INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

REPORT 1985

1985 BOARD OF TRUSTEES

Samar R. Sen
Chairman, India

Ralph Kirby Davidson
Vice Chairman, U.S.A.

Eliseu Roberto de Andrade Alves
Brazil

Yahia Bakour
Syria

Lowell S. Hardin
U.S.A.

Ivan L. Head
Canada

Nurul Islam
Bangladesh

Anne de Lattre
France

James R. McWilliam
Australia

Philip Ndegwa
Kenya

Saburo Okita
Japan

Leopoldo Solis
Mexico

T. Ajibola Taylor
Nigeria

Snoh Unakul
Thailand

Dick de Zeeuw
Netherlands

John W. Mellor, Director
Ex Officio, U.S.A.

IFPRI REPORT 1985

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

CONTENTS

INTRODUCTION

1985 marked IFPRI's tenth anniversary. During its ten years IFPRI has built a research program focused on the complex issues associated with food production, distribution, consumption, and trade in an effort to identify and analyze alternative strategies and policies for meeting food needs in the world, particularly in low-income countries.

Initially, IFPRI's research program focused heavily on Asia, a region in which the massive food availability problems in the 1960s were met through the adoption of the new agricultural technology and the development of the mechanisms necessary to foster its implementation. Because of the wealth of data available in Asia, it has been possible to analyze Asia's success and to identify the development processes that contributed to it.

In the 1980s there has been a shift in relative emphasis from Asia to Africa as the region where increasing food production growth is the highest priority. Because of the vastly different conditions for agricultural production and the limited availability of the data necessary for analysis, the challenges for Africa are even greater. IFPRI's research effort has shifted to encompass these challenges by building on the research foundation of the Asian example.

IFPRI has passed a number of milestones during its first decade. In 1979 IFPRI became a member of the Consultative Group on International Agricultural Research (CGIAR) and in 1984 underwent its first quinquennial review of program and management by the Technical Advisory Committee to the CGIAR to assess its achievements and the appropriateness and effectiveness of its research efforts. Overall the review was favorable, and since its completion we have taken the comments and suggestions of the review panel into account as we plan for the next decade.

In one such effort, there has been a rethinking of the six research questions on which IFPRI's research is focused. The questions were originally discussed in *IFPRI Report 1979* and formalized in *Looking Ahead: The Development Plan for the International Food Policy Research Institute* published in June 1982. Following the suggestions of the External Review Report, the six questions have given way to five research areas under which the Institute's research results are integrated. These five areas—development strategy, technology policy, poverty alleviation, Africa, and food aid—serve as links for broadened communication among IFPRI's researchers and across IFPRI's five research programs.

Specifically, IFPRI research is conducted on a project basis by a small group of researchers with expertise in economics, nutrition, political science, geography, and other fields. Research is administered through the five research programs on Food Data Evaluation, Food Production Policy, Agricultural Growth Linkages, Food Consumption and Nutrition Policy, and International Food Trade and Food Security. Researchers are assigned to only one program, but are usually involved in more than one project. Because policy formulation requires the analysis of research results from a number of research disciplines, IFPRI's research areas serve to integrate the findings from the research programs. Thus the research programs and the projects undertaken within them form the core of IFPRI's research efforts, and the research areas define and relate the projects in an integrated manner to contemporary policy problems.

Another area in which IFPRI initiated a strong push in 1985 is the role it can play in contributing to the building of national capacities to analyze food policy issues. There is a general recognition that food policy research in many countries is constrained by a lack of trained people and institutional capacity. There is a need to strengthen research capacities by augmenting the cadre of professional food policy analysts whose knowledge and skills are critical to achieving the policy goal of increased food production and the equitable distribution of its benefits, and to integrate these analysts into effective institutions. Although in the short run IFPRI has contributed to meeting the policy research needs of the developing countries through its research results, in the long run IFPRI's effort will broaden its scope for transferring knowledge, experience, and technology to countries and regions through research networks that bring together policy analysts from different backgrounds and levels of experience.

As in previous years the annual report describes the activities undertaken in IFPRI's five research programs. The results for 1985 were reported in four research reports, four issues of *IFPRI Abstract*, three working papers, and three issues of the newsletter *IFPRI Report*. The first book in a new IFPRI series with The Johns Hopkins University Press, *Agricultural Change and Rural Poverty: Variations on a Theme by Dharm Narain*, edited by John W. Mellor and Gunvant M. Desai, was issued in the fall of 1985. Other publications included *Administering Food Producer Prices in Africa: Lessons from International Experiences* by Ojetunji Aboyade, four food policy statements, and 15 reprints.

The Outreach section of the annual report describes IFPRI's collaborative activities with other centers in the CGIAR and collaboration with national institutions in developing countries. During 1985 these included some 35 collaborative research efforts in countries in Asia, Africa, Latin America, and the Middle East. In addition, IFPRI participated in three major workshops with researchers from around the world.

In February 1985, IFPRI held its Board of Trustees meeting for program review in Dhaka, Bangladesh. This included a meeting with Bangladesh economists to discuss food issues facing the country and a field trip to Bangladesh farms.

John W. Mellor

FOOD DATA EVALUATION PROGRAM

The work of the Food Data Evaluation Program examines historical food production and consumption trends in the developing regions of the world and, using projections based on these trends, identifies those regions where future food deficits are likely to occur and what the general size of these output shortfalls will be. Data from the Food and Agriculture Organization of the United Nations (FAO) and other international organizations provide the bases for the analyses. In 1985, data series on the major staple food crops were extended to 1980, and analyses have largely been completed for livestock products and cereals used as livestock feed. A 1984 study of trends and prospects for cassava also was expanded.

In addition to these analyses of food gaps, the program also examines trends in selected developing countries, centering in 1985 on the People's Republic of China and the economic growth in the countries of the Association of Southeast Asian Nations (ASEAN). And, in response to a mandate to address the problems posed by weak data collection systems in many developing countries, groundwork is being prepared for research on the gathering, evaluation, and use of data for food policy analysis in Third World countries.

A statistical reference book for IFPRI's staff, *A Handbook of Food Policy Research Statistics*, was completed in 1985. The first part of a planned two-phase project, it presents food-related statistics in the form of distributions, trends, ratios, and other indicators for the 1960s and 1970s. Tabulated data were compiled from those used by the program in its food trends analysis and projections work on developing countries, but the handbook also includes parallel statistics for developed economies. In the second phase of the project, indicators related to the work in other IFPRI programs, such as those for inputs, nutrition, and food aid, are planned.

MAJOR FOOD CROPS

A study analyzing trends and projections for the major food crops (cereals, roots and tubers, pulses, groundnuts, and bananas and plantains) was completed in 1985. It includes production data for the period 1961-80 and consumption and trade data for 1966-80 for the 4 regions, 11 subregions, and 105 countries of the Third World. Trends and projections are presented with and without Chinese data.

Results indicate that Third World food production growth in 1961-80 of 3.1 percent a year (2.6 percent, excluding China) outpaced population growth. But food consumption expanded faster than production, which led to a threefold increase in net food imports. Improvements in crop yields accounted for three-fourths of production growth, and expansion of crop area contributed the rest. In Sub-Saharan Africa, however, area expansion represented almost four-fifths of output growth.

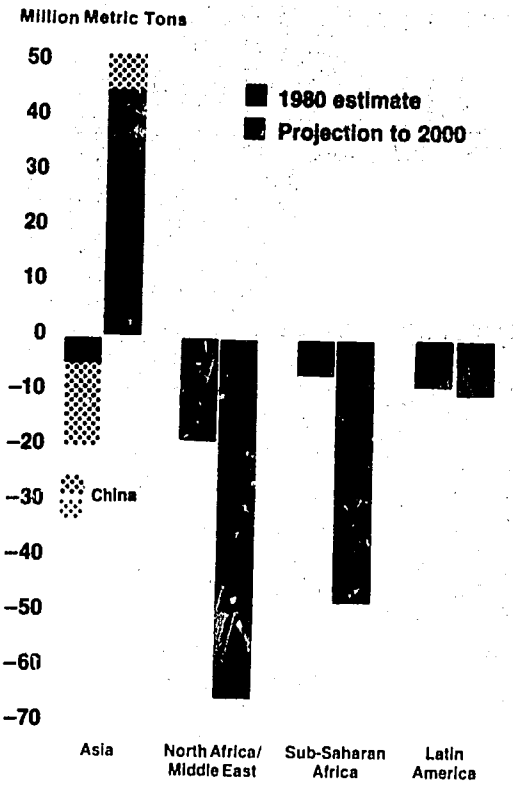
Trends suggest that 75-80 percent of the growth in food consumption may be attributed to population growth and the rest to income growth. The use of basic food staples for animal feed grew by 4.3 percent a year, raising its share in total use to 16 percent in 1976-80. Growth of feed use was especially rapid in North Africa/Middle East and Latin America, regions where increases in income caused a surge in demand for livestock and poultry products.

Food imports expanded more than twice as fast as food exports between the

1960s and the 1970s; average annual net imports increased from 12 million metric tons in 1966-70 to 38 million metric tons in 1976-80. However, in Asia exports grew faster than imports. Specifically, in South Asia increases in per capita income and consumption were not commensurate with production growth, thus contributing to mounting stocks. Demand spurred by income growth caused North Africa/Middle East and Latin America to import more food, but Sub-Saharan Africa's rapid growth of net imports stemmed from the region's poor production performance, which caused its food exports to decline by 7 percent a year, while imports increased by 9 percent a year.

If production and income trends continue, the overall net food deficit in developing countries could reach 69 million metric tons (76 million metric tons if China is excluded) by the turn of the century. Projections of the regional surpluses and deficits to the year 2000 augur well for Asia's prospects—a surplus is indicated (see Figure 1). But the prospects for Sub-Saharan Africa are bleak unless giant strides can be made in food output or population growth slows significantly.

Figure 1
Food surpluses and deficits among developing countries, by region, 1980 estimates and projections to 2000



Source: Leonardo A. Paulino, *Food in the Third World: Past Trends and Projections to 2000* (Washington, D.C.: International Food Policy Research Institute, forthcoming).

Note: These surpluses and deficits are the differences between production and consumption.

LIVESTOCK PRODUCTS

In addition to analyzing historical trends, *Livestock Products in the Third World: Past Trends and Projections to 1990 and 2000,* Research Report 49, by J. S. Sarma and Patrick Yeung, makes alternative projections of supply-demand balances for the principal livestock products (meat including poultry, milk, and eggs). The demand projections are based on two income-growth scenarios: a main scenario based on the trends of per capita income growth in the 1966-77 period and the other on per capita income growth rates 25 percent slower than these trends.

Between the early 1960s and the mid-1970s the output of meat and eggs in developing countries (excluding China) increased faster than the 2.6 percent annual growth of population (see Table 1). During the same period consumption of meat grew an average of 3.2 percent and eggs grew an average of 5.5 percent. For milk, the growth of consumption was about the same as that of population, but output growth lagged slightly.

Average annual net exports of meat declined from 0.8 million metric tons in 1961-65 to 0.3 million metric tons in 1973-77, net imports of milk nearly doubled to about 9 million tons, and net imports of eggs increased from 0.04 to 0.11 million tons.

Table 1
Growth of population and production and consumption of livestock products, by region, 1961-65 to 1973-77

				(percent/year)			
Asia	2.5	2.8	2.9	2.2	2.0	5.4	5.4
North Africa/ Middle East	2.6	3.5	4.1	2.2	2.8	6.0	6.6
Sub-Saharan Africa	2.7	2.3	2.0	1.4	2.1	3.4	3.5
Latin America	2.7	3.0	3.3	3.4	3.4	5.5	5.6
All study countries	2.6	2.9	3.2	2.5	2.6	5.3	5.5

Source: J. S. Sarma and Patrick Yeung, *Livestock Products in the Third World: Past Trends and Projections to 1990 and 2000*, Research Report 49 (Washington, D.C.: International Food Policy Research Institute, 1985).
Note: The figures do not include data for China.

If 1961-77 production trends continue, Third World countries are projected to produce about 51 million tons of meat, 178 million tons of milk, and 14.7 million tons of eggs by the year 2000. At trend income growth, the meat deficit is projected to be about 21 million tons and the milk deficit 64 million tons by 2000; eggs are projected to be in balance. Assuming that the output projections are unchanged, demand projections under the slower income-growth scenario would reduce the food gap to about 10 million tons of meat and 43 million tons of milk. Under this scenario, eggs would be in surplus.

According to the trend income-growth assumption, the projected production of meat and milk would fall short of projected demand in all four developing regions. Under the slower income-growth scenario, gaps in meat and milk are still projected for all regions except Latin America.

What are the consequences of these large deficits in meat and milk? This study suggests that unless they are filled through trade or aid, prices will rise, with possible adverse effects on the protein intake of the population. Many countries may prefer to accelerate domestic production through development of commercial or semicommercial enterprises near cities or labor-intensive rural production strategies based on new technology. Access to credit, inputs, veterinary services, and marketing facilities will be needed, as well as appropriate pricing policies and strengthening of livestock research. Apart from the large investments required for these services, large amounts of grain will be needed to feed livestock, especially as population growth causes pastureland to shrink. Because of their shorter production cycles, pigs and poultry have more potential for filling meat deficits.

CEREALS IN LIVESTOCK FEED

In 1980 nearly 680 million metric tons of cereals and cereal by-products were used as livestock feed in the world. (As used

here, the term livestock includes poultry.) About three-fourths of these feedgrains were used in developed countries, which produced nearly two-thirds of the world's livestock products in that year. Three-fourths of the feedgrains were coarse grains, such as maize and barley.

Developing countries (excluding China) used about 100 million metric tons of cereals as livestock feed, of which about two-thirds were coarse grains, and the balance divided between paddy and wheat. About 85 percent of paddy and 77 percent of wheat were fed in the form of by-products such as bran, whereas 90 percent of coarse grains was fed directly as whole grains. Cereal by-products constituted a little more than one-third of the total amount of cereals used as livestock feed.

Among the study regions, Latin America used the most cereals for animal feed—about 43 million metric tons, of which 86 percent was coarse grains. Asia accounted for 30 percent, nearly half of which was paddy, much of it in the form of rice bran. Sub-Saharan Africa used only 4 percent of the Third World's feedgrains.

Between 1966-70 and 1976-80 the use of cereals and their by-products as animal feed in developing countries increased by 57 percent, an average growth rate of 4.6 percent a year. More than 40 percent of this increase was in Latin America. The average annual growth rates of cereal feed use in the four developing regions were about 5.0 percent in both North Africa/Middle East and Latin America, 4.2 percent in Asia, and 3 1 percent in Sub-Saharan Africa.

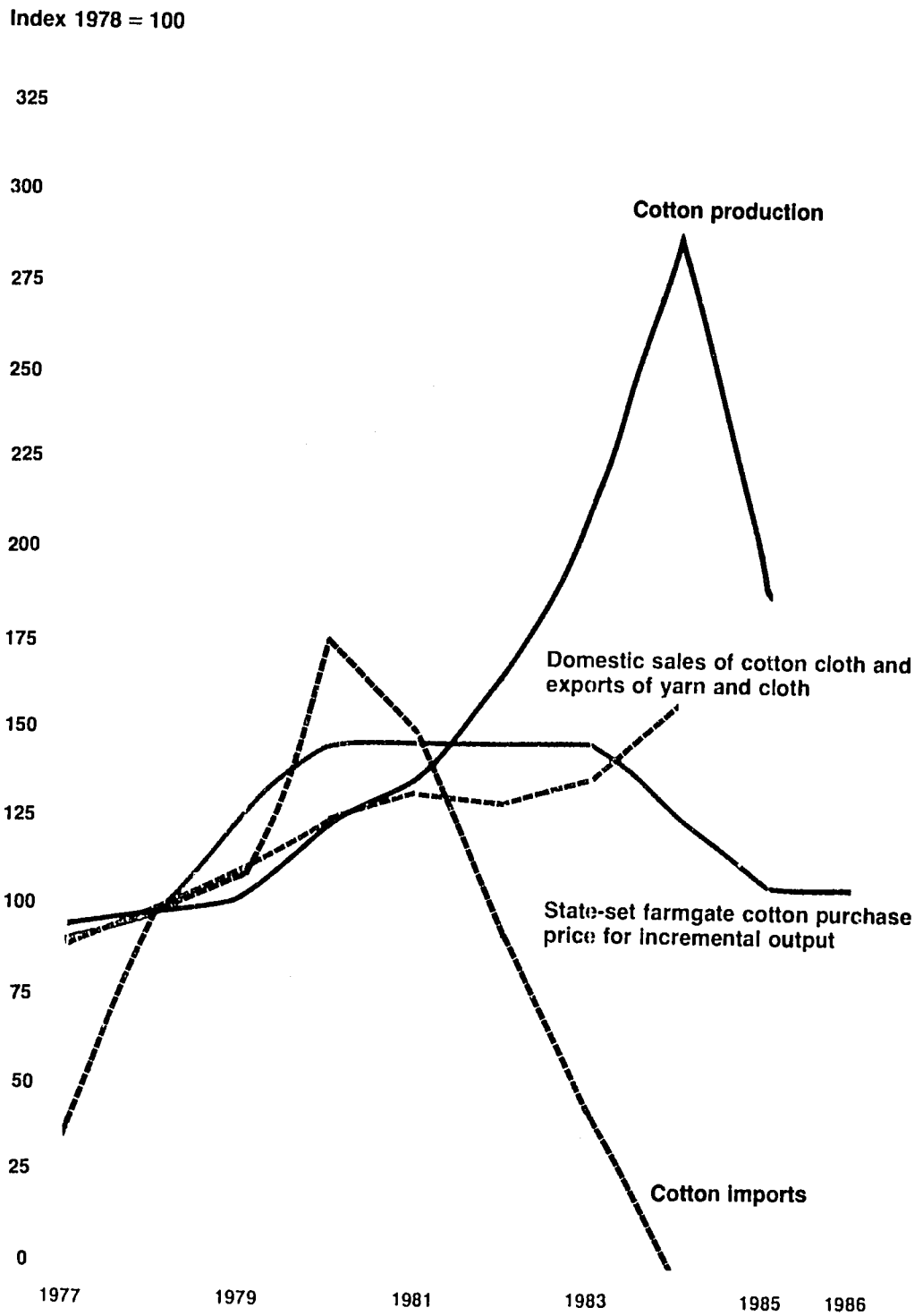
CHINA The rural organizational reforms instituted in China during the last several years have stimulated production of a number of nongrain food crops and have been critical to the growth of China's rural nonagricultural economy. The reforms have been far less instrumental in the rapid production increases of other crops, such as grains and cotton. Growth of these crops has been more closely associated with market guarantees and increased fertilizer supplies and price adjustments, which expanded fertilizer use by 174 percent between 1977 and 1984. Procurement and pricing changes aimed at reducing unmanageable surpluses and food subsidies comprising about one-third of the budget brought about production declines in grains and cotton in 1985.

Despite overproduction in the most important farm regions, many rural areas remain seriously impoverished. Immediate improvements in nutrition in these areas will still depend on local farm production growth or relocation. In addition, wealthier areas will consume more land-intensive foods. Despite declining government support, technical change in grain production must continue. Analysis in 1985 showed a large potential for crop production growth in both high-yield and poorer farm areas. If technical progress is allowed to decelerate, the supply of major grains could again be a problem in the 1990s. Agriculture's 5 percent share of state capital construction investment is the lowest ever, while the annual additions to fertilizer production capacity are the lowest since the 1950s.

Although the direction in which particular policies influence production are clear to Chinese decisionmakers, estimates of their effects are imprecise. IFPRI studies in 1985 delineated the technical basis for recent agricultural growth. Other research measured increased yield correlations among provinces and found rising sensitivity of aggregate grain output to policy changes.

China's immediate difficulties are more with effective demand and underdevelopment of market infrastructure than with aggregate supply. Demand and supply diverged rapidly in the early 1980s. This has occurred for cotton, as illustrated in Figure 2, and similar patterns are developing for grains and a few other major crops. In urban, suburban, and more affluent rural areas, the

Figure 2
Indexes of shifting supply and demand constraints in the Chinese cotton sector



Source: Based on calculations by Bruce Stone.

markets for grains and for goods produced with low-grade cotton are temporarily saturated. But as the suburban farm economy shifts toward livestock products, the growth in demand for feed crops will accelerate. Demand for all crops will improve with improvements in transport and marketing infrastructure and with higher employment and income levels in poorer rural areas.

