quantitative model reveals that increases in government resources from oil exports, the Suez Canal, and foreign aid led to the reduction of the burden on agriculture. Thus, the policy of gradually reducing the implicit taxation of agriculture might someday be reversed in order to subsidize food for consumers if a less favorable fiscal situation were to develop.

The report points out that the distortions in Egypt's agricultural prices are not a recent result of the food subsidy program, but have long been a traditional characteristic of Egypt's price policy. Adjusting domestic agricultural prices closer to their long-term international equivalents would improve the efficiency of resource allocation, but the effect would not be overwhelming: in 1980 the costs to the economy from these resource misallocations in agriculture represented about 1.5 percent of national income. In general, this report shows that government food subsidy programs are not necessarily detrimental to the growth of agricultural production and farmers' incomes.

Figure 6
The development of food subsidies and the tax burden on Egyptian agriculture, 1970-80



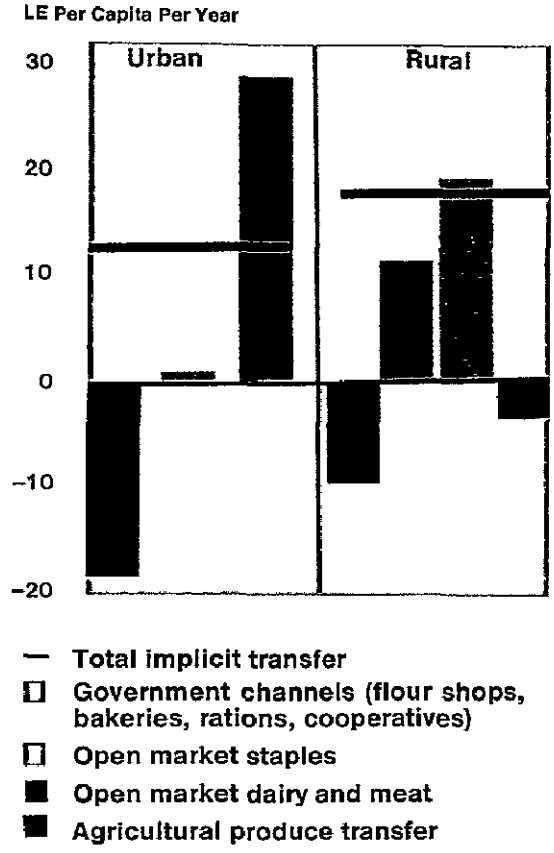
Sources: Joachim von Braun and Hartwig de Haen, *The Effects of Food Price and Subsidy Policies on Egyptian Agriculture,* Research Report 42 (Washington, D.C.: International Food Policy Research Institute, 1983), p. 72; and Harold Alderman, Joachim von Braun, and Sakr Ahmed Sakr, *Egypt's Food Subsidy and Rationing System: A Description,* Research Report 34 (Washington, D.C.: International Food Policy Research Institute, 1982).

The final phase of the Egyptian study utilizes data collected in a household survey in 1982 to investigate the impact of the subsidies on households. The study determines the regularity and universality of the distribution of rationed goods, especially bread and flour. More than 92 percent of the households in both rural and urban areas receive rations, with few reported gaps in availability. Whereas bread is primarily consumed in cities, rural residents have regular access to subsidized flour. The implicit income transfer from government sources amounts to LE 20 per capita annually for rural residents and LE 30 for urban residents.

In addition, due to price distortions there are implicit subsidies and consumer losses on the open market. Grain and flour are implicitly subsidized but meat and dairy products are protected. When these hidden gains and losses are totaled, rural consumers receive the equivalent of LE 22 annually compared to LE 13 for city dwellers, but the net gain to rural residents when implicit costs to agriculture are subtracted is LE 19. Because small farms concentrate on dairy products and inputs into protected meat production, such as clover, their implicit tax burden is relatively light. Thus it is the poorest groups in both urban and rural areas who benefit the most from subsidies. However, subsidies on certain commodities and certain outlets—frozen chicken and cooperatives, for example—primarily benefit upper income urban consumers (see Figure 7).

Because about 75 percent of both urban and rural families purchase some commodities like sugar, rice, and beans either at a cooperative or on the open market, the ration system can be considered primarily as a transfer of income rather than as a marginal price change. The study ascertains that the time spent waiting at the cooperatives encourages the purchase of more expensive open market goods. The poor do not particularly benefit from this allocation of goods by queuing, because they also tend to save time by purchasing goods on the open market.

Figure 7
Implicit transfer due to food subsidies and distorted prices in Egypt



Source: Harold Alderman and Joachim von Braun, "The Effects on Welfare and Distribution of the Egyptian Food Ration and Subsidy System," Washington, D.C., International Food Policy Research Institute, forthcoming.

Although the current subsidies on frozen meat and chicken often do not reach the lowest-income consumers, protein deficiency is not apparent in Egypt. Therefore a specific policy to bolster protein consumption is not needed. Deficiencies in calorie consumption were related to total income but could not be correlated with child mortality. Although a reduction of subsidies, particularly on bread or flour, may have nutritional consequences, it is less likely that remaining malnutrition in Egypt will be reduced by additional food rather than health policies.

FOOD STAMPS IN SRI LANKA

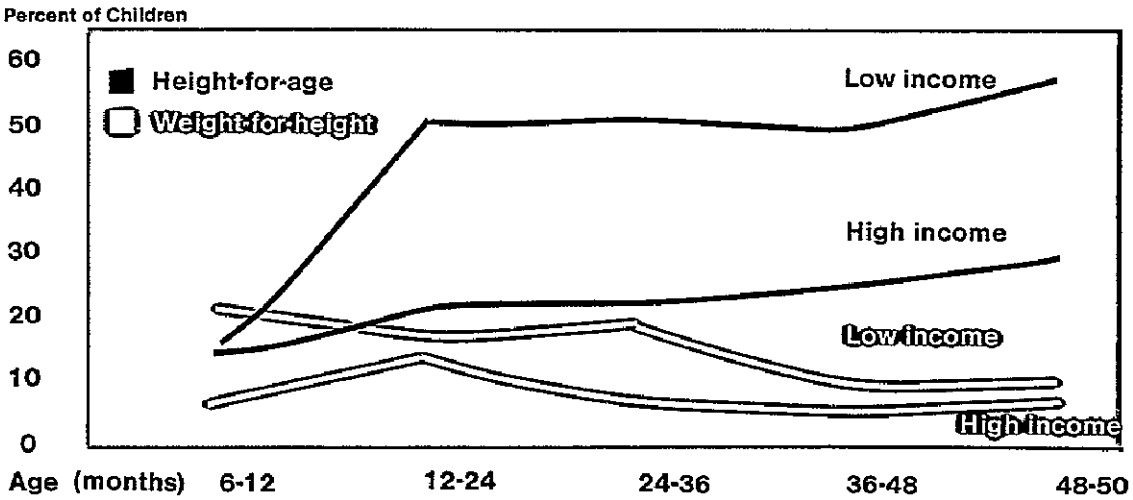
Food subsidy programs in Sri Lanka date back to the time of the Second World War. Over the years these programs have undergone substantial changes. In general, the changes have been prompted by the need to keep equity considerations compatible with resource availability and growth. Under the original program, which continued until the mid-1960s, almost all consumers were eligible for a subsidized rice ration. Subsequent modifications were aimed at curtailing costs and improving targeting. In spite of the changes, food subsidies accounted for nearly 16 percent of total government expenditures in 1977.

In 1979 the ration scheme was replaced by a food stamp scheme. This program issues food stamps for the purchase of a variety of foods. Eligibility is based on a minimum household income criterion. Price subsidies have been eliminated and the nominal values of the food stamps have remained constant. In 1981 the consumption subsidy amounted to about 7 percent of government expenditures.

IFPRI is reviewing the design and operation of the food stamp scheme and evaluating its fiscal costs and cost-effectiveness, including its likely effects on the real incomes, food consumption, and nutritional status of low-income consumers. Research to date has been mainly geared toward providing information to the collaborating agency in Sri Lanka for use in drawing up a nutritional plan and a food strategy.

Research results indicate that 37 percent of the preschoolers surveyed were short for their age ("stunted") and 13 percent were underweight for their age ("wasted"). A stunted child is one whose height falls more than two standard deviations below the median height for that age. Wasting is similarly defined using median weights. Stunting generally reflects long-standing inadequacies in nutrition and health, whereas wasting indicates current deficiencies. Data per-

Figure 8
Incidence of stunted and wasted children in low- and high-income households in Sri Lanka



Source: Neville Edirisinghe and R. M. K. Ratnayake, "A Preliminary Analysis of the Determinants of Nutritional Welfare in Sri Lanka," International Food Policy Research Institute, Washington, D.C., January 1984 (mimeographed).

