

PN-ABL-153

1991

REPORT

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

IFPRI
REPORT 1991

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MESSAGE FROM THE CHAIRMAN

My first full year as chairman of IFPRI's Board has been a challenging and productive one. During 1991 IFPRI continued to make headway in organization, research, and outreach.

The year was marked by further discussion among stakeholders and within IFPRI of the external program and management reviews of the Institute that were conducted in the second half of 1990. The substance of these reviews undertaken on behalf of the Technical Advisory Committee (TAC) of the Consultative Group on International Agricultural Research (CGIAR) was reported to the members of the CGIAR at their midyear meeting in May 1991 in Paris. At that meeting I reported with some pride the significant progress IFPRI had already made in addressing the recommendations of the reviewers (it has since made more), and I welcomed the follow-up review that TAC had recommended. This interim review will occur in May 1992.

During the year, the IFPRI Board of Trustees undertook reforms in a number of important areas. Of particular note are the tightened and clarified provisions for Board governance. At the beginning of the year, the Board implemented a full set of revisions to the bylaws of the Board of Trustees, delineated a clear conflict-of-interest policy, and established precise terms of reference for all of its officers and committees. At the same time, it initiated a new committee structure, including for the first time a separate program committee chaired by the vice chairman of the Board. The new program committee will serve in an advisory capacity to the full Board of Trustees on issues related to IFPRI's research and outreach activities and its working relationships with collaborating institutions and CGIAR centers. These changes in Board governance have resulted, I believe, in a fresh sense among Board members of involvement in and responsibility for IFPRI activities.

The Board was also heavily involved in the preparation of IFPRI's first strategic plan. This statement of long-term strategy sets priorities and identifies new research thrusts. The members of the Board enjoyed and profited from the many meetings with IFPRI staff and IFPRI's clients and collaborators at which drafts of the document were discussed. Intensive staff and stakeholder participation and strong Board involvement in the process of planning generated a wide sense of "ownership" and also contributed to its quality.

In October, after a worldwide search headed by Vernon Ruttan, professor of economics at the University of Minnesota, the Board chose Per Pinstруп-Andersen to be IFPRI's fourth director general. Per, who will join IFPRI in mid-1992, will leave his post as director of

the Food and Nutrition Policy Program and professor of economics at Cornell University. Per's energy, imagination, and talent will greatly contribute to IFPRI. The Board and staff anticipate his arrival with enthusiasm. Per follows Just Faaland, who will conclude his remarkably productive two-year term as director general in 1992. IFPRI owes much to Just for his wise leadership and his clear sense of direction during a period of potential uncertainty and stress.

During 1991 four new members joined the Board—David Bell of the Center for Population Studies at Harvard University; G. Arthur Brown, governor of the Central Bank of Jamaica; Henri Carsalade, director general of the Centre de Coopération Internationale en Recherche Agronomique pour le Développement; and Nicholas H. Stern of the London School of Economics and Political Science. During the year, Leopoldo Solís and Theodore W. Schultz completed their terms as Board members.

Finally, I would like to report that on August 31, 1991, John W. Mellor, IFPRI's director from 1977 to 1990 and more recently a research fellow on leave, retired from IFPRI. John's contributions to research on food and agricultural policy in developing countries and to IFPRI are widely recognized and respected. On the occasion of his departure, I would again like to express, on behalf of the Board, our thanks for his service to IFPRI and our best wishes for the success of his new endeavors in food policy.

This was an important year for IFPRI. We made great strides in reorganizing and redefining the role of the Board of Trustees, plotting our future research program, and, as this annual report attests, contributing to more effective policies for ensuring the food needs of the developing world. I would like to thank our donors and colleagues for their continued support and contribution to our efforts.

Gerry Helleiner
Chairman

INTRODUCTION

IFPRI'S ROLE IN POLICY FORMATION AND INSTITUTION BUILDING

The year 1991 was an active one for IFPRI. We completed *IFPRI's Strategy for the 1990s*, which charts the future direction of IFPRI research and outreach activities. In preparing the strategy, we sought help from a wide range of colleagues in the countries where we conduct research. We also sought the advice of policy analysts and policymakers in those countries. The more involved I became in discussions of program development with IFPRI staff and collaborators and with those who use, contribute to, and benefit from our research, the more I realized that IFPRI's work reaches far into the research, policymaking, and, ultimately, farming communities. Equally, it was brought home to me that IFPRI's collaborative approach can contribute significantly to strengthening developing countries' own capacity to conduct food policy research. I have highlighted some examples of this below.

IMPACT ON POLICY

IFPRI's mandate is not to make policy; nor is it to lobby for particular policy outcomes. Rather, through well-focused research activities and the dissemination of its findings by means of publications, workshops, and personal contact, IFPRI provides information and analysis that enter the policy debate and allow policymakers to make better-informed policy decisions.

I recently returned from a trip to Bangladesh, India, and Pakistan, countries where IFPRI has large collaborative research projects under way. As do senior IFPRI researchers in many developing countries throughout the year, I met with high-level policymakers in the government, colleagues in academic institutions, and representatives of the international community. These one-on-one meetings are essential for IFPRI's relevance and effectiveness. In Bangladesh, where IFPRI has a major study under way on food policy, IFPRI research has significantly improved the policy debate on the public food distribution system. The government of Bangladesh has temporarily suspended a counterproductive rural rationing scheme and has liberalized domestic procurement policies. Debate continues on opening export and import markets to private trade and on reaching the rural poor through cost-effective transfers.

IFPRI's direct impact on policy formulation during the year may be further illustrated by its contribution to the debate regarding agricul-

tural policies in the Sahel. IFPRI research on the regional integration of agricultural markets between coastal West Africa and the Sahel has shown that maintaining protectionist measures and high relative prices for basic cereals in the Sahel continues to slow economic growth in the region. IFPRI research has been crucial to this debate, which has involved the Club du Sahel, the Comité Inter-Etats de Lutte contre la Sécheresse au Sahel, the Institut du Sahel, the African Development Bank, and the World Bank. In 1991 the deadlock over cereals protection broke, and the parties are now finally discussing how to recoup the Sahel's former comparative advantage in livestock and oilseed exports to the coast. IFPRI research will continue to provide quantitative insights into the costs and benefits of different policies in this area.

On the other side of Africa, in Sudan and Ethiopia, IFPRI researchers have made a major contribution to identifying the policies that will contribute to ending centuries of famine in this region. Early in the year, at an IFPRI workshop in Khartoum, more than a hundred representatives of the Sudanese national and local governments and the international donor community as well as researchers agreed that the public policies necessary to end drought and famine in the country had been identified and now could be implemented. Following this remarkable meeting the short-term response was positive; yet, thus far, policies have not been sufficiently adjusted, and the risk of famine in Sudan continues. In Ethiopia, where famine conditions prevail, we are encouraged that measures outlined in a recent IFPRI food policy report will be addressed.

In other parts of Africa, IFPRI research on employment-generating public works programs has been at the forefront of the current debate on how to ensure food security. In Niger, Botswana, Tanzania, and Zimbabwe, government officials have begun to integrate public works programs into national planning. Policymakers are fashioning new institutions by providing relief for drought-stricken areas through rehabilitation projects, funding construction projects that generate nutritional improvement, and addressing erosion control and afforestation through programs to provide a sustainable agricultural resource base. IFPRI research documenting the benefits of these programs has helped bring about a variety of changes in Sub-Saharan Africa.

With the recent cessation of most of the armed civil conflicts in Central America, policymakers are now able to focus on the serious economic problems facing the region. During 1991 IFPRI cohosted an innovative workshop in Costa Rica that provided an opportunity for constructive interaction between public officials, who formulate and implement policies, and those usually at the receiving end of policies and programs—the rural poor, represented by nongovernmental organizations. At the workshop, representatives of grassroots organizations and officials from the ministries of health and agriculture from Costa Rica, Guatemala, Honduras, Nicaragua, and El Salvador

agreed that food security should be on the agenda of the next summit meeting of Central American presidents. The policy dialogue among these different agents of change contributed to their mutual appreciation of the constraints and concerns faced by all.

BUILDING CAPACITY FOR POLICY RESEARCH

IFPRI collaborates closely with institutions in developing countries. These institutions range from universities and development research centers to planning and research units of ministries of agriculture. A complete list of 104 organizations with which IFPRI collaborated in 1991 appears in the Outreach section of this report. In addition, IFPRI outposted 12 researchers to developing countries where we are conducting research. I would like to highlight a few collaborative activities here.

IFPRI's help in building the capacity of developing countries to conduct their own food policy studies has ranged from advising analysts in government ministries to training in-country enumerators to collect data. During 1991, at the request of the Policy Analysis Division of the Philippine Department of Agriculture, an IFPRI research fellow developed an economic model for analyzing price and investment policies for Philippine rice, corn, and livestock production. IFPRI trained the 10 analysts who are now using the model, which helps policy-makers analyze options for achieving agricultural production goals for these crops. IFPRI was also asked by the Philippine Institute for Development Studies to develop a policy perspective and overall framework for analyzing the Philippine rural development experience.

In Sri Lanka, IFPRI staff worked with researchers at the Agrarian Research and Training Institute (ARTI) in Colombo to analyze the future rice production in that country. We worked with ARTI researchers to develop an approach to comprehensive resource cost analysis for rice. This resulted in recommendations for technology development, investment in irrigation, and input and output pricing policy. The ARTI researchers are now applying this knowledge to other crops of importance to Sri Lanka.