IFPRI's research suggests that the growth in employment and effective demand, as well as supply, can be accelerated by appropriate investments in rural infrastructure and supportive policies. China's performance in these categories, except for its emphasis on irrigation, has been poor. A relaxation of long-standing restraints on rural nonagricultural and marketing activities is the principal current improvement, while irrigation has been deemphasized.

Rural transportation is far less developed than in comparably poor countries, but the proportion of the capital construction budget allocated to it remains low. Most transportation expenditures in rural areas are for railroad lines connecting cities; little is spent on rural roads. Food stocks are already too large in many high-yield farm regions, but storage facilities and transportation for linking surplus and deficit areas are inadequate. Rural electrification has slowed, and poor credit administration has forced the agricultural bank to cut credit allocations drastically.

Research also indicates that although the prospects for the Chinese rural economy remain bright overall, growth in the production of several crops, especially grains and cotton, will be slower than in the last decade because of alternating supply and demand constraints, lags in policy initiatives to eliminate them, and reduced public sector commitment. The structural basis of the constraints and the effects of rural policies and expenditures to address them must be more precisely understood if rapid long-term growth in the production and marketing of basic foodstuffs is to be maintained.

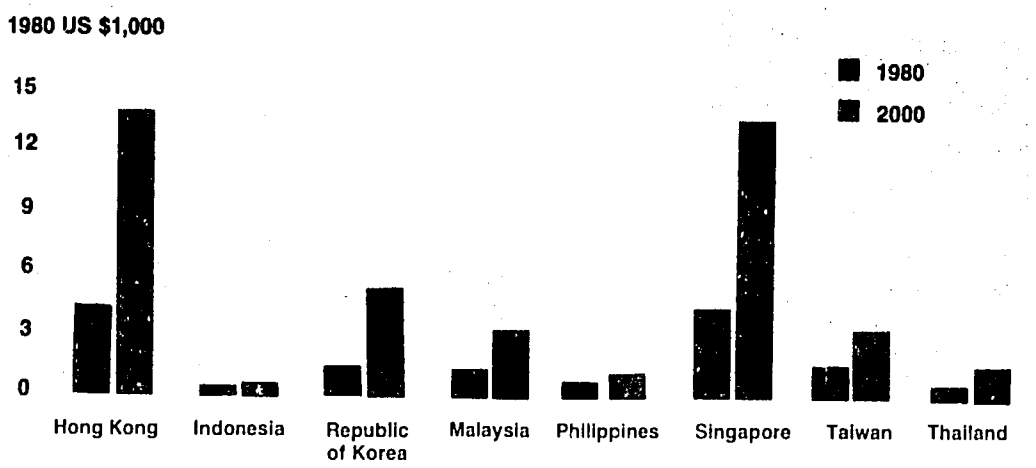
DEVELOPMENT IN *ASIA*

The economic growth of developing Asian countries since the 1960s has been spectacular. But the patterns of this growth have been diverse, depending on the development strategies and policies pursued. A study of the economic growth patterns of the East Asian and Southeast Asian (ASEAN) countries was completed in 1985. It estimates per capita GNP for eight countries for the year 2000 and identifies the development policies under which this growth potential may be realized.

For the East Asian and Southeast Asian countries studied—Hong Kong, Indonesia, Republic of Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand—average growth rates have been high, and steady growth trends have been maintained since the 1960s. Their economies recovered quickly from the first oil shock in 1973, and the stagnation of the world economy in the 1970s does not appear to have had a detrimental effect. The shares of manufactured exports in total exports have steadily increased from about 15 percent to more than 90 percent in countries such as the Republic of Korea and Taiwan and from less than 5 percent to an average of about 30 percent in Malaysia, Philippines, and Thailand. Some industries are now competing with those of the United States and Japan, and more are likely to in the future.

Economic growth of these Asian countries may slow in the 1980s and 1990s. Even then, however, the potential of their per capita GNP for growth is likely to be large. Figure 3 shows the probable changes among countries by the year 2000. Per capita GNP in Singapore and in Hong Kong could be higher in 2000 than that of Japan in 1980 (about $10,000 per person). Per capita GNP in the Republic of Korea and Taiwan could double, raising them to the 1980 economic status of Hong Kong and Singapore. Thailand and the Philippines are expected to reach the 1980 GNP of the Republic of

Figure 3
Per capita GNP in Asian countries, 1980 and 2000



Source: Based on data from World Bank, "Constant 1980 Dollar GNP Tape," Washington, D.C., 1985.

Notes: The figures are estimates on the trends between 1961 and 1980. The 1980 figure for Taiwan is extrapolated from 1978.

Korea. Indonesia, the largest of these countries and the least economically advanced, could attain the per capita GNP held by Thailand and the Philippines in 1980.

As part of this study, the countries were classified according to their development policies.

The first group, the countries pursuing inflationary development policies, is comprised of those that have funded their development by increasing external debts, overvaluing local currencies in relation to the U.S. dollar, and increasing imports of high-cost capital goods at relatively lower prices. The Republic of Korea and the Philippines are examples. The second group, countries with noninflationary development policies, has adopted a more balanced financial policy of undervaluing local currencies relative to the U.S. dollar to permit smoother export growth. This category includes Taiwan and Thailand.

The policies of countries in the third category are designed to maintain linkages between agriculture and nonagricultural sectors: Taiwan and Thailand also belong to this group, joined by the Republic of Korea about a decade later. For countries in the fourth category, the aim of development policy is to make the growth of export-oriented, labor-intensive light industries parallel the growth of capital-intensive heavy industries to provide the former with necessary production materials without having to import them. Taiwan and the Republic of Korea belong to this group.

These diversified approaches to development policy may explain the variations in patterns of economic growth of Asian countries, as represented by the newly industrialized countries, the quasinewly industrialized countries, and the less developed countries. The categorization of developing countries on the basis of these criteria provides a useful approach in analyzing the development strategies employed by the countries in each group in relation to their growth processes. The study emphasizes that such strategies, together with the international relations they entail, would need to be fitted to the stages of economic development and related growth mechanisms of these countries, considering their limited natural, human, and financial domestic resources.

FOOD PRODUCTION POLICY PROGRAM

The research agenda of the Food Production Policy Program is based on the assumption that accelerating the growth of food production is the principal objective of agricultural policy in developing countries. It is further assumed that this growth must be achieved with maximum stability in prices, supply, and employment, as well as maximum equity. Four interrelated factors contribute to this growth: technology, infrastructure, institution building, and incentives.

In countries that have reached their limits in area expansion, the key to increased production is the expansion of yields through modern technology. To be most effective, technology must be combined with adequate infrastructures, institutions, and incentives. Research on infrastructure is best conducted within the context of overall economic development (and is discussed in the Agricultural Growth Linkages Program section of this report), whereas research on institution building is related to the factors of production, such as agricultural research, fertilizer, irrigation, and the pricing and marketing of inputs as well as production. Research on incentives examines direct price incentives through domestic marketing and price support policies for both outputs and inputs. However, it recognizes that the best way of extending attractive incentives to farmers is through strong marketing institutions for agricultural outputs and financial institutions coupled with improved technology.

In countries where technology options are not so encouraging because of irrigation and labor limitations, the efficient use and augmentation of traditional land and labor resources is one of the most important areas on which to focus research. Production policy research in many African countries, for instance, focuses on the use of available land, labor, and indigenous technology, and on different mechanisms for providing incentives to farmers. Although improved technologies for these countries will be necessary in the long run, making the best use of available technology and resources may prove most appropriate in the short run.

Research undertaken by the Food Production Policy Program during 1985 fell under two broad categories: generation and diffusion of technology and incentive policies and stability. Research projects in the first category were concerned with issues related to resource allocation and the management of research systems, the transfer of technology to farmers, fertilizer policies, and investment in and management of irrigation and water control structures. Research projects in the second category focused on price policies, production-consumption patterns in West Africa, and instability and seasonality problems associated with the new technology.

GENERATION AND DIFFUSION OF TECHNOLOGY

RESEARCH AND RESOURCE ALLOCATION

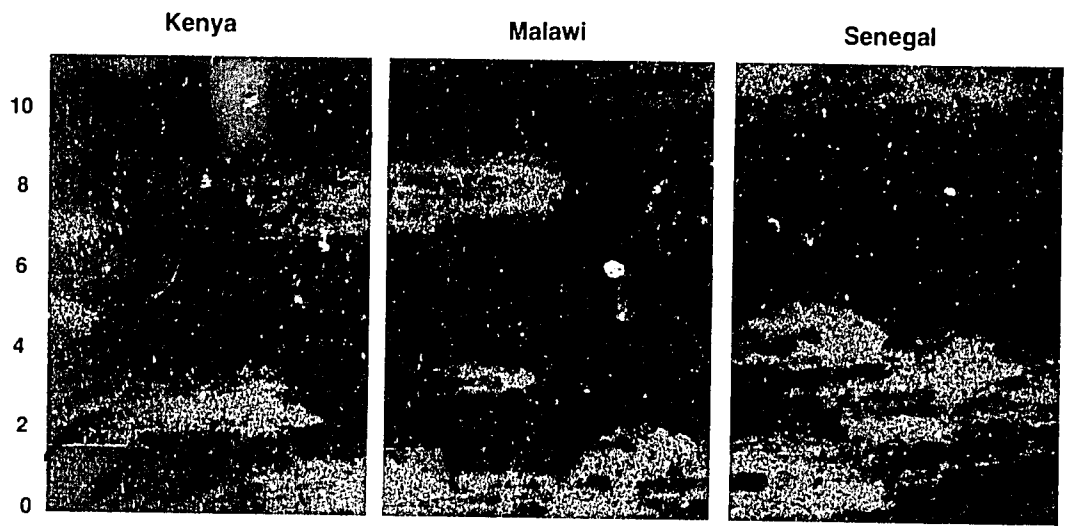
In collaboration with the Australian Centre for International Agricultural Research (ACIAR) IFPRI has been examining how best to determine which commodities and regions should receive research funding. In devising working criteria to assess resource allocations, a framework for determining the total benefits from research and

the distribution of these benefits was developed. This study has resulted in a survey of existing practices of resource allocations for more than 80 developing countries. The model incorporates both a measure of the direct benefits of research on a specific commodity to a specific country as well as the spillover effects to other developing countries producing the commodity in the same agroclimatic zone. As part of this effort, agroclimatic zones for 23 commodities were identified. Work was completed on 12 commodities. Initial results indicate that rice, bananas, and plantains merit high priority in the tropical regions, whereas wheat and potatoes rank high in the subtropical areas.

In a related study, IFPRI is examining the agricultural research systems of six African countries—Kenya, Malawi, Tanzania, Nigeria, Cameroon, and Senegal—in order to assess the constraints inhibiting technological development and the growth of productive research systems.

Research has thus far covered Kenya, Malawi, and Senegal. Results indicate that research expenditures grew nearly threefold during the last decade in all these countries (see Figure 4). Kenya and Malawi spent more than 1 percent of their agricultural GDP on research, while Senegal approached 3 percent in 1984. The growth in the numbers of national researchers has been even more impressive, and, although the proportion of expatriate researchers has declined, their numbers are currently higher than before in Malawi and Senegal. The study probes the qualitative aspects of this growth as well. It indicates that at the research station level, availability of nonsalary resources per scientist has gone down in real terms. Year-

Figure 4
Investment in agricultural research in Kenya, Malawi, and Senegal, 1972/73 to 1984/85



Note: The data exclude research on coffee, tea, and irrigation.

Notes: The data exclude research on tea, tobacco, and sugar. The data from 1982/83 include expenditures for fertilizer subsidies.

Notes: The data for 1983/84 are for only 6 months of 1983. The data for 1984/85 are for the whole of 1984 alone.

Sources: The data were compiled from official sources from Kenya, Malawi, and Senegal.

to-year fluctuations in recurrent grants was found to be high in Kenya and Malawi. The bulk of additional funds has gone to support a rising number of scientists and for greater dispersion of research efforts over regions and commodities. The study also examines the quality of scientific manpower, the pattern of resource allocation, and the role of external assistance for agricultural research.

Government expenditures are generally seen as having a major influence on the agricultural development of a country. There have been few studies, however, of government expenditures on agriculture and its effect on output. During 1985 IFPRI completed research on public resource allocation to agriculture in Latin America, the results of which were reported in *Government Expenditures on Agriculture and Agricultural Growth in Latin America,* Research Report 50, by Victor Elías. The report examines the effect expenditure policies have had on agriculture in nine Latin American countries—Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela.

Results indicated that, on the average, government expenditures on agriculture contributed almost 8 percent of the growth of agricultural output and that where the rate of growth of agricultural output was lower, the government contribution was smaller. In addition, government expenditure on agriculture contributed to the stability of agriculture. The rate of growth of government expenditure on agriculture was negatively related to variability of agricultural growth.

Of the components of government expenditure on agriculture—administration, irrigation, research and extension, education, health, land reform, and so forth—education and health were consistently largest in all nine countries. Irrigation was the second largest component in only five Latin American countries. In addition, the study found that the composition of government expenditures changed dramatically between 1950 and 1980. Expenditures on education and health increased more than 5-fold, expenditures on irrigation increased 6-fold, and expenditures on research and extension increased about 15-fold.

In another study initiated in 1985, work was begun on the generation and diffusion of agricultural technology to farms in Brazil, a country that has encouraged growth in agriculture through such mechanisms as price and credit policies. This research is aimed at identifying the mechanism in Brazil to induce farmers to adopt new technologies, given input and crop prices, credit availability, and technology characteristics.

FERTILIZER POLICIES

IFPRI research on fertilizer policies has focused on defining those forces that affect the increased use of fertilizers and identifying policy instruments to accelerate this use. Over the years IFPRI research has focused on fertilizer use in India, Bangladesh, Indonesia, and the Philippines. During 1985 a study on fertilizer use in Bangladesh was completed and one on fertilizer use in Africa was begun.

In Bangladesh, fertilizer consumption grew from about 51,000 metric tons of nutrients in the mid-1960s to 545,000 tons in the mid-1980s. This was achieved through a well-developed supply and distribution system, the spread of irrigation and the use of high-yielding varieties, and a relatively advanced extension and research system. However, throughout this period, fertilizer prices were heavily subsidized. In the early 1970s between 0.22 and 0.40 tons of rice were needed to buy one ton of urea. In the early 1980s, it took between 0.52 and 0.57 tons of rice to purchase one unit of urea. Even with this doubling of the price of fertilizer compared to rice, in the mid-1980s the fertilizer subsidy represented about 13 percent of the public development budget for agriculture.

The study estimates that agricultural growth and national gains would be accelerated if the subsidy were eliminated and the funds reallocated to develop irrigation. As Table 2 indicates, irrigation would continue to expand and fertilizer consumption and rice production would increase. The nation would gain by 500 to 900 million takas overall, depending on the type of irrigation development.

In Sub-Saharan Africa, fertilizer use has been low and the policy issues surrounding its use not well understood. According to the Food and Agriculture Organization of the United Nations, fertilizer use was less than five kilograms per hectare in 21 countries and exceeded 15 kilograms per hectare in only seven countries in Sub-Saharan Africa. During 1985 IFPRI began research on fertilizer use in this region. The work is attempting to identify key policy variables that have sustained rapid growth of fertilizer use in Kenya, Malawi, Zambia, and Zimbabwe, where use has been at some of the highest levels in the region. The research will attempt to identify factors responsible for growth in fertilizer consumption and the factors that will lead to increased consumption by smallholders.

IRRIGATION MANAGEMENT AND FARM INCOME

Expansion of irrigation, together with the adoption of modern rice varieties and growth in fertilizer use, has played a key role in increased rice production in many Asian countries. However, these successes, coupled with rapid increases in the cost of investment in new irrigation infrastructure and declines in world prices of rice, have led policymakers in Asia to take a closer look at the performance of existing systems. A particular concern is whether improved water management can boost total system production and income and improve the distribution of income between farms at the source of water supply and those further downstream.

Table 2
Effect on foodgrain production of the reallocation of funds to irrigation development following elimination of the fertilizer subsidy, Bangladesh

Total budgetary savings (million Tk)	1,023	1,023
Annual capital cost (Tk per acre)	1,340	2,063
Additional irrigated area (1,000 acres)	763	496
Increase in rice production[a] (1,000 metric tons)	854	556
Increase in fertilizer consumption (1,000 metric tons)	81	53
Increase in rice production minus losses from higher fertilizer prices (1,000 metric tons)	553	255
Farmers' savings from reduced fertilizer use (million Tk)[b]	854	854
Net gain after budgetary reallocation (million Tk)	893	489

Source: Mahabub Hossain, "Fertilizer Consumption, Pricing and Foodgrain Production in Bangladesh," in International Food Policy Research Institute and the Bangladesh Institute of Development Studies, *Fertilizer Pricing Policy and Foodgrain Production in Bangladesh* (Washington, D.C.: IFPRI, forthcoming).

Note: The figures are based on data for 1983/84 and assume that all other factors affecting fertilizer consumption are unchanged from 1983/84.

[a] The net increase in rice production would be about 30 percent less than the figures given here if the production of Aus rice is forgone on these lands.

[b] Farmers would use 220,000 fewer tons, valued at Tk 3,880 per ton.

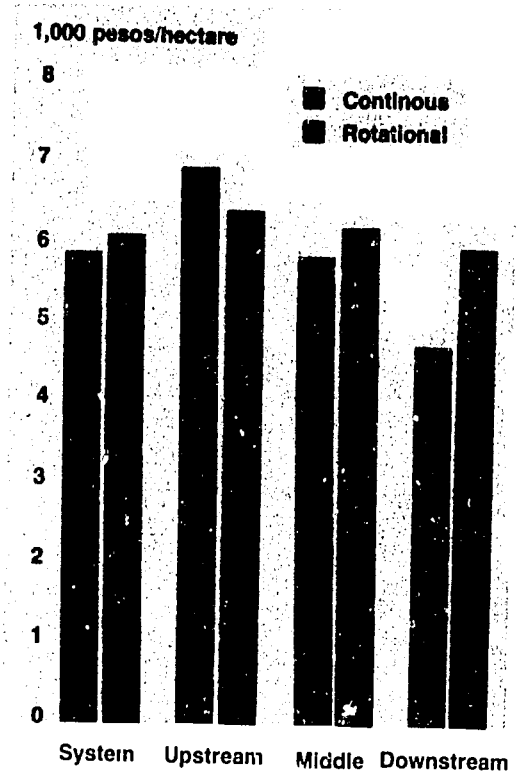
One area of focus is the type of irrigation system used. Studies of diversion irrigation systems, the most common type of Asian irrigation, indicate that the often-practiced continuous flow water distribution in these systems may cause overuse of water at the source of the system, which may reduce production and income further downstream. Rotational irrigation, in which water is rotated among different sections of the system to provide more equal access, may be an alternative. However, assessing the effects of rotational systems by the commonly used case study approach is difficult because of the complex agroclimatic and physical relationships that affect rice production.

IFPRI has developed a simulation model as an alternative approach for assessment. The simulation model links the operation of the irrigation system, together with agroclimatic variables such as streamflow, rainfall, and soil type, to the water adequacy of farms within the system. Water adequacy in turn determines, along with input levels and prices, yields and incomes within the system.

The model has been used to simulate the operation of three Philippine irrigation systems using rainfall and streamflow data for the years 1957-77. The results for continuous flow irrigation confirm the large disparity in benefits among farms due to differences in their access to water. Farms near the source of the system, with the best access to irrigation water, have annual per hectare incomes from 25 to 50 percent higher than farms downstream (see Figure 5). Roughly a third of the difference in incomes can be attributed to the smaller dry season area harvested downstream, and about two-thirds to higher moisture stress, which reduces fertilizer use and rice yield downstream.