Notes: Low-income households have per capita expenditures less than Rs 125 a month. High-income households have per capita expenditures greater than Rs 165 per month.

taining to urban, rural, and estate areas of Sri Lanka reveal both problems to be most serious on estates, followed by rural areas. Data pertaining to household incomes indicate that the percentage of stunted and wasted children is greater in low-income households than in high-income households (see Figure 8). The relatively high prevalence of both forms of malnutrition needs to be considered when evaluating the efficacy of the current food stamp program and identifying changes in design.

SUBSIDIZED MILK IN MEXICO CITY

The Mexican government operates a subsidized milk program in Mexico City. The program is targeted to low-income households with children under the age of 12 and pregnant and lactating women.

The subsidized milk costs half as much as milk sold on the free market. The amount of subsidized milk each family is eligible to receive is based on the number of target members in each household, up to a maximum of 4 liters per family per day. The duration of eligibility in the program is indefinite, but a new ration card to purchase the milk must be obtained every six months.

Between 1971 and 1977 the subsidy program grew by 44 percent. In 1977, 250,000 of Mexico City's 12 million residents participated in the program. Due partly to this rapid growth, the government of Mexico became interested in assessing the effects on nutrition of the milk program. Beginning in May 1978 an evaluation was conducted under the auspices of the National Nutrition Institute. Four hundred families, some participating in the milk program and some not, were included in the study. As part of a larger project to assess the effects of various nutrition interventions on target groups, IFPRI has been involved in the analyses of these data.

Food consumption data were available from this study for households as a whole and for preschool children within each household. Anthropometric data were collected for children, in addition to socioeconomic and demographic information for each family.

Preliminary analyses suggest that family caloric intake is positively associated with participation in the milk subsidy scheme. Energy intake is increased by approximately 1,700 calories per day in participating households. The family thus appears to benefit from the milk subsidy.

A different pattern emerges when the effects on the preschoolers in each household are analyzed. Milk contributes significantly more to the caloric and protein intake of the children drinking subsidized milk than it does to children from the nonsubsidized households. Milk supplies 24 percent of the calories and 36 percent of the protein in the diets of participating children, as compared with 19 percent and 26 percent in the diets of children without subsidized milk. But although participating children consume more milk, their total caloric intake is not substantially different from that of nonparticipating children, and the anthropometric indicators of weight and height for age show no differences between the two groups of children.

Given that the households' caloric intake increased as a result of the milk supplementation scheme but the child's caloric intake did not, it appears that the preschoolers' consumption of subsidized milk substitutes almost entirely for other sources of calories in the diet. The reasons for this are unclear. Further research on the distribution of food among family members and on the various influences on the nutrition of preschoolers will be conducted.

WHEAT SUBSIDIES IN THE SUDAN

Wheat bread is a major source of calories for the urban population in Sudan. Ac-

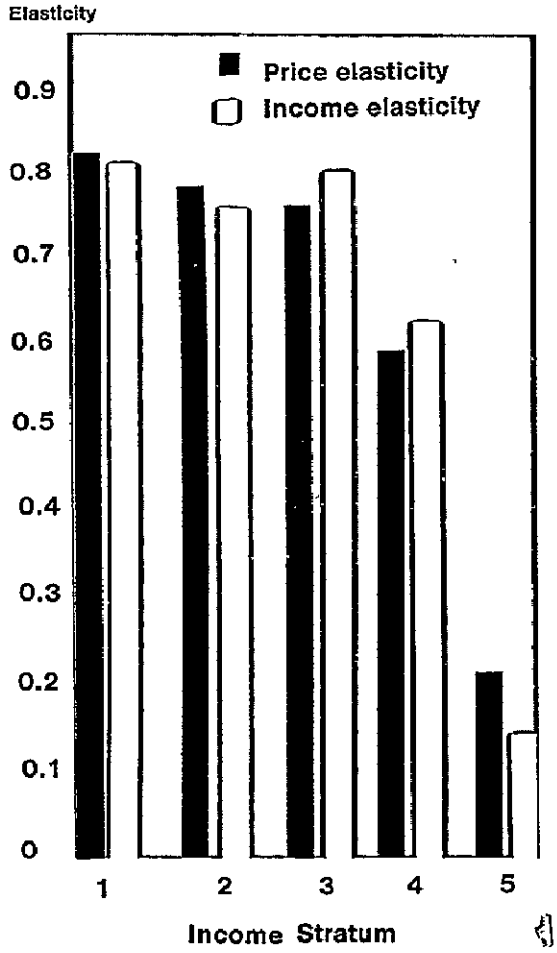
cording to the Household Budget Survey of 1978/79, approximately 25 percent of all calories consumed in urban Khartoum come from wheat bread. The Sudanese government has maintained an explicit price subsidy for bread but due to economic difficulties attempts have been made to reduce or eliminate the subsidy.

The purpose of this study is to estimate the effects of reducing or removing these subsidies on low-income households in urban Khartoum.

On the basis of an analysis of the food consumption patterns and calorie intakes of a sample population of urban Khartoum and an analysis of price and income elasticities by income stratum, the effects of changes in wheat bread prices on calorie consumption and incomes are estimated.

The analysis indicates that calorie deficiencies occur primarily in large households and that income differences alone do not explain differences in calorie consumption among households. Although many poor households are unable to meet calorie requirements and other basic needs, a number of calorie-deficient households spend a smaller than expected proportion of their incomes on food. However, these households are not generally among the poorest. The poorest 12.5 percent of the sample households, which spend about 53 percent of their income on food, are still calorie-deficient. The calorie consumption of these households is very responsive to changes in incomes and food prices: it is estimated that a 50 percent increase in bread prices will increase calorie deficiencies among this group by about one-third. Increasing bread prices will reduce the real incomes of all, but incomes of the poor will be reduced by a larger percentage, although the absolute reduction in their incomes will be smaller. Unless compensatory measures are introduced simultaneously, large increases in bread prices could cause severe hardships for low-income households in urban Khartoum, as illustrated by elasticity estimates shown in Figure 9.

Figure 9
Estimated price and income elasticities of demand for bread and meat by income stratum for urban Khartoum, Sudan



Strata 1 = lowest 12.5 percent of poorest households
2 = next 12.5 percent
3 = next 12.5 percent
4 = next 12.5 percent
5 = highest 50 percent

Source: Per Pinstrup-Andersen, Joachim von Braun, Thongjit Uy, and Winifreda Floro, "Impact of Changes in Income and Food Prices on Food Consumption by Low-Income Households in Urban Khartoum, Sudan, with Emphasis on the Effect of Changes in Wheat Bread Prices," International Food Policy Research Institute, Washington, D.C., April 29, 1983 (mimeographed).

OTHER FOOD AND AGRICULTURAL POLICIES

Government subsidy programs are not the only means of increasing food consumption in low-income households. Policies that are larger in scope may be more cost-effective and may better integrate the malnourished into the development process. During 1983, the Food Consumption and Nutrition Policy Program conducted research in three specific areas: price policies in Thailand, structural changes in food demand, and maize marketing policies in Zambia.

RICE PRICE POLICIES IN THAILAND

Research continued on the consumption effects of rice price policies in Thailand. Contrary to what is widely believed, it found that the short-run net gain to the rural poor from increases in the rice price are minimal in Thailand. Most of the gains accrue to the large commercial farmers. Many small farmers subsist on the rice they grow and many are net purchasers of rice. Among the rural households, the three top deciles receive about 60 percent of the total net gains from an increase in prices paid to farmers. Only about 10 percent of the gains will be received by the four deciles that make up the rural poverty group. The effects of rice price changes on the rural wage rate are also estimated to be quite small. Most of the labor used in rice production is family labor; only a small portion is hired labor. Because the labor supply is plentiful, a rise in prices will not cause wages to increase much.

In urban areas, the high-income consumers tend to spend more on rice than do the low-income consumers, but the rice price increases take a much larger portion of the incomes of the urban poor than of the rich. Results for the urban and rural poor combined, however, indicate that the increases in rice prices have had little effect on the incidence of poverty for the nation as a whole. In general, net income flows from urban consumers and government-controlled funds to the large commercial farmers, but the impact on the overall income distribution is small.

If the rice consumption of the low-income groups did decline, the findings indicate that a government policy to increase the domestic price of rice will not significantly diminish poverty in the rural areas in the short run. The increase in the real incomes of the rural poor will be slight, and for those who have to buy rice for their own use, including the urban poor, relative losses in real income can be substantial. These people may respond by decreasing the amount of rice they consume, and if their existing calorie intake is already low, the higher price of rice will further undermine their nutritional status.

STRUCTURAL CHANGES IN FOOD DEMAND

Research at IFPRI has helped to increase knowledge of the effects that changes in income and population growth have on food demand, but to improve demand projections and development policies, other food consumption and demand shifts over time and their causes also have to be studied. Work on these issues, through the analyses of demand parameters, food consumption patterns in rural and urban areas, and the effect of demographic shifts on rice demand, constitutes much of the effort of the Rice Policies in Southeast Asia Project (see the Regional Projects section).

