INTERNATIONAL FOOD
POLICY RESEARCH INSTITUTE

sustainable solutions for ending hunger and poverty

E S S A Y

Agriculture, Food Security, Nutrition and the Millennium Development Goals

2003-2004

A N N U A L R E P O R T

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute (IFPRI®) was established in 1975. IFPRI is one of 15 agricultural research centers that receives its principal funding from governments, private foundations, and international and regional organizations, most of which are members of the Consultative Group on International Agricultural Research.

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Message from the Chair of the Board of Trustees

The past year was certainly a "year of change" for IFPRI. Following a new strategy for the Institute which was developed by the management in consultation with the Board, the organization carried out a process of restructuring with a view to improving its quality of research, strengthening the capacity for research in developing countries, and setting up mechanisms that ensure greater impact of research on policy. In a major development during the year, IFPRI was entrusted by the Consultative Group on International Agricultural Research (CGIAR) with bringing the key programs of the International Service for National Agricultural Research (ISNAR) under its governance. The restructuring and the expansion during the year have provided further thrust to the decentralization of IFPRI's operations.

An important part of the restructuring exercise at IFPRI was the creation of a new division focusing on Development Strategy and Governance with a view to encouraging an integrated approach to study the implications of research on food and agriculture systems for policies and institutions. The Division has begun its work in full earnest and is expected to facilitate enhanced impact by offering policymakers and their advisers new insights into the consequences of policy choices. The restructuring exercise is also designed to enable researchers at IFPRI to better focus on the development challenges emanating from the external economic environment, particularly in the context of the World Trade Organization negotiations.

The integration of the ISNAR program into IFPRI has been both exciting and challenging. The new ISNAR Division is located in Addis Ababa, Ethiopia, greatly accelerating the pace of decentralization at IFPRI, and putting us within ready reach of partner institutions in Africa. The program is global, and focuses on institutional change, organization and management of agricultural research, and science policy. The Board has established a Program Advisory Committee—chaired by a Board member—to guide the development of the program of the ISNAR Division.

IFPRI has also opened new offices in China, Costa Rica, and India. These offices will carry out research drawing on the resources of the different divisions at IFPRI and research skills in the region, and will be different from the project-specific offices that exist in a number of other countries.

IFPRI's efforts at combating the scourge of "hidden hunger," the inadequate level of micronutrients that afflicts over 2 billion people in the world, received a major boost in 2003 with a grant of $25 million from the Bill and Melinda Gates Foundation for the HarvestPlus program that IFPRI co-leads with the International Centre for Tropical Agriculture (CIAT). The oversight of this large CGIAR Challenge Program is being carried out by a Program Advisory Committee set up by the Boards of the two centers and includes members of both Boards and a number of eminent experts.

During the past year IFPRI played a strong supportive role in the efforts to meet the Millennium Development Goals, especially by providing background analyses and reports for the "Hunger Task Force" to develop programs that facilitate the achievement to reach the goal to cut hunger in half by 2015.

While congratulating the IFPRI team on the many activities related to research and policy impact that are described in this report, it is important to remember that IFPRI has a lot more challenging work ahead in facilitating the attainment of food and nutrition security and poverty alleviation.

Isher Judge Ahluwalia
Chair, IFPRI Board of Trustees

Introduction from the Director General

I note with dismay that there is slow progress against hunger in 2003/04. But at the same time I am encouraged by political leaders' broader recognition of the hunger problem, and by some actions initiated around the world based on a new understanding of the importance of agricultural and rural growth and good nutrition and health for development. Demand for IFPRI's work is changing and growing. A number of strategic issues loom large for us, including rapid political change in the developing world, the end of some conflicts, increased decentralization of policymaking, globalization, and polarized global trade negotiations. The linkages of HIV/AIDS and other health crises to agriculture, food, water, and nutrition are increasingly seen as a challenge to which also IFPRI must respond with research and capacity strengthening. There is woefully inadequate progress on gender inequality and other discrimination, despite the key role of women in agriculture and nutrition.

IFPRI staff in cooperation with other CGIAR centers and other partners are rising to these challenges. For example, together with CIAT, we implemented the CGIAR HarvestPlus Challenge Program, which focuses on breeding micronutrient-rich staple crops. We are undertaking new work on biosafety systems in developing countries. Comparative work on rural development policy in India and China is progressing and IFPRI helped organize a dialogue among leading policy analysts of the two countries.

A major highlight of the early months of 2004 was the very successful all-Africa conference on "Assuring Food and Nutrition Security in Africa by 2020," held in April in Kampala, Uganda. It was attended by over 500 policy makers, scholars, farmers, and development practitioners, and was designed and organized by a committee composed primarily of our African partners. Three African heads of state, two Nobel Prize winners, and three World Food Prize winners were among the many eminent people addressing the gathering. The follow-up to the conference is ongoing with partners in Africa, including the New Partnership for Africa's Development (NEPAD) and at subregional levels.

In June 2004, the heads of state and government attending the Group of Eight Summit pledged their support for our work on "Strategic Analysis and Knowledge Support Systems" for agricultural and market analysis in Africa as part of an overall strategy to end the cycle of famine, raise agricultural productivity, and promote rural development. It is most gratifying that our work is getting even more attention from people in a position to do something about hunger and malnutrition.

Research excellence remains our foundation. IFPRI staff published 13 books through both IFPRI's own imprint and prestigious academic presses such as Johns Hopkins University Press, Oxford, and Elsevier Science, covering such topics as gender and food security, policies to end hunger, fish supply and demand to 2020, and institutions for natural resource management. IFPRI researchers also published numerous chapters in books and articles in peer-reviewed scholarly journals, including many top rated development, economics, and science journals. That IFPRI is an important part of the global stream of knowledge creation for improved food policy is also demonstrated by the fact that we presented our research findings at nearly 300 conferences, seminars, and workshops in 2003. An annual report can barely capture the innovations, their scale and relevance, and the commitment of IFPRI staff and partners that is driving these achievements.

IFPRI is decentralizing its operations and deepening its collaborative relationships. The number of staff posted with partner organizations increased in 2003 and will further rise in 2004. We believe that this approach to our operations will broaden and deepen our collaborative relationships in developing countries and strengthen our ties to research networks on the ground. In 2003 we worked with local partners in more than 70 countries. We spent 50 percent of our research budget in Africa and another third in Asia.

Our long-term strategy centers on research, capacity strengthening, and policy communication. In 2004, we will work on enhancing our strategies for communications and capacity strengthening.

Communications activities will increasingly be of a two-way nature. We will work to enhance our website, which is already the most visited of any CGIAR center, with over 3 million downloads since January 2003.

Capacity strengthening—rooted in research—is essential for facilitating sound policy changes. IFPRI's new ISNAR Division in Addis Ababa will further enhance capacity for the CGIAR and the national agricultural research systems in the developing countries. We gratefully note the cooperation of past ISNAR management and Board in the transition phase of 2003/04 and the support by the investors.

IFPRI staff conducted courses and training workshops for hundreds of partners in developing countries in 2003, and this will now accelerate even further with the ISNAR Division. We provided training materials to support programs carried out by development organizations, and 33 training programs put on by universities and other institutions in developing countries. In addition to long-standing capacity strengthening activities, IFPRI is facilitating the development of a collaborative master's degree program in agricultural economics with several East-African universities and is working on a global distance-learning initiative with other CGIAR partners.

Our finances remain sound. Revenues grew 8 percent in 2003, and are expected to rise another 30 percent in 2004, due to initiatives by our new Development Strategy and Governance Division, integration of the International Service for National Agricultural Research (ISNAR) program into IFPRI, and expansion of the HarvestPlus program.

Our mission is to provide policy solutions that reduce hunger and poverty. We strive to maintain academic excellence as a research institute, but always with that overarching goal in mind. In this regard, the essay in this volume on the role of agriculture in achieving the Millennium Development Goals—the international community's pledge to make the world a better place over the next decade—is meant to encourage both research and action. IFPRI actively supports the UN-Hunger Task Force as well as the World Economic Forum Initiative on the Millennium Development Goals with analyses and background research. With three out of four of the world's poor people living in the rural areas, there can be no sustainable solution to poverty that does not include agriculture and rural development as integral elements.

Joachim von Braun
Director General, IFPRI

Agriculture, Food Security, Nutrition and the Millennium Development Goals

by Joachim von Braun,
M. S. Swaminathan,
and Mark W. Rosegrant

In 2000, the member states of the United Nations committed themselves to creating a "more peaceful, prosperous and just world," to "free[ing] our fellow men, women and children from the abject and dehumanizing conditions of extreme poverty," to making "the right to development a reality for everyone," and to ridding "the entire human race from want."

Are these just more well-meaning words? Perhaps this time they will make a difference, because the joint declaration also set out eight goals—the Millennium Development Goals (MDGs)—and each goal has specific, measurable targets that should be met by 2015. These goals aim to make definite improvements in the lives of the world's poor people, judged, in most cases, against their situation in 1990.

The need for accomplishing these goals is immense. Today, 1.1 billion people live on less than one US dollar per day (the internationally recognized poverty threshold)—430 million in South Asia, 325 million in Sub-Saharan Africa, 260 million in East Asia and the Pacific, and 55 million in Latin America. Too many children live lives characterized by hunger and illness, and all too often succumb to early death. Moreover, another 1.6 billion people live on between one and two dollars per day, often sliding temporarily below the one dollar per day threshold. To enable all these people to live in dignity, the eight goals to achieve by 2015 are:

1. *Eradicate extreme poverty and hunger*
2. *Achieve universal primary education*
3. *Promote gender equality and empower women*
4. *Reduce child mortality*
5. *Improve maternal health*
6. *Combat HIV/AIDS, malaria, and other diseases*
7. *Ensure environmental sustainability*
8. *Develop a global partnership for development.*

These goals are all indispensable and they require complex, coordinated action. But with such an enormous yet essential mandate at hand, how best can we proceed to 2015?

Conceiving a Foundation Built on Agriculture and Food and Nutrition Security

The most effective strategy for making steady, sustainable progress on the Millennium Development Goals is to serve all the goals in an integrated way. However, each goal will need a well-defined package of technologies and services for success at the field level. The Task Force on Hunger (which advises on how to meet the target of cutting hunger in half by 2015) is providing appropriate guidance for developing these packages in the case of hunger. Pursuing each goal separately without acknowledging its interlinkages with others will reduce the complex process of human and economic development to a series of fragmented, conflicting, and unsustainable interventions. A comprehensive and harmonious development approach is in order.

Given that the majority of poor people live in villages or rely on agriculture, and that agriculture paves the way for economic growth in the poorer nations, agricultural and rural development will underlie progress on the broad array of economic and social indicators that the MDGs emphasize.

In pursuing the MDGs, we should seek ultimately the elimination of hunger, poverty, and maternal and child malnutrition. In this regard, particular attention should be paid to averting maternal and fetal under- and malnutrition, which lead to the low birth weight that damages health, reduces cognitive ability, and robs nations of healthy and productive adults. Micronutrient malnutrition is a part of these larger, devastating "hunger" problems.