Rotational irrigation is quite effective in equalizing benefits among farms in the system, increasing income downstream by 15-25 percent and reducing the disparity in income between farmers at the source and at the end of the system to 4-6 percent. However, the income gains to farmers downstream are partly at the expense of losses at the source, where annual incomes decline by 5-10 percent. Thus the systemwide income benefits from rotational irrigation are only 3-6 percent. Although investment in management reform may not be justified by aggregate income and production benefits, the rotational irrigation system does contribute to the redistribution of income to poorer farmers within the system.

Figure 5
Simulated average annual income per hectare of service area, with alternative water distribution methods, Santa Cruz river irrigation system, Philippines, 1957-77



Source: Mark W. Rosegrant, "Efficiency and Equity Impacts of Alternative Water Allocation Methods in Diversion Irrigation Systems in the Philippines," International Food Policy Research Institute, Washington, D.C., March 1985 (mimeographed).

INCENTIVES AND STABILITY FOR GROWTH

PRICE POLICIES

As part of IFPRI's work on price policies, a major study was published in 1985 as part of a new series with The Johns Hopkins University Press. The book *Agricultural Change and Rural Poverty: Variations on a Theme by Dharm Narain*, edited by John W. Mellor and Gunvant Desai, examines the fluctuations in the Indian poverty rate. These are found to be explained by the growth of agriculture, changes in the prices of commodities consumed by the rural poor, and trend factors. The book concludes that the interaction of the rate of expansion of agricultural output per capita, the price of food, and socioeconomic structures and policies largely determines the prevalence of poverty in developing countries.

Other research on the macro- and micro-economic dimensions of price policies has continued. Research is focusing on the interaction of price policies with technological and institutional policies and commodity-specific price policies and their effect on a growth and employment-oriented development strategy.

COARSE GRAIN PRODUCTION AND CONSUMPTION

As discussed in *IFPRI Report 1984*, per capita consumption of millet, sorghum, and maize—the traditional foodgrains—has decreased in West Africa, while consumption of rice and wheat—primarily imported grains—has increased. Evidence suggests that pricing policies may have contributed to shifts in consumption from domestically produced coarse grains to imported staples. Little is known, however, about the consumption responses of different segments of the population to policy-induced price changes and whether they are reversible. During 1985 data continued to be collected for two field studies in Burkina Faso aimed at improving information on the production and consumption of various grains. The survey data were collected during one of the region's worst agricultural years.

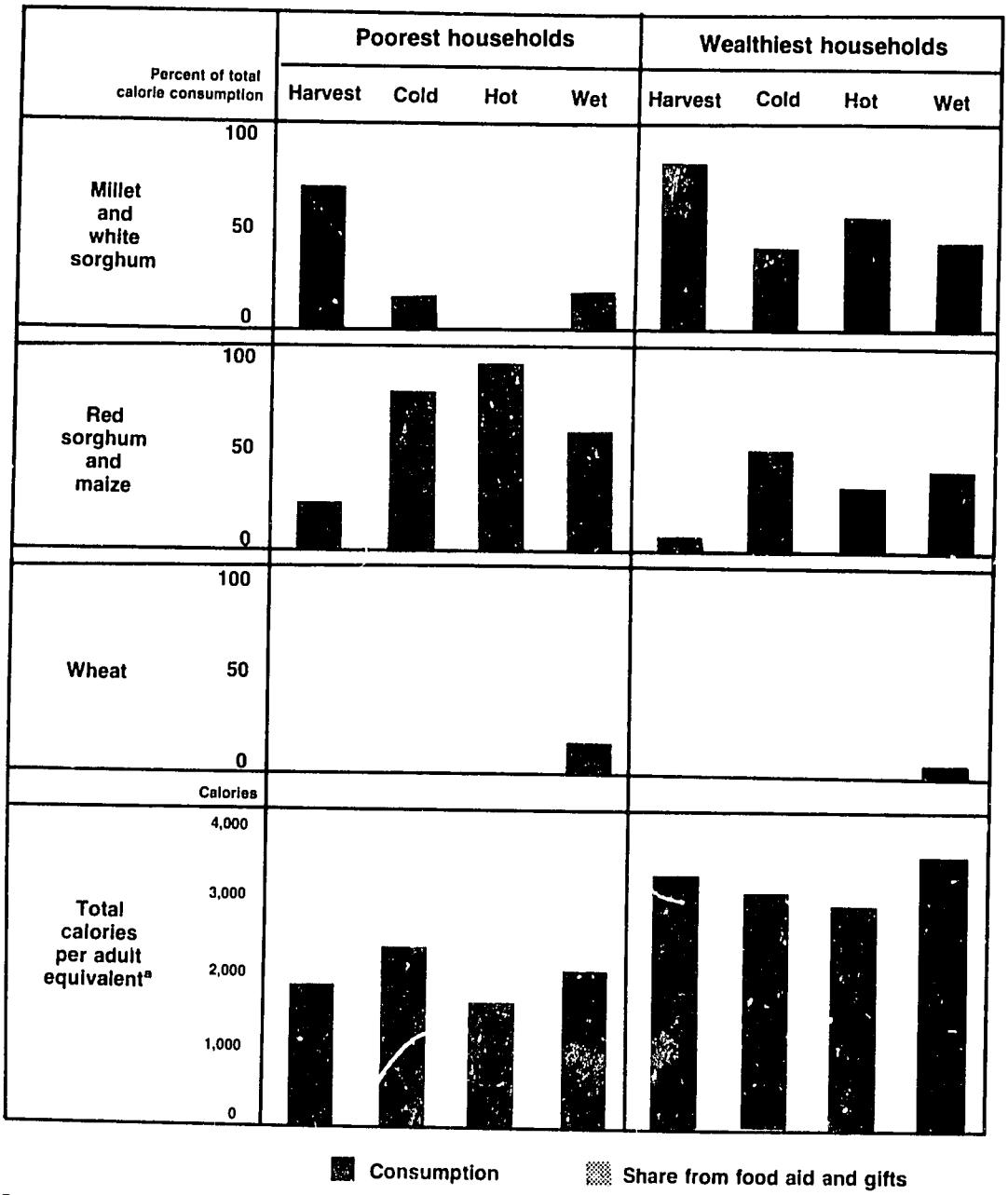
Data by income groups, seasons, and crops were collected on the consumption of staple calories for a sample of rural and urban households in Burkina Faso. Preliminary results are now available for one of the northern research areas, where the effects of the drought were especially severe. Millet and white sorghum are the traditional crops in the region. Red sorghum and maize are imported from further south or through food aid. All wheat consumed is from food aid.

As Figure 6 illustrates, the calorie consumption of the wealthiest tercile of households was adequate in all seasons and was at bare subsistence for the poorest, especially in the hot season. (It should be recognized, however, that because of out-migration during the hot season in 1985, the number of observations was low.) The data suggest that the poorest tercile of households relied entirely on commercial purchases of food during this season, whereas the wealthiest satisfied half of their food consumption from their own production. Research using the full survey results is under way to determine the equity implications for seasonal food price policies and for food aid policies.

The wet season occurs so much later than the preceding harvest that it is usually thought of as the famine season. However, the data from the surveys indicate that the caloric intake of both income groups is higher in the rainy season than in the hot season that precedes it. This appears to be explained by the availability of food aid in the wet season; food aid in the form of wheat accounts for a significant share of calories of both income groups at that time.

Figure 6

Sources of food consumption in a drought year, by season and crop, Woure village, Djibo subprefecture, Burkina Faso, 1984/85



Source: Based on calculations by Thomas Reardon and Christopher L. Delgado, using preliminary results from a joint IFPRI/International Crops Research Institute for the Semi-Arid Tropics survey.

Notes: Poorest households are those in the lowest wealth tercile, based on production assets and livestock ownership. Wealthiest households are in the highest tercile. Poor and wealthy are relative concepts; no one in Woure is truly wealthy. The harvest season is in October and November; the cold season, December through February; the hot season, March through May; and the wet season, June through August.

[a] Sum of the calories consumed from cereals, pulses, and vegetables. Calories from meat, milk, and other sources are excluded.

In addition, the poor rely most heavily on cereal produced outside northern Burkina Faso. This is consistent with the view that, in rural areas at least, substitution of imported for local cereals is driven primarily by shortfalls in regionally-produced supplies rather than changes in tastes, although this needs to be explored more thoroughly.

RICE PRODUCTION IN ZAIRE

Rice is Zaire's most important cash crop among the major staple food crops produced in the country. It has been grown, marketed, and distributed in Zaire before independence, but during the last two decades production has not kept pace with demand. Imports of rice have increased dramatically. During 1985 IFPRI began research on a project to identify the technical and economic factors associated with rice production by smallholder Zairean farmers in order to suggest policy changes that may lead to improved rice production. The basic factors in much of the agricultural production in Sub-Saharan Africa are labor and land. This is particularly true in Zaire. This study has surveyed farming households in the Zairean Basin to determine how labor is allocated. Preliminary results indicate that during 1982/83 the farming households allocated 7.9 percent of their time to farming, 12.8 percent to nonfarming economic activities including fishing, hunting, and making handicrafts, 54.0 percent to domestic and sociocultural activities, 23.0 percent to leisure activities, and 2.3 percent to sickness. This suggests that the present allocation of labor impedes increased farm production and needs to be examined more closely.

VARIABILITY IN FOODGRAIN PRODUCTION

Variability in cereal yields and production constitutes an important problem in relation to world agriculture and food supplies. IFPRI research on variability has suggested that some aspects of the new technology have resulted in greater variability in yields, and a reduction in offsetting patterns of variation in yields between crops and regions. In order to consider the issues of variability more comprehensively, IFPRI, in conjunction with the German Foundation for International Development (Deutsche Stiftung für Internationale Entwicklung, DSE), sponsored a workshop bringing together economists, plant breeders, and policymakers (see the Outreach section). The participants concluded that variability in cereal yield is largely driven by weather but that climatic change seems unlikely to have been the cause of recent changes in variability. The major components of the problem are the stronger covariances across crops and regions. Although plant breeding and farming systems research may reduce the supply side of the problem to some degree, research to ameliorate the social effect of such variability are likely to be more effective.

AGRICULTURAL GROWTH LINKAGES PROGRAM

The basic thrust of the Agricultural Growth Linkages Program is to research the contribution of technological change in agriculture to national economic growth and to the welfare of the poor. An important assumption underlying this research is that the consequences of technological change for growth and equity can be influenced by public policy and that these policies will differ with the stage of development of the national economy. Ongoing projects deal with the effects of agricultural technology under three topics: growth and equity in rural areas, policies to improve growth and equity, and resource transfers in the national economy.

GROWTH AND EQUITY IN RURAL AREAS

Early studies on the effect of the "green revolution" technologies concluded that the rural poor did not receive a fair share of the benefits, and that in some cases their incomes actually declined. More recent studies refute this claim; evidence indicates that small farmers have also benefited from the new technologies, despite some initial lags, and that most households in green revolution areas have benefited from increased incomes, even if the distribution of income has not always improved. In-depth case studies are under way to evaluate the short- and long-term effects of technological change on rural poverty more fully.

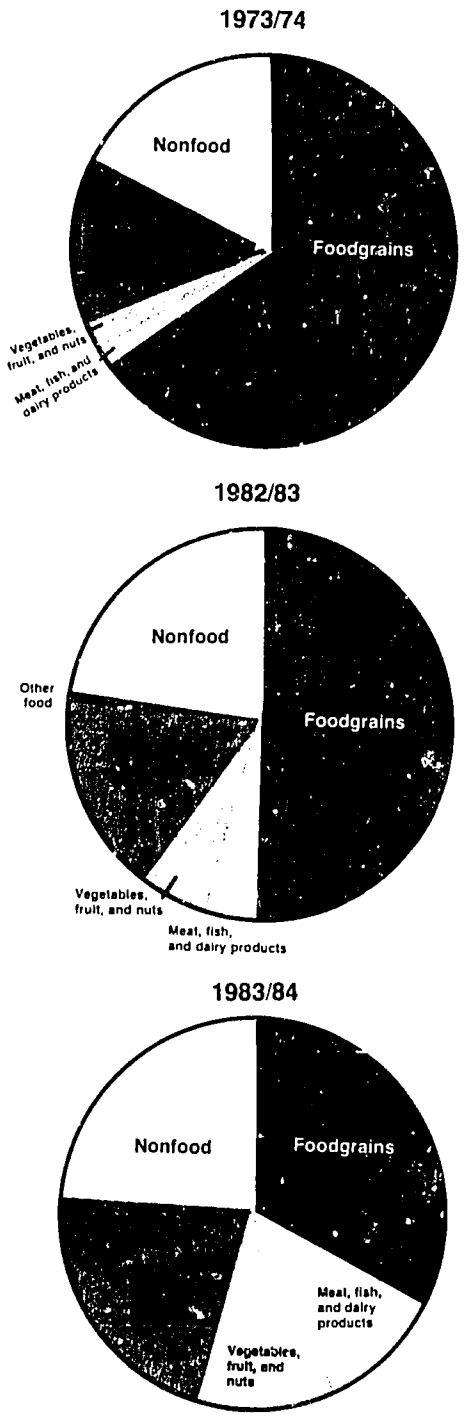
One study is examining the effects of the new varieties on income and employment in a rice-growing district in south India. Data collected in 1982/83 and 1983/84 were compared to those collected a decade earlier. The results of this study, which was undertaken in collaboration with the Tamil Nadu Agricultural University, indicate that there were significant increases in agricultural production and incomes during the decade, largely as a result of the adoption of high-yielding varieties of rice, increased use of fertilizers, and expansion of irrigated area.

Rice production has increased by about 40 percent since the addition of high-yielding varieties in the early 1970s. The average household more than doubled the real value of its total expenditures on food and consumer goods and services during this period. The poorer households, including the landless, participated in the growth, as the increases in their employment, incomes, and consumption of higher quality foods such as meat, fish, dairy products, vegetables, and fruits shows (see Figure 7).

The research indicates that the real per hectare returns from paddy farming have declined in recent years because input costs have increased sharply while the real price of paddy has fallen. However, paddy incomes have been maintained by a combination of increased irrigation and quicker-growing varieties that have enabled farmers to grow a larger gross area of paddy each year. Farmers have also expanded their production of important cash crops, especially groundnuts. These changes have also been facilitated by the higher-yielding rice varieties because family needs for paddy can now be assured from a smaller area of land.

Analysis of the linkage effects of the increase in production on agricultural activities in local villages and towns indicates that each dollar of increase in agricultural

Figure 7
Average budget shares of the landless in five villages in North Arcot, India, 1973/74, 1982/83, and 1983/84



Source: Based on calculations by Peter B. R. Hazell.

income induced about a 60 cent increase in nonagricultural income within the rural economy. Of this increase, about half is from increased demand for agricultural inputs, marketing, and processing, and half is from increased household demand for consumer goods and services. The benefits of these increases were found to be shared by small farmers and landless workers as well as urban households.

Research on a similar project in Eastern Province, Zambia, began in 1985 in collaboration with the Rural Development Studies Bureau of the University of Zambia and the Zambian National Food and Nutrition Commission. The study compares sample villages that have similar agricultural potential but that differ in their access to rural infrastructure and new technology and in the rate of agricultural growth they achieved during the last decade. Preliminary evidence indicates that the linkage effects of technological change are different from those seen in India because Zambia's infrastructure is less developed, its agricultural season is shorter, and its population density is lower. The comparison of India and Zambia will help explain the cause and effect relationships between technological change and rural poverty.

POLICIES TO IMPROVE GROWTH AND EQUITY

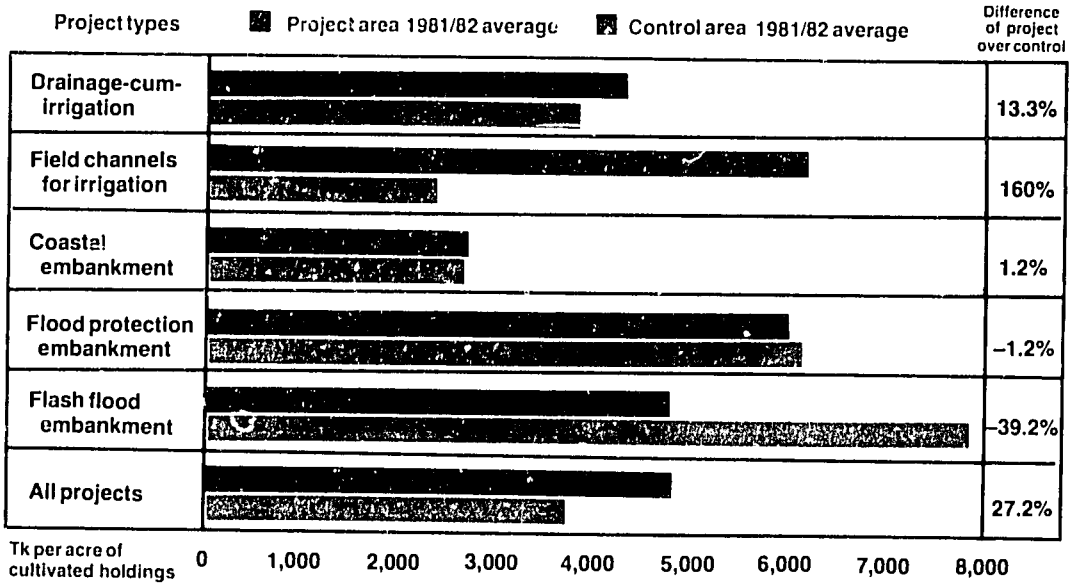
An important aspect of the research is to determine how government policy can enhance the growth and equity effects of agricultural technology. During 1985 the Linkages Program focused attention on policies related to infrastructure. The growth in nonfarm economies is stimulated by investment in two kinds of infrastructure, those that increase agricultural productivity, such as irrigation, roads, and telecommunications, and those that facilitate the flow of commerce such as transport, banks, and markets.

During 1985 IFPRI, in collaboration with the Bangladesh Institute of Development Studies, completed the second phase of a four-year evaluation of Bangladesh's food-for-work program. Since 1975 food-for-work (payment of in-kind wages to workers) has become a large part of the public works program in Bangladesh. The first phase of the study analyzed the direct and immediate consumption, employment, and income effects of food-for-work and its management and technical problems. In the second phase survey data from a diverse sample of villages were used to analyze the longer-run indirect effects of the rural infrastructure on income, employment, consumption, and investment. The infrastructure studied included dual-purpose canals to be used for irrigation in the dry season and drainage in the wet season, field channels for irrigation in areas with large surface water irrigation, coastal embankments to prevent the intrusion of saline water, river embankments for protection of crops during normal flooding and those for protection during flash flooding, as well as broader transportation, communication, and institutional settings.

Results indicate that the gross value of crop production was an average 27 percent higher as a result of infrastructure but that the amount of improvement varied according to the type of structure (see Figure 8). Production in field channel areas improved the most.

Household income was found to be 19 percent higher for the project area, and employment in crop production and employment in nonfarm activities were found to be 6 percent and 22 percent higher, respectively. Average household income in villages with developed infrastructure was 11 percent higher than in villages with underdeveloped infrastructure. Nonagricultural wage labor income was 62 percent higher in villages with well-developed infrastructure. The consumption and nutrition effects are discussed with the results of the Food Consumption and Nutrition Policy Program.

Figure 8
Changes in the gross value of agricultural production between project and control villages in Bangladesh, 1981 and 1982



Source: Based on calculations by Raisuddin Ahmed.

Another study of rural infrastructure that was completed in 1985 examined the importance of the location of services providing farm inputs and agricultural marketing and processing facilities and of farmers' access to rural goods and services for household consumption. In *Rural Household Use of Services: A Study of Miryalguda Taluka, India*, Research Report 48, Sudhir Wanmali used survey data from 369 households in 10 villages in this district in Andhra Pradesh in his examination of these issues. The same district had been surveyed in 1968.

The study found that services were not used with the same frequency. The more frequently used services tended to be the closer ones. Of the 84 services studied, statistical analysis showed that for one-third neither income nor distance were significant in explaining use of the service. Most of these were food and personal services used more than 12 times a year, and they were widely available in the study region. For one-fourth of the services studied, income was a significant and positive determinant. These services, which were used less than 6 times a year, included consumer durables and services such as photography. Those who could afford them were able to overcome distance. For the remaining services, those used 6 to 12 times a year, both income and distance were significant; the greater the distance, the more negative the effect on use. Agroservices are a prime example in this category. As Table 3 shows, between 1968 and 1982 distances traveled to services were reduced and frequency of use increased.