During the year, IFPRI increased the number of training sessions conducted for collaborators. In Bangladesh, Costa Rica, Nicaragua, and Sri Lanka these included classes in computer use and economic analysis. IFPRI began production of its first set of training materials—a manual on designing data entry and verification systems for field research.

IFPRI has established a number of research networks in various regions around the world. In Central America researchers from five countries are already formulating regional and national strategies, policies, and programs for food security and improved nutrition. In West Africa a network was initiated on regional agricultural marketing. This will include researchers from seven countries. In Asia, two research

networks will include researchers from seven Asian countries who will examine the outlook for food and agricultural growth for the region.

DEFINING THE RESEARCH AGENDA

I could not discuss IFPRI's impact on food policy without mentioning IFPRI's role in defining the agenda of the research community. This is seen in our interactions with peers in the international research and donor communities and in national and international development institutions, as well as with our colleagues in the CGIAR. During 1991 IFPRI published a study that documents the positive impact of the green revolution in South India. The findings of this study will help guide the direction of future agricultural research. IFPRI hosted two international meetings to identify approaches to agricultural research efforts. An international workshop on priorities for forestry and agroforestry policy research resulted in recommendations for future research efforts for IFPRI and the CGIAR. An IFPRI-sponsored international meeting on the links between agricultural growth, sustainability, and the alleviation of poverty brought together natural and social scientists, senior administrators, and policy advisers from developed and developing countries to discuss how agricultural development can be made compatible with sustained productivity of the natural resource base. IFPRI researchers were also called upon to prepare background papers for the International Nutrition Conference sponsored by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), to be held at the end of 1992.

In this annual report of IFPRI activities, we have provided further details about the policy impact of IFPRI's research results and our parallel efforts to help improve the skills of those who make and influence policy decisions in the Third World.

Just Faaland
Director General

RESEARCH RESULTS

ENVIRONMENT AND PRODUCTION TECHNOLOGY DIVISION

The principal concern of the Environment and Production Technology Division is how acceleration of Third World food production through the spread of new agricultural methods can be accomplished in the manner that best sustains the natural resource base.

As part of the collaborative research under way in this division, two international meetings were held to help IFPRI and the CGIAR to better define their roles in this area and to help set appropriate international and domestic priorities for policy research. In addition, a workshop in Trivandrum, designed to build India's national capacity to conduct interdisciplinary research on irrigation issues, brought together Indian collaborators and IFPRI researchers to focus on the practical aspects of research design, data collection and management, and analysis.

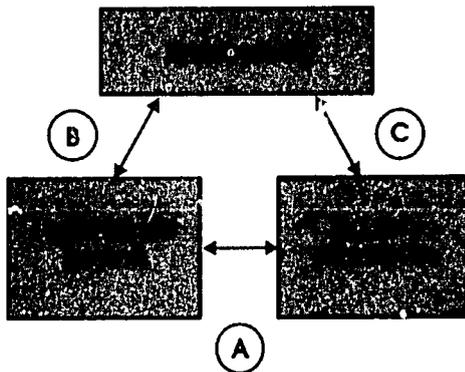
A workshop to examine priorities for forestry and agroforestry policy research in the international community brought together individuals from donor organizations, international and national institutions, and the research community. The participants identified three important areas for future research, including the contribution of forestry and agroforestry to rural incomes and welfare, the linkages between agriculture and agroforestry and other sectors of the economy, and the effects of macroeconomic policies on forestry and agroforestry. The participants agreed that national institutions in developing countries should initiate and expand collaborative research on key issues.

A second international meeting convened more than 50 researchers, policymakers, and environmental specialists from developing countries as well as donor representatives to discuss the interrelationships between agricultural growth, poverty alleviation, and sustainability of natural resources. The discussion focused on the humid and subhumid tropics, semi-arid tropics, and tropical highlands—the three agroecological zones comprising most developing countries—and key geopolitical regions within these zones. The group concluded that the debate on how to increase agricultural growth while maintaining the productive potential of the natural resource base should include poverty concerns in order to clarify the need for developing technologies that meet both growth and sustainability goals and for policies that promote the use of these technologies by farmers. The group also agreed that research is needed on the environmental

consequences of international, national, and regional price distortions; the role of land tenure and land markets in sustainable agriculture; and the constraints farmers face in adopting technologies that meet both growth and sustainability goals. (Figure 1) (From DSE proceedings on agricultural sustainability, growth, and poverty alleviation)

Enhancing the national capacity for interdisciplinary and fully integrated research on Indian irrigation was the purpose of a workshop on irrigation research methodologies. The meeting was part of a five-year project exploring policies for agricultural growth in India. The workshop extended to India an interdisciplinary approach that looks at irrigation schemes as whole systems, going beyond the village-based approach often taken by social scientists or the technology-based approach often used by engineers. More than 30 percent of the land farmed in India is irrigated, and investment in irrigation constitutes the largest component of the Indian government's agricultural investment budget. If the redesign and improvement of Indian irrigation systems in the future is to be effective, an interdisciplinary approach to research will be crucial.

Figure 1
Interrelationships of agricultural growth, poverty alleviation, and sustainability of natural resources



Recent research suggests that the separate goals of agricultural growth, poverty alleviation, and sustainability of natural resources are interrelated and should be considered together. Much is known about the determinants of and constraints to growth and poverty and about their interrelationship (Link A). Less is known about what sustainability is, what determines it, and how it relates to poverty alleviation (Link C) and agricultural growth (Link B). The factors that affect sustainability and the policies that determine it probably differ significantly in areas with different physical resource bases and policymaking arenas. There is a need for more systematic discussion of how these agroecological and geopolitical differences should be reflected in international and domestic policies to achieve these three objectives.

During 1991, the division initiated two research networks to enhance the institution-strengthening and capacity-building effects of its collaborative research. One network examines the food outlook for Asia. A second, in conjunction with the International Rice Research Institute, focuses on technology, investment, and price policies for agricultural growth in Asia. The networks include researchers from national agricultural research institutions in seven Asian countries. IFPRI assists in developing methodology, coordinating project activities, conducting comparative country and regional analyses, and organizing workshops and conferences. The country studies will be conducted by researchers from the collaborating institutions.

Research in the division during the year identified a number of results that have significance for food policy.

■ The increase in rice output per hectare in Asian agriculture during the last decade has now made it possible to release land to other crops. This could result in more sustainable and diversified agricultural growth. Research on the potential for diversification of production in the Philippines indicates that the country can move to a more flexible mix of higher-valued crops and livestock, and expand its processing of basic agricultural commodities. Corn, poultry, and pork production and processing show great potential for domestic markets, and if sanitary and quality improvements can be made, pork shows promise as an export. The research finds that an integrated set of policy reforms in the form of trade liberalization, real exchange rate devaluation, increased public investment in and deregulation of marketing and transportation, and stabilization of corn prices would lead to significant economic benefits. (From the Special Report on the Philippine corn/livestock sector)

■ Reduced public investment in irrigation during the 1980s was an appropriate response to declining world rice and wheat prices and the rapidly increasing capital costs of irrigation. However, synthesis of IFPRI and other research found that projected rice prices used to evaluate future investments should be raised to reflect the long-term effects of these investment reductions on rice prices and production. This adjustment would increase the number of profitable irrigation projects compared with current levels, moderately boosting expenditures on new irrigation. (Table 1)

■ Future development of Asian irrigation will require selective investment in rehabilitation, management reforms, and other interventions to improve the efficiency and performance of irrigation systems as well as increased private investment in irrigation, particularly tubewells. Research found that careful identification of systems to be rehabilitated and selection of high-payoff points of intervention within systems will improve the cost-effectiveness of these interventions. It also found that this private investment will need to be accompanied by public investment in electricity and roads, which will facilitate the con-

Table 1
Capital costs for construction of new Asian irrigation systems

Year	India (1968 prices)	Indonesia (1963 prices)	Philippines (1966 prices)	Sri Lanka (1968 prices)	Thailand (1968 prices)
	(US\$ per hectare)				
1956-69	2,698	1,321	1,813	1,470	1,419
1970-74	2,369	1,891	1,882	2,058	2,584
1975-80	1,650	3,137	2,283	2,853	2,386
1981-85	4,033	3,289	2,688	5,288	2,278
1986-88	4,866	4,089	n.a.	5,776	2,812

Source: Mark Rosegrant and Mark Svendsen.

Per hectare capital costs of new irrigation construction have risen sharply across the Asian region over the past two decades. In India and Indonesia the real cost of new irrigation has more than doubled since the late 1960s. In Thailand and the Philippines it has increased by more than 40 percent, and in Sri Lanka it has tripled.

14 junctive use of tubewells and canal irrigation. Specific research on the Indian irrigation sector indicates that Indian irrigation will require redirecting resources toward improving the performance of existing systems by introducing managerial innovations and supportive policy modifications. Groundwater development along with integrated use of surface water will continue to be necessary. (From the Occasional Paper on Indian irrigation)

■ Future production and distribution of improved seeds in the developing countries will be met through a mix of private and public activities and not primarily by public agencies as has been the case in the past. Research indicates that private companies are likely to conduct research on widely grown hybrid crops such as maize and sorghum but are unlikely to invest in research on self-pollinating crops like wheat and rice. At a minimum, developing countries will have to continue to support research on self-pollinating crops while private companies multiply the seed developed and sell it to farmers. (From the Occasional Paper on seed policy)

MARKETS AND STRUCTURAL STUDIES DIVISION

Research in this division focuses on how to increase agricultural production and rural incomes, particularly for smallholder farmers and landless laborers, through incentives to farmers to encourage agricultural growth. As part of the research efforts during the year, significant steps were taken to build the capacity of IFPRI's collaborators to conduct food policy research.