An emphasis on healthy, productive individuals means that we must attend not simply to food security at the aggregate level, but to nutrition security (economic, physical, social, and environmental access to a balanced diet and clean drinking water) at the individual level of child, woman, and man. Our interpretation of the MDGs must therefore be modified to promote a reduction in the absolute number of people living in unsuitable conditions across all countries, rather than a reduction in global proportions. The World Food Summit goal, for example, aims to reduce the absolute number, rather than the proportion, of people suffering from hunger.

Despite these limitations in framing the task at hand, the MDGs can be used to set a powerful agenda for developing countries and the international community, because they offer a guide for planning and implementing a broad range of development efforts.

How Can Improving Agriculture and Food and Nutrition Security Help?

We need to achieve faster, sustainable human and economic development—that is the bottom line that will serve all the MDGs. Environmentally friendly agriculture and rural development are key to this effort. What are the pathways that link agriculture, food and nutrition security, and the MDGs—both directly and indirectly—and how can these favorable linkages be reinforced?

MDG 1. Eradicate extreme hunger and poverty

Of the eight Millennium Development Goals, eradicating extreme hunger and poverty depends on agriculture the most. (MDG 1 calls for halving hunger and poverty by 2015 in relation to 1990.)

The agriculture-hunger-poverty nexus

Eradicating hunger and poverty requires an understanding of the ways in which these two injustices interconnect. Hunger, and the malnourishment that accompanies it, prevents poor people from escaping poverty because it diminishes their ability to learn, work, and care for themselves and their family members. If left unaddressed, hunger sets in motion an array of outcomes that perpetuates malnutrition, reduces the ability of adults to work and to give birth to healthy children, and erodes children's ability to learn and lead productive, healthy, and happy lives. This truncation of human development undermines a country's potential for economic development—for generations to come.

There are strong, direct relationships between agricultural productivity, hunger, and poverty. Three-quarters of the world's poor live in rural areas and make their living from agriculture. Hunger and child malnutrition are greater in these areas than in urban areas. Moreover, the higher the proportion of the rural population that obtains its income solely from subsistence farming (without the benefit of pro-poor technologies and access to markets), the higher the incidence of malnutrition. Therefore, improvements in agricultural productivity aimed at small-scale farmers will benefit the rural poor first.

Increased agricultural productivity enables farmers to grow more food, which translates into better diets and, under market conditions that offer a level playing field, into higher farm incomes. With more money, farmers are more likely to diversify production and grow higher-value crops, benefiting not only themselves but the economy as a whole.

A larger supply of agricultural products also brings prices down, allowing both the rural and urban poor to purchase essential foods for less money. Smaller food bills mean that landless poor people will have more money to invest in assets, which will help them increase income and survive future economic shocks. This income and asset security helps build a solid foundation for economic growth, by enabling people to work free from the debilitating effects of hunger and undernutrition. A flourishing agriculture sector also facilitates job creation in other areas, such as the food processing and marketing sectors, and creates secondary economic effects in the nonfarm economy.

By increasing food availability and incomes and contributing to asset diversity and economic growth, higher agricultural productivity and supportive pro-poor policies allow people to break out of the poverty-hunger-malnutrition trap.

Empirical research provides stark evidence of the benefits of agricultural productivity. In Africa, for example, a 10 percent increase in the level of agricultural productivity is associated with a 7.2 percent reduction in poverty. In India, a similar increase in productivity has been estimated to decrease poverty by 4 percent in the short run and 12 percent in the long run.

Progress in and prospects for reducing poverty and hunger

The indissoluble links between a growing agriculture sector and declining levels of poverty and hunger merit serious attention at the highest levels of decisionmaking, given that recent trends in meeting MDG 1 targets have been mixed. The trends point to a pressing need to step up efforts in reducing child malnutrition and at a minimum to stay vigilantly on course in the overall effort to reduce hunger and poverty.

In the last decade, both the proportion and the absolute number of people suffering from poverty and hunger worldwide have declined. There were 126 million fewer people living on less than a dollar a day in 2001 compared to 1990, reflecting a drop in the world's share of poor people from 28 to 21 percent. According to the latest data (for 1999-2001) from the Food and Agriculture Organization of the United Nations (FAO), the proportion of people who suffer from hunger has decreased from 20 to 17 percent since 1990, which means 19 million fewer food-insecure people. Similarly, the global prevalence of malnutrition among preschool children (the proportion of underweight preschool children is one of the MDG indicators of hunger) has declined from 30 to 25 percent between 1990 and 2000. In absolute terms, 27 million fewer children now are malnourished compared to 1990.

Aggregate trends, however, conceal the fact that at the regional and country levels, progress in the 1990s was not distributed equally. While Asia and Latin America saw declining rates and absolute numbers of poor, hungry, and malnourished people (except for the unchanged number of poor in Latin America), the situation in Sub-Saharan Africa and Eastern Europe deteriorated. In comparison with 1990, Sub-Saharan Africa now has 89 million more people living on less than a dollar per day, 33 million more people suffering from hunger, and an additional 6 million preschool children who are underweight. In Eastern Europe, the numbers are less staggering given the initial conditions, but the general trends suggest serious problems with the region's development processes.

If current trends persist, the world will stop just short of meeting the modest MDG targets for cutting the proportions of hunger and poverty, but miss by a wide margin the target for cutting the number of undernourished people in half (between 1996 and 2015), as stipulated by the World Food Summit. The proportion of hungry people in 2015 is expected to drop to 11 percent, but the MDGs specify 9.9 percent. Estimates vary on meeting the poverty goal, with an estimated 13 percent to 15 percent of people expected to remain under the poverty line in 2015, compared to the MDG target of halving poverty from 27.9 percent. With business as usual, the percent of malnourished preschool children will drop to only 24 percent, in comparison with the 15 percent needed. At the regional level, large disparities will exist in the gains made. China will remain the major force driving aggregate progress toward the MDG goals. At the other extreme, Sub-Saharan Africa will either stagnate or lose ground.

All in all, barring a major paradigm shift, projections show that 600 million people in the developing world will suffer from hunger in 2015, 900 million people will continue to live in absolute poverty, and 128 million preschool children will be malnourished.

But we need not resign ourselves to this fate. An alternative set of projections indicates that with the proper investments and policies we can certainly reduce malnutrition at a faster rate. Under an "MDG scenario"—reasonably higher agricultural and economic growth rates; more investment in the social sectors, including health and education; and a halving of the proportion of people without sustainable access to safe drinking water and basic sanitation, as MDG 7 prescribes—the global level of malnutrition is slashed to 16 percent, almost on target (see box on page 9).

WHAT WILL HALVING CHILD MALNUTRITON COST?

What are the implications for investment if we are to cut child malnutrition in half by 2015, consistent with the Millennium Development Goal of halving, between 1990 and 2015, the proportion of people who suffer from hunger?

IFPRI's global food model, IMPACT-WATER, allows us to project outcomes under different policy and investment scenarios. The model assumes that investment in five areas—rural road construction, education, clean water provision, agricultural research, and irrigation—is the most effective way to reduce hunger, poverty, and malnutrition. The cost of improvements in these five areas between 1995 and 2015 are estimated at country and regional levels based on the available data on cost of delivery of these key investments, and are shown in Figure 1 for two scenarios: the baseline scenario (where it's business as usual) and the MDG-compatible scenario (where the proportion of child malnutrition is reduced by half for nearly all developing countries).

As expected, the MDG scenario envisions increases in investment in the five key drivers of food and nutrition security. Business as usual during 1995–2015 will cost US$430 billion for all developing countries. Halving child malnutrition will cost $591 billion—only $161 billion more than current trends.

With business as usual, rural roads will account for 28 percent of total investment, followed by agricultural research and irrigation at 24 and 21 percent, and clean water and education at 15 and 12 percent, respectively. In the MDG scenario, education's share of investments increases to 20 percent, due to a rapid expansion in female secondary schooling, particularly in parts of Asia and Sub-Saharan Africa. The dollar amount for education more than doubles, from US$51 to US$119 billion. Investments in rural roads, irrigation infrastructure, and agricultural research increase as well, in order to achieve the much higher yields assumed under this scenario. Investment in clean water does not change much, given the relatively high levels of access to clean drinking water already achieved in the baseline scenario; the MDG scenario requires only $1.5 billion more, but most of this is in Sub-Saharan Africa, where it will make a significant impact. Due to the long lag time between investment in agricultural research and impact on crop production, relatively small increases in research expenditures are needed to achieve the 2015 MDGs, but greater increases will be essential to meet crop and animal production needs beyond 2015.

It bears repeating that the total estimated increase in investments needed to bring the world, particularly South Asia and Sub-Saharan Africa, within reach of the MDG target for malnourished children (see Figure 2) comes to only $161 billion—about $16 billion a year more than current expenditures from this point forward.

Figure 1 Cost Estimates for Implementing the Baseline and MDG Scenarios, 2015, Developing Countries

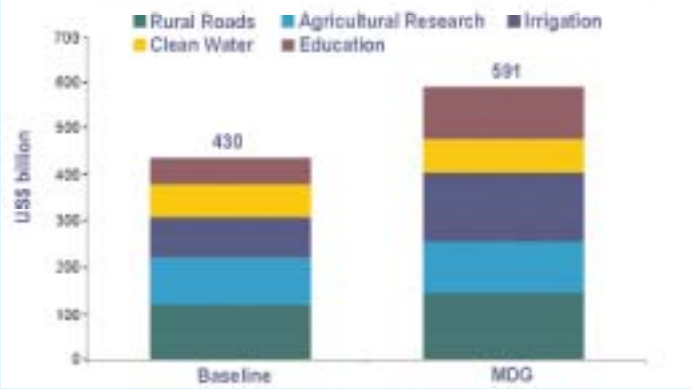
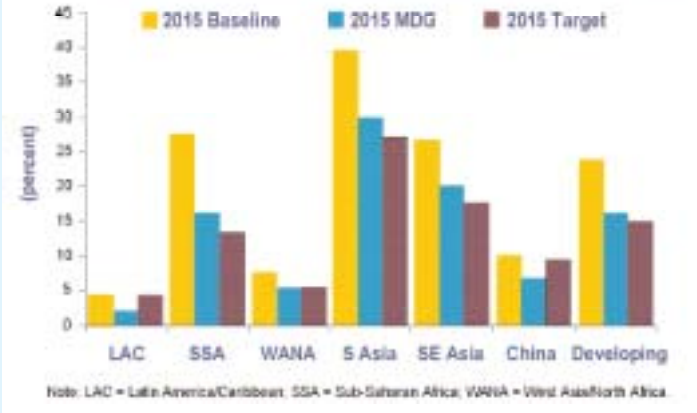


Figure 2 Child Malnutrition, Developing Country Regions, 2015 Baseline, 2015 MDG Scenario, and 2015 Target



Source: Mark W. Rosegrant. This scenario research at IFPRI was supported with a grant from the World Bank's Agriculture and Rural Development Department.