Where distance reduces use, public intervention to increase accessibility may be worthwhile. Provision of mobile units, for example, could be cost effective. With mobile units, services such as credit and banking, animal husbandry, and marketing of agricultural produce could be provided when demand was heavy. Other services, such as communications, could be made available at regular intervals, perhaps on village market days.

Provision of services is linked to development in other ways. If service centers have the necessary transportation, banking, and credit facilities, more private retail services will locate there. Poorer farm households will benefit from an increase in employment opportunities and from better access to

Table 3
Distance from services and frequency of use of sample households, Miryalguda Taluka, India, 1968 and 1982

	(kilometers)		(times/year)	
Communications	12.2	7.9	4.0	5.0
Credit and banking	13.9	13.0	1.3	1.5
Transportation	2.6	1.5	14.0	20.0
Animal husbandry	9.3	8.2	3.2	8.1
Marketing of agricultural produce	7.7	6.1	100.0	120.0
Retail services	17.8	12.9	20.0	23.0

Source: Sudhir Wanmali, *Rural Household Use of Services: A Study of Miryalguda Taluka, India*, Research Report 48 (Washington, D.C.: International Food Policy Research Institute, 1985), p. 43.

production-oriented services. The increased availability of services and consumer goods will add to the quality of rural life, and the reduced costs in time and money spent in traveling longer distances to attain services could be spent more productively.

RESOURCE TRANSFERS IN THE NATIONAL ECONOMY

Economic growth requires increased capital investment, particularly in industry. Because agriculture accounts for so much of the national income in developing countries, it must provide the net capital necessary to the development of the other sectors of the economy. Historically this has been proved in Japan during the late 19th century when agricultural land taxes provided up to 70 percent of the central government's total revenues, and more recently in Taiwan, where, between 1911 and 1960, net capital transfers from agriculture were usually more than 25 percent of the total value of agricultural production annually. In addition, industrialization requires a substantial labor flow from rural to urban employment and this eventually leads to the need to provide more food to the growing urban populations and to improve the productivity of the reduced agricultural labor force.

IFPRI's work on these resource transfers—both capital and labor—includes a series of historical, quantitative studies of intersectoral resource flows that occur between agriculture and the rest of the economy during the process of economic growth. This research examines agriculture's contribution to the capital transfers necessary for development and the increased agricultural production necessary for growing urban populations. Past research focused on Japan, which through investment in agricultural infrastructure, research, and institutions in the early stages of its development was able to increase agricultural production and labor productivity as it became a middle-income country. Current research is examining development in Punjab, India and in Chile (the effect of exchange rate policy on the development of both the agricultural and nonagricultural sectors of the Chilean economy is discussed in the Trade section).

RESEARCH RESULTS

FOOD CONSUMPTION AND NUTRITION POLICY PROGRAM

The work of the Food Consumption and Nutrition Policy Program is firmly focused on low-income households. It examines the ways in which government policies affect real incomes, food consumption, and the nutrition of the poor. Although studies were undertaken in Asia and Latin America in 1985, the pressing needs in Sub-Saharan Africa stimulated extensive research activity in that region. A major portion of the Program's research was carried out in five policy areas: commercialization of semisubsistence agriculture, household food acquisition behavior, food price and subsidy policies, technological change, and seasonal fluctuations.

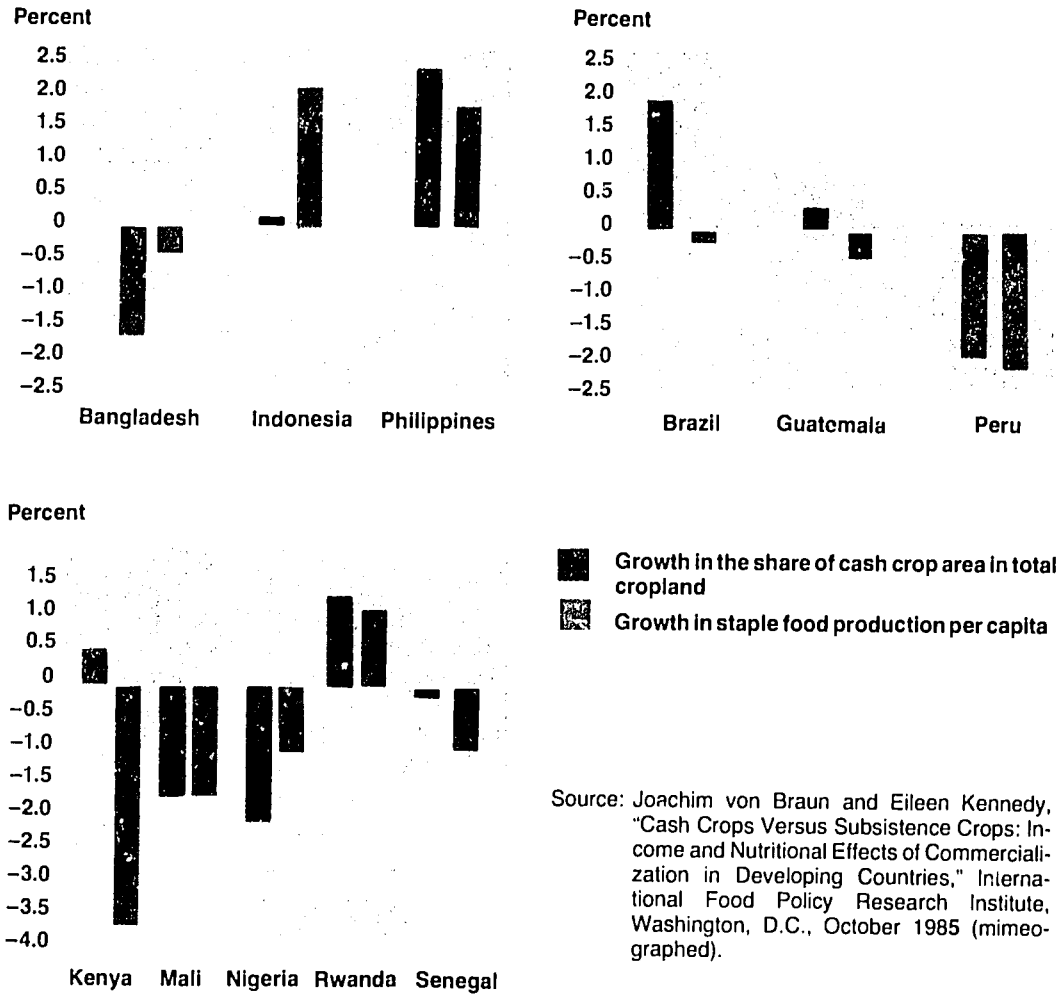
COMMERCIALIZATION OF SEMISUBSISTENCE AGRICULTURE

An increasing number of low-income countries, especially in Africa, are facing crucial strategic decisions on how to cope with food security problems. An important issue is the choice between policies that promote cash crop production for export or sale on the domestic market or those that encourage subsistence crop production. IFPRI research in 1985 studied the effects on income and nutrition of cash crops versus food crops and attempted to provide concepts for policies that enhance the positive effects of commercialization and avoid the adverse effects. Cash crop production may influence food availability at the national, rural community, or household levels. Whether national food availability is actually affected by export crop production depends on the degree of competition for scarce resources and how the foreign exchange earnings are used. IFPRI research indicates that in 28 of the 78 developing countries studied by IFPRI, more than 30 percent of cropped area was devoted to cash crops. The results also suggest that when area allocated to cash crops increases, per capita staple food production also increases (see Figure 9). Most countries combined growth in both cash crops and staple food crops or failed to have growth in either. Production of cash crops is decreasing in the poorer countries, particularly in Africa.

The study is also examining how increases in cash crop production affect increases in income and nutrition of households. The outcome depends on the size of the increase in real income and its distribution; which family member controls income; how time is allocated, especially mothers' time; nutritional knowledge; and health and sanitary factors. IFPRI's ongoing field research should shed light on these complex relationships.

With funding from the German Agency for Technical Cooperation (GTZ), the International Fund for Agricultural Development, the Danish International Development Agency (DANIDA), and the U.S. Agency for International Development, detailed surveys on agricultural production, consumption, and nutrition are being conducted at six sites in Africa, Asia, and Central America for analyzing the effects of cash cropping. These case studies, which were undertaken in collaboration with local institutions, include

Figure 9
Growth in production of cash crops and basic staple foods in selected developing countries, 1968-82



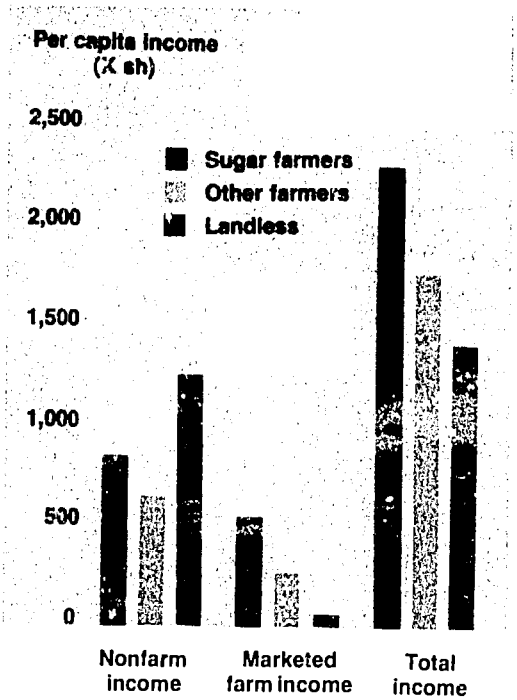
Source: Joachim von Braun and Eileen Kennedy, "Cash Crops Versus Subsistence Crops: Income and Nutritional Effects of Commercialization in Developing Countries," International Food Policy Research Institute, Washington, D.C., October 1985 (mimeographed).

analysis of the effects of dairy development schemes in Karnataka and Madhya Pradesh, India, and shifts from maize to sugarcane production in Kenya and the Philippines. In Gambia the effects on smallholders of a change from growing traditional swamp rice to high-yielding irrigated commercial rice are being analyzed, and in Rwanda, the effects on income, food consumption, and nutrition of growing tea and potatoes are being examined. In the Guatemalan highlands, research is examining the effects on income, employment, and nutrition of a project in which a small farmers' cooperative produces vegetables for export.

Preliminary results from Kenya indicate that the shift to sugarcane production has increased farmers' incomes (see Figure 10). But the nutritional status of children has not changed.

Finally, members of the research network of 13 countries formed at the end of 1984 to study the effects of commercialization of agriculture completed their proposals and began negotiations with potential funding agencies.

Figure 10
Annual per capita income of sugar farmers, other farmers, and the landless in South Nyanza, Kenya



Source: Based on survey data compiled by Eileen T. Kennedy and Bruce Cogill.

HOUSEHOLD FOOD ACQUISITION BEHAVIOR

Research on household food acquisition behavior is an integral part of many of the Program's studies. An understanding of how farmers make decisions about what crops to plant, whether crops will be sold or consumed by the family, and how food will be apportioned among household members is important in formulating policies. A study that will ultimately help the Pakistan government formulate policies for improving food security began by gathering rural data on decision-making in agricultural production and food consumption on semisubsistence farms. Parallel data will be collected on the consumption decisions of urban households and the landless rural poor.

Previous studies indicate that, at least in some cultures, the distribution of food among household members is substantially unequal in relation to the nutritional needs of individuals. Although a great deal is known about the factors that influence food consumption by households, little is known about the underlying determinants of the distribution of food among family members within a household.

Research in the Philippines found that allocation of food in the household is influenced by the economic opportunities available to women family members. This suggests that a policy that aims to increase income and employment opportunities for women will also increase their calorie shares. Changes in the allocation of their time may also affect the nutrition and health of family members.

Major changes are occurring in food consumption patterns. In developing countries, wheat consumption rose 2.3 percent per capita a year between the early 1960s and the late 1970s, while rice rose only 0.4 percent, and consumption of coarse grains, excluding maize, declined. Among the many reasons for these shifts is the increasing value of time—particularly that of women—in developing countries. Many traditional foods require long preparation time in the home. Therefore, as the opportunity cost of women's time increases, more processed foods, such as wheat bread, are consumed. A study in Sri Lanka of how increasing job opportunities for women affect food consumption shows that a 10 percent rise in the value of a woman's time as determined by what she can earn in the labor force causes bread consump-

tion to rise 1.3 percent and consumption of rice, the traditional grain, to decline 0.7 percent. Purchased bread saves time.

Other research on the Sri Lankan food stamp program focuses on the relationship between the source of income—food stamps, direct food transfers, or cash—and household spending behavior.

FOOD PRICE AND SUBSIDY POLICIES

Food subsidies have dominated the research agenda in recent years. Much of IFPRI's work in this area was completed in 1985, including studies for India, Colombia, Mexico, Egypt, and Brazil. Studies of price policies for maize in Zambia, food discount programs for rice and edible oil in the Philippines, food stamps in Sri Lanka, and a food-for-work project in Bangladesh continue.

INDIA

The first of two working papers published in 1985 as a part of a new series of working papers on food subsidies, *Some Aspects of Procurement and Distribution of Foodgrains in India,* by P. S. George, describes the development of India's extensive public procurement and distribution system, reviews its operations, and considers its effects; then it examines the operations of public foodgrain distribution in five states. George concludes that in 1980/81, if rationing had been abolished, the net cost to consumers would have been Rs 6.9 million, of which Rs 5.1 million would come from households with an annual income of less than Rs 3,600. In the short run, public distribution remains an important means of increasing the nutritional status of the poor although the cost-effectiveness of existing programs could be improved.

EGYPT

The second paper, *Food Subsidies and the Government Budget in Egypt,* by Grant M. Scobie, takes a broad approach in examining the evolution of public expenditures on subsidies in Egypt and their costs in light of political and economic changes. Scobie concludes that although the rise of per capita subsidies since 1974 has been unprecedented, overall public investment has risen faster than public consumption. The subsidies accomplish the stated policy goals: to stabilize consumption and to regulate agriculture by taxing or subsidizing it. However, costs are high—fiscal costs for consumer food subsidies accounted for 10-15 percent of total public expenditures in the second half of the 1970s and early 1980s. These subsidies influence the country's foreign exchange position, its ability to invest, its domestic inflation, and its agriculture in particular. Thus there is a constant tension between the economic and fiscal costs of the policies and their distributional benefits.

Based on IFPRI's earlier work, during 1985 the Egyptian government requested a comprehensive assessment of alternative policy options for coping with the fiscal problem of reducing food subsidies without burdening the poor. This assessment was undertaken with financial support from the Ford Foundation. If subsidized food prices stayed the same during the period 1981/82-1986/87, the food subsidy budget would increase by 44 percent in real terms (see Table 4). By 1986/87 it would require 12 percent of the total government budget. The foreign exchange needed for basic food imports would rise about 60 percent at a constant exchange rate.

The analysis shows that major fiscal savings may be obtained only by substantial modifications of the bread and flour price subsidy and the subsidies paid to customers of the cooperative shops (for example, for meat and poultry, and macaroni),

Table 4
Effects of different policies on food subsidy expenditures, Egypt, 1981/82 to 1986/87

		(percent)
Policies in 1981/82	. . .	10.1
Policies continued to 1986/87	44	12.2
All prices increased[a]	–25	6.8
All prices and public sector wages increased	–6	7.5
Subsidies targeted to poor	–28	5.8

Source: Harold Alderman and Joachim von Braun, "Egypt: Implications of Alternative Food Subsidy Policies in the 1980s," International Food Policy Research Institute, Washington, D.C., 1985 (mimeographed).

[a] Bread and flour prices would be increased 50 percent, other subsidized food prices would be raised to equal international prices.

or by targeting. Targeting could be very effective in reducing the costs of the system without serious negative effects on the poor.

The distribution of benefits from the subsidy system varies. Because the current system contains many components that distribute their benefits differently between urban and rural people and between rich and poor, program modification alters the distribution of benefits. Compensatory wage hikes for the public sector, for example, may make subsidy cuts politically more palatable, but they reduce the fiscal savings with only limited benefits to the poor. Furthermore, they increase urban-rural income disparities. Increased targeting of subsidies is most likely to reduce the costs of the system without adverse effects on the nutrition of the poor.

However, food subsidies are only one of many instruments used by the government to meet its diverse goals. Changes in other areas—for example, in energy pricing—could also greatly affect government deficit spending, economic growth, and, indirectly, food consumption.

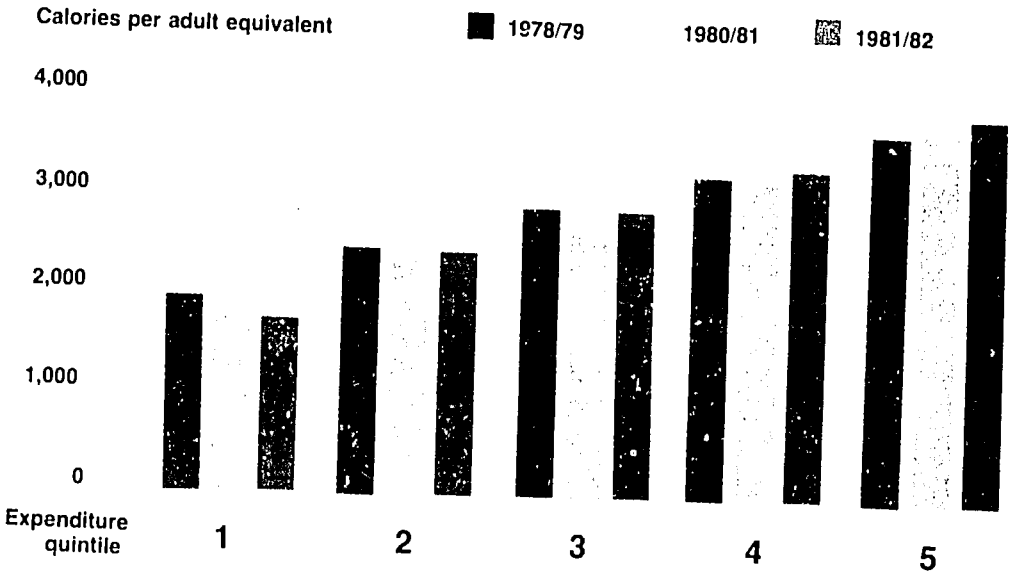
SRI LANKA

IFPRI's collaborative research with the Sri Lankan government funded by the U.S. Agency for International Development is assessing the effects of shifting from free and subsidized rations of certain foods to a food stamp program, with emphasis on the implications for current and future food subsidy policies.

Replacing food price subsidies and rice rationing with a food stamp scheme has resulted in substantial gross savings to the treasury. The cost of these programs has fallen from 15 percent to 5 percent of government expenditures. Net savings are less because public sector wages were increased to compensate for the reductions in the real value of the food stamps.

Preliminary research indicates that the lowest expenditure quintile experienced a steady decline in calorie consumption, in contrast to the highest expenditure quintile, whose calorie intake improved. The calorie consumption of the lowest expenditure quintile has declined by about 7 percent from an already low level of approximately 2,000 calories (see Figure 11).

Figure 11
Per capita calorie consumption by expenditure quintile, Sri Lanka, 1978/79, 1980/81, and 1981/82



Source: Based on calculations by David E. Sahn and Neville Edirisinghe.
Note: The 1st quintile is the poorest.

BANGLADESH

A study of the long-run effects of food-for-work projects in Bangladesh in collaboration with the Bangladesh Institute of Development Studies included an assessment of changes in seasonal food consumption and nutrition of people in nine project areas (see the Agricultural Growth Linkages Program section). Two to three years after completion of projects to create infrastructure for irrigation, drainage, and flood control, household incomes had increased for all income groups. Consumption of all major food groups was higher in the project areas than in control areas.

The dietary adequacy and nutrition of children was significantly better in the project than in the control areas even though there were indications that prior to the project the average nutritional status of the former may have been poorer (see Figure 12).