Data pertaining to two important causes of structural changes, rural to urban migration and scarcity of firewood in rural areas, have also recently been collected. A study in northern Mexico will assess the sociocultural changes resulting from migration and the effects of these changes on food consumption pat-

terns and dietary adequacy, while a field survey in Nepal completed in 1983 will be used to investigate the effects of deforestation on time allocation, agricultural production, consumption, and nutrition in the hill areas of that country. A preliminary report in this study was prepared for FAO for use in their training programs for agricultural project planners.

MAIZE MARKETING POLICIES IN ZAMBIA

The role of state marketing boards in Sub-Saharan Africa has grown steadily in recent years from one of intervention in crop exports to one of marketing of domestic foodgrains. Zambia provides an example of these changes. It was one of the first countries in the region to initiate various food production, marketing, and distribution schemes and therefore has an economy that has been widely affected by them. In the last 50 years maize has become the most important staple food in Zambia, and historical evidence clearly shows that government policies have played a central role in this evolution of the Zambian diet. Preliminary findings of a study on the maize marketing policies point to the presence of a seasonal food shortage for a substantial proportion of the households under study.

A survey of households in the Eastern Province of Zambia was completed in 1982. Preliminary analyses of both the aggregate and household data were carried out in 1983 to determine the degree of commercialization by farmers in the traditional sector and how this has affected consumption and nutrition in both rural and urban Zambia. Specifically, at the macro level, the question being investigated is whether producer incentives for maize coupled with consumer subsidies have influenced cropping and marketing behavior in the traditional sector so that dependence on cash purchases is increased.

Despite the heavy emphasis on maize production in the study area, it was found that in 1979/80, 45 percent of the households had finished their maize stocks by December and 63 percent by January, while the next harvest was not until May. It is noteworthy that November, December, and January are the planting months that require the heaviest work. This suggests that a link exists between food availability and labor input into agriculture. The study found that the size of the food crop, cash crop, and total areas planted are all related to the duration of the previous year's maize supply. Total area planted by a household is about twice as much if maize supply lasts beyond January than if it does not. The relationship between food and labor becomes clearer when it is noted that these households can choose to bring fallow land under cultivation at any time. Thus, while the previous year's planting and performance would be reflected in the duration of the stocks, there is no reason why current and previous plantings should be related unless they are mediated by food and labor supplies. The study also finds that the periods of food shortage are reflected in the declining nutritional status, as measured by weight, of groups that are of working age. Finally, as far as the nutritional status of children is concerned, it appears that both total area planted and income from sales of produce appear to be important factors. The significance of a household storing its own food is still to be investigated.

INTERNATIONAL FOOD TRADE AND FOOD SECURITY PROGRAM

INTRODUCTION

The researchers of the International Food Trade and Food Security Program study the effects of trade, exchange rates, and food aid policies on food consumption, production, and agricultural growth in developing countries. They examine both the trade policies of developing countries and initiatives by developed countries.

The research effort of the program examines the extent to which developing-country trade and exchange rate policies affect food consumption and agricultural production strategies, how agriculture in developing countries greatly influences and is greatly influenced by the rest of the country's economy, and how and the extent to which the world market influences domestic food strategies.

DEVELOPING-COUNTRY ISSUES

As their food demand continues to rise, many developing countries find themselves increasingly dependent on imports for the food they need for domestic supplies. The complex relationship that food import policies have with general trade policies and balance-of-payments constraints often means that they greatly influence national food policies designed to improve production and consumption. In developing countries where agriculture is an important part of the general economy, many policies not explicitly directed at agriculture still affect food consumption and agricultural growth.

During 1983 research on national trade and food supply strategies focused on short-term food supply management and the long-term effects of general economic policies, such as trade and exchange rate policies, on production incentives and agricultural growth. Work continued on trade policies and agricultural incentives in the Philippines, Thailand, Kenya, and Nigeria and on food strategies and their implications for import policies in Egypt and Peru.

TRADE POLICIES AND AGRICULTURAL INCENTIVES

Trade and exchange rate policies can affect the relative prices of crops and thus agricultural production incentives. Research on trade policy adjustments and agricultural development in the Philippines examines quantitatively the effects that several forms of trade liberalization and other policies (including exchange rate management) have on the agricultural sector, particularly on production incentives, resource allocation, and production patterns and output growth. The implications of agricultural terms of trade, factor earnings, and rural-urban migration also are being examined in view of their potential importance for income redistribution. The study also examines the trade-off between food and export crop production and the rural-urban pattern of food consumption.

The Philippines have long followed import substitution policies by protecting domestic industry heavily. Some major changes in economic policy were started recently, however. These include a sub-

stantial reduction in tariff rates and a relaxation of import licensing. As in other developing countries that have liberalized trade in recent years (with active support from some international organizations), the way agriculture might be affected by current trade policy adjustments has yet to be examined systematically. These adjustments are directed mainly to the rationalization of the country's manufacturing industries. But agriculture has dominated production in the Philippines, contributing about 30 percent of net domestic product and 50 percent of total employment. About one-half of the country's export earnings are derived from raw and processed agricultural products. In addition, the large social and economic disparities between rural and urban families (the former have an average income of only half that of the latter) also argue for a serious examination of agriculture's part in advancing Philippine development objectives and the policies affecting it.

Ongoing research on crop diversification in Thailand presents another aspect of trade policy and agricultural incentives. Since World War II Thailand has rapidly expanded upland crop exports of maize, cassava, and sugarcane, as well as rubber and rice, maize, cassava, sugarcane, kenaf, and mung bean in the forested area. This has led to the consequent rapid diversification of agricultural exports. The expansion of area and diversification of exports has been influenced by strong government intervention in the trade of some crops; by public investments in highway systems, irrigation systems, and research and extension; and by privately financed tractorization.

Preliminary quantitative results indicate that expansion of crop area and diversification of exports affected agricultural growth and industrial structure and the variability and uncertainty of crops' production and exports. They affected the migration and absorption of labor and the distribution of income and welfare between farmers, consumers, and the government. The expansion of area also had ecological effects after vast forests were converted to crop land. Because they have easy access to land, Thai farmers have not intensified their technology very much except to use tractors instead of animals.

Because the vast upland forest land has almost been exhausted by the expansion at the end of the 1970s, the Thai government now faces important questions about growth and industrial structure, labor migration, agricultural production and export uncertainty, expanded use of technological innovations, ecological problems, and welfare and income distribution. A new type of agricultural development and a new, consistent development strategy is now needed.

The Trade Program is also studying the potential that specific developing countries have to expand the export of agricultural goods. Its research is currently focused on Kenya.

Research was completed in 1983 on Kenya's potential to export agricultural goods to selected oil-exporting countries in the Gulf States, Iran, North Africa, West Africa, and Indonesia. The oil exporters were selected for this study because their imports grew by more than 70 percent between 1971-73 and 1976-78, while those of many countries stagnated.

Lack of industrial raw materials or a skilled labor force make rapid growth of foreign exchange earnings through industrialization in Kenya unlikely in the short run. Ideal growing conditions for many agricultural products, however, indicate that the potential for expanding agricultural exports may be great, but the constraints—both domestic and international—are also great.

The commodities examined are beef, sheep and goats, maize, sugar, pulses, horticultural crops, coffee, and tea. The outlook for beef is discouraging because of subsidized beef exports from the European Community. Kenya enjoys a definite market advantage in sheep and goats, however, because it produces the lean sheep and goats favored by Middle Eastern consumers, and because its proximity to the region makes it feasible to export live animals.

Sugar and maize, which are high volume, low value crops, are grown in areas far from the port of Mombasa, and Kenya lacks the infrastructure to move these crops to the coast economically. For maize, 50 percent of the f.o.b. price is the cost of handling and transport from producer to port, making Kenya's production costs higher than world prices. Kenya's costs for producing sugar are competitive, but new processing facilities are needed to process white sugar, and the amount of capital required is prohibitive. Kenya could, however, expand production of jaggery, a brown sugar, for domestic consumption and export its supplies of white sugar.

Pulses, widely grown in Kenya, could be exported at attractive prices if their quality could be improved to meet world standards. The potential for horticultural crops, especially mangoes, is substantial, but the report indicates that crop research, pest control, and supplies of improved planting materials are needed.

Expanding coffee and tea exports depends on improving the yields from existing hectarage, which can be done by applying more inputs and labor, but especially by alleviating the excessive delays and deductions in the marketing system.

The most significant constraint to expanding agricultural exports in Kenya according to this research, however, stems from a policy issue. Should a country that sometimes experiences food shortages export food? To create the surplus for export, the government must apply incentives for producers, which could potentially affect domestic consumption of food. Only as foreign exchange becomes more scarce are Kenya's policymakers likely to make the politically risky choices necessary to stimulate production of food crops for export.