Raising agricultural productivity and benefiting from agriculture

To obtain higher agricultural productivity will require seeds and other agricultural technologies matched to the local agroclimatic, labor, and market needs of small-scale farmers. These technologies, which must be environmentally friendly, will come from both conventional and newer scientific approaches, including scientifically sound and environmentally safe genetic modification. Agricultural innovation must raise yields and reduce environmental costs, and be affordable to small-scale farmers. In many regions, the land itself needs regeneration because soils have become less productive due to loss of nutrients. This problem requires research on methods for reducing nutrient loss and replenishing soils. To innovate on all these fronts in ways that serve poor farmers, national and international agricultural research systems must be strengthened.

How can the poor benefit most from higher agricultural productivity? Past experience has shown that a number of key conditions help maximize the benefits of a growing agriculture sector for poor people. To achieve faster agriculture-based growth rates, favorable macroeconomic and trade policies, good infrastructure, and access to credit, land, and markets must be in place. These conditions create level playing fields and give farmers incentives to adopt new and sustainable technologies and diversify production into higher-value crops, actions that raise incomes and lift households out of poverty.

In addition to pro-poor economic and agricultural policies, agriculture, like other sectors, needs good governance, absence of conflict, and well-functioning markets and private enterprise to flourish.

In the case of the latter, the development and business communities increasingly recognize that the MDGs cannot be achieved and private enterprise cannot flourish without greater and more equitable involvement of poor people in markets. In many developing countries, small farmers face unfavorable terms of trade, paying more for inputs than they receive from the sale of their products. An improved domestic regulatory framework would intensify competition among suppliers of essential inputs, such as seeds and fertilizer. In addition, the elimination of

trade barriers for agricultural products, especially the high-value-added products, would encourage a greater number of private entrepreneurs to explore opportunities in agribusiness. A healthy market and private sector would provide value-added, skilled work to the landless poor and generate multiple livelihood opportunities in both the farm and nonfarm sectors.

The idea of enticing global private enterprise into developing-country markets is not new but the expectations are different this time around. In many respects they are driven by a greater understanding that just any kind of economic growth will not improve the lives of the poor.
It will take a particular kind of private-sector involvement to generate the necessary economic transformations. Private entrepreneurs are now increasingly held to environmental, social, and corporate governance principles that stress sustainable business practices and adherence to labor standards. Without these standards and practices, the private sector and disadvantaged groups cannot mutually benefit from consumer, employment, and entrepreneurial activities.

When good governance, equitable markets, and the other key conditions noted above are absent, poor farmers are unlikely to earn decent incomes and secure adequate diets for themselves and their families. If agriculture underperforms or fails, nonfarmers will also feel the negative effects. We need to keep uppermost in our minds that significant gains in agricultural productivity have provided the critical first steps in economic development in many countries.

MDG 2. Achieve universal primary education

Education is crucial to both human and economic development. To achieve the MDG goal for education we must take into account education's links to agriculture and food and nutrition security. Poor rural households often cannot afford to send their children to school. Education fees and the opportunity costs of educating children, rather than putting them to work to earn money or help at home or on the farm, can be prohibitive. It therefore takes a three-pronged strategy to address this huge trade-off the poor face: one, food for children in school; two, incentives (food or cash) for parents and support services (such as crèches) for working mothers so that they can send children to school and keep them there; and three, improvements in agricultural productivity and market functioning to assure adequate food supply and access.

Feeding children in school has paid significant educational dividends. A school feeding program in Bangladesh, for instance, has resulted in a 35 percent overall increase in enrollment (and a remarkable 44 percent increase for girls) in comparison with only a 7 percent increase in schools where the program was not available. Similar improvements in school enrollment, attendance, and retention rates have been observed in a number of other education-supporting food programs in the developing world. The scaling up of such programs in many developing countries would go a long way toward simultaneously achieving both the education and hunger MDGs.

There are further favorable linkages between education and agriculture. By raising incomes and allowing farmers to hire labor or invest in labor-saving agricultural technologies, rising agricultural productivity will enable rural parents to send their children to school. Agriculture-led economic growth

Research shows that girls' education and overall improvement in women's status contribute significantly to improving the nutritional status of children.

will also have a broader impact by creating nonfarm jobs in food-related industries for the skilled and educated. As agriculture develops, farmers will produce more high-value products, including animal products such as milk, thereby increasing the demand for skilled labor in this sector because these products have specialized production and marketing requirements. These sectoral changes will mean that investing in children's education will seem more worthwhile.

As a growing agriculture sector improves household incentives to educate children, more girls will become educated. This outcome will be particularly important for improving child welfare (MDGs 1 and 4). Research shows that girls' education and overall improvement in women's status contribute significantly to improving the nutritional status of children. But because girls constitute the majority of school "dropouts"— better referred to as "pushouts"— due in part to their role as caregivers for young children in the absence of child care services for poor working mothers, their continued enrollment will depend on the provision of child care. There is an urgent need for community or publicly funded child care, particularly crèches, for working women in rural areas, and for publicly and/or privately funded services in the case of women employed in the industrial sector.

MDG 3. Promote gender equality and empower women

Many women are farmers. But unlike men, who have greater opportunities for nonagricultural work, women depend mainly on agriculture to secure food or earn money for their families. Improvements in agriculture, therefore, can contribute in a fundamental way to increasing incomes and economically empowering women. What's more, improvements in labor-saving technologies in agriculture that reduce the number of hours worked and enhance income per each hour of work (especially for high-value crops) will free up poor women's time, benefiting them and allowing them more time for child care. More time away from farming would also allow women the option of choosing skilled work in the nonagricultural sector.

The issue of time poverty for women is one of the main obstacles to achieving gender equality. Even in the case of educated working women, employers and communities often do not take account of the multiple time burdens women face: caring for children, running a household, and keeping gainful employment. Women and girls in poor rural households face an even greater time challenge, especially since their farm and household chores are made more difficult because of inadequate investments in water, sanitation, energy,

and transport infrastructure. Rural development strategies that invest in gender-based infrastructure needs would improve the prospects for agriculture and produce more equitable outcomes for men and women.

Successful women farmers will also require access to the same financial resources, such as credit, that are available to men. Otherwise they will continue to operate in the economic shadow of men. Without economic parity, women are also much more vulnerable than men to shocks and high-risk behaviors. For instance, women at an economic disadvantage are less likely to be able to negotiate the use of condoms and are more likely to stay in an abusive relationship. Women can be empowered by gaining secure access to the resources and property rights they need to make a living from agriculture, and by having control over the food or money they produce. The agrarian reforms in some Latin American countries in the late 1980s and early 1990s, for example, have allowed joint titling of land for men and women. These changes have led to significant improvements in women's position in rural communities.

Legal and economic rights that extend equality to women will ensure that they obtain the full welfare benefits of improved agriculture. Such equality will, in turn, boost agricultural productivity further.

MDG 4. Reduce child mortality

The links between agriculture and child mortality are indirect but important. About half of all child deaths occur because of malnutrition, which prevents children from fighting off even common childhood ailments. Mildly underweight children are twice as likely to die prematurely as children who have normal weight. The risk of dying increases five- to eight-fold for children who are moderately or severely malnourished. The absence of essential micronutrients further exacerbates poor children's vulnerability to disease. Child mortality hits particularly hard in rural areas, where proportionately more children die before the age of five than in urban areas. Boosting food production and improving the quality of children's diets will help reduce child malnutrition and child mortality, especially in rural areas. Higher incomes from agriculture-led economic growth will allow households to spend more on food and medicine, thus also leading to lower child mortality rates.

Ultimately, the problem of child mortality is a result of some combination of poor living conditions, including a deficient diet, and the quality of and accessibility to the health system. It is no surprise that poverty

correlates with all of the health concerns specified in the MDGs. Pulling people out of poverty by expanding their earning opportunities would help resolve major health problems. Agriculture and rural growth contribute to that health effect at the earlier stages of economic development.

MDG 5. Improve maternal health

To properly care for their children, women need to be healthy. Self-reliant, educated women with access to adequate resources are better able to care for themselves. Thus, meeting the MDGs for education and women's empowerment by improving agricultural productivity can indirectly improve women's health.

But agriculture can also benefit maternal health directly, by improving the quality of women's diets. Both the quality and the quantity of food available to women affect their health, and the impact of malnutrition on reproductive health is well documented. Women whose immune systems are weakened because of insufficient food intake have a higher likelihood of infections and adverse pregnancy outcomes. Maternal health also depends on having achieved food security in girlhood, well before conception.

In addition, micronutrients such as iron, zinc, and vitamin A are particularly important in women's diets, because women, along with young children, suffer most from deficiencies in this area. Anemia, caused by a lack of iron, is especially damaging, because it hits women hardest during pregnancy, delivery, and the first few months following childbirth. More than

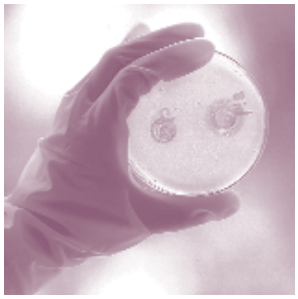
65,000 women die of anemia each year. To overcome such health problems, we need to supplement diets and fortify foods with micronutrients and breed staple crops rich in these nutrients. The CGIAR's HarvestPlus program is already breeding these kinds of crops, which will provide an agricultural contribution to solving the problem of "hidden hunger."

Improving food and nutrition security for poor households with the help of agriculture and ensuring that households allocate food equitably are critical steps in improving maternal health.

MDG 6. Combat HIV/AIDS, malaria, and other diseases

Agriculture and food and nutrition security play important but still underrated roles in addressing HIV/AIDS. A holistic perspective is needed here. A dynamic agricultural sector can reduce risky economic behavior, increase the demand for education and good health care, and provide adequate food for leading a healthy life and fighting illness if the need arises. A sluggish agricultural sector, on the other hand, can seriously undermine attempts to curb the spread of HIV/AIDS and other diseases. Stagnating agriculture can lead poor people to take dangerous risks and engage in economic activities that imperil health. Moreover, without proper food and nutrition, people living with HIV will transition to AIDS more rapidly, because individuals with HIV require up to 50 percent more

Agriculture and food and nutrition security play important but still underrated roles in addressing HIV/AIDS.



protein and up to 15 percent more calories than healthy individuals. Similarly, infected pregnant mothers are more likely to transmit the disease to children who are food insecure. The treatment of HIV/AIDS patients is also less effective in the absence of food security. In addition to direct links between diet quality and the severity of the illness, poverty and HIV/AIDS are closely correlated. People in marginalized groups are more vulnerable to the disease because of their limited access to coping mechanisms such as social networks and the sale of assets.

The incidence of tuberculosis is also associated with malnutrition and poverty. People who lack appropriate diets and access to essential micronutrients, such as iron, vitamin D, and zinc, are more likely both to contract TB and to progress faster from infection to active TB and early death.

With malaria, the previously mentioned links between disease on the one hand and income levels and diet quality on the other are compounded by the direct relationship between agriculture and the spread of disease. A recent initiative launched by CGIAR—a Systemwide Initiative on Malaria and Agriculture (SIMA)— aims to deepen our understanding of the linkages between agriculture and malaria and to seek new ways of controlling the spread of this disease by adopting favorable agricultural practices. Using new high-yielding rice strains and diversifying crop production are two strategies suggested to help combat malaria.