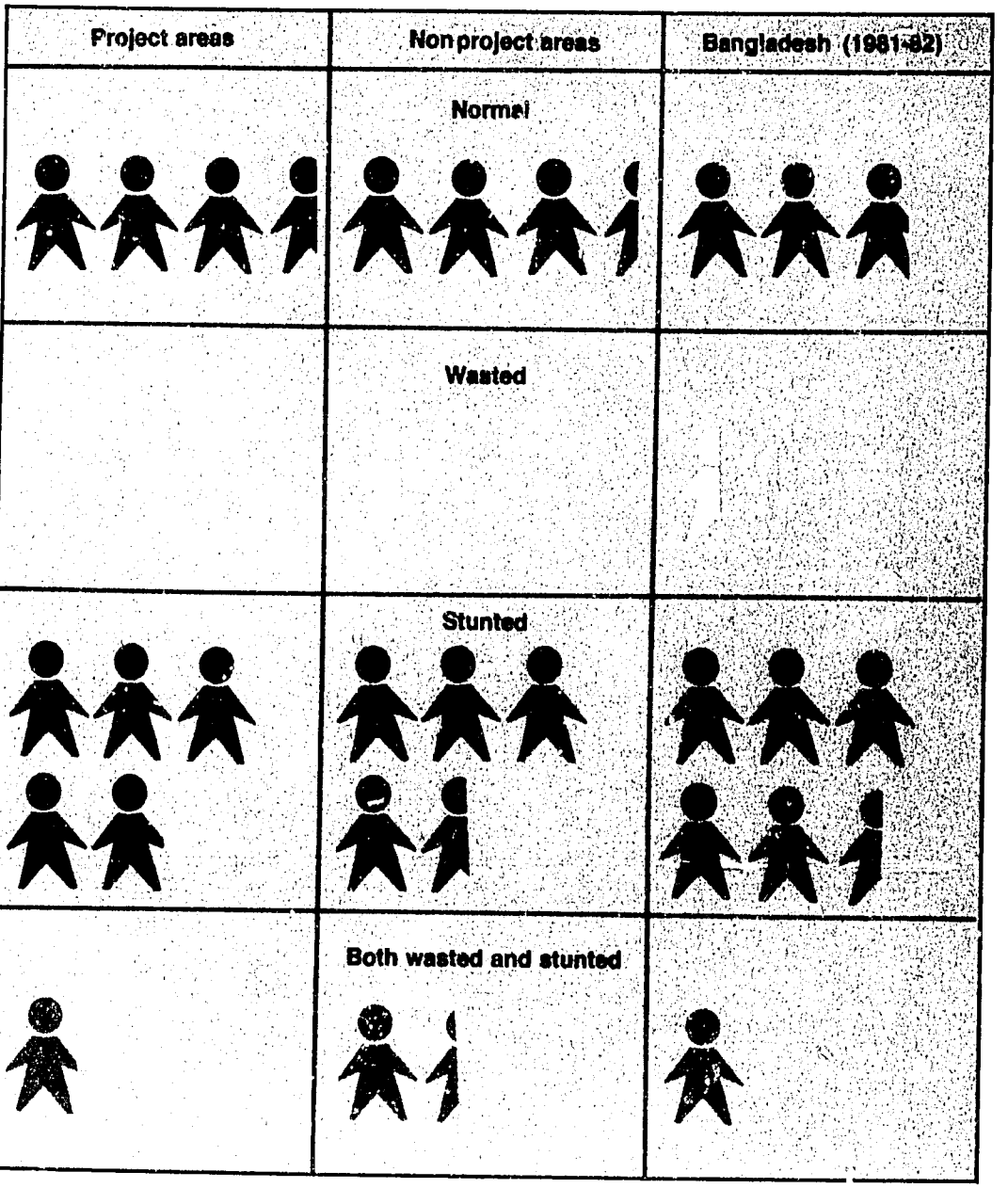
TECHNOLOGICAL CHANGE

How technological change contributes to improved nutrition is not well understood or documented. Questions exist in a number of areas. Does increased production translate into increased protein and calorie consumption for the poor? Are better quality foods substituted for poorer quality foods as production increases? Does the nutritional status of all income groups improve?

Research on the effect on consumption and nutrition of technological change in agriculture continued in Malaysia, India, and Colombia. In Muda, Malaysia, ongoing research indicates that technological change

Figure 12
Nutritional status of children in areas with and without food-for-work projects, Bangladesh, 1981-82

Each figure represents 10% of all children



Source: Based on data from Bangladesh Institute of Development Studies and International Food Policy Research Institute, *Final Report: Development Impact of the Food-for-Work Program in Bangladesh*, Summary—July 1985 (Washington, D.C.: IFPRI, 1985), p.79.

Note: The data were gathered in three rounds of seasonal observations. The children were between 6 months and 10 years old.

linked to an irrigation project has led to increased incomes, food expenditures, and calorie and protein consumption and has improved the nutritional status of preschool children. In North Arcot, India, comparisons of the diets of families before the introduction of the new varieties and after is being undertaken (also see the Agricultural Growth Linkages Program section). And in Colombia, increases in rice yields through the introduction of modern varieties during the last 15 years is being studied. Particular emphasis is being given to the calorie consumption of low-income consumers, producers, and landless laborers.

SEASONAL FLUCTUATIONS IN FOOD CONSUMPTION

In many developing countries, hunger is a seasonal phenomenon coinciding with the agricultural cycle and fluctuations in income, prices, food supply, and food demand. During 1985 analysis of the components of seasonal fluctuations continued. A major aspect of this was an IFPRI-sponsored workshop that brought together an interdisciplinary group of researchers, policymakers, and advisers to discuss what is known about the seasonal dimensions of hunger and malnutrition and what areas of the problem need further research (also see the Outreach section). The workshop participants noted that seasonal fluctuations are more troubling in Africa than in other parts of the world.

As a result of many factors, including general economic development, increased population pressures, and social change, many of the traditional methods of buffering seasonal fluctuations are breaking down. In addition, technological change and modernization has contributed to the abandonment of traditional patterns of cultivation, which, in the past, tended to smooth out seasonal food supplies and labor requirements. The participants agreed that there is a need for subsidy programs and employment guarantee schemes, such as food-for-work projects, to be seasonally targeted, credit opportunities expanded, and a need to improve policies related to on-farm storage and stockpiling, infrastructure, and promoting competitive markets in order to stabilize seasonal price variability. Agricultural research and extension should emphasize understanding seasonal constraints in the production system, and greater attention should be given to improving traditional methods of cultivation and enhancing the traditional food crops, such as roots and tubers and coarse grains.

INTERNATIONAL FOOD TRADE AND FOOD SECURITY PROGRAM

In most developing countries, where agriculture dominates their economies, trade and exchange rate policies affect the ability to meet food consumption needs, incentives for growth in food production, foreign exchange earnings from agriculture, and overall economic growth potential. The framework in which national trade policies are formulated is in turn affected by the trade behavior of other countries, including the role played in providing food aid, and world market conditions. Reflecting this, research undertaken in the International Food Trade and Food Security Program includes analyses of developing country trade and exchange rate policies and the international policy issues that influence them.

DEVELOPING COUNTRY POLICIES

During 1985, research on domestic policy issues focused on trade and exchange rate policies, policies that can greatly affect the agricultural sector through their influence on production incentives, employment opportunities, and general economic growth. Research focused on trade and exchange rate regimes in countries in Sub-Saharan Africa, Latin America, and Asia.

SUB-SAHARAN AFRICA

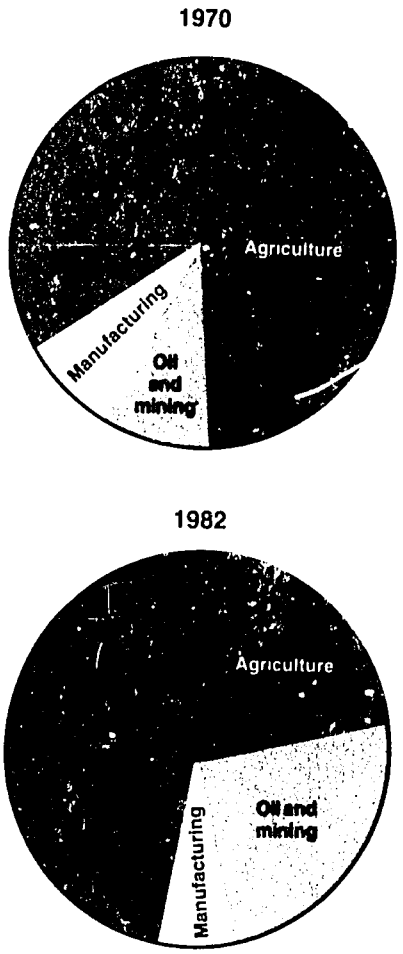
With funding from the International Development Research Centre, two projects examined the links between trade and exchange rate policies and agricultural performance in Africa. One examined these policies in Nigeria, which has shifted from being a net exporter of agricultural products in the early 1960s to being a net importer in the 1980s. Research results indicate that during this period of high overall economic growth, management of the high oil revenues had a disincentive effect on agriculture.

Some specific research results indicate that the structural changes in the economy brought about by the oil boom had an adverse effect on the output of nonoil tradables. Thus agriculture's contribution to total output declined from 48.8 percent in 1970 to 22.2 percent in 1982 (see Figure 13). Similarly, the share of manufacturing fell by 1.6 percentage points and the oil sector's share climbed by almost 15 percentage points. Changes in the sectoral levels of employment were most apparent in agriculture, where employment declined from 75.0 to 59.0 percent of the total, and in services, where employment increased from 9.8 to 22.9 percent of the total.

The study found that increasing the domestic price of industrial imports caused a drop in the relative domestic price of agricultural exports, and that export subsidies were insufficient to improve agricultural production incentives. The declines in agricultural output of 55 percent and in agricultural employment of 27 percent were shared equally by the food and export crop production sectors.

The second IDRC-funded study found that trade and exchange rate policies in Zaire also had a disincentive effect on agriculture which was manifested in heavy

Figure 13
Changes in output by sector in Nigeria, 1970 and 1982



Source: Computed from data in Nigeria, Federal Office of Statistics, *National Accounts of Nigeria* (Lagos: Federal Government Printer, 1978); and Nigeria, Federal Office of Statistics, *Economic and Social Statistics Bulletin* (Lagos: Federal Government Printer, 1984).

taxation of agricultural exports. The Zairean study also examined the competition between export and food crops.

Preliminary results indicate that during 1966-70, trade and exchange rate policies encouraged food and export crop production, which resulted in an expansion of annual output by 4.0 percent and 8.9 percent, respectively. In the 1971-82 period more restrictive policies lead to a deceleration in output, reducing annual rates of growth of food and export crops to 1.6 percent and 0.8 percent, respectively. Overall farm output decelerated from a 3.9 percent growth rate during the 1966-70 period to 0.8 percent in 1971-82. The policies of the later period discriminated against export crops more than they did against food crops, but the discrimination against both meant the loss incurred by the export crop sector was not offset by a production increase in the food crop sector.

LATIN AMERICA

Work continued on a study of the foreign trade regime of Peru, where the real exchange rate declined from 1960 until the mid-1970s. This decline has been largely the result of protective instruments that favored industry, which, combined with agricultural price policies, contributed to a deterioration of the incentives to agriculture. The result has been a declining performance of agricultural exports and a growing need for food imports. By the mid-1970s it became necessary to subsidize cereal imports because of rising international prices. These subsidies were then extended to domestic rice producers. As a result, home (nontraded) agricultural products became relatively more expensive and there has been a shift in the diets of Peruvians away from traditional foods to imported foods.

In addition, this study has examined the indirect effect of these policies on food consumption and income distribution. Results indicate that during the 1970s, the food consumption of the upper half of the income distribution of Lima was most positively affected. Food consumption of Lima's poor and the rural coastal dwellers was least affected by the industrial protection policies.

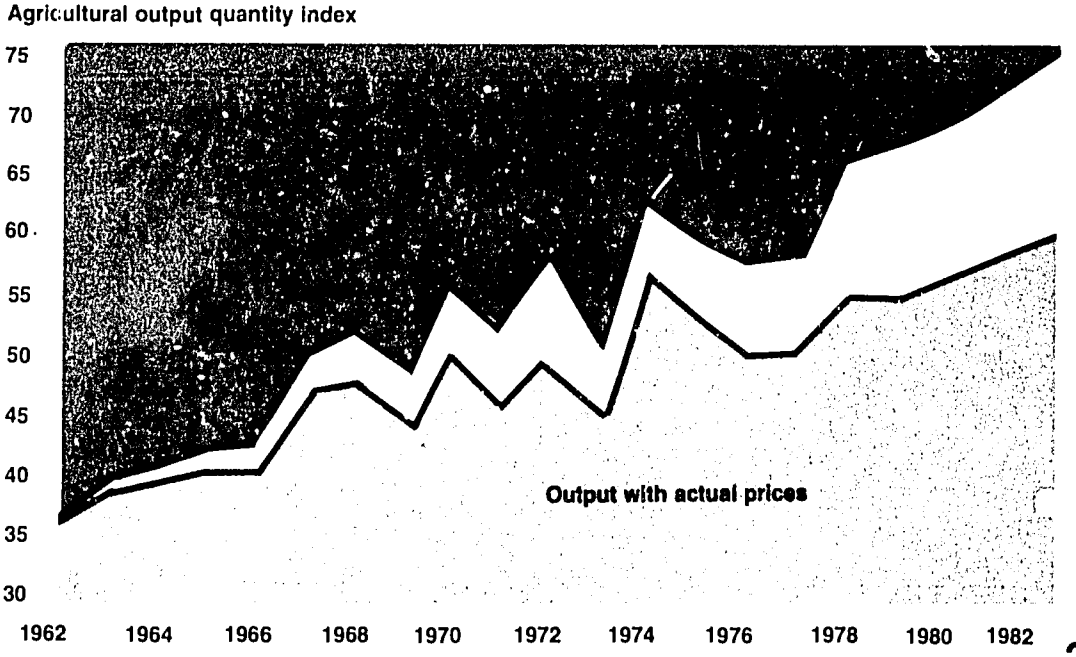
The growth of agriculture is determined by its ability to expand its resources

and improve their productivity. Ongoing work on Chile is investigating the competition between agriculture and other sectors of the economy. Agricultural growth depends on events that affect agriculture directly as well as those that affect other sectors of the economy.

A model of the Chilean economy was formulated that divides the economy into four productive sectors plus government. The productive sectors are agriculture, mining, manufacturing, and services. A migration function determines the allocation of labor between agriculture and the nonagricultural sectors using an approach in which wages are determined endogenously in both markets. Sectoral capital stocks are distributed over time according to the intersectoral allocation of total investment. This latter phenomenon is determined by differential rates of return, overall investment, and other exogenous variables that take into account public policy and institutional characteristics of the Chilean economy. Overall investment is determined by internal plus external savings. Because each productive sector has exportable, importable, and nontradable output, the sectoral price index depends on international prices valued at domestic currency, tariffs on imports (or subsidies on exports), and sectoral average cost of the nontradable components.

Preliminary empirical results indicate that rural-urban migration responds to differences in income and to employment conditions; sectoral allocation of investment reacts to expected differences in rates of return; urban real wages are affected, although slowly, by unemployment, thus implying a slow motion toward fuller employment; sectoral demands are sensitive to relative prices; employment demands and agricultural output are sensitive to relative prices (see Figure 14); and endogenous technical progress is important

Figure 14
Response of output to a 10 percent rise in agricultural prices, Chile, 1962-82



Source: Based on calculations by Yair Mundlak.

in the explanation of output changes. The model also evaluates the effects of the Chilean agrarian reform on agricultural output, of copper nationalization on investment flows, of quantitative import restrictions on the supply of machinery and the investment process, and of the direct or quantitative interventions of public policy on the economic system.

ASIA

Ongoing work in the Philippines is examining how the prices of major agricultural products have changed relative to the prices of nonagricultural and home goods and how trade and exchange rate policies have contributed to such changes. In addition, using a multisectoral model of the Philippine economy that emphasizes food and agriculture, research is under way to investigate the effects of changes in the foreign trade regime, including trade liberalization and reduced foreign borrowing, on the national economy.

The research examines how agricultural production and income would be affected by liberalization policies involving the correction of three common sources of domestic distortion in the Philippines and most developing countries: underpricing of food, overvaluation of the domestic currency, and taxation of export crops.

Results indicate that of the three liberalization policy instruments, raising food prices increases agricultural income by 4.3 percent, eliminating export taxes leads to an increase in agricultural income of 9.5 percent, and adjusting the exchange rate to the free trade value raises agricultural income by 10.2 percent. Thus an overall income improvement of 24 percent results from the removal of all three sources of domestic price distortions and resource reallocation without adding to the fixed inputs to agricultural crop production in the Philippines.

INTERNATIONAL POLICY ISSUES

International conditions greatly affect a developing country's choice of domestic trade policies. Fluctuating world prices and gaps in world food supplies affect the availability and affordability of food. Research is examining these conditions and how they affect the framework in which national policies are formulated. During 1985 research focused on food aid, regional food security, and agricultural protectionism.

FOOD AID

The costs of a country's cereal imports may rise either because it has to import a larger quantity to meet a shortfall in domestic production or because it has to pay higher prices for its imports. In either case, if it is not able to pay the larger cost involved, it might not be able to maintain average per capita foodgrain consumption. In order to deal with these problems, in 1981 the International Monetary Fund (IMF) established a Cereal Import Financing Scheme. Research is under way to examine the effectiveness of this scheme.

The IMF scheme was praised as an important, though not perfect, step in strengthening the international food security system. However, the scheme has been seldom used since its creation four years ago, even though the period has been one of acute food shortages in a number of developing countries that are members of the Fund. The study examines the factors responsible for the relatively small use of the Fund's resources under the scheme, including the economic environment affecting its cereal imports and the provisions of the scheme governing drawings. The research also examines the countries assisted by the scheme since 1981, the volume of assistance provided, and the repayment obligations incurred by

the beneficiary countries as a result of the drawing.

Two other studies on food aid were begun in 1985. One examines the role of food aid in Sub-Saharan Africa. The other looks at the use of dairy products as food aid in India.

Food aid to Sub-Saharan Africa has been increasing rapidly during the last 15 years, rising from 545,000 metric tons in 1970/71 to almost 2,315,000 metric tons in 1981/82. This reflects in part a shift in food aid away from countries in Asia, where food self-sufficiency has been achieved or food import needs can now be met through commercial purchases. The African food aid project has begun to analyze food aid in Cameroon, Kenya, Malawi, Senegal, and Tanzania, countries in which food aid has increased dramatically since the early 1970s (see Figure 15). Research is examining the levels and patterns of food aid, reviewing policies of donor countries and the recipients, and determining the effects of food aid on food imports, consumption, prices, and production. Two of the study countries—Cameroon and Malawi—have received low, but increasing amounts of food aid during recent years, while Kenya, Senegal, and Tanzania have received one-fourth of the aid to the region. As part of the research, the differences between these two groups of food aid recipients will be examined and quantified.