Specifically, a formal training course was conducted as a part of IFPRI's work on food policy in Bangladesh. This involved the participation of public officials from various ministries directly concerned with the formulation and implementation of food policy. Participants attended sessions on such topics as food production growth, supply response relationships, and targeted policy instruments.

As part of IFPRI's collaborative research on the assessment and determinants of agricultural marketing costs in West Africa, a workshop on methodologies for measuring these costs was held in Washington with researchers from national research institutions in Mali, Senegal, Burkina Faso, and Côte d'Ivoire. Following the workshop these researchers collected field data in the study countries, then returned to IFPRI to analyze the data and identify preliminary results.

The division plans to build on this work and has taken the first steps toward establishing a formal research network within West Africa to examine the issues related to the improvement, development, and integration of agricultural markets in the region. IFPRI has outposted to the region a research fellow who will be developing this network. Initially, the network will include researchers from national institutions in seven countries. Students working toward postgraduate degrees will also be integrated into the research effort. Collaboration will also involve the CGIAR centers in the region and researchers from donor institutions.

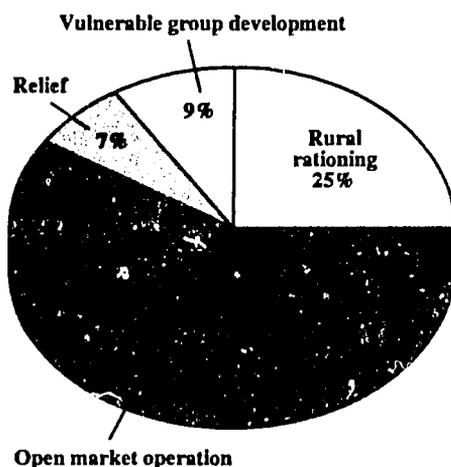
The division's involvement in training activities in the Southern African Development Coordination Conference (SADCC) region was spearheaded by an outposted IFPRI researcher working with counterparts from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT) in a policy analysis initiative for the region. This activity assists economists from national agricultural research systems to conduct policy-oriented research on agricultural marketing issues in their own countries.

A network for fertilizer research was initiated by IFPRI with researchers in Ghana and Mali and from the International Fertilizer Development Center (IFDC) during 1991. The 15 members of the network are gathering and analyzing data on fertilizer use, crop response to fertilizer applications, the relationship between the cost of fertilizer and crop prices, the availability of fertilizer, and the availability of credit to purchase fertilizer in order to determine which policy environment will best promote fertilizer use.

Division research during the year identified a number of results of significance to policy formulation.

■ In Bangladesh, the present structure of the public intervention mechanism to meet short-term food needs is costly—equivalent to about 12 percent of the public sector investment in the economy. And research found that a large portion of the food distributed through the public food distribution system does not go to the poor for whom the system was designed. This suggests that a more liberalized system—based on the private market, with marginal interventions in trade—can ensure the degree of food security that the country needs. (Figure 2) (From the Working Papers on food policy in Bangladesh, Numbers 1-4)

Figure 2
Direct subsidies of the Bangladesh public food distribution system, by distribution channel, 1989/90



Source: Ralsuddin Ahmed.

The Bangladesh government subsidizes 100 percent of the cost of food distributed through nonmonetized channels—food-for-work, vulnerable group development, and relief programs. Through the monetized channels—which accounted for 63 percent of total quantity of distribution—the government subsidized 37 percent of the cost of food through the rural rationing scheme, 35 percent of the cost through the urban rationing scheme, and 18 percent of the cost through open market operation in 1989/90. During 1991, the government undertook a review of the benefits of the rural rationing scheme and determined that the subsidies were not reaching the target groups. This scheme has since been suspended. The government is currently undertaking a review of the urban rationing scheme.

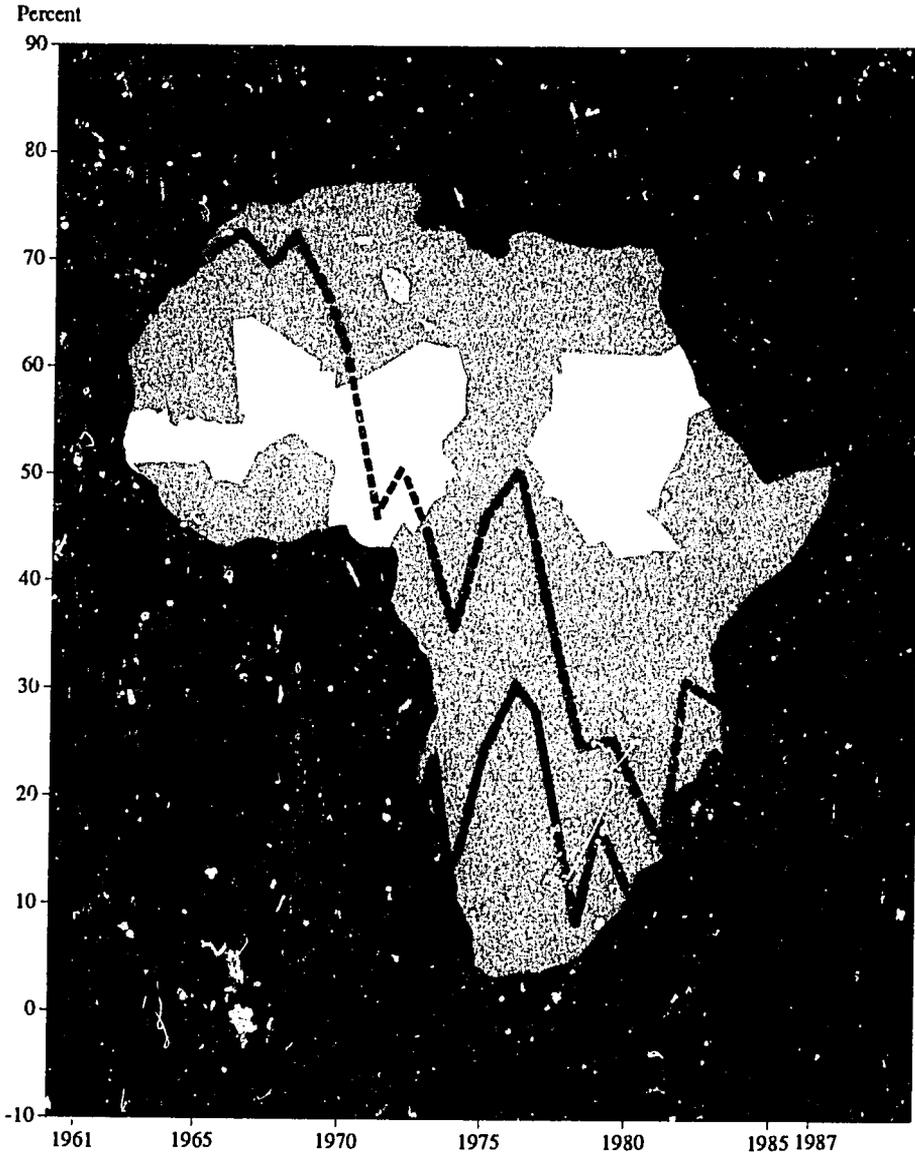
■ Contrary to conventional wisdom, rural Sahelian households are not self-sufficient and subsistence-oriented, but operate in a monetized, commercial economy, with sales and purchases of agricultural products far exceeding nonmarketed exchanges. Research in Senegal and Niger finds that most farm households are net purchasers of foodgrains and that nonfarm income plays a major role in household food security. Thus, demand-side marketing and pricing policies will affect incomes and consumption in the region.

■ World demand for West African exports has less of an effect on export performance than domestic policies that overvalue the exchange rate and raise agricultural production costs. Research on the export performance of agricultural commodities found that this is particularly true for Senegal and other members of the African Groundnut Council, whose groundnut exports have been declining in recent years. In addition, the research found that existing regional trade opportunities currently cannot substitute for trade on the world market despite the fact that Africa's demand for vegetable oil is growing two-and-a-half times as fast as world demand. Implementing domestic policies that lower domestic costs of production and distribution will be crucial for improving export performance in the region. (Figure 3)

■ In West Africa, transport costs for cereals can vary from 10 percent to 50 percent of wholesale prices, depending on the distance traveled, which helps explain the disjointed nature of West African cereals markets. Even when cereals trade was liberalized, for example in Senegal, access to transport services and the ability to deal with "unofficial taxation" along long-distance routes still determined the competitiveness of traders. Although the government has liberalized movement of goods, the transportation sector continues to profit from a number of significant barriers to entry, and credit is difficult to obtain for trade. Policies to boost agricultural marketing under liberalization will have to address these issues more fully.

■ In southern Africa, the rapid move to market liberalization faces enormous problems. In particular, in many areas there are no private markets, and credit markets are not geared to induce private trade in coarse grains. As a result, the sudden withdrawal of public marketing parastatals has created a vacuum in the availability of marketing services in many areas, especially in the drier and remoter regions. This, in turn, has created major political problems for governments and threatens to derail liberalization efforts.