Overall, to attain the MDGs for disease, the resources of the agricultural sector need to be coordinated with those of the health sector to meet the joint challenges of poverty reduction and disease eradication. Combating HIV/AIDS is particularly important, as this disease is ravaging rural populations and wiping out the workforce in some countries.

MDG 7. Ensure environmental sustainability

The Millennium Declaration targets a variety of environmental issues, including biodiversity, critical natural habitats, energy use, global climate change, safe water and sanitation, and urban slums. A productive agricultural sector can reduce pressure in all of these areas but that outcome is not automatic. In fact, many agricultural practices that push productivity tend to do so at the expense of the environment. Pressures to increase agricultural production with inappropriate policies in the past have resulted in soil degradation, greater concentration of greenhouse gases in the atmosphere, marine pollution, overexploitation of fisheries, and loss of valuable habitats. People who suffer from food and nutrition insecurity generally try to safeguard their environments, but often fail for lack of resources and the capacity to organize the needed collective action at the local level.

In addition, various market failures in agriculture have been known to contribute to environmental deterioration. Some of the most prominent examples have to do with overexploitation of natural resources where property rights are not clearly assigned and where subsidies encourage malpractice in resource management. Funds need to be diverted from eco-destructive subsidies to policies that strengthen the ecological foundations essential for sustainable agriculture.

For agricultural development programs to be environmentally sustainable, their long-term environmental costs and benefits have to be taken into account. Plus, policies and regulations need to be in place to encourage efficient—instead of excessive—energy, water, fertilizer, and pesticide use. Sound water management in agriculture is critical for safe drinking water, as well as for prevention of water-borne diseases and wasting of water. At the same time, agriculture-led economic growth will provide public revenues that governments can use to provide safe drinking water and better sanitation, as well as higher incomes that will allow individual farming households to invest in these basic needs.

The issue of better resource management arises in urban areas as well. Urban water subsidies, for example, go disproportionately to the better off in most developing countries because they are connected to the public system. The urban poor, who must rely on water vendors, pay many times more for water than better-off residents. Removing such subsidies and using the available money to finance wider distribution of piped water would benefit the poor.

MDG 8. Develop a global partnership for development

Wrestling with the problems of development is going to require countries to work together closely at regional and international levels to address a wide range of issues. The final MDG attempts to capture this need and has many different targets. One of these involves creating jobs for young people. Jobs in rural areas and small towns are particularly important, and the economic, political, and institutional conditions that facilitate agricultural development can make a strong contribution here. Although initially the jobs created will be within agriculture, once general economic growth kicks in as a result of agricultural growth, employment opportunities will arise in other sectors.

Agriculture needs to be taken into account when addressing the other targets of MDG 8 as well. For example, when developing "an open, rule-based, predictable, nondiscriminatory trading and financial system" (one specific target), priority should be given to harmonizing and rationalizing global agricultural trade because of the direct, positive impact this will

have on poor farmers. At the same time, the special needs of poor agricultural producers should be considered to ensure that this vulnerable group benefits as much as possible from the trade generated. For example, decisionmakers need to make sure that poverty reduction strategies (such as those developed under the Heavily Indebted Poor Countries [HIPC] Initiative) are clearly linked to agricultural development because of the strong connection between poverty reduction and agriculture.

The creation of a global partnership for development will require increased commitments on the part of global and national actors to the pursuit of pro-poor growth. Reforming the international trade system is one example of such commitment. Higher and better-targeted levels of foreign aid financed on a sustained basis and promotion of sustainable inflows of foreign investment are other examples. Such efforts are essential for strengthening the domestic capacity of developing countries and achieving the MDGs.

Lastly, genuine collaboration between international organizations, international and local research institutions, and civil society to produce cohesive and usable research and policy recommendations, as well as the monitoring and evaluation of ongoing policy efforts, are crucial. The CGIAR is one such collaborative international effort that shows the power of partnerships in promoting public good in the farm sector.

Policy Actions to Meet the MDGs

The progress made toward achieving the MDG targets is being monitored by many civil society organizations and reported on in the media. Countries are modifying policies and programs to bring about the changes needed to meet those targets. As these efforts get underway, any evaluation of progress should consider that participatory policy action takes time as the flow of developments unfolds from abstract goals to policy change to investment, implementation, and outcome. Evaluating the progress along this spectrum would therefore involve keeping track of transitions from development-friendly rhetoric, to binding documents specifying commitments, to concrete policy designs backed up by appropriate budgetary allocations, and finally to implementation activities that have impact on the ground. Throughout the process, we must be cognizant of the political and economic realities that accompany major changes. Thus, expectations of rapid developments must be tempered by recognizing that policy change requires time, yet in the end real outcomes must be evident.

Since only a few years have elapsed after the declaration of MDGs, most associated actions currently fall between the "declarations" and "initiatives" stage (see figure). Policy actors have made suitable progress at these initial stages to promote the roles of agriculture and food and nutrition security in the development process. However, in terms of progress towards achieving the MDGs, we have yet to see concrete results and we may fail to reach a number of targets at the current pace of change. Transition to the "actions and investments" stage is now critical.

A comprehensive development strategy that addresses the whole set of goals is required for MDG-related efforts to be successful. These strategies differ by country due to resources and institutional conditions, so they must be tailored to the specific needs and circumstances of a given situation. Political and economic climate must be taken into account, along with historical, cultural, and geographic characteristics. At the same time, each of the goals needs to be reached and that requires specific action in the overall context. For instance for the goal of cutting hunger in half, the Task Force on Hunger that focuses on this goal has proposed seven concrete recommendations at the global, national, and community levels.

Policy actions that improve agricultural productivity and food and nutrition security are essential components of a successful MDG strategy. In addition, a set of other domestic and international policies to stimulate the agriculture sector generally will be required. Supporting agriculture growth in low-income countries generally means supporting pro-poor growth, especially when combined with better access to markets by small farmers.

Because simulations show the vital importance of easy market access for farmers, more needs to be invested in infrastructure such as roads and bridges to meet MDG 1 targets. These investments are especially important for Sub-Saharan Africa. Public-private partnerships offer an efficient way of providing infrastructure and social services, where public sector efforts alone have proved inadequate. At the same time, investment in infrastructure should be linked to national poverty reduction and general development goals. Lack of coordination at the national, regional, and donor levels means that investment is being wasted. For example, building schools without building roads for access inevitably just means empty classrooms.

A sense of ownership is important to ensure investments are sustainable. Local communities, particularly those with women and men living in poverty, need to be integrated fully into any investment plans by asking them what they need and how much they can do to maintain any new infrastructure. This requires us to shift our development paradigm so we think of partnerships, not "beneficiaries" and the patronage that implies.

These measures will increase overall economic growth, but economic growth alone will not ensure adequately fast reductions in malnutrition. Growth policies have to be supplemented by nutrition-focused interventions, such as community nutrition programs and comprehensive safety nets. In looking further into the future, beyond 2015, social safety nets and social protection policies will become more necessary to address the remaining hunger and poverty problems of developing countries. To finance these actions requires continued stimulation of growth and the development of new institutions—including insurance systems—that strengthen the capacities of the poor to address income and health risks.

Poor governance, however, can and often does thwart the implementation of appropriate policies and economic reforms. Stemming from corruption, lack of competence, or poor information, governance poses a major problem for achieving the MDGs. Many experts nowadays point particularly to lack of political will at the national and international levels as the reason that attempts to combat hunger and poverty stall. The precise ways to overcome this obstacle remain unclear, but undoubtedly have to do with giving voice to poor citizens and ensuring government accountability. Where poor people are able to exercise their political and civil rights, governments are more attuned to their needs and demands.

Policy action in the critical arenas of sustainable agriculture productivity and food and nutrition security will be essential for responding effectively and responsibly to reach the Millennium Development Goals.

Recent experiences in Brazil, China, Ethiopia, India, and Uganda with improved participation of the rural poor in public policy formulation and implementation point to new ways of developing and carrying out rural initiatives. A push toward decentralization and devolution of decisionmaking has resulted in the rural poor's increased participation in decisions regarding rural development.

Inter- and intranational conflicts also continue to pose threats to the effort to reduce hunger and poverty. Preventing or stopping violent conflict remains a necessary undertaking in many developing countries that hope to stabilize rural areas and improve the lives of their poor citizens. Where rampant violence and war persist, an agriculture- and rural-development-driven MDG strategy has no chance.

It is a promising development that the review of progress—and lack thereof—in achieving the MDGs has reached global attention. Calls for accountability and action that has real impact on people are growing because of that attention. Governments, civil society organizations, and private business can no longer avoid the calls to respond. Policy action in the critical arenas of sustainable agriculture productivity and food and nutrition security will be essential for responding effectively and responsibly to reach the Millennium Development Goals.

Joachim von Braun is the director general of IFPRI; M. S. Swaminathan is the chairman of the M. S. Swaminathan Research Foundation, the co-coordinator of the Millennium Project's Task Force on Hunger, and president of the Pugwash Conferences on Science and World Affairs; and Mark W. Rosegrant is the director of IFPRI's Environment and Production Technology Division.

For further reading:

www.developmentgoals.org

www.unmillenniumproject.org

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Overview: International Food Policy Research Institute

Improvements in food output, thanks to breakthroughs in agricultural science and more efficient trade and production systems, have significantly helped to feed the world's growing population over the past few decades. But this progress in the fight against hunger and malnutrition has slowed and left 1.2 billion behind—almost a fourth of the population in the developing world. At the same time, the land and water that support food production have been degraded. Without better agricultural policies, rapid and sustainable agricultural productivity growth, and faster economic growth that benefits the poor, people will remain mired in poverty, or sink further into it, and the environment will risk further damage.

To move toward a better future, poor people will require access to resources and education; better technologies for producing and distributing food; markets that offer a level playing field to small producers; nutrition-related programs that improve the productive capacities of individuals; better governance; and national and international policies that encourage growth while benefiting the poor. Poor women and children, in particular, need better access to resources within households, communities, and societies.

Four years ago, the world sought to restore the momentum of the fight against poverty by committing itself to cutting the number of hungry people in half by 2015. This and the other Millennium Development Goals (MDGs) are important for setting a development agenda, but by themselves the goals do not provide a strategy for success. The goal of cutting hunger in half by 2015 is also unsatisfactory in view of the fact that half of the hungry will still be left in 2015, if the goal is achieved.

In any case, progress toward the MDGs has been slow. Some of the reasons include the traditional ones. In Sub-Saharan Africa, for example, natural disasters, poor governance, protracted civil wars, and the AIDS epidemic have drastically curtailed people's ability to acquire enough nutritious food to lead active, healthy lives.

But there are also new dynamics at play, including changes in the authority of governments and the structure of markets, the farming sector, and global and local food industries, along with greater globalization of economies and the development of new biotechnologies.

All these changes make it imperative we rethink our approach and focus on core issues that benefit the poor. The following pages describe IFPRI's research program and organization changes in 2003 and part of 2004 intended to help achieve global food and nutrition security.