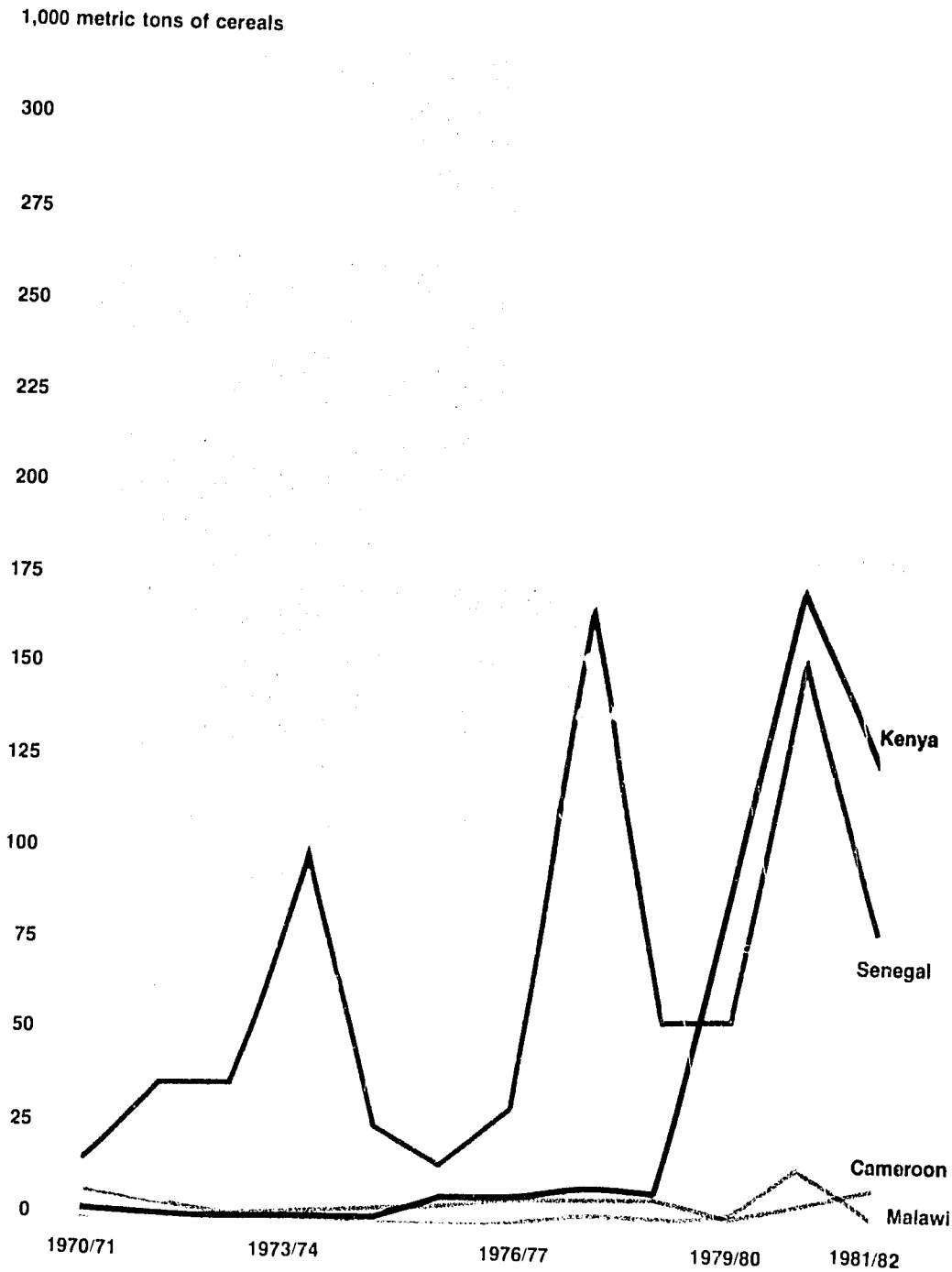
In India IFPRI is studying a program (known as Operation Flood) in which dairy products donated as food aid are processed and sold in metropolitan areas and the proceeds are used to promote dairy development throughout the country. Since its inception in June 1970, India has received more than 300,000 tons of skimmed milk powder and 100,000 tons of butter oil under the program. With the proceeds, facilities have been established for milk collection and processing and for distribution of milk and milk products. Also, veterinary services have been strengthened and production facilities for cattle feed expanded. By 1983, 26,500 village cooperative milk production societies, covering nearly 2.9 million farm families, had been set up. Affordable, pasteurized milk was being provided to more than 40 million people in 180 urban centers. These developments are reflected in an increase in domestic milk production from 20 million tons in 1970 to 35 million in 1982/83. Questions have arisen about the actual success of this scheme. Has it led to increased incomes and food consumption in the rural areas or has it increased income inequality, reduced milk consumption in rural areas, and impeded domestic milk production?

REGIONAL FOOD SECURITY

Another mechanism for improving food security in developing countries is regional cooperation. Research in this area focuses on the countries comprising the Southern African Development Coordination Conference (SADCC): Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe. Research examines how regional stockpiling could be effectively managed.

Results so far indicate that trade among the nine SADCC countries has been minimal, in 1981 totaling only U.S. $283 million with most of that trade coming from or going to Zimbabwe (see Figure 16) and that the potential for increasing trade is high. Three major benefits are anticipated. First, because cereal production fluctuates more within countries than regions, it would lead to increased stability of supply. Second, interregional trade would reduce the transportation costs associated with international trade. There are several commodities that are imported by one country in the region and exported by another. Reducing trade with countries overseas and increasing interregional trade could increase the competitiveness of agricultural production in the region. Third, a regional approach could facilitate

Figure 15
Food aid in selected African countries, 1970/71 to 1981/82



Source: Food and Agriculture Organization of the United Nations, *Food Aid in Figures* (Rome: FAO, 1983).

Figure 16
Total trade within southern Africa, 1981

Country	Exports to SADCC countries										Share of exports to SADCC in total exports
	Angola	Botswana	Lesotho	Malawi	Mozambique	Swaziland	Tanzania	Zambia	Zimbabwe	Total	
	(U.S. $ million)										(percent)
Angola											
Botswana	3				8			2	23	36	9
Lesotho											
Malawi		1			1				22	24	10
Mozambique	1			4		1	3		22	31	9
Swaziland					5				4	9	3
Tanzania					3			2		5	1
Zambia		1					3		36	40	4
Zimbabwe	3	42	2	21	16	2	2	51		139	10
Total intra-SADCC imports	7	44	2	25	33	3	8	55	107	284	

Source: Data from the Southern African Development Coordination Conference, cited in J. Hanlon, *SADCC: Progress, Projects, and Prospects, The Trade and Investment Future of the Southern African Development Coordination Conference,* The Economist Intelligence Unit, Special Report No. 182 (London: EIU, 1984), p. 68.

the economical development of an early warning system and improved transportation and storage facilities.

AGRICULTURAL PROTECTIONISM

Another influence on agricultural trade in the Third World is protectionism. The agricultural policies pursued by developed countries have strong influence on international markets for agricultural products. Their effect on developing countries can be great. In the past IFPRI research has focused on the effects of developed-country policies on such things as the export potential of developing countries. In *Determinants of Agricultural Policies in the United States and the European Community,* Research Report 51, Michel Petit examines the process through which agricultural policies in the United States and the European Community (EC) are formulated. He poses a number of questions: Why are policies what they are? How do policies evolve? Can the evolution of policies be projected? Two hypotheses are tested. One states that policies are the outcome of a dynamic process driven by conflicts of economic interest regulated by political institutions. The other suggests that in the long run, economic forces play a critical role in determining the evolution of agricultural policies, but only through the political process.

These hypotheses are examined by comparing the birth of commodity programs in the United States and France during the last 50 years. In addition, the study examines the current confrontation between the United States and the EC about international agricultural trade. The study points out that the stake of third parties, particularly developing countries, in this confrontation cannot be overstated because of the influence of the United States and the EC on world markets and suggests that monitoring policy is an important task of policy research.

OUTREACH

The effectiveness of IFPRI research depends on its ability to communicate to IFPRI's principal audience—policymakers and researchers in developing and developed countries—results that are relevant to key policy issues. This is achieved through a number of vehicles: its publications, its collaboration with institutions in developing countries and other centers in the CGIAR, and its workshops, seminars, and conferences.

IFPRI's close collaboration with researchers in national and international settings ensures that research is applicable to specific policy issues and facilitates the replication of results that is so important to their final acceptance. The interactions of IFPRI researchers with policymakers at workshops and conferences and in collaborative research enables IFPRI to better identify research priorities and areas of concern while strengthening institutional research capacity at the national level.

PUBLICATIONS

IFPRI communicates its rigorous analysis of national, regional, and global issues in food policy to its constituency through published research. The research report series is the major vehicle for transmitting methodological approaches, data analyses, and research findings; conclusions for policymakers are summarized in abstracts of these reports. A working paper series on food subsidies was initiated this year along with a book series published for IFPRI by The Johns Hopkins University Press. This latter series is intended to focus the expertise of researchers from IFPRI and other institutes on critical issues in food policy. Workshops will provide the basis for several of these books.

A complete list of publications for 1985 is provided in the following section. These publications were distributed through the mailing list and through special requests to about 13,000 individuals and organizations—1,000 more than last year—almost half of these being individuals, libraries, educational institutions, research organizations, and government agencies in the Third World. Efforts are continually made both to increase and consolidate the size of the audience in the Third World through surveys and special mailings. IFPRI also attempts to convey development issues to a more general audience through press releases and press briefings.

IFPRI continued to display publications at international meetings and book fairs in 1985, including exhibits in Bangkok, Brighton in England, Frankfurt, Harare, Malaga, and various cities in the United States.

COLLABORATION WITH CENTERS IN THE CGIAR

To help increase the effectiveness of the production, consumption, and trade of food in the Third World, IFPRI identifies policy changes that lead to the adoption of the new technologies developed by other centers in the CGIAR. IFPRI collaborates frequently with these centers by supplying data, engaging in problem identification, and conducting joint research.

During 1985 IFPRI carried out a wide range of collaborative activities with other centers in the system. These are listed below. More detailed descriptions of some of these projects are given in the sections dealing with IFPRI's five programs.

- IFPRI's examination of food problems in Southeast Asia with the International Rice Research Institute (IRRI) continued.

IFPRI is investigating the effect of investment in irrigation on rice production and farm income in Southeast Asia, the productivity of alternative investments in irrigation, and the aggregate requirements and allocation of investment funds for irrigation in Indonesia and the Philippines. IRRI is involved in the analysis of water management as it relates to this irrigation study.

Overall coordination of a project designed to assess the outlook for millet and sorgnum in West Africa is being provided by IFPRI. The other CGIAR center involved is the International Crops Research Institute for the Semi-Arid Tropics. The study is looking at the substitution in consumption of wheat and rice for traditionally grown millet and sorghum and the substitution in production of maize and rice. The magnitude, determinants, and consequences of these substitutions at the household level are being investigated.

IFPRI, along with the Centro Internacional de Agricultura Tropical (CIAT) and the International Institute of Tropical Agriculture (IITA), is studying the supply and demand prospects for cassava, with particular reference to its food and feed uses in the Third World. CIAT and IITA are focusing on a survey of cassava technology, while IFPRI is analyzing the price and yield levels that would make cassava profitable as food and feed.

In conjunction with the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), IFPRI has synthesized and systematized available data related to the agroecological zones for wheat production in the People's Republic of China. IFPRI continues to supply Chinese agricultural production data to other centers as well.

As part of IFPRI's research on the consumption and nutrition effects of technological change in agriculture, a study with CIAT is quantifying the nutritional implications of the diffusion of high-yielding semidwarf rice varieties in Colombia.

A researcher from the Centro Internacional de la Papa completed his study of potatoes in the tropics while on sabbatical leave at IFPRI. His research dealt partly with production and consumption trends of the crop.

IFPRI is collaborating with other centers in the CGIAR and outside organizations to develop an intercenter approach to the characterization of agroecological zones and the integration of socioeconomic and agroecological parameters in agricultural research programs.

Scientists from 10 of the 13 centers in the CGIAR participated in the workshop on increased variability in cereal yields. (See Seminars and Meetings below for details.)

COLLABORATION WITH INSTITUTIONS IN DEVELOPING COUNTRIES

Collaborating institutions in developing countries range from government agencies to universities, and IFPRI is thus able to interact with both decisionmakers and researchers on issues in policy design and analysis. This provides opportunities for both IFPRI and its collaborators to improve approaches to and develop appropriate frameworks for food policy analysis. Interaction allows research results to be incorporated into policy planning and it enhances the capacity for developing-country agricultural research systems to undertake studies in food policy. Additionally, collaboration creates an advisory capacity within a country, which helps governments translate broad, unprioritized agendas, such as currency devaluation, into specific policies that contribute to an overall strategy for development.

The wide range of analytical and methodological techniques employed in IFPRI's integrated approach to food policy research

allows collaborating researchers to further develop their professional skills in a variety of areas, including problem definition, project design, survey technique, and data analysis. IFPRI researchers also gain from this exchange as both national problems and the relationship of research to national problems come into focus. IFPRI can collaborate effectively in a wide variety of settings because the results of its research are generalizable—its approach is both location-specific and transnational.

Collaborative research covered a wide range of issues related to food policy. Collaborators included:

AFRICA

Burkina Faso

Centre d'Etudes, de Documentation, de Recherche Economique et Sociale, Ouagadougou, on research on the substitution in consumption of wheat and rice for traditionally grown millet and sorghum and the substitution in production of maize and rice.

Gambia

Ministry of Agriculture, Banjul, on a study of the implications for economic and nutrition-related programs and policy of increased commercialization of semisubsistence agriculture in Gambia.

Ivory Coast

Centre Ivorien de Recherches Economiques et Sociales, Abidjan, on research on the substitution in consumption of wheat and rice for traditionally grown millet and sorghum and the substitution in production of maize and rice.

Kenya

Kenyatta University, Nairobi, and the National Council for Science and Technology, Nairobi, on research on the effects on food consumption and nutrition of shifts from semisubsistence maize to commercialized sugarcane production in Kenya.

Nigeria

University of Ibadan, Ibadan, on research on the incidence of trade and exchange rate policies on production incentives, growth, and employment in agriculture, with an emphasis on the effects of the oil sector, and research on the trade-offs between expanding food exports and pursuing food security.

Rwanda

Ministry of Agriculture, Kigali, on research on the implications for economic and nutrition-related programs and policy of increased commercialization of semisubsistence agriculture in Rwanda.

Senegal

Institut Sénégalais de Recherches Agricoles, Dakar, on research on the substitution in consumption of wheat and rice for traditionally grown millet and sorghum and the substitution in production of maize and rice.

Zambia

Eastern Province Agricultural Development Project, Chipata, on a study of the effects of technological change in agriculture on rural welfare and the impact of rural infrastructure on agricultural development in Zambia.

National Food and Nutrition Commission, Lusaka, on a study of the effects of technological change in agriculture on rural welfare and research on the food consumption and nutrition implications of maize price and marketing policies in Zambia.

Rural Development Studies Bureau of the University of Zambia, Lusaka, on a study of the effects of technological change in agriculture on rural welfare and the impact of rural infrastructure on agricultural development in Zambia and an investigation of the food consumption and nutrition implications of maize price and marketing policies in Zambia.

ASIA

Bangladesh

Bangladesh Institute of Development Studies, Dhaka, on a study cf fertilizer pricing policy and foodgrain production strategy for the Bangladesh Ministry of Agriculture and research on the food consumption and nutrition effects of a food-for-work program in Bangladesh.

Bangladesh Rice Research Institute, Dhaka, on a study of fertilizer pricing policy and foodgrain production strategy for the Bangladesh Ministry of Agriculture.

People's Republic of China

Chinese Academy of Agricultural Sciences (CAAS), Beijing, on research with a visiting scholar from CAAS on various aspects of Chinese agriculture, including the agroclimatic delineation of Chinese wheat zones and the variability in Chinese cereal production.

India

Centre for Development Studies, Trivandrum, on a study of some aspects of procurement and distribution of foodgrains in India.

Indian Institute of Management, Ahmedabad, on research on fertilizer pricing policy and foodgrain production strategy for the Bangladesh Ministry of Agriculture in addition to analysis of the forces governing fertilizer use in other Asian countries.

Tamil Nadu Agricultural University, Coimbatore, on research on the effects of technological change in agriculture on rural welfare and on the role of marketing and service facilities in rural development in North Arcot district in the state of Tamil Nadu.

Indonesia

Badan Urusan Logistik, Jakarta, on an analysis of working stock requirements for Indonesian rice as a part of the Rice Policies in Southeast Asia Project.

Center for Agro-Economic Research, Bogor, on an investigation of food demand and supply prospects for Indonesia in relation to agricultural policies and strategies such as irrigation development.

Nepal

Agricultural Projects Services Centre of the Government of Nepal, Kathmandu, on an investigation of the ways in which the depletion of forests, which provide wood as cooking fuel, influences time allocation, nutrition, and agricultural productivity in the hill areas of Nepal.

Pakistan

Applied Economic Research Centre, Karachi, Centre for Applied Economic Studies, Peshawar, Pakistan Institute of Developmental Economics, Islamabad, and the Punjab Economic Research Institute, Lahore, on research to formulate and assess policies related to food security and human nutrition at the household level in urban and rural areas in Pakistan.

University of Lahore, Lahore, on a study of approaches to short-run food supply management and food security in Pakistan.

Philippines

Ministry of Agriculture, Manila, on an analysis of the nutritional implications of selected food and agricultural policies in the Philippines.

National Nutrition Council, Manila, on a pilot study of food price discount programs in the Philippines.

University of the Philippines, Los Baños, on an investigation of food demand and supply prospects for the Philippines in relation to agricultural policies and strategies such as irrigation development.

Xavier University, Cagayan de Oro, on a study of the food consumption and nutrition effects of the shift from semi-subsistence maize to commercialized sugarcane production in the Philippines.

Sri Lanka

Ministry of Plan Implementation, Colombo, on an investigation of the effect of the Sri Lankan food stamp program on the real income, food consumption, and nutritional status of low-income people.

Thailand

Kasetsart University, Bangkok, and Thammasat University, Bangkok, on a study of the equity and income distribution effects of irrigation in Thailand.

Thailand Development Research Institute, Bangkok, on a study of the relationships that exist between and along the growth paths of agriculture and the rest of the economy in Thailand.

LATIN AMERICA

Argentina

Fundación Mediterránea, Cordoba, on a study of the relationships that exist between and along the growth paths of agriculture and the rest of the economy in Argentina.

Brazil

Empresa Brasileira de Pesquisa Agropecuária. Brasilia, on a study of the forces influencing the adoption and diffusion of modern agricultural practices in Brazil.

Chile

Pontificia Universidad Católica de Chile, Santiago, on a study of the relationships that exist between and along the growth paths of agriculture and the rest of the Chilean economy, and research on the effects of technological change in rice production on calorie consumption by low-income households in Colombia.

Colombia

Agricultural Farmers Association (SAC), Bogota, on research on the incidence of trade and exchange rate policies on production incentives, growth, and employment in agriculture in Colombia.

Ministry of Planning, Bogota, on a study of the food stamp program in Colombia.

Guatemala

Institute of Nutrition of Central America and Panama, Guatemala City, on an investigation of the implications for economic and nutrition-related programs and policy of increased commercialization of semisubsistence agriculture in Guatemala.

Mexico

Centro de Estudios Económicos, El Colegio de México, Mexico City, on an investigation of the various subsidy programs in Mexico and their fiscal costs, benefits, and the distribution of benefits among population groups.

MIDDLE EAST

Egypt

Institute of National Planning, Cairo, on a study of the effects of potential changes in Egyptian food subsidy policies.

SEMINARS AND MEETINGS

During 1985 IFPRI brought together policymakers, analysts, and researchers from developing countries to join IFPRI researchers in workshops, seminars, and conferences. These meetings provided the opportunity to disseminate research results directly and to elicit the views of those involved in the policy process on future priorities for research. In addition, a long-term plan was developed for future policy seminars in the areas of trade and exchange rate policy, agricultural commercialization, changing food patterns in West Africa, fertilizer use in Eastern and Southern Africa, key food policy issues in Sub-Saharan Africa, agricultural research

and transfer of technology, and irrigation development in Asia and Africa. Three major workshops and a number of seminars were held during the year.

POLITICAL ECONOMY OF NUTRITION

Nutritional goals are shaped by various actors in the policy process, including national government agencies, regional and local institutions, food producers, suppliers, and marketing agents, and consuming households. However, relatively little is known about the effect these often conflicting interests have on the design and operation of nutrition programs. In order to examine the political and economic factors influencing the design and implementation of nutrition policies in developing countries and how these factors could be better integrated into policy analysis and decision-making, IFPRI sponsored a workshop on "The Political Economy of Nutrition Improvements" held June 10-13. The workshop, held in Berkeley Springs, West Virginia, was sponsored in collaboration with the United Nations Development Programme and the United Nations University, and attended by researchers from institutions in Africa, Asia, South America, Europe, and North America.

Workshop participants reviewed the nutrition program experiences of a number of countries and considered the political and economic conflicts and trade-offs that contribute to formulation of nutritional, agricultural, and other national goals; the effect of local institutions and power structures on the demand for and distribution of benefits from nutrition-related policies and programs; and the compatibility of household behavior and government preferences in meeting nutritional goals. Case studies were presented and analyzed on food stamp programs in Sri Lanka, Colombia, and the United States; national nutrition programs in the Philippines and Chile; food policy issues in Tanzania; and the role of the local power structure in Egypt. The group suggested that the probability of success in improving nutrition increases as policymakers and administrators take into account the behavior, goals, and pressures of the most important interest groups. In-depth analyses are needed to find better ways of integrating these political and economic considerations in the design and management of nutrition programs.