Figure 3
Groundnut oil export share of the African Groundnut Council countries



Source: Ousmane Badiane.

In the early 1960s the African Groundnut Council (AGC) countries—The Gambia, Mali, Niger, Nigeria, Senegal, and Sudan—dominated world trade in groundnut products with a combined share of more than 60 percent of global exports. This changed drastically during the last two to three decades, during which groundnut oil exports from member countries fell an average of 3.6 percent annually. In particular, Nigeria, with a 26 percent share of world exports, went from being the largest exporter among the AGC countries to a net importer in the 1970s. Exports from Senegal, the principal groundnut exporter in the group in the 1980s, accounted for 70 percent of the group's exports and 14 percent of world exports.

RESEARCH RESULTS

FOOD CONSUMPTION AND NUTRITION DIVISION

Food security—access by all people at all times to the food needed for a healthy life—is still beyond the reach of most of the poor and undernourished people of the developing world. Research in the Food Consumption and Nutrition Division focuses on a wide range of policies and programs to improve the food security and nutrition status of these populations.

The FAO/WHO International Conference on Nutrition to be held in late 1992 will increase attention on food security issues worldwide. At the request of the conference organizers, the division prepared background papers, including a major review of policies and programs to improve the food security of poor people. It found that food security is not achievable with a few inexpensive interventions but that large-scale public resource commitments and economic development are required. The wide variation in dimensions, causes, and consequences of food insecurity precludes a general blueprint for setting priorities. (From the Special Report on improving household food security)

To discuss and disseminate research findings and to recommend policy solutions and actions, the division undertook two large-scale workshops during 1991. Both brought together IFPRI researchers with study-country collaborators, policymakers, and representatives of private organizations.

With the Sudanese Ministry of Finance and Economic Planning, the division organized a workshop to discuss findings from its long-term research on drought and famine prevention in Sudan. The workshop brought together some 120 representatives of Sudanese national and local governments, national and international research organizations, and private, international, and bilateral donor communities. The group agreed to a set of immediate and long-term actions, including local and regional stockpiling of food; rationing schemes and targeted food subsidy programs for grains and cooking oil; increased agricultural growth through access to inputs, improved technology, improved irrigation management, and research on rainfed agriculture. (From Division Discussion Paper on famine and food policy, Number 5)

As part of its collaborative research efforts in Central America, the division organized a workshop in Costa Rica with 45 participants representing government agencies—mainly ministries of agriculture and health—nongovernmental and grassroots organizations, regional technical institutions, and international cooperation agencies from

Costa Rica, Honduras, Guatemala, Nicaragua, and El Salvador to discuss ways to reduce food insecurity and malnutrition in the region. Participants addressed the political, social, economic, and cultural causes of food insecurity and critically analyzed current regional strategies, national policies, and local actions. Through the inclusion of grassroots organizations from the five countries, the workshop provided a forum for interaction between those formulating and implementing policies and those usually at the receiving end of policies and programs. A summary of the workshop proceedings, including recommendations of the group, was distributed to the presidents and ministers of health and agriculture of the participating countries and to the heads of key regional institutions and international organizations.

Research completed in the division during the year identified a number of results of significance to policy formulation.

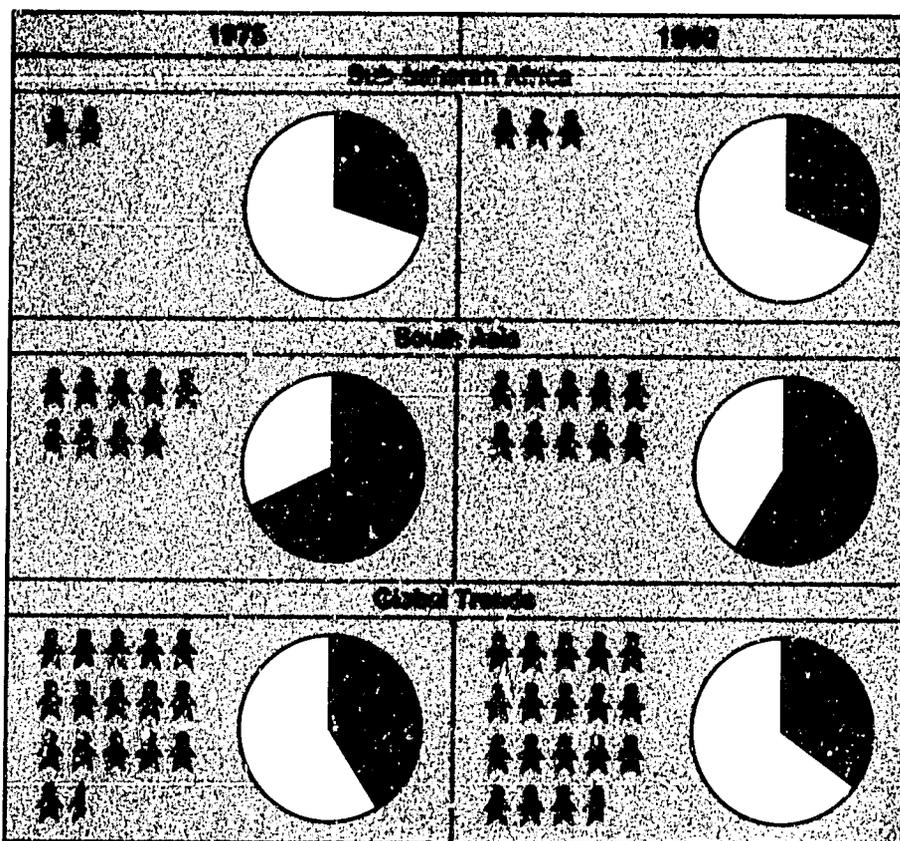
■ Between 1975 and 1990 the number of malnourished children aged four or younger throughout the developing regions of Africa, Asia, and Latin America increased from 166 million to 188 million. Although the percent of malnourished children declined slightly during this period, from 41 to 35 percent, population growth rates suggest that the number of malnourished children will continue to increase. (Figure 4)

■ There is much scope for employment-generating public works programs to improve food security in Sub-Saharan Africa. Research found that the three central problems facing Africa today—food insecurity, lack of employment, and poor infrastructure—can be addressed simultaneously through employment-generating, asset-creating programs. To ensure useful and sustainable asset creation, public works programs need to be integrated into the national planning systems for public goods provision, while identification and implementation must occur locally. (From Working Paper on Food Subsidies 6)

■ Famines are primarily "man made," the result of faulty public policies and wars, and are only partially the result of sudden natural disasters. A systematic study of the causes of famine in East Africa found that famine is inseparable from poverty. Famine-stricken households are characterized by lack of employment opportunities, limited assets, isolation from major markets, limited access to credit, lack of adequate farm technology, and poor health and sanitation. Policy options for the prevention of future famines include promoting agricultural growth in subsistence and commercial food crops, improving rural infrastructure through employment programs, providing basic health and sanitation services, and providing education. (Table 2) (From Food Policy Report on famine, Food Policy Statement 13, and Research Report 88)

■ In countries with complex agro-ecologies facing rapid population growth and limited availability of new technology for rapid agricul-

Figure 4
Trends in malnourished children in the Third World, 1975-90



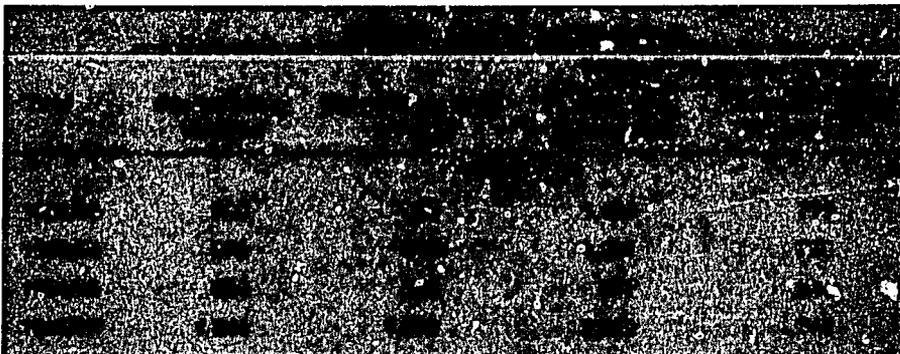
Each figure represents 10 million children.

Source: Marito Garcia

From 1975-1990, the number of malnourished children (those who are underweight for their age) aged four or younger declined in Southeast Asia and Latin America. However, in Sub-Saharan Africa the number rose from 18 to 30 million, and in South Asia—India, Pakistan, Sri Lanka, Bangladesh, and Nepal—the number increased from 90 to 101 million. The percentage of malnourished children declined in all regions except Sub-Saharan Africa; however, projections to the year 2000 suggest that although the prevalence of malnutrition will probably continue to decline overall, the number of malnourished children will increase, particularly in Sub-Saharan Africa and South Asia.

tural growth, nonagricultural rural growth and employment expansion are critical factors for improving food security and nutrition. Research on agricultural commercialization in a densely populated area of Rwanda found that technical change in subsistence crops alone cannot be a long-term solution to household food security and improved

Table 2
Grain production before, during, and after 1984/85 Sudanese drought in area participating in a rural development project



Source: Joachim von Braun, *A Policy Agenda for Famine Prevention in Africa* (Washington, D.C.: IFPRI, 1991), 15.