IFPRI directly supports developing-country policymakers and the increasingly important civil society segment, including nongovernmental organizations (NGOs), to help the poor by researching and analyzing different policy options for meeting food needs in a sustainable manner. The Institute's research findings reach opinion leaders, donors, advisers, researchers, and media that influence national and international decisionmaking.

IFPRI's research, capacity building, and policy communications focus on the sustainable intensification of agricultural production, economic access to food for the poor, nutrition, agricultural market functioning, global and regional trade policies and agreements, globalization, macroeconomic policy reforms, and building the capacity of developing countries to carry out policy analysis.

IFPRI'S MISSION

IFPRI's mission is to provide policy solutions that cut hunger and malnutrition. This mission flows from the CGIAR mission: "To achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, livestock, forestry, fisheries, policy, and natural resources management." Two key premises underlie IFPRI's mission. First, sound and appropriate local, national, and international public policies are essential to achieving sustainable food security and nutritional improvement. Second, research and the dissemination of its results are critical inputs into the process of raising the quality of the debate and formulating sound and appropriate food policies. IFPRI's mission entails a strong emphasis on research priorities and qualities that facilitate change:

- identifying and analyzing alternative international, national, and local policies for improved food security and nutrition, with an emphasis on low-income countries and poor people and on the sound management of the natural resource base that supports agriculture;
- contributing to capacity strengthening of people and institutions in developing countries conducting research on food policies; and
- actively engaging in policy communication, making research results available to all those in a position to apply or use them, and carrying out dialogues with those users to link research and policy action.

In 2003–2004, IFPRI pursued its mission through a number of initiatives that saw a major expansion of its activities in Africa, the continued decentralization of its global presence, as well as the continuation of its bread-and-butter work—the publication and dissemination of a host of new research papers and briefs.

Among the most significant of these initiatives were the addition of the International Service for National Agricultural Research (ISNAR) as a division of IFPRI, the staging of the high-level, Africa-wide 2020 Africa Conference in Kampala, and the opening of IFPRI offices in Addis Ababa, Beijing, San José, and New Delhi.

ISNAR

The new ISNAR program, which began operations on April 1, 2004, focuses on improving agricultural innovation systems and strengthening capacity in national agricultural research and knowledge systems. IFPRI assumed responsibility for this program based on the work of the former International Service for National Agricultural Research (ISNAR). Key elements of this program now reside in the ISNAR Division, based in Addis Ababa.

The ISNAR Division continues the efforts of its predecessor, responding to the needs and demands of stakeholders, partners, and collaborators throughout the developing world. In doing so, the division embraces a broader perspective on agricultural research and innovation systems by emphasizing the roles of and relationships among diverse actors engaged in generating and using new knowledge. With this broader understanding, the division seeks to foster policy, institutional, and organizational change in order to enhance the impact of innovations on food security, poverty reduction, economic growth, and sustainable development. The division maintains a global focus in line with IFPRI's mission to end hunger and malnutrition, and places particular emphasis on Sub-Saharan Africa, where the need for innovation is most acute.

The new program's research activities concentrate on three broad themes:

(1) Agricultural science and technology policy focuses on investments in and national policies regarding agricultural R&D and examines the factors that inhibit or enhance the performance of agricultural science and technology. Specific attention is given to the study of changes and trends in science and technology policy to help policymakers, researchers, and other R&D actors make meaningful comparisons among different countries, different types of actors, and different points in time.

Continued on Page 24

2020 Africa Conference

In 2003–04 IFPRI devoted additional energy to the issue of food and nutrition insecurity in Africa, the only region of the world where the share of people who are malnourished has been rising. With new momentum for change emerging both within Africa and in the international community, IFPRI initiated a process of policy consultation on African food and nutrition security in early 2003. The flagship event of this consultation process was an all-Africa conference in Kampala, Uganda, in April 2004. The conference, "Assuring Food and Nutrition Security in Africa by 2020: Prioritizing Actions, Strengthening Actors, and Facilitating Partnerships," was organized by IFPRI's 2020 Vision Initiative, cohosted by the Government of Uganda, and cosponsored by more than a dozen organizations.

To assure the 2020 Africa conference's relevance, impact, and follow-up, it was designed in close consultation with key partners and actors in Africa. A pan-African Conference Advisory Committee (CAC) of 40 African policymakers, researchers, and civil society leaders, as well as representatives of cosponsoring institutions, was assembled under the chairmanship of Dr. J. J. Otim, senior adviser to President Yoweri Museveni of Uganda. Under the committee's guidance, the conference was designed to identify institutional and political solutions and strategies for achieving food and nutrition security in African countries, articulate steps that key actors and stakeholders can take to strengthen their role in achieving food and nutrition security, and facilitate strategic partnerships that allow actors to complement one another's activities and take advantage of synergies and multiplier effects.

Prior to the Conference, much of the dialogue and exchange on African food and nutrition security matters had been confined by and large by sector or by actor—there had been limited opportunities for cross-cutting dialogues and for dialogues that go beyond diagnosing causes and consequences of food and nutrition insecurity to focus on facilitating action and change. More than 500 participants from all corners of Africa and key stakeholder groups—policymakers and advisers, parliamentarians, key actors in nongovernmental and community-based organizations, leaders in business and industry, heads of regional organizations, farmers, researchers and academics, directors of bilateral and multilateral international agencies, and media—converged on Kampala in April 2004. The conference program was also highlighted by a number of high-profile speakers, including three heads of state, one former head of state, one current and one former First Lady, two Nobel Prize winners, and several World Food Prize laureates.

In plenary sessions and parallel breakout groups, participants considered the current food and nutrition situation in Africa and the continent's long-term prospects. President Museveni, President Abdoulaye Wade of Senegal, and President Olusegun Obasanjo of Nigeria each delivered powerful keynote addresses on the first day with frank analyses of the fundamental issues influencing Africa's well-being and with bold calls for action.

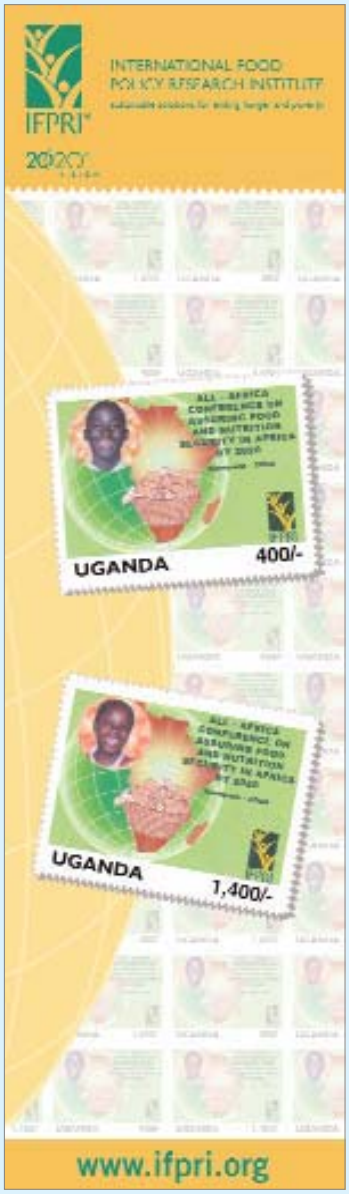
Participants then turned to the question of how the actions and policy changes identified as priorities will be implemented. Discussions centered on five key action areas—raising agricultural productivity; fostering economic growth and improving markets and trade; building human capacity; improving nutrition and health; and strengthening governance—allowing a cross-section of stakeholder groups to discuss how best they can work together to achieve their goals. Much discussion also concerned the political will to eradicate hunger and malnutrition, and how this will can be formed and nurtured. Using a digital instant voting system, 61 percent of the participants expressed their belief that food security *can* be attained by 2020, but only 42 percent of them believed that it in fact *will* be attained. Their predictions for nutrition security were much grimmer: 44 percent believed that nutrition security *can* be achieved, whereas just 14 percent believed it *will* be achieved.

Keynote addresses by Mrs. Janet Museveni, the First Lady of Uganda, Nobel Prize Laureate Wole Soyinka, and the former First Lady of Mozambique Mrs. Graça Machel expressed the need for attitudinal and behavioral changes to overcome the devastation caused by poverty, hunger, HIV/AIDS, and conflict.

Several activities designed in conjunction with the 2020 Africa conference ensured that the reach of the deliberations in April went well beyond the participants at the event. IFPRI and its partners held two lead-in events that helped set the stage for discussions at the conference. One was a conference on "Successes in African Agriculture: Building for the Future" held on December 1–3, 2003, in Pretoria, South Africa, and the other was a regional workshop on "Food and Nutrition Security Policies for West Africa: Implementation Issues and Research Agendas" held in Bamako, Mali, January 13–15, 2004.

In conjunction with the Kampala conference, an Africa-wide youth writing contest was also held. Through this contest,

IFPRI is honored that the Government of Uganda has produced these commemorative stamps to raise public awareness about food and nutrition security and the outcomes of the 2020 Africa Conference, which was facilitated by IFPRI's 2020 Vision Initiative and cohosted by the Government of Uganda.



entitled "A Full Food Basket for Africa by 2020," African youths were invited to tell their view of Africa's food and nutrition situation and how they feel we can make tomorrow's reality better than today's. More than 200 young people from about two dozen countries submitted entries in English and French, and an independent panel of judges selected the winners, who were announced in Kampala. Winning entries were compiled into a booklet that was shared with conference participants and thereafter with many others working on issues of youth, education, hunger, and poverty in Africa.

The conference concluded with a discussion on the way forward, during which participants discussed a draft statement on the Way Forward prepared by the Conference Advisory Committee. This statement is designed not as an immutable set of instructions, but as a set of guidelines, or a framework, pointing the way toward a food- and nutrition-secure Africa. It is hoped that the statement will contribute to the efforts by individuals and institutions to ensure healthy and productive lives for all Africans. The statement was translated into French and Portuguese and is being distributed widely to stakeholders within and outside Africa.

Follow-up to the conference is far from over. The members of the CAC are taking the lead in mainstreaming the results of the conference in their networks and forums. CAC members have continued dialogue on actions with the three African presidents who attended and made special efforts to brief key African leaders on the outcome of the conference and the Way Forward statement. CAC members also participated in the Presidential Seminar on "Innovative Approaches to Meeting the Hunger Millennium Development Goal in Africa," held as a precursor to the African Union Summit in early July 2004 in Addis Ababa. At this seminar, IFPRI's director general, Joachim von Braun, presented the outcomes of the conference and the Way Forward statement. CAC members participated in the subsequent African Union Summit and related meetings in Addis Ababa and will continue to engage in follow-up with the African Union and other regional and continental organizations.

IFPRI itself has also taken steps to follow up to the 2020 Africa Conference. In addition to preparing a comprehensive proceedings volume and publishing various background papers and policy briefs prepared for the conference, IFPRI is communicating the conference results to key stakeholders, including in the international development and donor communities; providing background support to the Conference Advisory Committee, which has decided to remain active through at least 2004; revisiting its strategy for research, policy communications, and capacity building in Africa based on conference deliberations; and using its increasing presence on the ground in Africa to support these activities.