FOOD STRATEGIES AND IMPORT POLICIES

During 1983 short-term food supply management (including food imports policy) in the Philippines and Peru was studied. So was the relationship between Egypt's food subsidy scheme and its food imports and the implications it has for Egypt's foreign sector. This research was undertaken as part of an extensive analysis of Egypt's food subsidy system being conducted with the Food Consumption and Nutrition Policy Program (see that section of this report).

In the study of the Philippines, emphasis was given to short-term fluctuations in effective demand in rural areas. These affect food consumption stabilization and the trade-offs between producing food and export crops.

Recent discussions of the food security issues faced by developing countries have drawn attention to short-term fluctuations in effective demand, especially of the low-income households. Real income is presumed to be particularly unstable in rural areas, given fluctuating agricultural production and volatile international markets for primary commodities. The general finding is that, while income from export crops is indeed more unstable than income from food crops, the rise in instability caused by the marked increase since World War II in the share of exports of Philippine crop production is remarkably small. The estimates made in the study indicate that on the average a 1 percent rise in the share of exports leads to an increase of less than 0.15 percent in the instability of total crop income.

The results do not give a basis for the fear prevalent among developing-country policymakers that a greater orientation of agricultural production toward exports necessarily increases instability in agricultural income.

Work on food supply stabilization policy in Peru was undertaken at the request of the Inter-American Development Bank. In Peru during the last 20 years, changes in consumption, poor farm production performance, and constraints in some export markets have contributed to the modest growth in agriculture. The degree of food self-sufficiency, as measured by

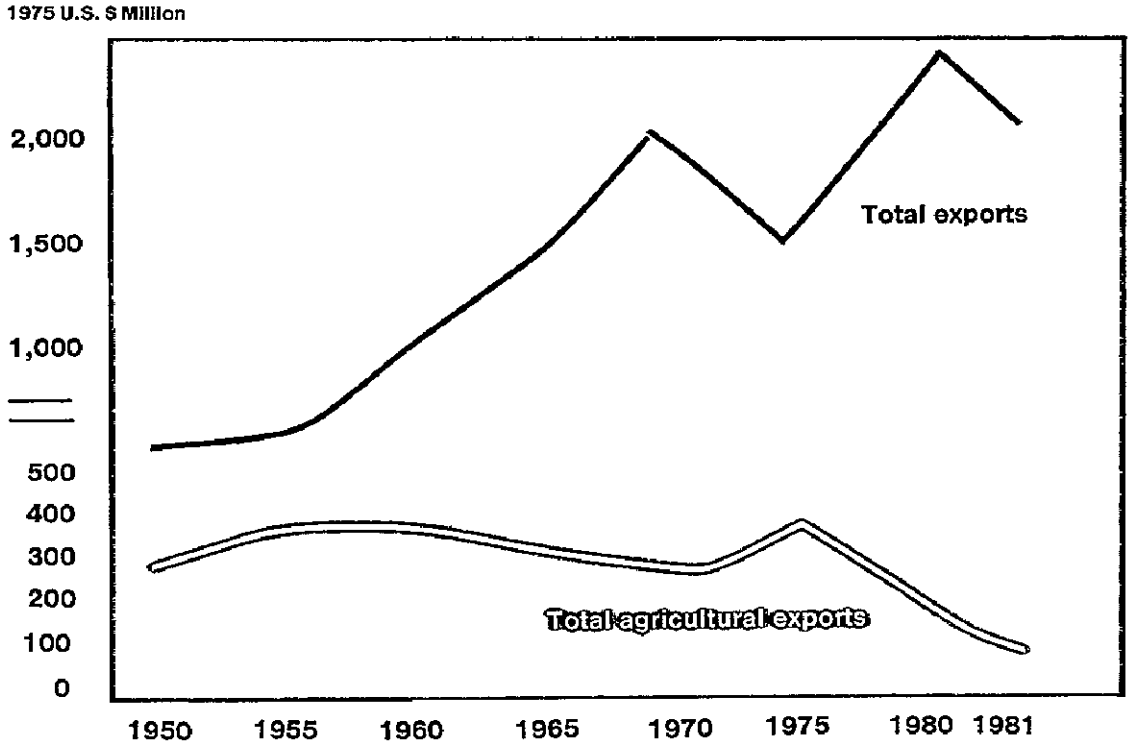
the ratio of food imports to domestic food supply, has decreased. In addition, as Figure 10 indicates, the share of agricultural exports in total exports has decreased dramatically over time.

Preliminary conclusions indicate that current agricultural development priorities, including an effort to decrease government intervention in agriculture, may contribute to faster abandonment of sierra agriculture in Peru. However, stabilization policies have been given priority over sectoral policies, and the long-run impact of these policies on producers' and consumers' welfare is still to be determined.

INTERNATIONAL POLICY ISSUES

One of the most pressing food policy issues government planners face today is determining how important it is to a developing country to become more self-sufficient in food. In order to understand how international conditions affect the decision by a country about the desired degree of self-sufficiency, the International Food Trade and Food Security Program is trying to determine how secure and stable international food supplies are and how food and other critical imports can be financed over the long run. The program is trying to learn how instability in world food markets can be reduced and what financial arrangements can alleviate the effects of short-term fluctuations in the cost of food imports. It is also examining how much of the expected gaps in food supplies can be closed by commercial trade and to which markets developing countries can export agricultural goods.

Figure 10
Value of total exports and agricultural exports in Peru, 1950-81



Source: Alberto Valdés and Elena Alvarez, "Food Security in Peru: Supply Management," International Food Policy Research Institute, Washington, D.C., January 1984, Table 8 (mimeographed).

FOOD SECURITY

Research on the world rice market has culminated in the publication of Research Report 39: *The World Rice Market: Structure, Conduct, and Performance* by Ammar Siamwalla and Stephen Haykin.

The report identifies thinness as the main characteristic of the structure of the world rice market. Not only are international transactions only a small part of worldwide production and consumption, but there is no established pattern of trade because each country substantially varies the volume traded year by year. These characteristics cause search costs to be higher for rice than for other major cereals, such as wheat or yellow maize.

Given the lack of a central market for world traded rice, the high search costs make the attitudes of importing and exporting countries toward policies that increase productivity very different. Importers find the push toward self-sufficiency rewarding, but exporters are at best ambivalent about the new technology and put much less effort into inducing farmers to adopt it. When occasional importers such as the Philippines increase production to the point that they can become exporters, they find the costs of entering the export market so high that they usually stay out of the world market altogether.

The report suggests that the new technology introduced in the late 1960s and early 1970s favored importers more than exporters. Whether by accident or design, its bias reinforced the tendency of the world market to remain thin. Furthermore, in the short run, the volume of a country's imports or exports make little adjustment to world prices, which makes world prices less stable. The study finds that the world rice market thus poorly supports a country's food supply strategy. With a properly functioning international market, a trade-oriented supply strategy would be the most economical, but without one, it may well be imprudent. With such a strategy, higher self-sufficiency is aimed at, and a larger amount of grain in storage becomes a valid policy goal. These are costly measures, and not only for importers: in the long run they lose markets for exporters as well.

During 1983, a special report on *Contingency Planning for Famines and Other Acute Food Shortages: A Brief Review* by J. S. Sarma was published. It examines the issue of short-term food security during periods of acute food shortages caused by droughts or other natural calamities. The report reviews the roles and functions of international agencies concerned with such food shortages and discusses national preparedness to meet such situations.

The report concludes that although much attention is paid to providing emergency international relief, little consideration has been focused on national preparedness policies. Although IFPRI research has emphasized long-run policy issues, this report was issued to provide preliminary information for projects that national and international agencies might undertake.

FOOD AID

It has long been apparent that the imports of developing countries will continue to grow rapidly and that developing countries might not be able to finance them. Research on how to use trade and food aid to close the gap between developing countries' production and consumption of cereals continued in 1983.

In determining how food aid has contributed to the imports of developing countries in the past, it was discovered that no adequate data base existed. An important part of IFPRI's contribution in this area has been the construction of a data base on food aid. An effort has been made to distinguish between commercial cereal imports and concessionally financed imports.

The estimates of food aid requirements for 1990 made as a part of this research are not precise, but the pro-

cedure is useful for estimating food aid requirements in the near term. Donors may find that some of the suggestions about procedure can be applied directly to their own estimates. Policymakers may also find that this research helps place issues relating to suitability of food aid as a development resource in historical perspective by tracing trends in the growth of cereal imports and their association with food aid and other economic variables.