Villages participating in a project providing participants with access to improved cultivars, fertilizers, animal traction, and extension advice in Darfur, an area hard hit by drought during the 1984/85 crisis, were better able to cope than nonparticipating villages. As a result, fewer household members were forced to migrate in search of food. This concentration of technological improvements in a comparatively high-potential area provided respite for drought refugees from a large surrounding area. The success of this project highlights the key role that improved agricultural technology can play in famine prevention and mitigation.

nutrition; this will require diversification of the rural economy accompanied by a better educated and trained work force and improved infrastructure, particularly roads and services. The study found that nutritional improvement also depends on improvements in health and sanitation conditions. (From Research Report 85)

■ Poor people in rural areas have diverse sources of income that vary by economic setting. Research on the income and employment strategies of the malnourished rural poor in Africa, Latin America, and Asia found that half of the income of rural households in many survey locations comes directly from agriculture; the rest comes from nonagricultural wage employment, transfers, and other nonagricultural sources. The study suggests that focusing on prevention of policy-induced market failures, improved market integration through infrastructure, provision of social security (including community health and sanitation improvement), and rural growth promotion will help alleviate poverty. (From Working Paper on Commercialization of Agriculture and Nutrition 5)

■ Formal credit systems have bypassed the rural poor and have carried high costs because of bad loans made to those with higher incomes. The Grameen Bank in Bangladesh and other formal and informal systems serving the rural poor in other countries suggest that this need not be the case. Collaborative research in The Gambia, Madagascar, Cameroon, Ghana, and Pakistan has found innovative credit and savings schemes that may be contributing to increased food consumption and improved nutrition.

■ In Pakistan, research suggests that a woman's level of education is closely linked to her child's nutritional well-being. A significant reduction in malnutrition could be achieved by increasing public investments in health and education. The research finds that children's growth is hampered by illness. Community health services with adequate supplies of drugs and functioning equipment, sanitation, water supply, and drainage systems are crucial to reducing illness and so improving children's growth and development.

■ Proper growth and development of some children in some areas may be affected in the long run more by micronutrient intakes and sanitary practices and conditions than by levels of calorie intake. This finding is currently contributing to a refocusing of attention on the production and consumption of foods containing these micronutrients.

RESEARCH RESULTS

TRADE AND MACROECONOMICS DIVISION

Trade and macroeconomic—or economy-wide—policies of developing countries significantly affect the structure of incentives for growth in food production and other related sectors, and they also affect the ability of these countries to meet food consumption needs. World market conditions and policies of developed countries influence the food system of developing countries, limiting what they can accomplish through national policies to exploit their comparative advantage in world trade. Research in the Trade and Macroeconomics Division addresses various aspects of the domestic and international policy environment that affect the food systems of the developing countries.

The division's collaborative research effort, which focused on Asia and Sub-Saharan Africa during 1991, resulted in two major workshops and a number of significant research findings.

A workshop was held in Nyanga, Zimbabwe, on the regional integration of southern African agricultural markets, cosponsored by the Zimbabwean Ministry of Lands, Agriculture, and Rural Resettlement, the SADCC Food Security Unit, and the University of Zimbabwe. Senior policymakers and analysts from the region discussed the potential for intraregional trade in agricultural products, how existing internal and external policies reduce that potential, and the policy implications for food security. Ongoing economic liberalization reforms can contribute to expanded trade and economic progress in the region, given the distorted exchange rates, high barriers to trade, misleading investment incentives, and heavy government intervention in economic activities. They agreed that internal liberalization among southern African countries is a necessary starting point for a program of regional market integration.

In Colombo, a workshop was held to discuss the results of a collaborative research effort to assess Sri Lanka's comparative advantage for meeting its domestic rice needs and building its capacity to conduct food policy research. With key officials from the ministries of agriculture and planning and the Central Bank as well as representatives of bilateral agencies, the World Bank, and nongovernmental organizations, researchers from IFPRI and Sri Lanka presented research methodologies and findings on how Sri Lanka, currently a rice importer, could meet its domestic rice needs. With methodology developed for this project to assess the future of rice production,

IFPRI's Sri Lankan collaborators are continuing research on a number of secondary food crops including maize and chilies.

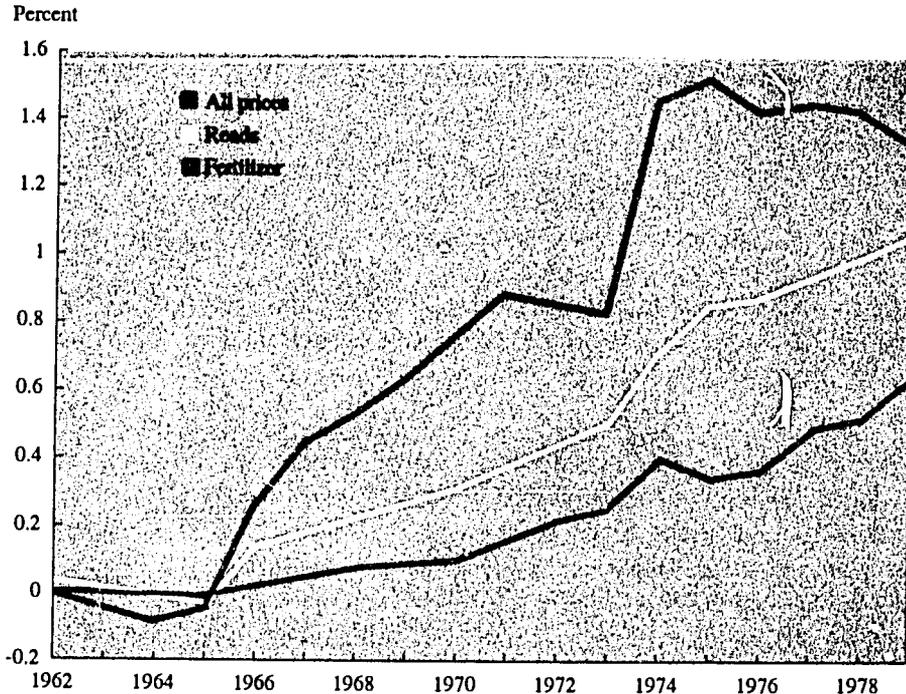
The division's research effort identified a number of results of policy significance during the year.

■ In the Philippines, the macroeconomic policy environment—in particular the foreign trade regime, interest rate and credit policies, and public investment—favored large industry and urban-based enterprises over the relative profitability of rural nonfarm production during 1965-80, a period marked by rapid agricultural growth in that country. Thus, the broad-based employment and income growth that could have induced substantial multiplier effects from the rapid agricultural growth was unrealized. Research on the Philippine experience shows that inappropriate trade and macroeconomic policies can represent an important supply-side constraint in the linkage effects of agricultural growth on rural nonagricultural production and overall economic growth.

■ Improvement in the economic environment is assumed to lead to improvement in productivity through the resulting introduction of new techniques of production. Research that captures this process in the case of the green revolution in the Indian Punjab found that during the 1960s and 1970s the pace of diffusion of the modern wheat technology was determined by economic incentives and the availability of inputs such as fertilizers and irrigation. Only three years after their introduction, the green revolution wheat varieties were being planted on 70 percent of the wheat area in Punjab. Subsequently, the spread of these varieties was more gradual. The results suggest that when the input requirements of the new technology are different from those of the existing technology, the pace of implementation will be determined by the speed at which resources can be shifted to the new technology. This speed depends on the difference in productivity between the new and existing technologies, on relative prices and other economic incentives, and on overall availability of inputs. This identification of the process of technology diffusion has far-reaching implications for policies for agricultural growth. (Figure 5) (From Research Report 87)

■ If developing countries are to increase their exports of horticultural products—including fruits, vegetables, and cut flowers—to developed countries, low prices may not be enough to enable them to compete. A study of the rapidly growing Japanese horticultural market identified the importance of price changes in explaining supply shifts from one exporter to another, but not in explaining the overall growth of Japan's horticultural imports. Japan's phytosanitary regulations are the major impediment to the access of developing countries to this expanding market. Because phytosanitary standards are not likely to be lowered, the study suggests that developing countries should try to adopt the technology needed to satisfy the standards. Improvements

Figure 5
Effect of economic incentives and the availability of inputs on Punjab agriculture during and after the introduction of improved varieties



Source: Anya McGuirk and Yair Mundlak, *Incentives and Constraints in the Transformation of Punjab Agriculture*, Research Report 87 (Washington, D.C.: IFPRI, 1991), 92.

The introduction of modern varieties of wheat, rice, and other crops in the Punjab increased the demand for inputs and infrastructure. It also increased the extent to which prices influenced production because of their effect on profitability, enabling farmers to purchase inputs and make other investments. Shown here is the effect on crop output of a 1 percent change in prices, roads (representing infrastructure), and fertilizers (representing inputs). The effect of these responses is cumulative over time as the share of modern varieties increases in total area, and the availability of inputs improves.

in the distribution systems in both Japan and the exporting countries would also help expand developing-country exports of horticultural products to Japan. Diversification of agricultural production, including production of nontraditional export crops, is critical to raising incomes and enhancing food security in many developing countries. (From Research Report 89)

SPECIAL DEVELOPMENT STUDIES DIVISION

Research in the Special Development Studies Division focuses on the pivotal role of agriculture in the development process. Research continued in 1991 for ongoing projects on China, India, Pakistan, Zambia, Zimbabwe, the Middle East, and North Africa. All of these projects focus on identifying policies to strengthen the growth and equity effects of technological change in agriculture.