IFPRI was proud to facilitate the 2020 Africa Conference and thereby contribute to identifying solutions for bringing about food and nutrition security in Africa. Issues of food and nutrition insecurity have been placed squarely onto the African agenda, and IFPRI hopes that this African-owned, African-driven conference has set the stage for action to eliminate food and nutrition insecurity in Africa by 2020.

Continued from Page 21

(2) The institutional change and innovation systems theme works to broaden the knowledge base on new approaches to innovation in agricultural science and technology. Specific emphasis is placed on how innovation processes are affected by the wider social and economic contexts of a society; how different innovative actors can be brought into partnerships, networks, and other forms of interaction; and how innovative institutional approaches can help reduce poverty and add value to food and nonfood agricultural commodities.

(3) The organization and management of agricultural research theme complements IFPRI's policy emphasis and seeks to enhance the quality and effectiveness of organizations and individuals engaged in research and innovation processes. The research aims at providing both appropriate and cutting-edge tools to managers and decisionmakers engaged in various levels of the innovation process in order to improve strategic planning, priority setting, management, financing, and project execution.

The ISNAR Division also encompasses a learning and capacity strengthening program that complements each of the aforementioned research themes. Through this program, IFPRI shares its research findings and strengthens the capacity of individuals and institutions in an agricultural innovation system. The program brings together IFPRI researchers and collaborators to carry out learning events and distance-education programs, to design and produce publicly accessible learning modules, and to develop informational networks that support higher-education institutions and other institutions engaged in agricultural innovation.

Decentralization

The ISNAR move is part of a wider IFPRI effort to increase its reach and follows a call from its board for greater decentralization to bring the institute's work closer to the people who researchers study, serve, and collaborate with. IFPRI's decentralization is being undertaken in close connection with other CGIAR centers and regional research organizations. In addition to the Addis Ababa office, set up in cooperation with ILRI, IFPRI has opened a second subregional hub in South Asia (New Delhi) that will facilitate collaboration between headquarters and local organizations and individuals. The office in New Delhi is housed at the National Agricultural Science Center (NASC) Complex, where several other CGIAR centers have already established bases. Initially, this office will concentrate on South Asian countries and gradually may expand its research and capacity-strengthening activities to Central and Southeast Asia. The priority research activities include economic reform, trade liberalization, and food security; high-value agriculture and vertical integration; water and food safety; and biotechnology related issues.

Other decentralized research and capacity-strengthening activities are also underway, for instance with the New Partnership for Africa's Development (NEPAD), and with IICA in Costa Rica.

These steps should create opportunities for collaboration, feedback, and research synergies between IFPRI researchers and their colleagues in government and research.

Strategic Direction

Since its inception in 1975, IFPRI has undertaken research on national and international policies with a basic aim to improve and expand people's access to food in a sustainable manner, particularly in developing countries and among the poorest people in those countries. It does this by presenting policy solutions—derived from its own research activities—to developing-country policymakers, researchers, nongovernmental organizations (NGOs), and civil society more broadly. It further provides research support, technical assistance, and training for capacity building to help these groups design policy, invest resources, and reform their institutions.

In a bid to sharpen its focus and become more responsive to the demands placed on it, IFPRI published a revised strategy in 2003, based on deliberations with researchers, partners, and other stakeholders. In that strategy the Institute resolved to concentrate on three overarching objectives over the next 10 years—improving global food-system functioning, global and national food system governance, and food system innovations—supported by research on 12 themes (see pages 28—57).

It was also decided that IFPRI needed to focus on development strategies, in order to give policymakers sound information on overall approaches to economic development. In line with this, IFPRI restructured in 2003, creating the Development Strategy and Governance Division (DSGD) and incorporating the work of the Trade and Macroeconomics Division in DSGD and the newly focused Markets, Trade, and Institutions Division. With the addition of the ISNAR Division, led by Wilberforce Kisamba-Mugerwa, IFPRI now comprises five research and outreach divisions, a Communications Division, and the 2020 Vision Initiative.

The Development Strategy and Governance Division, formed in April 2003, undertakes research on food and agriculture

strategy in an economywide context. The division's research and outreach agenda helps identify development strategy options for different types of countries through cross-country analysis, country case studies, research on cross-cutting issues, and the design of country and regional strategic analyses. The DSGD creates practical tools for strategic planning to guide country investments in poverty reduction, food security, and agricultural growth, and supports national efforts by maintaining a presence in selected countries and by working through regional policy research networks. Peter Hazell is DSGD's director.

The revitalization of World Trade Organization (WTO) negotiations in mid-2004 has raised the possibility that more poor countries may be able to trade their way out of poverty. Liberalized trade can encourage agriculture-led economic growth in developing countries. But the transformation of rural economies to better respond to trade opportunities can cause hardship for smaller farmers who cannot meet new production standards or who lack credit or specialized knowledge. Moving toward a commercial, market-oriented economy is complex; high transaction costs, falling producer prices, and rising food prices hurt the poor. Without oversight, ineffective policies, weak institutions, and inadequate infrastructure can create market inefficiencies. The Markets, Trade, and Institutions Division (MTID) analyzes these economic transformations to understand how to broaden the benefits of market reform to include the poor; identifies constraints on market efficiency; and focuses on the institutions and policies most likely to help smallholders access markets. MTID's director is Ashok Gulati.

To drastically reduce the number of hungry people and feed the generations to come, agricultural production must grow. But current agricultural systems are threatened by land degradation, water scarcity, and the erosion of genetic resources. Solving these problems requires technologies that can improve yields and contribute to better natural resource management. It also requires that institutions and policies be in place to provide poor people with opportunities and incentives to conserve and manage natural resources efficiently. The Environment and Production Technology Division (EPTD), under the leadership of Mark Rosegrant, focuses on ways to increase agricultural growth in developing countries, reduce poverty, and sustain the environment. Whether these closely linked goals complement or compete depends on a country's mix of policies, technologies, and investment strategies. EPTD quantifies the trade-offs and links between agricultural ecosystems and poverty reduction so that policymakers and practitioners can establish research-based priorities for action.

The Food Consumption and Nutrition Division (FCND) researches how policies and programs affect the nutrition levels and food security of communities, households, and individuals; how poor people generate income, get food, and ensure good nutrition and health for themselves and their families; how diets change and affect food security and poverty over time; why some communities develop and prosper while others remain mired in poverty; and how institutions assist or constrain people and communities in moving out of poverty. Sustainable food production alone does not eliminate malnutrition. Economic access to food and the ability to harness food for physical growth and nutrition are also essential. FCND seeks to understand what influences the behavior of communities, households, and family members, and the importance of gender for planning and implementing specific policies or program interventions. The division was led by Lawrence Haddad, until Marie Ruel took over during 2004.

The 2020 Vision Initiative has two primary objectives: To develop and promote a shared vision for action for meeting food needs while reducing poverty and protecting the environment; and to generate information and encourage debate to influence action by national governments, NGOs, the private sector, international development institutions, and other elements of civil society. It seeks to do this by generating information related to food and agriculture issues, raising public awareness, and providing forums for debate among policymakers, researchers, NGO leaders, private-sector representatives, and other stakeholders. Rajul Pandya-Lorch heads this initiative.

The Communications Division, under the direction of Klaus von Grebmer, supports IFPRI`s research staff in their communications and outreach activities. In close cooperation with the research and outreach divisions and the 2020 Vision Initiative, it produces a range of communication tools to convey research findings and policy implications to IFPRI's key audiences. Individual outreach strategies are systematically conceived for all communications products, including books, research reports, briefs, press releases, the website, and CD-ROMs. The Communications Division also works with IFPRI's Publications Review Committee to ensure the academic quality of IFPRI's publications and it safeguards IFPRI`s brand and visual image through consistency in design.

In 2003–2004 the division contributed to IFPRI's outreach on a number of fronts, from the intensive multimedia and multilingual policy dialogue of the 2020 Africa Conference to the major, new CGIAR initiative on distance learning that the division facilitates. In 2003 alone, the division organized more than 20 policy seminars, workshops, and conferences; carried out about 40 press events; and increased and improved website content, resulting in about 40 percent more visitor sessions

than the previous year. The division also disseminated work through numerous publications, including about 10 major research monographs, ranging from books on hunger and globalization to fish supply and demand to 2020.

One of these books, *Ending Hunger in Our Lifetime: Food Security and Globalization*, by C. Ford Runge, Benjamin Senauer, Philip Pardey, and Mark Rosegrant, was published by IFPRI and the Johns Hopkins University Press in 2003. Intended for a broader audience than other IFPRI monographs related to food security, the book presents a synthesis of the most recent research findings on food security in developing countries in a nontechnical manner. The Communications Division designed the book accordingly, giving it an appealing and poignant look by integrating photos of the renowned Brazilian photographer Sebastião Salgado. These efforts garnered a positive review in *The Economist* as well as the American Agricultural Economics Association's 2004 Quality of Communication Award. The book was also among Johns Hopkins University Press's top 20 bestsellers for books published in fiscal year 2003–04, and it has gone into its second printing.

In one of several examples of the Communications Division's targeted approach to reaching an audience composed of researchers, policy advisers, policymakers, students, journalists, and others interested in agriculture-based development, the Division communicated research on the outlook for fish to 2020 in a variety of forms. In conjunction with the 2020 Vision Initiative and the WorldFish Center, the Communications Division released a trio of publications—a book, a food policy report (providing detailed highlights for policy advisers and research-oriented nonexperts), and an issue brief (for those wanting a concise overview). In addition, the Division organized simultaneous media events in Washington, Penang, and Hamburg and a half-day policy seminar at IFPRI. Media coverage included Agence France-Presse, BBC Online, Das Tageblatt, the Financial Times, and numerous other wire services and newspapers. In addition, the authors were interviewed by BBC and other media outlets.

In 2003 the division conducted press events in Africa, Asia, Latin America, Europe, and North America, garnering worldwide coverage in prominent media outlets, from the New York Times to major newspapers and TV/radio outlets in developing countries. The division launched a list serve for journalists in 2003 and about 400 journalists from around the world joined up. Subscribers include reporters from prominent international news outlets such as the *New York Times* and BBC, as well as major dailies and wire services in Africa, Asia, Europe, and the Americas.

The division also disseminated information through its website. It added about 700 new pages to the IFPRI website in 2003, resulting in a monthly average of 70,000 website visitor sessions. By the end of 2003 the publications database on the website contained links to or information on almost 1,700 IFPRI documents, all of them searchable by keyword, author, year, and language. Website visitors conducted almost 30,000 searches of the publications database. The division also supported the information needs of IFPRI researchers by providing desktop access to journals, databases, search engines, and other research tools.

In ongoing efforts to make IFPRI's research more accessible through electronic and digital means, the division produces numerous CD-ROMs and makes research output "harvestable" through a variety of databases/search engines, including Citeseer, Scirus, Google Scholar, OCLC WorldCat, and REPEC. Taking advantage of these digital libraries allows IFPRI to make its publications available to tens of thousands of individuals who use these search engines and databases.