TRADE REFORM

With special funds provided by the government of France, research has been initiated on a comparative analysis of agricultural policies of the United States and Europe. During the last century, agricultural policies on both sides of the Atlantic have become both interdependent and conflicting. Their interactions shape international agricultural trade throughout the world. This research will examine possible options for future U.S.-European trade relations and their implications for Third World countries.

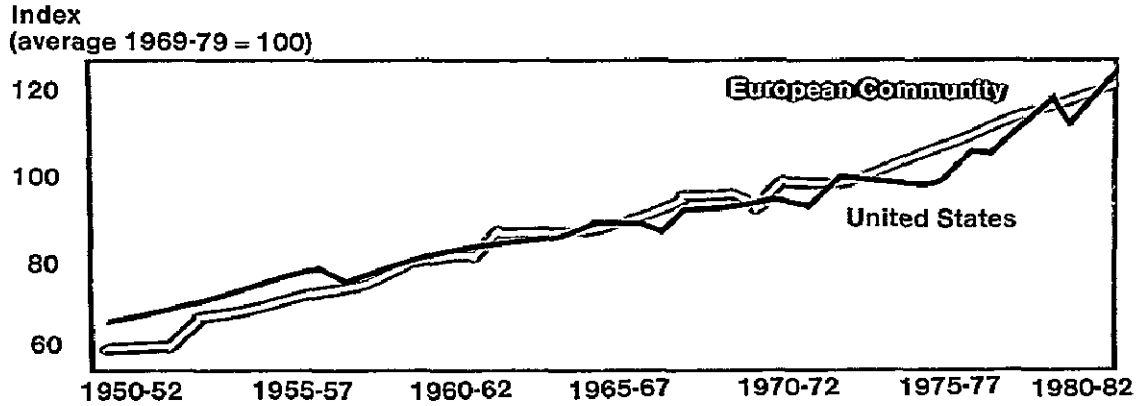
As Figure 11 indicates, the growth of total agricultural production was faster in Europe than in the United States between 1950 and the mid-1960s. Following the adoption of the common agricultural policy in Europe, the rate of growth between the two was about the same. Faster but more irregular growth occurred in the United States after 1973.

Although four times as much land is farmed, less than half as many people work in agriculture in the United States than in the European Community. Total agricultural land has remained stable in Europe but has varied by 10 percent in the United States due to changes in set-aside programs.

Research indicates that as European production has increased, so have agricultural imports, although in recent years at a slower rate. In addition, agricultural exports have increased as the result of export refunds designed to compensate for the difference between European and world prices.

These policies have led to a weakening of U.S. and European agricultural trade relations. This increases uncertainty in the world markets. In the short run, this increased trade conflict between the two can benefit Third World importers by lowering export prices. Thus research will expand on these issues and examine more closely the mechanisms of the policy process.

Figure 11
Agricultural production indexes for the United States and the 10-member European Community, 1950-52 to 1980-82



Source: Michel Petit, "Comparison of European and U.S. Agricultural Policies: The Need to Reassess the Dynamics of Supply," International Food Policy Research Institute, Washington, D.C., October 1983 (mimeographed).

INTERDEVELOPING-COUNTRY TRADE

With special funding from FAO, research was initiated on trade of agricultural products among developing countries. This research will identify recent trends in trade of agricultural products among the developing countries and the commodities and country markets that have the highest growth potential for agricultural products. The research considers the trade prospects of developing countries by region as well as of the developing countries as a whole. Preliminary analysis indicates that the principal individual commodities traded among developing countries between the 1960s and 1979 were rice, sugar, tea, vegetable oils, and fruits and nuts. The value of trade in traditional exports from the developing countries—rice, tea, cotton, coffee, rubber, and oilseeds—remained constant.

Developing countries represent the principal market for most processed foods exported by other developing countries, whereas most of the products exported as raw materials go to developed countries and countries with planned economies.

As Table 2 indicates, during the period 1977-79 developing countries exported significant proportions of their exports of live animals, dairy products and eggs, cereals, animal oils and fats, and manufactured fertilizers to other developing countries. However, in terms of their value in U.S. dollars, developing-country exports of meats and meat preparations, fruits and vegetables, coffee and related preparations, textile fibers, and fixed vegetable oils and fats alone make up over 60 percent of the total value of developing-country exports to the world, with the majority of these exports going to the OECD countries.

Table 2
Destinations of the exports of developing countries, 1977-79

Commodities Exported	Developing Countries	OECD Countries	Centrally Planned Economy Countries	Value of Exports
	(percent)			(U.S. $ million)
Live animals	63.6	36.1	0.4	255.0
Meats and meat preparations	18.2	79.0	2.7	1,169.0
Dairy products and eggs	66.9	32.4	0.7	67.9
Cereals and cereal preparations	50.1	31.2	18.7	2,696.2
Fruits and vegetables	18.3	72.1	9.6	4,012 3
Sugar, sugar preparations, and honey	30.4	59.6	9.9	1,714.2
Coffee, tea, cocoa, spices, et al.	7.0	83.6	9.4	9,720.1
Animal feed	8.1	75.7	16.1	1,885 2
Food preparations	46.2	57 8	1.0	112.7
Alcoholic beverages	15.7	42 6	41.6	181.5
Tobacco and tobacco manufactures	11.0	82.5	6.5	919 0
Hides and skins, undressed	7.5	78.1	14.3	178.9
Oilseeds, oilnuts, and oil kernels	10.7	78.2	11.1	1,142.2
Crude rubber	9.5	68.9	21.6	1,637.0
Textile fibers	15.5	54.4	30.1	2,436.7
Crude fertilizer	17.4	61.8	20.8	845.9
Crude animal and vegetable material	16.1	80.6	3.3	607.2
Animal oils and fats	61.6	33.3	0.1	53.3
Fixed vegetable oils and fats	30.3	62.0	7.7	2,248.7
Processed animal and vegetable oils	27.8	72.1	0.2	58.1
Manufactured fertilizers	66.1	25.6	8.3	292.4

Source: Alberto Valdés, "Commodity Structure of Trade in Agricultural Products Among Developing Countries." International Food Policy Research Institute, Washington, D.C. (mimeographed).

REGIONAL PROJECTS

RICE POLICIES IN SOUTHEAST ASIA

IFPRI, in collaboration with the International Rice Research Institute (IRRI), the International Fertilizer Development Center, and national institutions in Indonesia, Malaysia, the Philippines, and Thailand, is examining food problems in Southeast Asian countries. This ongoing research is divided into five areas: irrigation, trade and reserve stocks, fertilizer, consumption, and the integrating model.

Research in irrigation includes six projects assessing the impact of irrigation on income distribution. The studies, using comparable methodologies, cover all four countries and both small- and large-scale irrigation systems. Ongoing studies in the trade and reserve stock area are examining the effects and costs of government interventions in rice markets in Indonesia and the Philippines. Research on fertilizer is estimating the production response to fertilizer use and assessing the efficiency of fertilizer marketing systems. The research on consumption is estimating demand parameters for Indonesia, Thailand, and the Philippines and analyzing how modern rice technology and rice prices affect farm labor use and real wages in agriculture. Analysis using the integrating models for Indonesia and the Philippines is assessing the broader effects of rice price policies, fertilizer subsidies, and irrigation investment strategies on production, consumption, and income. Preliminary results from research in these areas were presented in the 1982 *Annual Report*. During 1983, research was refined and extended, and final results from most of the research projects are expected in 1984.

Two working papers were published in 1983. In *Status and Performance of Irrigation in Thailand,* Working Paper 8, Dow Mongkolsmai examines past, current, and future irrigation programs and their effects on rice production in Thailand.

According to this paper, irrigation in Thailand was successful in expanding irrigated area and increasing output in the wet season during the 1960s, but the growth of rice output slowed in the 1970s. As a result of the slowdown in growth of wet-season cropping area, the Thai government initiated irrigation projects designed to increase rice production in the dry season. As a result, dry-season cropping area increased from 132,000 hectares in 1970 to 645,000 hectares in 1979.

In contrast to earlier large-scale projects, many of these projects were small, low-budget projects such as weirs, pumps, tanks, drainage structures, and minor canal rehabilitation. The portion of the budget allocated to large projects dropped from 65 percent in 1961 to 35 percent in 1979, whereas spending on small projects increased from 9 percent to 23 percent.

The paper also presents data on the regional distribution of irrigated areas, the types of irrigation that are prevalent in each region, yield differences by region and by category of irrigation, and project costs.

In *The Effect and Cost of Philippine Government Intervention in Rice Markets,* Working Paper 9, Laurian J. Unnevehr assesses Philippine rice price policy, which has been implemented through

market intervention in support of floor and ceiling prices, accompanied by government control of international trade.

Unnevehr shows that rice prices in the Philippines generally followed the trend in world prices from 1960 to 1980, but tended to be above world prices in importing years and below in exporting years, indicating that the government monopoly on international trade reduced the amount of rice traded. In exporting years this monopoly prevents world market quality premiums from being reflected in domestic prices, so farmers have little incentive to produce high-quality rice. This reduces export values and raises the cost of disposing of the domestic surplus because the government must subsidize sorting and grading.