As part of the collaborative research effort of the division, a workshop was held in Lusaka, Zambia, on smallholder agriculture and household welfare. The workshop, which followed a recently completed research project, brought together representatives from the Zambian Cabinet Office, Ministry of Agriculture, National Food and Nutrition Commission, and National Commission for Development Planning and the Food and Agriculture Organization of the United Nations with researchers from IFPRI and the University of Zambia to discuss future collaborative research. This effort will focus on how government objectives for improving the welfare of smallholder farmers are met through policies related to agricultural research and extension, irrigation, and the provision of rural service infrastructure and education.

A number of research results relevant for food policy were identified by the division during 1991. Those of particular significance are noted below.

■ The green revolution in South India led to sizable, across-the-board gains in income, nutrition, and standard of living for both small- and large-scale farmers, and even for the landless poor. A study on the effects of the modern agricultural technologies in Tamil Nadu found that large-scale farmers were the first adopters of the new technology, but that smallholder farmers also adopted the technology after a lag time of three to five years. Wages almost doubled for smallholder farmers and landless laborers as well. This study, which was the first to examine the effects of the green revolution on nonagricultural households, found considerable economic growth among nonfarm activities in the villages and local towns.

The study found that government policy encouraged this pattern of growth based on technological change in agriculture. The local and national governments invested heavily in basic infrastructure initially, which led to well-developed transport, telecommunications, postal, banking, small irrigation, and electrification systems throughout the region. They also provided a range of producer and consumer services and supported an array of small businesses through a direct assistance program. (Table 3) (From the IFPRI/Johns Hopkins University Press book, *The Green Revolution Reconsidered*, and *Food Policy Statement 14*)

■ The cultivation of hybrid maize was a driving force in the growth of agriculture in Eastern Province, Zambia, and incomes of farmers who adopted hybrid maize were substantially higher than those who did not. A study in Zambia that examined the effects of technological change in agriculture on growth and equity for farmers in the region found that use of oxen was the most significant factor for increasing productivity. The study found that consistent government policies encouraging access to production services, including credit for smallholder farmers, could greatly contribute to increased adoption of technology, as could policies to increase the efficiency of agriculture and to shift the terms of trade in favor of agriculture. The research for this study, which included the compilation of primary data to delineate the physical, institutional, and policy environments in which modern agricultural technology is adopted, involved collaboration with three Zambian institutions. (From the Occasional Paper on adopting improved technology in Zambia)

■ Remittances from Egyptian migrant workers benefit the rural poor of their local economies. A study examining the economic effect of workers from the developing countries migrating to wealthier countries to increase their earnings found that laborers from all economic groups migrate and that migrants are more likely than those who do not migrate to invest their earnings in the local economy, particularly in land and housing. The study suggests that if policymakers were to ensure that private rates of return on key agricultural crops were favorable, governments could channel the large flow of cash into investments in new agricultural technologies. (From Research Report 86)

Table 3
Effect of the green revolution on household incomes in North Arcot, India

Type of Household	Poorly irrigated Villages	
	1973/74	1983/84
Small paddy farms	1,100	2,263 (1973/74 Re)
Large paddy farms	2,764	3,266
Nonpaddy farms	1,732	2,032
Nonagricultural households	1,187	1,837

Source: Peter B. R. Hazell and C. Ramasamy, *The Green Revolution Reconsidered: The Impact of High-Yielding Rice Varieties in South India* (Baltimore: Johns Hopkins University Press for IFPRI, 1991), 41-42.

With access to the modern agricultural technologies identified with the green revolution, family incomes improved substantially between 1973/74 and 1983/84 in the study sample of poorly irrigated villages. It increased by 18 percent for large paddy farms and by 90 percent for small paddy farms. The landless laborers more than doubled their income, bringing their average almost up to the level of small paddy farmers. The nonpaddy and nonagricultural households increased their incomes by about 17 and 55 percent, respectively, even though they were not directly involved in the changes that occurred in paddy technology.

OUTREACH

Through its outreach activities—collaboration, training, publications and information dissemination, and workshops, seminars, and other meetings—IFPRI reaches its audience of policymakers, policy analysts, natural and social scientists, and opinion formers in the international political arena. IFPRI's research results can thus form the basis for dialogues on food policy at the national level, among regional and international organizations, within the CGIAR, and among the donor community. The different aspects of the outreach process are outlined below.

COLLABORATION

IFPRI conducts virtually all of its field-based research with developing-country partners. These collaborative activities help to build the capacity for policy research within national research systems and enable IFPRI to shape its research to the needs of developing countries. In 1991 IFPRI collaborated with more than 100 institutions in the Third World, about two-thirds of which were universities and development research centers and about a third were ministries of agriculture, economics, or planning. IFPRI is currently experimenting with formalizing some of the informal research networks that have developed as a result of its collaborative activities. During the last year 10 IFPRI staff members were posted to developing countries as part of collaborative projects with institutions in those countries.

IFPRI also undertakes collaborative research with other centers in the CGIAR. This provides a focus on the policy factors that affect the development and use of the new technologies developed by the other centers. The recent expansion of the CGIAR has raised new policy concerns—in the area of forestry and agroforestry, for example—to which IFPRI is able to bring its experience in a wide range of micro- and macroeconomic research. Collaborative activities among centers include data sharing, project analysis, formulation of intercenter research strategies, and posting of staff to other centers. In 1991 two IFPRI staff members were posted to other international agricultural research centers.

A third group of collaborators consists of multilateral and developed-country institutions. These partnerships enable IFPRI to identify gaps in knowledge and adopt new developments in methodology. The forms of collaboration include shared staff appointments, joint projects, consulting arrangements, and conferences and seminars.

COLLABORATING INSTITUTIONS IN DEVELOPING COUNTRIES

AFRICA

Botswana

Ministry of Agriculture
Ministry of Finance and Development Planning
Ministry of Health
Southern African Development Coordination Conference

Burkina Faso

Centre d'Etudes, de Documentation, de Recherche Economique et Sociale
Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel

Côte d'Ivoire

Cellule Cinergie
Centre Ivoirien de Recherches Economiques et Sociales

Ethiopia

Addis Ababa University
Ethiopian Nutrition Institute
Office of the National Committee for Central Planning

Ghana

Ministry of Agriculture
Ministry of Health
University of Ghana, Institute of Statistical, Social, and Economic Research

Kenya

Central Bureau of Statistics
Jomo Kenyatta University College of Agriculture and Technology
Ministry of Planning and National Development

Madagascar

Direction de la Production Agricole, Ministère de l'Agriculture
Ministère de Recherche Scientifique et Technologique, Centre National de
Recherche sur l'Environnement

Malawi

Department of Research and Environmental Affairs

Mali

Institut du Sahel
Système d'Information des Marchés

Niger

Institut National de Recherches Agronomiques du Niger

Nigeria

African Groundnut Council

Senegal

Institut Sénégalais de Recherches Agricoles

Tanzania

Ministry of Agriculture
Ministry of Public Works
Sokoine University

Tanzanian Food and Nutrition Commission
University of Dar es Salaam

Togo

Ministry of Rural Development

Zambia

Cabinet Office

Eastern Province Agricultural Development Project

Ministry of Agriculture

Ministry of Cooperatives

Ministry of Finance, Economic Development, and Planning

National Commission for Development Planning

National Council for Scientific Research

National Food and Nutrition Commission

Small Industries Development Organization

University of Zambia

Zimbabwe

Environment and Development Activities

Institute of Development Studies

Ministry of Local Government, Rural and Urban Development

University of Zimbabwe

ASIA

Bangladesh

Bangladesh Institute of Development Studies

Ministry of Food

People's Republic of China

Beijing Agricultural University, Center for Integrated Agricultural Development

China National Rice Research Institute

Chinese Academy of Agricultural Sciences, Institute of Agricultural
Economics Research

Chinese Academy of Sciences, Institute of Geography

Nanjing Agricultural University

India

Central Soil Salinity Research Institute

Commission on Agricultural Costs and Prices

Gujarat Institute of Area Planning

Indian Agricultural Research Institute

Indian Agricultural Statistics Research Institute

Indian Institute of Management (Ahmedabad)

Institute of Economic Growth

Jawaharlal Nehru University

Metaplanners

Ministry of Agriculture

National Council for Applied Economic Research

Punjab Agricultural University

Regional Research Station (Aruppokottai)

Tamil Nadu Agricultural University

Tamil Nadu Rice Research Institute

University of Madras

Indonesia

Center for Agro Socio Economic Research
Ministry of Agriculture

Nepal

Agricultural Projects Services Centre
Ministry of Agriculture

Pakistan

Applied Economic Research Centre
Centre for Applied Economic Studies
Pakistan Institute of Development Economics
Punjab Economic Research Institute

Philippines

Department of Agriculture
Philippine Institute for Development Studies
University of Philippines, Diliman
University of Philippines, Los Baños

Sri Lanka

Agrarian Research and Training Institute
Ministry of Agriculture

Thailand

Thailand Development Research Institute
Thammasat University

LATIN AMERICA**Brazil**

Empresa Brasileira de Pesquisa Agropecuária
Instituto Sociedade, População e Natureza

Chile

Universidad Católica de Chile

Costa Rica

Centro de Estudios y Publicaciones-Alforja
Confederation of Central American Universities
Ministry of Health
Ministry of Agriculture and Livestock
Tropical Agricultural Center for Research and Training