As part of its mission to provide free public goods, the division began the Global Public Goods project in 2003. Its major objective is to rehabilitate and document a large number of socioeconomic datasets at IFPRI and make them available in the public domain for use by researchers working on policy issues in developing countries. The division has reorganized these IFPRI datasets and re-documented their content with descriptions and other cataloging information. The datasets can now be downloaded directly from the IFPRI website and be requested in CD-ROM format. In addition, users can browse through available datasets by country, region, and survey theme.

Finally, the division contributed to the successful integration of ISNAR by cooperating closely with the transition teams and helping to reorganize information and communication products and resources so that ISNAR could become a full-fledged division of IFPRI in 2004.

Networking for Results

While much of IFPRI's research is global, the institute currently invests the majority of its regionally focused programmatic budget in Sub-Saharan Africa and Asia, and is increasing its activities in Latin America and the Caribbean and West Asia/North Africa.

The main focus in the coming years will continue to be Sub-Saharan Africa and South Asia, where food insecurity and undernutrition are broadest and deepest. Outside of Sub-Saharan Africa and South Asia, IFPRI will emphasize work in the

most food-insecure areas, expand research cooperation in China, Central Asia, and Central America, and work with other CGIAR centers and new partners to strengthen regional networks.

These partnerships are key in helping IFPRI accomplish its mission and as a means to reach the Millennium Development Goals. Altogether, the institute conducts research on food policy issues with governments, universities, NGOs, and private-sector organizations in about 70 countries and with more than 30 international and regional organizations. It invests in these partnerships and networks to identify and implement the best and most innovative solutions for poverty reduction and share state-of-the-art knowledge with and strengthen the capacity of its collaborators and stakeholders in developing countries.

Among the major collaborative efforts are the following:

- HarvestPlus program on biofortification co-led with CIAT
- East Africa Food Policy Network
- South Asia Initiative (SAI)
- Mashreq and Maghreb (M&M) Project
- Regional Network on AIDS, Rural Livelihoods, and Food Security (RENEWAL)
- Agricultural Science and Technology Indicators (ASTI)
- Collective Action and Property Rights initiative (CAPRi), a systemwide initiative of the CGIAR
- Program for Biosafety Systems (PBS), a consortium of experts, government officials, and research organizations that seeks to help countries in Africa and Asia learn to evaluate and manage the potential benefits and risks of modern biotechnology.

While some networks, such as the one for East Africa, the Mashreq and Maghreb Project, and the South Asia Initiative, deal with specific regions, others, like RENEWAL, which concentrates on AIDS, and CAPRi, which focuses on collective action and property rights in natural resource management, are dedicated to a single theme or subject area. These networks aim to improve access to policymakers for researchers in member countries and to coordinate the work of IFPRI researchers with their counterparts in the field.

Senior researchers at IFPRI also cooperate widely with Future Harvest centers of the CGIAR and in large, effective networks with partners in developing countries and centers of excellence worldwide.

IFPRI plans to strengthen incentives for this crosscutting and collaborative research within and beyond IFPRI. IFPRI proactively works to create and support regional networks in West Asia/North Africa, South Asia, and Sub-Saharan Africa.

In the future, as IFPRI decentralizes its operations, these networks will assist outposted IFPRI staff. IFPRI itself is a member of the CGIAR network, and relies heavily on partnerships with sister centers throughout the world, including joint projects and staff appointments with IPGRI, ISNAR, ILRI, IWMI, and ICARDA.

The causes of hunger are complex and include violent conflict, environmental degradation, water scarcity, and climate change. But poverty is at the root of hunger: people are hungry because they cannot afford to buy all the food they need, or they lack the land and other resources to produce food for themselves. The stakes are high: about 170 million malnourished children under the age of five go hungry every day in the developing world. Five million children die annually of malnutrition and related diseases. These brutal statistics underscore the violence and injustice of hunger itself.

In addition to its science-based approach to food, IFPRI's work places an explicit emphasis on human rights because of its mandate of reducing hunger and poverty and helping to create a food-secure world.

In 1974 the World Food Conference pledged to eradicate hunger in a decade, but 30 years on we are still a long way from meeting that goal, even though nearly every country in the world produces 85 percent to 100 percent of its food needs, and many produce large surpluses. Part of the reason is that we no longer consider food to be a basic human right. First and foremost it is a business. Nevertheless, the international environment has considerable influence on national policies, making it incumbent upon decisionmakers to make the decisions that will lift the floor of poverty so that all might flourish. But achieving food security will require unwavering commitment, new approaches, broad political mobilization, and a more effective and sustainable attack on the scourge of hunger.

The pledge in IFPRI's logo, to find "sustainable solutions for ending hunger and poverty," encapsulates our support of the right to adequate food, understood as the right to have a fair chance to get access to the means to feed oneself and one's family.

With explicit attention to vulnerable groups, IFPRI pursues activities that benefit people in greatest need. We pledge to boldly and independently communicate findings based on sound analysis, even when controversial. ■

Research and Outreach

In 2003 IFPRI published its revised long-term strategy, *IFPRI's Strategy Toward Food and Nutrition Security: Food Policy Research, Capacity Strengthening, and Policy Communication.* That document delineated 12 research themes critical to IFPRI's mission grouped under three overarching objectives: global food system functioning, food system governance, and food system innovation. The research IFPRI carried out on these themes in 2003–2004 is described in the following pages.

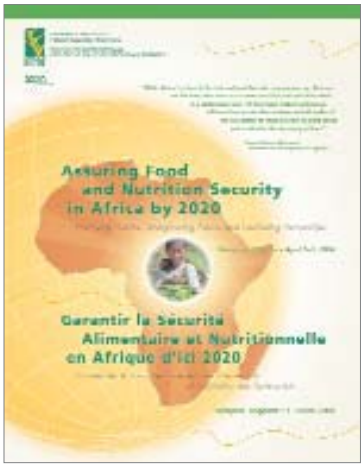
GLOBAL FOOD SYSTEM FUNCTIONING: Policies supporting more efficient functioning of the global food, nutrition, and agriculture system that enhance inclusion of low-income countries and improve food and nutrition security for poor people.

Global food situation and scenarios of policy risks and opportunities

A 2020 Vision for Food, Agriculture, and the Environment

2003–2004 was a landmark year for the 2020 Vision Initiative. The Initiative, which since 1993 has sought to develop a shared vision and consensus for action on how to meet future world food needs while reducing poverty and protecting the environment, continued to contribute to the three pillars of IFPRI's strategy by commissioning cutting-edge research, engaging in unique policy communications activities, and facilitating a pioneering capacity-building initiative.

The highlight of the year was the Conference on "Assuring Food and Nutrition Security in Africa by 2020: Prioritizing Actions, Strengthening Actors, and Facilitating Partnerships," which was held on April 1–3, 2004 in Kampala, Uganda. More than 500 participants from all key stakeholder groups—including policymakers, parliamentarians, business leaders, civil society actors, farmers, researchers, and the media—from over 50 countries came together to deliberate on how to bring about change and implement action to combat hunger and malnutrition in Africa. The 2020 Africa Conference, which is part of a longer-term consultative process on African food and nutrition security, was designed in close consultation with a Conference Advisory Committee (CAC) composed primarily of distinguished African leaders. Several lead-in and follow-up activities have taken place, and a number of background materials were commissioned for publication. A key outcome of the Conference is a statement prepared by the CAC entitled The Way Forward from the 2020 Africa Conference, which provides a set of guidelines for a food- and nutrition-secure Africa (for further information about the Conference, see pp. 22–23 in the Overview section of this annual report).



While the 2020 Africa Conference was the Initiative's signature activity this year, spanning all three pillars of research, communication, and capacity strengthening, the 2020 Vision Initiative also engaged in several other activities.

The Initiative supported research, undertaken jointly by IFPRI and the WorldFish Center, to examine the outlook for fish in the context of changing global and national market forces. Extending IFPRI's state-of-the-art International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), the researchers projected that over two-thirds of the increase in global food fish production to 2020 will come from aquaculture, and that virtually all of the increase in global consumption of food fish will take place in developing countries.

The work was released in October 2003 in a trio of publications—a book, food policy report, and issue brief—with simultaneous media events in Washington, Penang, and Hamburg and a half-day policy seminar at IFPRI.

With food safety gaining prominence as a global issue, the Initiative commissioned a set of 17 policy briefs and case studies, collected in *Food Safety in Food Security and Food Trade*, to better understand the

key food safety issues that prevail today and the different policy options available to developing countries for addressing them.

There is growing recognition that if we are to successfully promote sustainable and pro-poor management of natural resources, we must understand and address the complex issues surrounding property rights and collective action that govern the use of natural resources. To address this issue, the Initiative collaborated with the CGIAR System-wide Program on Collective Action and Property Rights (CAPRi) to commission 16 policy briefs, compiled in *Collective Action and Property Rights for Sustainable Development*, that describe what kinds of arrangements work best and under which conditions.

Another highlight of the year was the successful completion of a pilot capacity strengthening activity—a planning exercise to develop a Collaborative Masters Program in Agricultural and Applied Economics for Eastern, Central, and Southern Africa. Since 2002, the 2020 Vision Initiative has been facilitating this activity, which is being led by the Agricultural Economics Education Board (AEEB) comprising 16 heads of departments of agricultural economics in the region. The AEEB has developed a shared vision and sense of ownership over the program through regular, informed, intensive exchanges on issues of immediate and longer-term concern to the collaborating institutions. Plans are underway to transition the management of the Masters Program from IFPRI to a permanent institutional home within Africa, which will be jointly determined by the AEEB and supporting donors. The first intake of students is expected in September 2005. The momentum generated by this carefully structured, intensive planning process has greatly facilitated the subsequent financing and implementation of an innovative, locally driven program that will contribute significantly to development of agriculture and agribusiness in the region.

The 2020 Vision Initiative continues to be guided by a prestigious Advisory Council, chaired by H.E. President Yoweri Museveni of Uganda. The Council's membership was expanded during the year to reflect the changing constellation of actors involved in tackling hunger and poverty. Advisory Council members gathered in Kampala during the 2020 Africa Conference to discuss the achievements of the 2020 Vision Initiative and the types of activities in which it might engage in the future in order to achieve the vision of a food- and nutrition-secure world by 2020.

Global Trends in Food Supply and Demand: IMPACT Special Project

Since the late 1960s, technology and innovation have ably met the Malthusian challenge, with increases in global food production outstripping population growth. Agricultural research, new crop varieties, increased irrigation, and investments in rural development have all played key roles in boosting food output. Food security, and in particular child malnutrition, has also improved significantly. Still, serious concerns exist about the ability of the agricultural sector to continue to meet the needs of expanding populations in the developing world. The supply of additional arable land and irrigation water is limited, and the potential gains from the Green Revolution have been, in many cases, fully realized.