VARIABILITY IN CEREAL YIELDS

"Sources of Increased Variability in Cereal Yields: Consequences for Agricultural Research and Policy" was the topic of a second workshop held November 26-29, cosponsored by IFPRI and the German Foundation for International Development (DSE) in Feldafing, Federal Republic of Germany (also see the Food Production Policy Program section). Many countries have achieved impressive rates of growth in national foodgrain production in recent decades, much of which can be attributed to new technologies and the increased use of modern inputs, such as fertilizers. At the same time, the variability of national foodgrain production around trend often has increased as measured by the variance or the coefficient of variation of production. This increased variability is reflected in increased market and price instability, which poses difficult problems for farmers and poor consumers alike. It also increases the size of emergency food stocks that a government must carry. The workshop dealt with a range of issues associated with this problem. A set of empirical studies were prepared to document the nature of changing patterns of yield variability for different cereals in various regions, examining alternative approaches that can be taken to reduce yield variability. Papers dealt with the relationship between changes in yield variability and yield correlations and such causal factors as changes in agricultural technologies, weather, irrigation, input availability, and farming systems.

The meeting brought together prominent biologists, economists, and scientists from the CGIAR centers, national research programs, and the private sector to discuss if the new agricultural technologies are an important source of increased cereal yield variability at the farm and national levels and, if so, what the implications are for the agricultural research and policymaking communities.

SEASONAL FOOD FLUCTUATIONS

In a third workshop, which was held December 10-13, an interdisciplinary group of researchers, policymakers, and advisers met to discuss "Seasonal Causes of Household Food Insecurity" and to develop guidelines for designing policies and programs to alleviate the adverse consequences of seasonal fluctuations in employment, income, and consumption. The group also identified research priorities to improve existing systems for dealing with rural household food insecurity.

The workshop, cosponsored by the Food and Agriculture Organization of the United Nations and the U.S. Agency for International Development, was held in Annapolis, Maryland, and attended by researchers, policy advisers, and program administrators from Africa, Asia, Europe, and North America.

The discussion focused on the problems associated with seasonal hunger and the strategies for dealing with it at the household, community, and governmental levels. Participants identified ways of measuring the effects of seasonal hunger and discussed the causes, control, and implications of seasonal malnutrition. The group examined ways in which the adverse consequences of seasonal patterns of work, income, and consumption might be mitigated.

Because many of the traditional mechanisms to buffer seasonality are breaking down as a result of economic growth, social change, and population pressures, there is a need for greater sensitivity to potentially adverse effects of the development process on household- and community-level strategies for coping with seasonal food stress. The role of targeted interventions such as employment guarantee schemes and food-for-work programs to reduce seasonal troughs in employment was emphasized, as was the need to make credit available at a fair price so that households can inexpensively adjust consumption expenditures to seasonal needs. The effects of technological change in agriculture on seasonal food insecurity and the effect of seasonal constraints on the adoption of new technology were also discussed. Emphasis was placed on the need to take into account how seasonal labor shortages affect the process of technological change and how inherent seasonal patterns in agriculture result in periods of heightened food stress and nutritional risk. Improving the productivity of traditional farming practices and food crops, particularly in the African context where the problem of seasonality is most pronounced, was considered to be of vital importance for reducing seasonal food insecurity.

SEMINARS

IFPRI's in-house seminar program serves the Washington, D.C. area's network of research and policymaking institutions concerned with food policy. These meetings typically involve researchers, administrators, and visiting officials from developing countries in informal discussions of the results and policy implications of IFPRI research. Seminars are also occasionally given by guest speakers. In 1985, 21 seminars were held on such topics as differential levels of agricultural prices and protection in developed and developing countries, agricultural adjustment problems in Japan's economic development, and aggregate agricultural research priority assessment.

PUBLICATIONS AND PAPERS

RESEARCH REPORT AND ABSTRACT SERIES

Research Report 48
Rural Household Use of Services: A Study of Miryalguda Taluka, India, by Sudhir Wanmali, March 1985.

Research Report 49
Livestock Products in the Third World: Past Trends and Projections to 1990 and 2000, by J. S. Sarma and Patrick Yeung, April 1985.

Research Report 50
Government Expenditures on Agriculture and Agricultural Growth in Latin America, by Victor J. Elías, October 1985.

Research Report 51
Determinants of Agricultural Policies in the United States and the European Community, by Michel Petit, November 1985.

IFPRI Abstract, the four-page policy summaries of the research reports, are published in English, French, and Spanish.

OTHER SERIES

Food Policy Statements

Number 2
The Changing World Food Situation, by John W. Mellor, January 1985.

Number 3
Agricultural Change and Rural Poverty, by John W. Mellor, October 1985.

Number 4
The Role of Government and New Agricultural Technologies, by John W. Mellor, November 1985.

Number 5
Is There a Role for Crop Insurance in Agricultural Development?, by Peter Hazell and Alberto Valdés, December 1985.

Working Papers on Food Subsidies

Number 1
Some Aspects of Procurement and Distribution of Foodgrains in India, by P. S. George, August 1985.

Number 2
Food Subsidies and the Government Budget in Egypt, by Grant M. Scobie, November 1985.

Rice Policies in Southeast Asia Project, Working Papers

Number 10
An Analysis of Working Stock Requirements for Indonesian Rice, by Anas Rachman, Yogana Prasta, and Sakrani, August 1985.

IFPRI Reports

The newsletter, *IFPRI Report*, is published three times a year in English, French, and Spanish.

GENERAL INFORMATION

Senior Research Staff 1985, June 1985.

A Review: 1979-84 (Excerpts from the Report of the External Program Review of the International Food Policy Research Institute)

Information Packet—this contains brochures in English, with translations of some items into French and Spanish, on the following areas:

The International Food Policy Research Institute

The International Food Policy Research Institute and Sub-Saharan Africa

Nutrition-Related Research and the International Food Policy Research Institute

OTHER PUBLICATIONS

Administering Food Producer Prices in Africa: Lessons from International Experiences, by Ojetunji Aboyade, December 1985.

Reprints

Adams, Richard H., Jr. "Development and Structural Change in Rural Egypt, 1952 to 1982." Reprinted from *World Development* 13 (No. 6, 1985): 705-723.

Delgado, Christopher L. (With Mathurin Gbetibouo.) "Lessons and Constraints of Export Crop-Led Growth: Cocoa in Ivory Coast." Reprinted from *The Political Economy of Ivory Coast*, pp. 115-147. Edited by I. William Zartman and Christopher L. Delgado. New York: Praeger, 1984.

Delgado, Christopher L. (With John W. Mellor.) "A Structural View of Policy Issues in African Agricultural Development." Reprinted from the *American Journal of Agricultural Economics* 66 (December 1984): 665-670.

Delgado, Christopher L. (With Cornelia P. J. Miller.) "Changing Food Patterns in West Africa: Implications for Policy Research." Reprinted from *Food Policy* 10 (February 1985): 55-62.

Ezekiel, Hannan. "India's Food Surplus." Three articles reprinted from *The Economic Times* (Bombay), October 31-November 2, 1984.

Gonzales, Leonardo A. "An Economic Perspective of Crop Diversification in Rainfed Areas: Implications to National and Regional Planning." Reprinted from *The Philippine Journal of Crop Science* 9 (No. 2, 1984): 89-100.

Hazell, Peter. "Sources of Increased Variability in World Cereal Production Since the 1960s." Reprinted from the *Journal of Agricultural Economics* 36 (May 1985): 145-159.

Mellor, John W. "Food Aid: Reflections on a Decade of Action." Reprinted from *Food and Nutrition* 10 (No. 1, 1984): 91-104.

Oram, Peter A. "Sensitivity of Agricultural Production to Climatic Change." Reprinted from *Climatic Change* 7 (1985): 129-152.

Paulino, Leonardo. (With John W. Mellor.) "The Food Situation in Developing Countries: Two Decades in Review." Reprinted from *Food Policy* 9 (November 1984): 291-303.

Pinstrup-Andersen, Per. (With Peter Hazell.) "The Impact of the Green Revolution and Prospects for the Future." Reprinted from *Food Reviews International* 1 (No. 1, 1985): 1-25.

Pinstrup-Andersen, Per. (With Shubh K. Kumar.) "Food Policy, Human Nutrition, and Fertility." Reprinted from *Rural Development and Human Fertility*, pp. 235-251. Edited by Wayne A. Schutjer and C. Shannon Stokes. New York: Macmillan, 1984.

Sahn, David E. "Methods for Evaluating the Nutritional Impact of Food Aid Projects: Lessons from Past Experience." Reprinted from *Food and Nutrition Bulletin* 6 (September 1984). 1-16.

Stone, Bruce. "The Basis for Chinese Agricultural Growth in the 1980s and 1990s: A Comment on Document No. 1, 1984." Reprinted from *The China Quarterly* (March 1985): 114-121.

Valdés, Alberto. "Trade in Agricultural Products Between Developing Countries: Latin America Exports During 1962-1979." Reprinted from *Materie Prime* 3 (June 1984): 96-107.

IFPRI/The Johns Hopkins University Press Books

Agricultural Change and Rural Poverty: Variations on a Theme by Dharm Narain, edited by John W. Mellor and Gunvant Desai (Baltimore: The Johns Hopkins University Press for IFPRI); $24.95.

In India the book is published by and available from Oxford University Press, New Delhi.

SPECIAL REPORTS

Developmental Impact of the Food-for-Work Program in Bangladesh, Summary and Technical Papers. 2 vols. Submitted to the World Food Programme by IFPRI and the Bangladesh Institute of Development Studies. July 1985.

Fertilizer Pricing Policy and Foodgrain Production Strategy in Bangladesh, Summary and Technical Reports. 2 vols. Prepared for the Bangladesh Ministry of Agriculture by the IFPRI/Bangladesh Institute of Development Studies Joint Team. February 1985.

Meat Supply and Demand in Developing Countries: Past Trends and Projections to 2000. Prepared by J. S. Sarma for the Ralston Purina Co. April 1985.

OTHER PUBLISHED WORKS BY IFPRI STAFF

Bautista, Romeo. "Does Increasing Agricultural Exports Raise Income Instability?" *Philippine Review of Economics and Business* 22 (September/December 1985).

———. "Effects of Trade and Exchange Rate Policies on Export Production Incentives in Philippine Agriculture." *Philippine Economic Journal* 24 (No. 3, 1985).

———. "The Recent Recession and Rising Protectionism in Developed Countries: Some Thoughts on the ASEAN Economies." *Journal of Philippine Development* 20 (Second Semester, 1985).

Delgado, Christopher L. "Statistical Significance of Indicators of Efficiency and Incentives: Examples from West African Agriculture." *American Journal of Agricultural Economics* 67 (November 1985).

Garcia, Marito. (With John Mason et al.) "Nutritional Considerations in Project Planning." *Food Policy* 10 (May 1985): 109-122.

Gonzales, Leonardo A. "Philippine Tilapia Marketing in the Context of Structural Demand for Protein: A Comment." In *Philippine Tilapia Economics*, pp. 232-237. Edited by I. R. Smith, E. B. Torres, and E. O. Tan. Los Baños and Manila: Philippine Council for Agriculture and Resources Research and Development and International Center for Living Aquatic Resources Management, 1985.

Kennedy, Eileen. (With Harold Alderman.) *Comparative Analysis of the Nutritional Effectiveness of Select Interventions*. Joint Nutrition Surveillance Program Working Paper. New York: UNICEF, 1985.

Kennedy, Eileen. (With Odin Knudsen.) "A Review of Supplementary Feeding Programs and Recommendations on Their Design." In *Nutrition and Development*. Edited by Margaret Biswas and Per Pinstrup-Andersen. Oxford: Oxford University Press, 1985.

Kumar, Shubh. "Analysis by Gender: A Context for Planners." *Horizons* 4 (Summer 1985).

———. "User Perspective in IFPRI Research: Relevance to Agricultural Technology and Women as Users." In *Women and Agricultural Technology: Relevance for Research, Report of a Seminar*. New York and The Hague: Rockefeller Foundation and the International Service for National Agricultural Research, 1985.

———. "Women in Agriculture in Sub-Saharan Africa: Implications for Agricultural Research and Technology." In *Women and Agricultural Technology: Relevance for Research, Report of a Seminar*. New York and The Hague: Rockefeller Foundation and the International Service for National Agricultural Research, 1985.

Mellor, John W. "Review of Gustav Ranis et al., eds., *Comparative Development Perspectives: Essays in Honor of Lloyd G. Reynolds.*" *Journal of Economic Literature* 23 (March 1985).

———. "Review of Jane Jacobs, *Cities and the Wealth of Nations—Principles of Economic Life.*" *Environment* 27 (April 1985).

Mundlak, Yair. *The Aggregate Agricultural Supply*. Working Paper 8511. Rehovot: Rehovot Center for Agricultural Economic Research, 1985.

———. *Agricultural Growth and the Price of Food*. Working Paper 8505. Rehovot: Rehovot Center for Agricultural Economic Research, 1985.

Mundlak, Yair. (With H. Binswanger, M. C. Yang, and A. Bowers.) *Estimation of Aggregate Agricultural Supply Response*. Agricultural Research Unit Discussion Paper 848. Washington, D.C.: World Bank, 1985.

Oram, Peter. "Agricultural Research and Extension: Issues of Public Expenditure." In *Recurrent Costs and Agricultural Development*. Edited by John Howell. London: Overseas Development Institute, 1985.

Pinstrup-Andersen, Per. "Food Prices and the Poor in Developing Countries." *European Review of Agricultural Economics* 12 (Nos. 1/2, 1985).

———. "Nutrition and Research." *The IDRC Reports*, Vol. 14, No. 2, July 1985.

Pinstrup-Andersen, Per, ed. (With Margaret Biswas.) *Nutrition and Development*. Oxford: Oxford University Press, 1985.

Ranade, C. G. (With D. P. Mathur, K. Rangarajan, and V. K. Gupta.) *Performance of Integrated Dairy Cooperatives in India*. Ahmedabad, India: Indian Institute of Management, 1985.

Rosegrant, Mark. (With James A. Roumasset and Arsenio M. Balisacan.) "Biological Technology and Agricultural Policy: An Assessment of Azolla in Philippine Rice Production." *American Journal of Agricultural Economics* 67 (November 1985): 726-732.

Rosegrant, Mark. (With James A. Roumasset.) "The Effect of Fertiliser on Risk: A Heteroskedastic Production Function With Measurable Stochastic Inputs." *Australian Journal of Agricultural Economics* 29 (August 1985).

Stone, Bruce. "Chinese Fertilizer Application in the 1980s and 1990s: Issues of Growth, Balance, Allocation, Efficiency and Response." In *China's Economy in the Eighties*, pp. 452-495. Edited by the U.S. Congress Joint Economic Committee. Washington, D.C.: Government Printing Office, 1985.

____. "Review of Kenneth R. Walker, *Food Grain Consumption and Procurement in China* and Elisabeth Croll, *The Family Rice Bowl: Food and Domestic Economy in China.*" *Pacific Affairs* 58 (Spring 1985): 115-117.

____. "Tyuugoku-Banguradessyu no Nogyo Mondai: Hiryo Seisaku no Hikaku Kenkyuu." *Shokuryo Seisaku Kenkyuu Kuotarii* 44 (No. 4, 1985): 6-43.

Valdés, Alberto. "Estructura y Tendencias en la Producción, Consumo y Comercio Exterior de Productos Agrícolas en América Latina." In *Fortalecimiento de la Investigación Agrícola en América Latina y el Caribe.* Proceedings of a conference organized by the Centro Internacional de Mejoramiento de Maiz y Trigo and the Inter-American Development Bank. Mexico City: CIMMYT, 1985.

Wanmali, Sudhir. "Service Provision and Service Centers: Lessons from Miryalguda." In *Geography and Planning: Essays in Honor of V. L. S. Prakasa Rao*, pp. 189-219. Edited by K. V. Sundaram. New Delhi: Concept, 1985.

PAPERS PRESENTED BY IFPRI STAFF

Alderman, Harold. (With Joachim von Braun.) "Fiscal and Macro-Economic Effects of Alternative Food Subsidy Policies." Paper presented at a seminar on the Implications of Alternative Food Subsidy Policies in the 1980s, Institute of National Planning, Cairo, February 12, 1985.

Bautista, Romeo. "Effects of Trade and Agricultural Policies in a Multisectoral Model for the Philippines." Paper presented at a seminar at the Economic Growth Center, Yale University, New Haven, February 25, 1985.

____. "Effects of Trade and Exchange Rate Policies on Export Production Incentives in Philippine Agriculture." Paper presented at a workshop on Trade and Growth in Pacific Asia, Center for Pacific Asia Studies, Stockholm University, Stockholm, April 16-17, 1985.

____. "Instability in Food and Export Crop Income: The Philippine Case." Paper presented at the 19th International Conference of Agricultural Economists, Malaga, Spain, August 26-September 4, 1985.

____. "Recent External Disturbances and the ASEAN Economy." Paper presented at a Southeast Asia Program Seminar, Cornell University, Ithaca, April 11, 1985.

Delgado, Christopher L. "The Influence of Relative Prices on the Substitution of Imported for Domestic Cereals in West Africa: Survey of the Evidence." Paper presented at the internal project workshop on The Changing Role of Coarse Grains in SAT West Africa, organized by CEDRES, IFPRI, ICRISAT, CIRAD, CIRES, and ISRA, Ouagadougou, June 25-27, 1985.

Gonzales, Leonardo A. (With N. D. Perez, V. B. Marfori, and C. L. Opeña.) "Changing Comparative Advantage of Philippine Soybean Production." Paper presented at the Second National Consultative Meeting on Increasing Domestic Soybean Production, Philippine Council for Agriculture and Resources Research and Development, Los Baños, November 27-29, 1985.

Gonzales, Leonardo A. (With J. F. Sison, N. D. Perez, and R. A. Guino.) "The Comparative Advantage of Diversifying to Irrigated Non-Rice Crops in the Philippines: A Domestic Resource Cost Approach." Paper presented at the International Irrigation Management Institute Planning Workshop on Irrigation Management to Promote Crop Diversification, Los Baños, September 5-7, 1985.

Gonzales, Leonardo A. (With L. S. Cabanilla.) "Opportunities to Increase Income Under Partially Irrigated Conditions Through Farming Systems Research." Paper presented at an International Rice Research Institute conference, Los Baños, June 1-5, 1985.

Gonzales, Leonardo A. (With D. L. Umali.) "Rice Production Systems: Issues to be Considered." Paper presented at the Sixteenth Session of the International Rice Commission, Los Baños, June 10-14, 1985.

Haseyama, Takahiko. "Economic Cooperation and Direct Investment in Asia." Paper presented at a workshop on the History of Asian Development, sponsored by Keio University and the Fletcher School of Law and Diplomacy, Tokyo, December 5-7, 1985.

Kennedy, Eileen. (With Bruce Cogill.) "Effects of the Commercialization of Agriculture on Women's Decisionmaking and Time Allocation." Paper presented at the annual meeting of the Association of Women in Development, Washington, D.C., April 26, 1985.

Khaldi, Nabil. "Interest Rates and Credit Cost and their Impact on Lending to Low Income Farmers." Paper presented at the Regional Conference on Agricultural and Supporting Services to Low Income Farmers, sponsored by the Food and Agriculture Organization of the United Nations and the International Fund for Agricultural Development, Rabat, October 22-25, 1985.

Kumar, Shubh. "Energy and Nutrition Links to Agriculture in a Hill Region of Nepal." Paper presented at a workshop on Incorporating Energy and Nutrition in Agricultural Project Planning in Nepal, organized by the Agricultural Projects Services Centre and the Food and Agriculture Organization of the United Nations, November 1985.

———. "Women's Agricultural Work in a Subsistence-Oriented Economy: Its Role in Production, Food Consumption, and Nutrition." Paper presented at the 13th International Congress of Nutrition, Brighton, England, August 1985.