Guatemala

Cooperative Unión de Cuatro Pinos

Honduras

Centro de Comunicación Popular de Honduras

Mexico

National Institute of Nutrition

Nicaragua

Centro de Educación y Comunicación Popular-Cantera
Centro para la Participación Democrática y el Desarrollo-Cenzontle
Instituto Mujer y Comunidad
Proyecto PRONORTE

Panama

Regional Program on Food Security in Central America

Uruguay

Centro de Estudios de la Realidad Económica y Social

NORTH AFRICA/MIDDLE EAST**Jordan**

Ministry of Agriculture

Syria

Ministry of Agriculture and Agrarian Reform

Tunisia

Ministry of Agriculture

**COLLABORATING CGIAR AND OTHER
INTERNATIONAL AGRICULTURAL
RESEARCH INSTITUTIONS**

Centro Internacional de Mejoramiento de Maíz y Trigo

Centro Internacional de la Papa

International Center for Agricultural Research in the Dry Areas

International Crops Research Institute for the Semi-Arid Tropics

International Fertilizer Development Center

International Irrigation Management Institute

International Livestock Center for Africa

International Rice Research Institute

International Service for National Agricultural Research

West Africa Rice Development Association

Winrock International

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**COLLABORATING INSTITUTIONS IN DEVELOPED
COUNTRIES AND MULTILATERAL AGENCIES**

Agropolis, France

Asian Development Bank

Centre de Coopération Internationale en Recherche Agronomique
pour le Développement, France

Centre d'Etudes et de Recherches sur le Développement
International, France

Club du Sahel, France

Cornell University, U.S.A.

Food and Agriculture Organization of the United Nations

Institute of Nutrition of Central America and Panama

Italian Nutrition Institute

The Johns Hopkins University, U.S.A.

Michigan State University, U.S.A.

New York University, U.S.A.

Otaru University of Commerce, Japan

Rutgers University, U.S.A.

United Nations Administrative Committee on Coordination/
Sub-Committee on Nutrition

United Nations Children's Fund
Universidad Politécnica de Valencia, Spain
University of Guelph, Canada
University of Kiel, Federal Republic of Germany
University of Leuven, Belgium
University of North Carolina, U.S.A.
University of Pennsylvania, U.S.A.
University of Stuttgart (Hohenheim), Federal Republic of Germany
Virginia Polytechnic Institute and State University
Williams College, U.S.A.
World Bank
World Food Programme
Yale University, U.S.A.

TRAINING

Successful policy formulation and implementation is ultimately a function of developing-country institutions that have adequately trained staff. Recognizing this, IFPRI builds research capacity principally by improving the skills of researchers in developing countries through their participation in collaborative research projects. Because training is integrated with actual research participation, it is more effective than independent training, which may not be related to the work responsibilities of the trainee.

Researchers collaborating on projects improve their data analysis skills during the field component of the project as well as during their stay at headquarters. As part of the project on the food situation and outlook in Asia, for example, researchers from Indonesia, Nepal, Pakistan, and Thailand spent a month each at IFPRI in 1991 working on their country studies. Workshops and seminars—such as the training session in India on irrigation research methodologies—also provide a means of informing and training researchers, as do informal discussions with government officials. Within a field project, courses are organized as necessary to teach data entry, statistical analysis, and analytical techniques to implement the project. Graduate students whose thesis work coincides with the project are supervised by IFPRI staff. When the research output is a model, courses are held to train those who will use the model in their work.

IFPRI's project on food policy in Bangladesh included training in major food policy issues for 32 officials from several government ministries and the planning commission. Participants attended sessions on such topics as food production growth, supply response relations, world price and domestic price comparisons, monitoring changes in food security, and targeted policy instruments. A previous course in the use of computers for food policy analysis was given in 1990.

In Sri Lanka in 1991, researchers at the Agrarian Research and Training Institute were trained in computer use and methodology. The workshop focused on determining the appropriate policy environment for improving the efficiency of rice production in Sri Lanka.

Close and long-lasting interactions between IFPRI staff and developing-country researchers and policy analysts, in which each learns from the other, are among the most effective means of improving skills and research effectiveness. Further, research collaborators who have moved to senior government positions can incorporate IFPRI training programs into their own training programs.

To increase the scope of its training program, IFPRI intends to expand its postdoctoral program, facilitate the participation of its staff in training programs of other institutions, enable a larger number of developing-country researchers to work on IFPRI projects outside their own countries, encourage developing-country institutions to offer courses using methodologies developed or improved by IFPRI, and develop materials for these training courses. During 1991 production began on a training manual for designing data entry and verification systems for field research. This will be the first in a series of manuals.

PUBLICATIONS AND INFORMATION

IFPRI's publications—distributed to about 14,000 individuals and libraries in educational, research, and government organizations in about 150 countries—are the primary vehicle for disseminating research results. Major studies undertaken in relation to specific policy issues and based on data analysis and research to advance methodology are published in the refereed research report series. The key policy implications in each report are summarized in four-page abstracts. In 1991, analyses were also reported in several working paper series, occasional papers that make available conference proceedings and overviews of policy issues, reprints of journal articles by IFPRI staff, and a book series published for IFPRI by The Johns Hopkins University Press. A new series, Food Policy Report, was initiated that presents in-depth, nontechnical overviews of regional or international policy issues of pressing concern. A complete list of publications for 1991 and a list of the research report referees for 1990-91 appears in the Publications and Papers section.

As part of its effort to reach its more general audiences and influence conventional wisdom with some of its more exciting research results, IFPRI participated in two press briefings in 1991—one on famine and another on the green revolution.

WORKSHOPS, SEMINARS, AND OTHER MEETINGS

IFPRI holds workshops and seminars as part of its research projects in study countries and regions. These meetings bring together IFPRI collaborators and staff to discuss research design, methodologies, and results and to increase the relevance of the research to policy problems. To make research results more directly accessible to

IFPRI's policymaking audience, IFPRI also holds policy seminars, which bring together high-ranking government officials in developing countries and IFPRI staff to discuss major issues of Third World agriculture. Results of these meetings are discussed in the sections on each of the divisions.

WORKSHOPS AND CONFERENCES 1991

- Workshop on Drought and Famine Prevention in the Sudan, January 7, Khartoum, Sudan
- Workshop on Efficiency and Policy Incentives in Rice Production in Sri Lanka, February 14, Colombo, Sri Lanka
- Workshop on Irrigation Performance Indicators, March 18-19, Washington, D.C.
- Workshop on Measures to Reduce Food Insecurity and Malnutrition in Central America, June 4-6, Heredia, Costa Rica
- International Workshop on Forestry and Agroforestry Policy Research Needs, July 9-12, Washington, D.C.
- Conference on Agricultural Sustainability, Growth, and Poverty Alleviation: Issues and Policies, September 23-27, Feldafing, Federal Republic of Germany
- Workshop on Smallholder Agriculture and Household Welfare, November 7-9, Lusaka, Zambia
- Workshop on Regional Market Integration and Trade in Southern Africa: The Impact of Agricultural Trade Liberalization Policies and Market Reform, November 19-21, Nyanga, Zimbabwe
- Basic Policy Training Course, November 25-December 12, Chittagong, Bangladesh
- Workshop on Irrigation Research Methodologies, December 16-17, Trivandrum, India

In addition, in order to identify areas of possible collaboration among IFPRI, European, and developing-country scientists, a meeting of IFPRI's Advisory Committee was held on May 16-17 in Leuven, Belgium. And, as part of IFPRI's strategic planning process, policymakers, advisers, and researchers from the developing regions of the world met with IFPRI board members and staff in Paris on May 21-22. These discussions were incorporated in the published statement of IFPRI's strategy for the 1990s.

In 1991 IFPRI continued to conduct its in-house seminar program in Washington, D.C. These seminars provide a chance for visiting officials from developing countries to informally discuss the policy implications of IFPRI's research with IFPRI staff and other representatives from organizations in the Washington area. Ten seminars were held in 1991.

PUBLICATIONS AND PAPERS

RESEARCH REPORTS AND ABSTRACTS

Research Report 85

Commercialization of Agriculture Under Population Pressure: Effects on Production, Consumption, and Nutrition In Rwanda, by Joachim von Braun, Hartwig de Haen, and Juergen Blanken, 1991.

Research Report 86

The Effects of International Remittances on Poverty, Inequality, and Development in Rural Egypt, by Richard H. Adams, Jr., 1991.

Research Report 87

Incentives and Constraints in the Transformation of Punjab Agriculture, by Anya McGuirk and Yair Mundlak, 1991.

Research Report 88

Drought and Famine Relationships in Sudan: Policy Implications, by Tesfaye Teklu, Joachim von Braun, and Elsayed Zaki, 1991.

Research Report 89

Growth in Japan's Horticultural Trade with Developing Countries: An Economic Analysis of the Market, by Masayoshi Honma, 1991.

Policy implications of each research report are summarized in the four-page *IFPRI Abstract*, which is published in English, French, and Spanish.

OTHER SERIES

IFPRI/Johns Hopkins University Press Book Series

The Green Revolution Reconsidered: The Impact of High-Yielding Rice Varieties in South India, by Peter B. R. Hazell and C. Ramasamy. Baltimore, Md.: The Johns Hopkins University Press for IFPRI, 1991. US\$39.