Because of a desire to provide high prices to producers and low prices to consumers, official floor and ceiling prices have often been set without regard to marketing costs. In most years since 1960, the difference between official floor and ceiling prices has been less than private costs of storage, indicating that an unstated policy goal has been to reduce the rise in prices that occurs prior to a new harvest. Producer prices remain below the floor during harvest, however, indicating that intervention is inadequate to maintain official prices.

Unnevehr suggests that official floor and ceiling prices should be set to cover normal private costs of storage, unless reduction of marketing margins is an explicit policy goal, so that the government would intervene only when there are unexpected changes in supply.

FOOD-FOR-WORK: BANGLADESH

The World Food Programme and IFPRI were interested in conducting a study on the impact of food-for-work on agriculture and rural development and on the immediate benefits for the recipients of the food. Because it had a substantial food aid program that had been in operation for a number of years, Bangladesh was selected as a study site. This work will be followed by studies in other countries.

The in-depth evaluation of the food-for-work projects in Bangladesh is funded by the World Food Programme and a consortium of bilateral donors, including Canada, the United Kingdom, Australia, and Sweden. IFPRI has provided research that has been matched by an equal number of researchers from the Bangladesh Institute of Development Studies (BIDS). BIDS has supervised the field work.

In the second phase of the study, which examines the effect of food-for-work on growth linkages, a series of surveys on production conditions, employment, consumption, and nutritional status of households in 16 sites were undertaken. Data from these surveys were computerized. The data will be analyzed and reported in 1984.

Initial observations suggest that the food-for-work programs provide the poor with employment and income beyond what they would have in the absence of the program.

Various issues concerning the management of the project were investigated, particularly the role of local project implementation committees. These have encouraged local participation and interest in the projects. Problems concerning technical supervision were noted in an engineering survey. One of the recommendations will be to strengthen the technical assistance provided by the World Food Programme so that local officials can better implement projects under their jurisdiction.

Some recommendations regarding the project design and selection process were made and many of these recommendations have already been implemented. The evaluation and the process of making policy have been ones of continuing dialogue in order that policymakers can take into account results as they begin to emerge without having to wait for final reports to be issued.

OUTREACH

IFPRI continues to strive to reach its main audiences—policymakers and researchers in the developing and developed countries—through rigorous research and appropriate outreach. The outreach effort is achieved through the dissemination of publications, personal interaction with researchers and policymakers, and formal seminars and meetings.

With the dissemination of its research, IFPRI attempts to elucidate policies and strategies that will ultimately contribute to the welfare of the poor in the developing world.

PUBLICATIONS

IFPRI's published research, which is listed in the following section, is distributed to some 6,600 individuals and organizations, almost half of these being individuals, libraries, educational institutions, and research organizations in the Third World. During 1983, IFPRI continued to exhibit publications at international meetings, which included meetings in New York, Washington, D.C., and Frankfurt. In Frankfurt, IFPRI participated in the exhibit of international agricultural research centers sponsored by the German Agency for Technical Cooperation.

COLLABORATION WITH CENTERS IN THE CGIAR

As a member of the Consultative Group on International Agricultural Research, IFPRI utilizes research on the new technological developments undertaken by the agricultural production scientists of the other centers within the CGIAR system. This has led to joint research activities with these centers. During 1983 these collaborative efforts included:

- Rice Policies in Southeast Asia Project. Support from the Asian Development Bank (ADB) added a new dimension to this ongoing project with IRRI and IFDC to identify appropriate long-term rice irrigation strategies in the Philippines.
- West African Coarse Grains Project. With five other collaborating institutions—the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the Groupement d'Etudes et de Recherches pour le Developpement de l'Agronomie Tropicale (GERDAT), CIRES, the Centre d'Etudes, de Documentation, de Recherche Economique et Sociale (CEDRES), and ISRA—the project is assessing the outlook for millet and sorghum, the traditional food staples in semiarid West Africa, in the context of rapid substitution in consumption patterns of wheat and rice for the traditional grains. IFPRI provides overall coordination.
- Symposium on Food Policy Issues in Sub-Saharan Africa. Organized by IFPRI at its Washington, D.C. headquarters, this meeting offered members of the CGIAR donor community an opportunity to consider the research implications of an IFPRI conference involving extensive collaboration with other centers and African research institutions.
- A seminar convened by IFPRI on behalf of the CGIAR Secretariat to discuss plans for a study of the impact of the CGIAR system on developing countries. A substantial number of international agricultural research centers participated, including the Centro Internacional de Majoramiento de Maíz y Trigo (CIMMYT), CIAT, IRRI, and the Inter-

national Service for National Agricultural Research.

- Cooperation with CIMMYT in planning joint research on trends in maize production and consumption in developing countries.
- Consolidation of Chinese national and provincial data. The food production process includes collaboration with CIP, CIAT, the International Institute of Tropical Agriculture, IRRI, and CIMMYT.
- Completion of plans for a workshop involving CIAT, CIP, CIMMYT, and IFPRI that will examine trends in food production, consumption, and trade in Latin America and will identify the implications these trends have for food and agricultural policy research in the region.

COLLABORATION WITH LOCAL INSTITUTIONS

Many IFPRI research activities are undertaken in conjunction with local and regional research organizations around the world. This interaction serves a number of purposes. It adds local expertise and insights to IFPRI research work, enhances national research capacities through interaction with IFPRI's specialized international staff, and improves IFPRI's perception of relevant national and regional policy concerns. It also is an essential vehicle for conducting new survey work, where necessary, to generate important data for policy analysis. Collaborative activities also provide opportunities to incorporate research results into the delineation of actual policies. Many of IFPRI's regional projects and projects in each of the program areas include local collaborative efforts. IFPRI is striving to increase the number.

In 1983 IFPRI's collaborative activities included 20 projects involving nearly 80 researchers, administrators, and policymakers in 16 developing countries. These projects varied considerably in scope, methodology, and focus. Generally, however, they fell within five broad areas of food policy research—food price and subsidy policies, growth linkages, trade and exchange rate policies, structural demand changes, and specific production strategies and policies. The scope and diversity of IFPRI's outreach effort is reflected in the network of institutions collaborating with the Institute in 1983. They included:

Agricultural Projects Services Centre of the Government of Nepal (APROSC)
Katmandu, Nepal

Arab Organization for Agricultural Development (AOAD)
Khartoum, Sudan

Bangladesh Institute of Development Studies (BIDS)
Dhaka, Bangladesh

Central Bureau of Statistics
Damascus, Syria

Centre Ivorien de Recherches Economiques et Sociales (CIRES)
Abidjan, Ivory Coast

Institut Facultaire des Sciences Agronomiques
Kisangani, Zaire

Institut Senegalais de Recherches Agricoles (ISRA)
Dakar, Senegal

Institute of National Planning
Cairo, Egypt

Institute of Rural Management
Anand, India

Kenyatta University College
Nairobi, Kenya

Ministry of Agriculture
Manila, Philippines

Ministry of Plan Implementation
Colombo, Sri Lanka

National Council for Science and Technology
Nairobi, Kenya

National Nutrition Council
Manila, Philippines

Tamil Nadu Agricultural University
Coimbatore, India

University of Bangalore
Bangalore, India

University of Ibadan
Ibadan, Nigeria

University of Ouagadougou
Ouagadougou, Upper Volta

University of the Philippines
Los Baños, Philippines

University of Zambia
Lusaka, Zambia

University of Zimbabwe
Harare, Zimbabwe

Xavier University
Cagayan de Oro City, Philippines

Zambian National Food and Nutrition Commission
Lusaka, Zambia

SEMINARS AND MEETINGS

In 1983, IFPRI's Policy Seminars Program provided opportunities for interaction between developing country decision-makers and IFPRI researchers on food policy issues. These meetings served to communicate research results more effectively and elicited the views of those directly involved in the policy process on future priorities for research.

In particular IFPRI sharpened its focus on Sub-Saharan Africa by convening an international conference to address the critical issues that must be understood if agricultural growth in that region is to accelerate. Held at Victoria Falls, Zimbabwe, from August 29 to September 1, 1983, the meeting was cosponsored by IFPRI and the University of Zimbabwe. Individuals from the research and policy-making communities of 12 African countries and participants from international agricultural research centers, donor agencies, and Western universities participated.

The meeting was prompted by concern that inappropriate agricultural policies are responsible for the steady and substantial decline in per capita food production in Sub-Saharan Africa over the past 20 years. Yields of the major food crops have increased little or not at all, while the area cultivated grew slowly in the 1960s and 1970s. These trends, coupled with rapid growth in population and net food imports and the declining quality of the region's natural resource base, formed the context for a thorough evaluation by conferees of the current state of knowledge of African agriculture which could be used to identify the research priorities necessary to improve agricultural policies.