Mellor, John W. "Dealing with the Uncertainty of Growing Food Imbalances: International Structures and National Policies." Paper presented at the 19th International Conference of Agricultural Economists, Malaga, Spain, August 26-September 4, 1985.

———. "Food Aid for Food Security and Economic Development." Paper prepared as contribution to the Festschrift in honor of Hans W. Singer, Institute of Development Studies, Sussex, December 12-14, 1985.

———. "Food Production, Food Supply, and Nutritional Status." Paper presented at a symposium on Nutrition Issues in Developing Countries for the 1980s and 1990s, sponsored by the National Academy of Sciences and the National Research Council's Food and Nutrition Board, Washington, D.C., December 9, 1985.

———. "Issues in World Agriculture—A U.S. Perspective." Paper presented at the American Agricultural Economics Association Symposium on Agricultural and Rural Areas Approaching the 21st Century: Challenges for Agricultural Economics, Ames, Iowa, August 8, 1985.

———. "Long-Term Development in Sub-Saharan Africa." Testimony given before the Subcommittee on Foreign Operations and Related Agencies, Committee on Appropriations, House of Representatives, Washington, D.C., May 1, 1985.

———. "Opportunities in the International Economy for Meeting the Food Requirements of the Developing Countries of the World." Paper presented at the Utah State University Conference on the Political Economy of Food, Logan, Utah, May 2-4, 1985.

———. "Prediction and Prevention of Famine." Paper presented at a Special Symposium on Biomedical Aspects of World Famine sponsored by the Federation of American Societies for Experimental Biology, Anaheim, California, April 21, 1985.

———. "Requisites to Global Food Security—Challenges to Developed and Developing Nations." Paper presented at the World Food Production Conference organized by the International Minerals and Chemical Corporation, Beijing, September 2-7, 1985.

Oram, Peter. "Donor Assistance to Agricultural Research: A Proposal for Information Exchange." Paper presented at a meeting of donors convened by the World Bank to discuss a special program for African agricultural research, September 3-5, 1985.

———. "Environmental Deterioration and Famine in Africa, Cause or Effect?" Paper presented at a World Food Day seminar, Harrisburg Community College, Pennsylvania, October 16, 1985.

Pinstrup-Andersen, Per. "Agricultural Policy and Human Nutrition." Paper presented at the Agricultural Policy Workshop, Santiago. Dominican Republic, April 1-3, 1985. (Also available in Spanish.)

———. "The Role of Food Policy Analysis in Rural Development Cooperation." Paper presented at the International Symposium on Effectiveness of Rural Development Cooperation, Royal Tropical Institute, Amsterdam, September 30-October 4, 1985.

Reardon, Thomas. (With Taladidia Thiombiano.) "Methodological Issues in the Collection of Household Food Consumption and Expenditure Data in Ouagadougou." Paper presented at the internal project workshop on The Changing Role of Coarse Grains in SAT West Africa, organized by CEDRES, IFPRI, ICRISAT, CIRAD, CIRES, and ISRA, Ouagadougou, June 25-27, 1985.

Sahn, David E. "A Commentary on the Experiences and Issues in the Evaluation of Food Aid Programs." Paper presented at the workshop on the Nutritional Aspects of Project Food Aid, sponsored by the United Nations Administrative Committee on Co-ordination/ Sub-Committee on Nutrition, Annapolis, Maryland, January 14-18, 1985.

Sarma, J. S. "Basic Agricultural Statistics and Monitoring and Evaluation of Rural Development Projects in West Africa—Some Issues for Consideration." Background note circulated at the Expert Consultation on Production Statistics of Subsistence Food Crops in Africa, Harare, November 4-8, 1985.

———. "Contingency Planning for Famines and Other Acute Food Shortages: Role of Food Agencies." Paper presented at a seminar on Role of Foodgrain Agencies in Food Security in Asia and the Pacific, New Delhi, April 23-25, 1985.

———. "An Exploration into Dynamics of Cereal Demand in Selected Developing Countries." Paper presented at the 19th International Conference of Agricultural Economists, Malaga, Spain, August 26-September 4, 1985.

———. "Principles and Procedures of Administered Prices of Foodgrains in India." Paper presented at the Agricultural Marketing Seminar organized by the Economic Development Institute, World Bank, Washington, D.C., May 16-17, 1985.

Stone, Bruce. "Chinese Experience and Research on Fertilizer Use Efficiency: Implications for Developing Countries." Paper presented at the International Seminar on Fertilizer Use Efficiency, Lahore, Pakistan, November 4-6, 1985.

———. "Chinese Fertilizer Sector Development in the PRC Period and Prospects for the Future." Paper presented to the Chinese Economy Study Group of Washington, D.C., School for Advanced International Studies, Johns Hopkins University, Washington, D.C., October 24, 1985.

———. "Climate-Related Impacts in Developing Countries: Research Policy Priorities." Paper presented at the Climate Impacts Networkshop, National Center for Atmospheric Research, Boulder, Colorado, May 4-8, 1985.

Valdés, Alberto. "Exchange Rates and Trade Policy: Help or Hindrance to Agricultural Growth." Paper presented at the 19th International Conference of Agricultural Economists, Malaga, Spain, August 26-September 4, 1985.

———. "LDC Importer Response to Changes in U.S. Grain Policy." Paper presented at the Annual Meeting of the American Agricultural Economics Association, Ames, Iowa, August 4-7, 1985.

Wanmali, Sudhir. "Service Center Planning: Theoretical Framework and Empirical Applications, Examples from India." Paper presented at the conference of the Association of American Geographers, Middle States Division, Albany, New York, October 18-19, 1985.

PERSONNEL

DIRECTOR'S OFFICE

J. Mellor, *Director, U.S.A.*
R. Adams, *Special Assistant, U.S.A.*
E. Foster, *Research Assistant, U.S.A.*
J. Haynesworth, *Administrative Assistant, U.S.A.*
I. Pereira, *Secretary, Tanzania*
J. Vibar, *Word Processor, Philippines*

RESEARCH

Food Data Evaluation Program

L. Paulino, *Program Director, Philippines*
T. Haseyama, *Visiting Research Fellow, Japan*
N. Khaldi, *Research Fellow, U.S.A.*
J. Sarma, *Research Fellow, India*
B. Stone, *Research Fellow, U.S.A.*
Z. Tong, *Visiting Research Fellow, People's Republic of China*
D. Kunchai, *Research Analyst, Thailand*
D. Chesser, *Research Assistant, U.S.A.*
M. McFadden, *Research Assistant, U.S.A.*
M. Rechache, *Research Assistant, Algeria*
F. Walther, *Secretary, U.S.A.*

Food Production Policy Program

R. Ahmed, *Program Director, Bangladesh*
C. Delgado, *Research Fellow, U.S.A.*
L. Gonzales, *Research Fellow, Philippines*
D. Jha, *Research Fellow, India*
P. Oram, *Research Fellow, United Kingdom*
M. Rosegrant, *Research Fellow, U.S.A.*
T. Tshibaka, *Research Fellow, Zaire*
T. Reardon, *Postdoctoral Fellow, U.S.A.*
A. Bernard, *Research Assistant, U.S.A.*
T. D'Addio, *Research Assistant, U.S.A.*
J. Smith, *Research Assistant, U.S.A.*
M. Snyder, *Secretary, U.S.A.*
C. Solomon, *Secretary, Philippines*

Agricultural Growth Linkages Program

P. Hazell, *Program Director, United Kingdom*
R. Celis, *Research Fellow, Costa Rica*
Y. Mundlak, *Research Fellow, Israel*
C. Ranade, *Research Fellow, India*
S. Wanmali, *Research Fellow, India*
N. Bliven, *Research Assistant, U.S.A.*
R. Millman, *Research Assistant, U.S.A.*
S. Regalado, *Secretary, Philippines*

Food Consumption and Nutrition Policy Program

P. Pinstrup-Andersen, *Program Director, Denmark*
H. Alderman, *Research Fellow, U.S.A.*
H. Bouis, *Research Fellow, U.S.A.*
J. von Braun, *Research Fellow, Federal Republic 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*
D. Sahn, *Research Fellow, U.S.A.*
D. Rubin, *Postdoctoral Fellow, U.S.A.*
B. Cogill, *Research Analyst, Australia*
P. Webb, *Research Analyst, United Kingdom*
J. Csete, *Research Assistant, U.S.A.*
L. Haddad, *Research Assistant, United Kingdom*
D. Hotchkiss, *Research Assistant, U.S.A.*
E. Jacinto, *Research Assistant, Philippines*
M. Jaramillo, *Research Assistant, Colombia*
D. Katikineni, *Research Assistant, India*
D. Puetz, *Research Assistant, Federal Republic of Germany*
Z. Primor, *Research Assistant, U.S.A.*
Y. Yohannes, *Research Assistant, Ethiopia*
G. Dizon, *Word Processor, Philippines*
A. Go, *Secretary, Philippines*
W. Merrill, *Secretary, U.S.A.*

International Food Trade and Food Security Program

A. Valdés, *Program Director, Chile*
R. Bautista, *Research Fellow, Philippines*
H. Ezekiel, *Research Fellow, India*
T. Pinckney, *Postdoctoral Fellow, U.S.A.*
S. Gnaegy, *Research Analyst, U.S.A.*
M. Chakraverti, *Research Assistant, India*
J. Gilmartin, *Research Assistant, U.S.A.*
D. Davis, *Secretary, U.S.A.*
C. Patterson, *Secretary, U.S.A.*

Visiting Researchers

More than 50 researchers visiting from around the world spent time at IFPRI during 1985. In addition to the visiting research fellows listed above, who are on leave from their home organizations for one or more years, the visiting researchers listed below spent periods of a month or more at IFPRI.

A. Abdullah, *Bangladesh*
S. Adamu, *Nigeria*
J. Anderson, *Australia*
V. Bindlish, *India*
V. Elías, *Argentina*
J. García, *Colombia*
N. Hettiaratchy, *Sri Lanka*
D. Horton, *U.S.A.*
M. Hossain, *Bangladesh*
A. Kimoto, *Japan*
U. Koester, *Federal Republic of Germany*
G. Montes, *Colombia*
A. Oyejide, *Nigeria*
A. Parikh, *United Kingdom*
M. Petit, *France*
A. Quasem, *Bangladesh*
V. Rajagopalan, *India*
C. Ramasamy, *India*
A. Samad, *Bangladesh*
B. Senauer, *U.S.A.*
Y. Suzuki, *Japan*

RESEARCH SUPPORT

L. Halsey, *Director of Finance and Administration, U.S.A.*
Z. Emam, *Travel Coordinator, Afghanistan*
M. Turner, *Administrative Assistant, U.S.A.*

Accounting

M. Devol, *Controller, U.S.A.*
T. Nguyen, *Senior Accountant, U.S.A.*
J. Hsu, *Bookkeeper, Taiwan*
F. Vatcha, *Secretary, India*

Personnel/Office Services

J. Gilpin, *Personnel/Office Manager, U.S.A.*
D. Thullen, *Office Services Coordinator, U.S.A.*
G. Briscoe, *Office Aide, U.S.A.*

Computer Services

R. Donaldson, *Head, Australia*
W. Alvarado, *Programmer, Philippines*
N. Carlson, *Programmer, U.S.A.*
J. Rozen, *Programmer, U.S.A.*

Information Services

B. Rose, *Head, U.S.A.*
P. Skillman, *Editor, U.S.A.*
J. Voorhees, *Editor, U.S.A.*
U. Mohan, *Assistant Editor, India*
K. Marcos, *Information Assistant, U.S.A.*
L. McCoy, *Typesetter, U.S.A.*
E. Reynolds, *Editorial Word Processor, U.S.A.*

Policy Seminars Program

R. Bordonaro, *Head, U.S.A.*
L. Goldberg, *Conference Coordinator, U.S.A.*

Library

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

List includes part-time staff members. Countries indicate citizenship.

FINANCIAL STATEMENT

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

BALANCE SHEET as at December 31, 1985 and 1984

ASSETS

	1985	1984
Current Assets:		
Cash and short-term investments	$1,690,489	$ 329,502
Grants receivable	227,744	334,286
Contracts receivable	679,796	445,474
Employee and other receivables	90,487	117,586
Prepaid expenses and other current assets	107,088	39,880
	2,795,604	1,266,728
Property and Equipment:		
Furniture and equipment	373,593	285,598
Leasehold improvements	76,439	65,454
	450,032	351,052
Less – accumulated depreciation	245,866	201,777
	204,166	149,275
TOTAL ASSETS	$2,999,770	$1,416,003

LIABILITIES AND FUND BALANCE

Current Liabilities:		
Accounts payable	$ 183,156	$ 121,629
Note payable		320,000
Current portion of long-term debt	9,773	8,819
Accrued vacations	234,231	195,575
Advance payment of grant funds	1,299,354	75,727
Unexpended contract funds	619,145	329,021
	2,345,659	1,050,771
Long-term Debt	38,042	47,041
Fund Balance		
Working capital fund (Note 2)	389,680	25,000
General fund (Note 3)	226,389	293,191
	616,069	318,191
TOTAL LIABILITIES AND FUND BALANCE	$2,999,770	$1,416,003

The accompanying notes are an integral part of these statements.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

STATEMENT OF REVENUE, EXPENSE, AND GENERAL FUND BALANCE
For the Years Ended December 31, 1985 and 1984

	1985	1984
Revenue:		
Grant income	$4,311,485	$4,272,751
Special project income	2,507,377	1,578,488
Expense reimbursements and other income	139,264	231,723
Investment income	53,788	34,549
	7,011,914	6,117,511
Expenses:		
Personnel	2,932,710	2,511,853
Employee benefits	804,868	737,011
Field and collaborative research	910,889	703,773
Travel	515,493	656,867
Computer services	267,835	225,144
Publications and conferences	377,598	289,805
Trustees' expenses	99,331	113,636
Office operation and administration	680,933	563,264
Depreciation	55,179	40,368
Nonpayment of previous grant pledge	69,200	
	6,714,036	5,841,721
Excess of Revenue Over Expenses	297,878	275,790
Transfer to working capital fund (Note 2)	(364,680)	(25,000)
Increase (decrease) in general fund balance	(66,802)	250,790
General Fund Balance, Beginning	293,191	42,401
GENERAL FUND BALANCE, ENDING	$ 226,389	$ 293,191

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, 1985 and 1984

	1985	1984
Funds Provided by (Used in) Operations:		
Excess of revenue over expenses	$ 297,878	$ 275,790
Items not requiring funds:		
Depreciation	55,179	40,368
	353,057	316,158
Funds Provided by (Used in) Changes in Operating Working Capital (Except Cash and Short-term Investments):		
Grants receivable	106,542	(304,464)
Employee and other receivables	27,099	(26,745)
Contracts receivable	(234,322)	(271,201)
Prepaid expenses and other current assets	(67,207)	3,552
Accounts payable	61,527	23,992
Accrued vacations	38,656	33,631
Advance payment of grant funds	1,223,627	(254,273)
Unexpended contract funds	290,123	70,508
	1,446,045	(725,000)
Funds Provided by (Used in) Operations	1,799,102	(408,842)
Funds (Used in) Provided by Investment Transactions:		
Acquisition of property and equipment	(110,070)	(119,301)
Disposal of property and equipment		540
	(110,070)	(118,761)
Funds (Used in) Provided by Financing Transactions:		
Short-term borrowings (repayments)	(320,000)	220,000
Long-term borrowings (repayments)	(8,045)	55,860
	(328,045)	275,860
INCREASE (DECREASE) IN CASH AND SHORT-TERM INVESTMENTS	$1,360,987	$(251,743)

The accompanying notes are an integral part of these statements.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

NOTES TO FINANCIAL STATEMENTS
December 31, 1985 and 1984

Note 1. Summary of Significant Accounting Policies

Organization

By Executive Order 12359, 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).

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 receivable represent income which has been earned but for which funds have not yet been received, which included billed amounts of $326,282 for 1985. Unexpended contract funds represent funds received 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 5 years. 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. Working Capital Fund

Under guidelines of the Consultative Group on International Agricultural Research (CGIAR), the Institute is allowed to establish a working capital fund equivalent to 30 days income. The working capital fund would be comprised of cash and short term investments and certain receivables less certain liabilities and grant funds and contract funds paid in advance.

The budgeted working capital fund balance, using the CGIAR criteria, was $584,326 at December 31, 1985. The Institute had available net assets for the working capital fund of $389,680 at that date. Therefore, there was a shortfall of $194,646.

Note 3. Commitments

The Institute has made commitments for the purchase of equipment under the 1985 budget in the amount of $114,000. Orders were placed for the purchase of equipment but delivery was not made prior to the end of the year. In addition, the Institute has approved for carryover to 1986, $112,000 which represents approved 1985 budget amounts which were not spent in 1985.

NOTES TO FINANCIAL STATEMENTS
December 31, 1985 and 1984
(continued)

Note 4. Leases

The Institute occupies office space under various leases expiring through 1990. The leases provide for additional rents based on increases in building operating costs and the Consumer Price Index.

Minimum lease payments for all noncancellable leases having a remaining term in excess of one year at December 31, 1985, are as follows:

1986	$ 413,827
1987	413,827
1989	413,827
1990	310,370
	$1,551,851

Note 5. Pensions

The Institute purchases retirement annuity contracts for employees under agreement with the Teachers Insurance and Annuity Association and the College Retirement Equities Fund. In 1985, the Institute began purchasing offshore pension investments for international staff through the American International Reinsurance Company in Bermuda and the Alliance Capital Management International in London. The costs were $339,000 and $307,000 for 1985 and 1984, respectively.

Note 6. Grant Income

Grant income is core program support received from agencies participating in the Consultative Group on International Agricultural Research.

Note 7. Cash

As part of a Special Project in Pakistan, a bank account has been opened to receive payments from the U.S. government in the local currency, rupees. The funds must be spent in Pakistan, and cannot be removed from the country. Due to the restrictions on their use, the rupees deposited into this account are not recognized as an asset. Income will be recognized only when expenses are paid. No disbursements were made in 1985. Three million rupees ($187,500) were deposited in the account during 1985.

Note 8. Note Payable

The note payable at December 31, 1984 was a loan from the World Bank without interest, that was due by December 31, 1985. It was repaid on December 27, 1985.

NOTES TO FINANCIAL STATEMENTS
December 31, 1985 and 1984
(continued)

9. Long-term Debt

Installment note, dated December 9, 1984 for $55,860, due to Eastman Kodak Company in 60 monthly installments of $1,221, including interest at 11.25% per annum. A Kodak Ektaprint copier serves as the collateral for this note.

	1985	1984
Note payable	$47,815	$55,860
Current portion	9,773	8,819
Long-term debt	$38,042	$47,041

Future payments of principal are as follows:

1986	$ 9,773
1987	10,930
1988	12,226
1989	13,674
1990	1,212

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

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

March 19, 1986

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 of December 31, 1985 and 1984, 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, 1985 and 1984, 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.

Raymond E. Lang & Associates, P.A.

The International Food Policy Research Institute (IFPRI) was established 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 world-wide 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. The Institute receives support as a constituent of the Consultative Group on International Agricultural Research (CGIAR) from a number of governments, multilateral organizations, and foundations. In addition, a number of other governments and institutions contribute funding to special research projects.

IFPRI was incorporated in March 1975 and by the end of that year, with a staff of four and a Board of Trustees of five, began to undertake research on issues related to food production and consumption in low-income countries. Four years later, the Institute became a member of the CGIAR. Initially, IFPRI's research was heavily focused on Asia in recognition of the importance of the region's food and poverty problems and because of the wealth of data and analytical capacity that could be built on and used later. In 1984 IFPRI underwent its first five-year review by the Technical Advisory Committee to the CGIAR. The review panel stated, "In the 10 years since its foundation, IFPRI's mandate and its research have clearly evolved in response to changing needs and perceptions of the problems faced by developing countries." They are still evolving. As we look to the next decade, we see that food issues continue to loom large in Third World development. The food problems of Africa are now especially challenging, and IFPRI's experience both allows us to place these problems in a broader perspective and to facilitate developing approaches to deal with them. IFPRI celebrated its tenth anniversary this year. We look forward to our continuing evolution, enabling us to meet the challenges of the next decade.