Occasional Papers

Adopting Improved Farm Technology: A Study of Smallholder Farmers in Eastern Province, Zambia, edited by Rafael Celis, John T. Millimo, and Sudhir Wanmali, 1991.

A Framework for Seed Policy Analysis, by Carl E. Pray and Bharat Ramaswami, 1991.

Future Directions for Indian Irrigation: Research and Policy Issues, edited by Ruth Meinzen-Dick and Mark Svendsen, 1991.

Trends and Prospects for Cassava in the Developing World, by J.S. Sarma and Darunee Kunchai, 1991.

Working Papers on Commercialization of Agriculture and Nutrition

Number 5

Income Sources of Malnourished People in Rural Areas: Microlevel Information and Policy Implications, edited by Joachim von Braun and Rajul Pandya-Lorch, May 1991.

Working Papers on Food Policy in Bangladesh

Number 1

A Literature Review of Public Food Distribution in Bangladesh, by Jeffrey Alwang, September 1991.

Number 2

The Relation Between Rice Prices and Wage Rates in Bangladesh, by R. Thamarajakshi and Martin Ravallion, October 1991.

Number 3

A Disaggregated Model for Stabilization of Rice Prices in Bangladesh, by Quazi Shahabuddin, October 1991.

Number 4

Optimal Stock for the Public Foodgrain Distribution System in Bangladesh, by Francesco Goletti, Raisuddin Ahmed, and Nulmuddin Chowdhury, 1991.

Working Papers on Food Subsidies

Number 6

Labor-Intensive Public Works for Food Security: Experience in Africa, by Joachim von Braun, Tesfaye Teklu, and Patrick Webb, July 1991.

Working Papers on Future Growth in Indian Agriculture

Number 1

Farm-Level Effects of Soil Degradation in Sharda Sahayak Irrigation Project, by Pramod K. Joshi and Dayanatha Jha, September 1991.

Food Policy Report

A Policy Agenda for Famine Prevention in Africa, by Joachim von Braun, October 1991.

Food Policy Statements

Number 13

A Policy Agenda for Famine Prevention in Africa, by Joachim von Braun, October 1991.

Number 14

The Green Revolution Reconsidered, by Peter B.R. Hazell and C. Ramasamy, December 1991.

IFPRI Reports

The newsletter, *IFPRI Report*, was published quarterly in 1991 in English, French, and Spanish.

Reprints

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Badiane, Ousmane. 1991. Regional agricultural markets and development strategies in West Africa. Reprinted from *Quarterly Journal of International Agriculture* 30 (No. 1).

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_____. 1990. Agricultural growth and food imports in developing countries: A reexamination. Reprinted from *Economic development in East and Southeast Asia: Essays in honor of Professor Shinichi Ichimura*, ed. Seiji Naya and Akira Takayama. Singapore: Institute of Southeast Asian Studies, and Honolulu: East-West Center.

- _____. 1990. Development strategies, foreign trade regimes, and agricultural incentives in Asia. Reprinted from *Journal of Asian Economics* 1 (No. 1).
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- Bouis, Howarth E. 1991. Rice in Asia: Is it becoming a commercial good? Comment. Reprinted from *American Journal of Agricultural Economics* 73 (No. 2).
- Braun, Joachim von. 1991. Social security in Sub-Saharan Africa: Reflections on policy challenges. Reprinted from *Social security in developing countries*, ed. Ehtisham Ahmad, Jean Drèze, John Hills, and Amartya Sen. New York: Oxford University Press.
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- Braun, Joachim von. (With Hans P. Binswanger.) 1991. Technological change and commercialization in agriculture: The effect on the poor. Reprinted from *The World Bank Research Observer* 6 (January).
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- Garcia, Marito. (With Benjamin Senauer.) 1991. Determinants of the nutrition and health status of preschool children: An analysis with longitudinal data. Reprinted from *Economic Development and Cultural Change* 39 (January).
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Stone, Bruce. 1990. Evolution and diffusion of agricultural technology in China. Reprinted from *Sharing innovation: Global perspectives on food, agriculture, and rural development*, ed. Neil B. Kotler. Washington, D.C.: Smithsonian.

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OTHER PUBLISHED WORKS BY IFPRI STAFF

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SPECIAL REPORTS

Improving household food security. Prepared by Joachim von Braun, Howarth Bouis, Shubh Kumar, and Rajul Pandya-Lorch for the Food and Agriculture Organization of the United Nations and the World Health Organization.

The Philippine corn/livestock sector: Performance and policy implications. Prepared by Mark Rosegrant and Leonardo Gonzales for the U.S. Agency for International Development.

DIVISION DISCUSSION PAPERS

"Drought and famine prevention in Sudan," by Elsayed A. A. Zaki, Joachim von Braun, Tesfaye Teklu. Food Consumption and Nutrition Division Discussion Papers on Famine and Food Policy, Number 5, 1991.

"Household responses to recurrent drought: A case study of the Kababish pastoralists in northern Kordofan, Sudan," by Frank Z. Riely. Food Consumption and Nutrition Division Discussion Papers on Famine and Food Policy, Number 6, 1991.

PAPERS PRESENTED BY IFPRI STAFF

In addition to the publications mentioned above, IFPRI staff in 1991 presented more than 50 papers in various forums around the world other than those organized by IFPRI. Presentations were made at seminars, workshops, and conferences in institutional settings that included universities and academic society conferences, nationally and internationally organized research colloquia, and bilateral and multilateral advisory group meetings. These intensive interactions with policymakers and researchers on issues related to food policy enabled IFPRI to contribute to policy dialogues and discussions on research and methodology, complementing other forms of outreach.

More than a third of the papers were presented at nationally or regionally sponsored meetings and bilateral or multilateral agencies, another third at symposia held at universities, and the remainder at national or international research institutions and academic society meetings.

PUBLICATIONS REVIEW COMMITTEE AND REFEREES

All manuscripts submitted for publication as IFPRI research reports and IFPRI/Johns Hopkins University Press Books undergo extensive review, both inside and outside IFPRI. The Publications Review Committee oversees these reviews and makes recommendations for publication. The Committee comprises 9 research fellows and the director of Information.

IFPRI is most grateful for the efforts of the following external referees who reviewed manuscripts for the research report series during 1990 and 1991.

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About 60 researchers from around the world spent time at IFPRI during 1991. Those listed below spent about a month or more at IFPRI.

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List includes part-time staff members. Country indicates citizenship of IFPRI staff.

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FINANCIAL STATEMENTS

Summary of financial information for the years ended December 31, 1991 and 1990. The full financial statements and the independent auditors' report are available from IFPRI on request.

Balance Sheets December 31, 1991 and 1990 (US\$ thousands)

		1991	1990
Assets			
Current Assets	Cash and short-term investments	\$1,377	\$2,447
	CGIAR unrestricted grants receivable	141	311
	Special project contracts receivable	2,437	1,516
	Other receivables	384	262
	Prepaid expenses and other current assets	158	186
	Total current assets	4,497	4,722
Other Assets	Property and equipment, net	331	422
	Total assets	\$4,828	\$5,144
Liabilities and Fund Balances			
Current liabilities	Accounts payable	\$440	\$684
	Accrued vacations	429	409
	Advance payment of CGIAR unrestricted grant funds	500	1,200
	Unexpended CGIAR restricted grant funds	897	838
	Unexpended special project contract funds	1,228	859
	Other liabilities	26	9
	Total current liabilities	3,520	3,999
Accrued benefits		138	-
	Total liabilities	3,658	3,998
Fund balances – unrestricted	Working capital fund	838	723
	Net investment in property and equipment	330	422
	Total fund balances – unrestricted	1,169	1,145
Commitments and contingencies		-	-
	Total liabilities and fund balances	\$4,828	\$5,144

**Statements of Revenue, Expenses, and Changes in
Working Capital Fund Balance**
December 31, 1991 and 1990
(US\$ thousands)

		1991	1990
Revenue			
Grant income	CGIAR - unrestricted	\$6,680	\$6,742
	CGIAR - restricted	301	296
	Special project income - restricted	6,417	5,292
Investment income		65	113
Other income		5	8
Total revenue		13,468	12,451
Expenses			
Program services	Direct research	8,884	8,053
	Direct research support (information dissemination and computer services)	846	767
	External reviews	70	308
	Total program services	9,800	9,128
Nonprogram services		116	75
General and administrative - indirect support		3,528	3,393
Total expenses		\$13,444	\$12,596
Excess (deficiency) of revenue over expenses		24	(145)
Transfer from net investment in property and equipment		\$91	\$165
Increase in working capital fund		115	20
Working capital fund balance, beginning of year		723	703
Working capital fund balance, end of year		838	723

Schedule of Expenses by Type
(US\$ thousands)

		1991	1990
Expenses			
	Personnel	\$5,697	\$5,345
	Fringe benefits	1,877	1,743
	Collaboration	2,167	1,860
	Travel	1,180	1,123
	Computer	136	171
	External publications	378	437
	Trustees' expenses (non-travel)	60	109
	Office operations	1,706	1,542
	Equipment purchases - special/restricted projects	59	43
	Depreciation	184	223
Total		\$13,444	\$12,596

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 worldwide interaction with policymakers, administrators, and others concerned with increasing food production and with improving the equity of its distribution. Research results are published and distributed to officials and others concerned with national and international food and agricultural policy. As a constituent of the Consultative Group on International Agricultural Research, IFPRI receives support for its integrated program of research from a number of governments, multilateral organizations, foundations, and other sources.

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