The conference started from the premise that sustained generation and adoption of technology is key to agricultural growth in Sub-Saharan Africa. The main production issue discussed was whether this was being done adequately. Key discussions centered on how much weight should be given to agriculture in national development priorities and the equity implications of the need to boost food production in areas with agricultural resources of highly variable quality. A closely related concern is the need to involve rural people in decision-making, so that policies affecting the allocations to agriculture and the provision of rural services might meet local needs and mobilize national resources for growth effectively.

Underlying these considerations are the social, physical, and biological potential of African agriculture. The risks of farming in Africa are high. The soils cultivated are low in natural fertility, and the weather is highly variable. Agricultural labor productivity is low, which encourages migration out of agriculture and leads to a commensurate drop in production as labor becomes scarce in seasons of highest demand. The nutrition of rural people is poor and subject to extreme annual and seasonal fluctuations—low food production in one year can even reduce plantings in a succeeding year.

Precisely because soils are poor, acceleration of agricultural growth in Africa is dependent on the use of large amounts of purchased inputs, particularly fertilizer. Increased input use, in turn, will require a more highly developed infrastructure. Thus, agricultural production will grow slowly if limited capital resources are concentrated in industry rather than in agriculture and in the capital-intensive activities of each.

The conference stressed the complexity of the technological problems facing African agriculture and their relationship to building viable rural institutions. Whereas existing technology is sometimes used too little, the size, difficulty, and long-run nature of Africa's production problems and the inability of existing mechanisms to deal with them make it necessary to institutionalize the process of technological innovation and implementation. The key to this process is rural organization. Virtually all successful cases of agricultural development in Africa—and examples are not lacking—include farmers organizing themselves to get the investment allocations and services required to support agricultural development. Such participation by producers has the added advantage of making it easier for them to express their views about technology development and extension. The political importance of agriculture is currently low and the dangers to national integrity of creating such rural organizations may appear large, yet they seem essential if the policies are to be changed to favor agricultural growth.

Discussions also noted that in the short run increased agricultural production may increase regional income disparities and create difficult political problems. Research needs to focus on the effects that concentrating resources in areas of higher potential have on production and on the equity policies that should be pursued in zones with lower potential. Land tenure in Eastern and Southern Africa, in particular, merits the immediate attention of policymakers and researchers. Existing rural structures and national programs may not be able to deal with the special problems of the poor. It will be necessary to create rural organizations able to cope with the equity effects of specific production policies.

The conference pinpointed the need for research in many fields of agricultural science. The need to develop national institutions for collecting basic data on population, production area, and yields was emphasized. And the need for more problem-oriented field surveys was noted. The conference participants agreed that immediate attention should be given to improving the macroeconomic and microeconomic data bases, to increasing the number of African analysts skilled in the agricultural disciplines, and to creating the appropriate institutional structure in Africa and international agencies to provide a continuous analysis of past experiences.

Four important lessons to the foreign assistance community arose from the conference proceedings. First, there is a tremendous need to train people to analyze policy, help rural people organize, conduct research, and deliver inputs. Second, because agroclimatic conditions are so variable, physical, biological, and social science research all must be emphasized. Third, given the nature of the resource base, capital-intensive investment schemes should be minimized. Finally, the processes required to apply science and technology to development are complex, and patience is needed.

The proceedings of the conference will be published in book form.

During 1983 preparations were made for a series of Food Policy Seminars designed to deal with issues of general interest to policymakers in developing countries. The first of these meetings will try to identify the structure of incentives appropriate to achieving increased production. The central focus of the meeting, which will involve senior officials from countries in Asia, Africa, and Latin America, will be on policies that influence the motivation of farmers to change the amount

they produce through their allocative decisions. In designing such policies some basic questions confront decision-makers. What are the relative prices that provide adequate incentives in relation to policy objectives? What available policy instruments influence prices most effectively? What consequences do relative price changes have for production and consumption, in both the short run and the long run?

IFPRI's in-house seminars program continued to attract the interest and participation of Washington-area scholars and visiting officials in 1983. Twenty informal meetings were held during the year to discuss recently completed IFPRI studies or research in progress.

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PERSONNEL, 1983

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S. Wanmali, *Research Fellow, India*
R. Yadav, *Research Fellow, Nepal*
A. Deolalikar, *Post-Doctoral Fellow, India*
N. Bliven, *Research Assistant, U.S.A.*
C. Miller, *Research Assistant, U.S.A.*
R. Olsson, *Research Assistant, U.S.A.*
M. Shibli, *Research Assistant, Bangladesh*
M. Strudler, *Research Assistant, U.S.A.*
L. Lessin, *Secretary, U.S.A.*
J. Walsh, *Secretary, U.S.A.*

Food Consumption and Nutrition Policy Program

P. Pinstrup-Andersen, *Program Director, Denmark*
H. Alderman, *Research Fellow, U.S.A.*
J. von Braun, *Research Fellow, Fed. Rep. of Germany*
N. Edirisinghe, *Research Fellow, Sri Lanka*
M. Garcia, *Research Fellow, Philippines*
E. Kennedy, *Research Fellow, U.S.A.*
S. Kumar, *Research Fellow, India*
H. Bouis, *Post-Doctoral Fellow, U.S.A.*
P. Trairatvorakul, *Post-Doctoral Fellow, Thailand*
B. Cogill, *Research Assistant, Australia*
D. Cox, *Research Assistant, U.S.A.*
J. Gilmartin, *Research Assistant, U.S.A.*
Z. Primor, *Research Assistant, U.S.A.*
T. Uy, *Research Assistant, Thailand*
R. Duffin, *Secretary, U.S.A.*
W. Merrill, *Secretary, U.S.A.*

International Food Trade and Food Security Program

A. Valdés, *Program Director, Chile*
R. Bautista, *Research Fellow, Philippines*
B. Huddleston, *Research Fellow, U.S.A.*
U. Koester, *Research Fellow, Fed. Rep. of Germany*
M. Petit, *Research Fellow, France*
A. Siamwalla, *Research Fellow, Thailand*
H. Tsujii, *Research Fellow, Japan*
S. Gnaegy, *Research Assistant, U.S.A.*
S. Haykin, *Research Assistant, U.S.A.*
C. Patterson, *Secretary, U.S.A.*
L. Gonzales, *Project Coordinator, Rice Policies in Southeast Asia, Philippines*

RESEARCH SUPPORT

Administration

L. Halsey, *Associate Director for Finance and Administration, U.S.A.*
J. Gilpin, *Personnel/Office Manager, U.S.A.*
M. DeVol, *Senior Accountant, U.S.A.*
T. Moore, *Accounting Assistant, U.S.A.*
M. Douglas, *Administrative Assistant, U.S.A.*
J. Sims, *Secretary, U.S.A.*
Z. Emam, *Receptionist, Afghanistan*
G. Briscoe, *Clerical Assistant, U.S.A.*

Information Services

B. Barbiero, *Head, U.S.A.*
P. Skillman, *Editor, U.S.A.*
J. Voorhees, *Editor, U.S.A.*
U. Mohan, *Editorial Assistant, India*
E. Benenson, *Information Assistant, U.S.A.*
L. McCoy, *Typesetter, U.S.A.*
M. Cole, *Word Processor, U.S.A.*

Computer Services

R. Donaldson, *Head, Australia*
N. Carlson, *Programmer, U.S.A.*
W. Floro, *Programmer, Philippines*

Policy Seminars Program

R. Bordonaro, *Head, U.S.A.*
L. Goldberg, *Administrative Assistant, U.S.A.*

Library

P. Klosky, *Librarian, U.S.A.*

Countries indicate citizenship of staff members

FINANCIAL STATEMENT

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

BALANCE SHEET as at December 31, 1983 and 1982

ASSETS

	1983	1982*
Current Assets:		
Cash and short-term investments	$581,245	$350,551
Grants receivable	29,822	25,687
Employee and other receivables	90,841	25,602
Contracts-in-process	174,273	66,064
Prepaid expenses and advances	43,432	44,279
	919,613	512,183
Property and Equipment:		
Furniture and equipment	198,217	181,175
Leasehold improvements	34,614	34,614
	232,831	215,789
Less – accumulated depreciation and amortization	–161,949	–128,414
	70,882	87,375
TOTAL ASSETS	$990,495	$599,558

LIABILITIES AND FUND BALANCE

Current Liabilities:		
Accounts payable	$ 97,637	$166,058
Note payable	100,000	-0-
Accrued vacations	161,944	119,628
Advance payment of grant funds	330,000	80,000
Unexpended contract funds	258,513	139,035
	948,094	504,721
Fund Balance	42,401	94,837
TOTAL LIABILITIES AND FUND BALANCE	$990,495	$599,558

*See Notes 6 and 7

The accompanying notes are an integral part of these statements.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

STATEMENT OF REVENUE, EXPENSE, AND FUND BALANCE

For the Years Ended December 31, 1983 and 1982

	1983	1982*
Revenue:		
Grant income	$3,400,003	$3,247,718
Special project income	1,106,036	789,629
Expense reimbursements and other income	229,090	100,599
Investment income	23,394	27,346
	4,758,523	4,165,292
Expenses:		
Personnel	2,440,321	2,059,576
Employee benefits	575,849	555,853
Field and collaborative research	334,609	353,779
Travel	362,318	301,329
Computer services	269,529	172,271
Publications and conferences	234,341	205,150
Trustees' expenses	66,112	96,312
Office operation and administration (Schedule A)	494,345	411,207
Depreciation	33,535	36,654
	4,810,959	4,192,131
Excess of Expenses Over Revenue	-52,436	-26,839
Fund Balance, Beginning	94,837	121,676
FUND BALANCE, ENDING	$ 42,401	$ 94,837

OFFICE OPERATION AND ADMINISTRATION

For the Years Ended December 31, 1983 and 1982

	1983	1982
Space rent	$274,989	$198,566
Reproduction	37,505	21,356
Telephone and telex	55,718	49,146
Supplies and equipment rental	45,040	35,361
Library	12,434	11,786
Professional fees	44,070	74,756
Other office expenses	24,589	20,236
	$494,345	$411,207

*See Notes 6 and 7

The accompanying notes are an integral part of these statements.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

STATEMENT OF CHANGES IN FINANCIAL POSITION
For the Years Ended December 31, 1983 and 1982

	1983	1982*
Source of Funds:		
Excess of expenses over revenue	$ -52,436	$ -26,839
Items not affecting working capital:		
Depreciation	33,535	36,654
	-18,901	9,815
Use of Funds:		
Additions to property and equipment	-17,042	-32,117
(DECREASE) IN WORKING CAPITAL	$ -35,943	$ -22,302

Increase (Decrease) in Working Capital:		
Cash and short-term investments	$230,694	$215,399
Grants receivable	4,135	-25,809
Employee and other receivables	65,239	-3,102
Contracts-in-process	108,209	16,010
Prepaid expenses and advances	-847	-30,355
Accounts payable	68,421	-134,013
Note payable	-100,000	-0-
Accrued vacations	-42,316	-31,692
Advance payment of grant funds	-250,000	-80,000
Unexpended contract funds	-119,478	51,260
(DECREASE) IN WORKING CAPITAL	$ -35,943	$ -22,302

*See Notes 6 and 7

The accompanying notes are an integral part of these statements.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

NOTES TO FINANCIAL STATEMENTS
December 31, 1983 and 1982

Note 1. Summary of Significant Accounting Policies.

Organization

By Executive Order 12359 of April 22, 1982, the Institute is a public international organization entitled to enjoy certain privileges, exemptions and immunities conferred by the International Organizations Immunities Act, including exemption from Federal income tax under Sec. 501(c)(3).

Prior to April 22, 1982, the Institute was a non-profit non-stock corporation qualified as an organization exempt from Federal income tax under Sec. 501(c)(3) of the Internal Revenue Code as a publicly supported organization to which contributions are deductible by other individuals and organizations.

Revenue

Grants are recorded as revenue in the period stipulated by the donor. Grants which have been pledged for the current year but not received at year end are recognized as revenue and the related receivables are recorded. Grants received for funding of future periods are recorded as liabilities.

Special project income is recorded as the related costs are incurred. Contracts-in-process represent special project income which has been earned but for which funds have not yet been received. Unexpended contract funds represent funds received on special projects for which costs have not yet been incurred.

Other income is recorded when earned.

Property and Equipment

Property and equipment is stated at cost. Depreciation is provided over an estimated useful life of 3 to 5 years for furniture and equipment and over the life of the lease for leasehold improvements. Expenditures for additions are capitalized and expenditures for maintenance and repairs are charged to earnings as incurred. When properties are retired or otherwise disposed of, the cost thereof and the related accumulated depreciation are removed from the respective accounts and the resulting gain or loss is reflected in earnings.

Note 2. Leases

The Institute occupies office space under various leases expiring through August 31, 1987. The leases provide for rent increases based on increases in building operating costs and increases in the Consumer Price Index.

Minimum lease payments for all noncancellable operating leases having a remaining term in excess of one year at December 31, 1983, are as follows:

1984	$253,943
1985	237,576
1986	169,898
1987	119,605
	$781,022

Note 3. Pensions

The Institute is purchasing retirement annuity contracts for employees under agreement with the Teachers Insurance and Annuity Association and the College Retirement Equities Fund. The costs were $283,938 and $235,370 for 1983 and 1982 respectively.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

NOTES TO FINANCIAL STATEMENTS
December 31, 1983 and 1982
(continued)

Note 4. Grant Income

Grant income is core program support received from agencies participating in the Consultative Group on International Agricultural Research. Funds were received in 1983 and 1982 as follows:

	1983	1982
Advance payment of grant funds from prior year	$ 80,000	$ -0-
January	21,195	221,997
February	312,000	131,028
March	127,090	164,163
April	711,505	550,576
May	273,530	297,733
June	600,158	80,315
July	29,642	662,722
August	496,068	150,000
September	160,000	2,267
October	168,797	169,685
November	148,682	647,367
December	571,514	224,178
	3,700,181	3,302,031
Add: Grants receivable	29,822	25,687
Less: Advance payment of grant funds	-330,000	-80,000
Grant Income	$3,400,003	$3,247,718

Note 5. Note Payable

The note payable represents funds drawn down on a line of credit from the First American Bank of Washington, D.C. The line of credit is unsecured and carries interest at the bank's prime rate plus 1.5%. The interest rate charged at December 31, 1983, was 12.5%.

Note 6. Reclassification of Grant Funds Received in 1982

In late 1982, the Institute received $128,000 from the World Bank which was originally designated, and recorded as, 1983 grant income. This amount appeared in the Institute's 1982 financial statements as an advance payment of grant funds. Subsequently, in early 1983, the World Bank authorized that $98,000 of this amount be reclassified to 1982 grant income. Accordingly, the amounts for 1982 have been restated to reflect this reclassification. The effect of this adjustment is to decrease the excess of expenses over revenue by $98,000, and to reduce liabilities and increase the operating fund balance by $98,000.

Note 7. Change in Accounting Principle – Capital Leases

In the Institute's 1982 financial statements, equipment leased under capital leases had been capitalized as property and equipment, and obligations under the leases had been shown as liabilities. The Institute has restated its prior year financial statements to account for payments under capital leases as equipment rental expense and to eliminate the leases from the property and equipment and liabilities portions of the balance sheet. The restatements did not materially affect the 1982 excess of expenses over revenue.

RAYMOND E. LANG & ASSOCIATES, P.A.
CERTIFIED PUBLIC ACCOUNTANTS

8401 CONNECTICUT AVENUE
CHEVY CHASE, MD. 20815-5869
(301) 654-4900

February 15, 1984

Officers and Trustees
International Food Policy Research Institute
1776 Massachusetts Avenue, NW
Washington, DC 20036

We have examined the balance sheet of the INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE as at December 31, 1983 and 1982, and the related statements of revenue and expense and changes in financial position for the years then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion the financial statements present fairly the financial position of the Institute as at December 31, 1983 and 1982, and the results of its operations and the changes in its financial position for the years then ended in conformity with generally accepted accounting principles applied on a consistent basis, after restatement for the change, with which we concur, in the method of accounting for capital leases as described in Note 7 to the financial statements.

Raymond E. Lang & Associates, P.A.

The International Food Policy Research Institute was established in 1975 to identify and analyze alternative national and international strategies and policies for meeting food needs in the world, with particular emphasis on low-income countries and on the poorer groups in those countries. While the research effort is geared to the precise objective of contributing to the reduction of hunger and malnutrition, the factors involved are many and wide-ranging, requiring analysis of underlying processes and extending beyond a narrowly defined food sector. The Institute's research program reflects worldwide interaction with policymakers, administrators, and others concerned with increasing food production and with improving the equity of its distribution. Research results are published and distributed to officials and others concerned with national and international food and agricultural policy.

IFPRI is now one of 13 nonprofit international research centers supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR consists of 40 donor countries, international and regional organizations, and private foundations. IFPRI receives support as a constituent of the CGIAR from a number of donors, including the governments of Australia, Canada, the Federal Republic of Germany, India, Italy, Japan, the Netherlands, the Philippines, and the United States of America; the World Bank; the Ford Foundation; the International Fund for Agricultural Development; the International Development Research Centre (Canada); and the Rockefeller Foundation. In addition, a number of other governments and institutions contribute funding to special research projects.

MARCH 1984

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