To allow researchers and policymakers better insight into future trends in food supply, demand, price, and security, IFPRI developed IMPACT—the International Model for Policy Analysis of Agricultural Commodities and Trade. IMPACT is an economic model that covers 43 countries and regions that account for virtually all of the world's food production and consumption. It incorporates 32 commodities, including all cereals, soybeans, roots and tubers, meats, milk, eggs, oils, oilcakes, meals, vegetables, fruits, sugar, and fish in a partial equilibrium agricultural-sector framework. IMPACT projects the percentage and number of malnourished preschool children in developing countries based on an assessment of the average number of calories that will be available per capita and an estimation of a series of indicators, such as the share of females in secondary schools, that are proxies for investments in nonagricultural sectors.

A wide range of factors that have significant impact on the world food situation can be modeled with IMPACT. These factors include population and income growth, the rate of growth in crop and livestock yield and production; feed ratios

for livestock; investments in agricultural research and irrigation; commodity price policies; and elasticities of supply and demand. For any specific level assigned to these underlying factors, IMPACT generates projections for crop area, yield, production, prices, trade, and the demand for food, feed and other uses, and for livestock numbers, yield, production, demand, prices, and trade.

In 2003, IFPRI worked with its CGIAR partner, WorldFish Center, to use the IMPACT model to project supply, demand, and trade scenarios for fish through the year 2020. The results were released in a jointly published book, *Fish to 2020: Supply and Demand in Changing Global Markets*, and an accompanying food policy report and issue brief. The researchers modeled a range of scenarios such as slower or faster aquaculture expansion, lower Chinese production, more efficient use of fish feed, and the ecological collapse of wild fisheries. The model's projection results indicate that:

- with growth in demand outstripping supply, fish products will become more expensive to consumers over the next two decades;
- fish consumption as food will continue to increase rapidly in developing countries, while developed-country consumption levels will stagnate;
- rapid growth in fish production is likely to continue, with developing countries producing an ever-greater share; and
- the share of aquaculture in total fish production will continue to grow, accounting for more than 40 percent of total production by 2020.

The impact of these outcomes on the lives of poor people and the environment will be substantial, and the report offers several suggestions for policy actions and investments that can reduce environmental damage and generate benefits for the poor.

Globalization, retail food industries, and trade negotiations related to food and agriculture

Global and Regional Trade

Liberalizing markets can improve agricultural productivity and increase economic growth in developing countries. Many such countries have historically kept food prices artificially low, discouraging farmers from investing in the inputs required to boost production. Many developing countries have seen agricultural production, exports, and incomes rise as a result of more open domestic markets. However, such policy reforms, if poorly implemented, can also harm the poor. Smaller farmers may find it disproportionately difficult to adapt to new market regimes. If increased production reduces producer prices, small farmers whose output does not grow lose income. Or rising food prices can hurt the non-farm poor. Participation in and exposure to global agricultural markets is also a two-edged sword. Without reform of high agricultural subsidies in industrialized nations, small farmers in developing nations can face artificially low prices for their exports.

The global cotton market provides a clear example of the impact of such subsidies on developing-country producers. Between 2001 and 2002, the world cotton price declined about 40 percent, partly in response to rising subsidies for cotton growers in the industrialized nations. In 2002, the World Bank commissioned IFPRI to study the impact of the precipitous fall in prices on poverty in Benin. At the time, Benin, a West African nation with a per-capita GNP of $380, was the twelfth-largest exporter of cotton in the world.

IFPRI research has shown the impacts of various cotton-price scenarios using data from a previous IFPRI survey of Benin households. A strong link exists between cotton prices and rural welfare in Benin. A 40 percent drop in cotton prices resulted in an 8 percent increase in rural poverty in the short run, and a 6-7 percent increase in the long run. The study's conclusion—that higher cotton subsidies in industrial countries have directly increased rural poverty in cotton-producing developing countries—has major implications for global trade agreements.

Policymakers may not adequately understand the implications of new trade rules for their countries, if they do not have accurate measures of the existing policy distortions in their own economies. Since 1987, the OECD countries have used and refined standard measures of domestic support to agriculture. No comparable indicators exist for developing countries, though those in the WTO submit an annual Aggregate Measure of Support that provides some information. A team of IFPRI researchers, in collaboration with several other institutions, is working to develop more consistent measures of the level of implicit taxation or subsidy for agriculture. Country studies are underway at IFPRI for India, China, and Vietnam. Preliminary results indicate that in these countries there is a trend away from discrimination against agriculture and that support has been counter-cyclical to low world prices in recent years.

Developing-country policymakers also need to understand the current and potential impacts of global trade regimes—and the domestic policy reforms they may force—on their agricultural sectors. Since 2001, an IFPRI team has been studying the implications of the WTO and other agreements for household welfare in Bangladesh, with the goal of helping the country's policymakers steer their way through the changing trade environment. Other ongoing IFPRI projects focus on WTO negotiating positions with regard to poverty and food security in the developing world; the impacts of regional trade agreements, such as SADC, NAFTA, the Free Trade Area of the Americas, and MERCOSUR; the consequences of China's accession to the WTO; market opportunities for Southern African agriculture in the new global trade environment; and a broad-based project on the globalization process.

Managing natural resources of particular importance to food, nutrition, and agriculture—land, water, trees, genetic resources, biodiversity—and responding to climatic change

Property Rights and Collective Action

Property rights—legally recognized rights to land—play an important role in determining how natural resources are used. Collective action—cooperative management of natural resources—can help groups of people who depend on a resource work together to maintain or enhance it. Taken together, property rights and collective action systems entail a bundle of personal and group rights and obligations that can have profound consequences for the economic success of farmers, livestock producers, and the communities they live in. Economic liberalization has led some developing countries to increase private control over natural resources, often with mixed results for the poor. A solid understanding of the implications of various systems of land tenure and collective action can help ensure that agricultural policy reforms not only improve productivity, but also reduce poverty, improve equity, and bolster sustainable resource use.

Researchers from IFPRI, the International Center for Agricultural Research in the Dry Areas (ICARDA), and various national agricultural research systems, in collaboration with regional partners, are studying the effectiveness of property rights regimes in the Mashreq and Maghreb (M&M) region—which encompasses the low-rainfall areas of North Africa and West Asia. These researchers are identifying the impact that existing property rights and collective action systems are having on cropland management, what are the alternative institutional arrangements for rangeland management, how markets can be used to increase access to feed, and what effect the growing role of women in resource management is having on land use. Governments in the region have introduced a variety of different tenure options, including private ownership, agrarian-reform-based rights, and collective-use rights, all of which have had different impacts on farmers and land.

It is generally assumed that farmers with incomplete land rights (limited use rights, limited rights to transfer (sell)) will make less use of inputs and rented machinery than farmers with complete land rights (private ownership). Researchers found this to be true in Morocco. There, farmers relied on family and hired labor on land under incomplete rights, but used mechanization and more inputs on land under complete rights. As a result, profit margins from collective tribal lands and land "appropriated" from state-owned areas (incomplete land rights) were much lower than those from rented fields and bought and inherited private fields.

In Tunisia, however, the results were less clear cut. Input use was not obviously related to the type of land rights farmers held. Plus, profit margins did not differ significantly between land-right categories. They did differ significantly among crops grown. For example, vegetable fields generated higher profit margins per hectare than cereal fields.

Two main conclusions emerged from the studies: First, Tunisia's privatization policies have removed the differential effects of land rights. Farmers now have similar opportunities for gaining access to credit and investing in their land. As a result, the main difference between farms is the extent to which farmers adopt new seed technologies and diversify production.

Second, though the maintenance of collective land rights in the croplands may have been a good strategy in the 1920s (when population pressure was low), the region's countries now need to improve the productivity of their lands (through the use of inputs and mechanization and other forms of investment). To encourage this, full ownership should be granted to right holders.

The region's governments have also introduced a number of options to improve collective rangeland management. These include tenure reforms and the institutional reorganization of pastoral communities. However, only limited efforts have been made to quantify the effects of these options on both pastoral production systems and the costs and benefits of livestock production. The project is therefore assessing whether the new options provide higher payoffs than customary management systems. The results to date demonstrate the considerable promise of recent institutional approaches that empower communities and make them stewards of their pastoral resources.

Additionally, a number of research projects have been concerned with evaluating the extent to which successful collective action impacts on natural resource management

within a community as well as on household incomes and livelihood strategies, with identifying the conditions under which communities successfully organize and sustain collective action, and assessing how policies can create a more enabling environment. Recently completed rangeland projects in Sub-Saharan Africa indicate that the capacity for cooperation leads to more sustainable land use in terms of lowering stock densities, increasing herd mobility, and reducing encroachment of private cropland onto community pastures. Greater cooperative capacity also leads to greater investments in natural resource management, for example, soil erosion control and reforestation, and in the case of Burkina Faso, to greater total incomes as well as income from livestock production. Factors that determine cooperative capacity differ across countries, but, in general, heterogeneity in wealth and the sharing of resources with non-community members appear to reduce cooperative capacity. Interestingly, access to markets does not appear to reduce this capacity, and in some cases, leads to greater cooperation.

Results also indicate that climate variability plays a role in determining how common pastures are used and managed, as well as the importance of flexible land-access rights for those living in high variability regions. Stock densities are lower in very high variability environments, meaning that policies to protect stock losses during crises may inadvertently lead to higher stock densities and thus greater vulnerability. Moreover, climate variability tends to be associated with greater management of the use of natural resources, but also to less investment in those resources.

Ongoing research also focuses on collective action and rights to water resources in Ghana and Chile; this project will extend the earlier methodology to consider the links between communities as well as with government agencies and private water concerns. Finally, a new project on the fiscal and economic implications of alternative land reform scenarios in South Africa has just begun. The project will combine micro-level data on farm households with a countrywide, dynamic macroeconomic model to evaluate how different reforms could play out over the next 15 years.

CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi)

Collective action and property rights institutions play an important role in how people use natural resources. This, in turn, has an important effect on agricultural productivity, and on the prosperity of rural economies. Insofar as property rights determine people's access to resources, they can also have a major impact on patterns of equality and inequality within a society. Some resources—such as forests, rangelands, extensive waterways, and irrigation systems—can be better managed by groups of people because they cover large

Insofar as property rights determine people's access to resources, they can also have a major impact on patterns of equality and inequality within a society.

geographical areas. However, collective management requires collective action and voluntary adherence to a common set of rules. The success of collective action institutions depends on the characteristics of the group, the resource in question, and the external policy environment.

In recognition of the critical importance of such institutions, the CGIAR established its Collective Action and Property Rights initiative (CAPRi) in 1996. IFPRI convenes the program, which involves all 15 CGIAR centers and around 400 collaborating institutions. CAPRi's goal is to help alleviate rural poverty by analyzing and disseminating knowledge on the ways collective action and property rights institutions influence the efficiency, equity, and sustainability of natural resource use and rural development.

In 2003, CAPRi released three working papers and 16 policy briefs covering the roles of property rights and collective action in a wide variety of situations. CAPRi also led the review process for a forthcoming special issue of *Agricultural Systems*, which will include eight papers on methodologies for studying collective action. CAPRi has produced 1,000 copies of a CD-ROM containing all the program's publications from 1995 to 2003, as well as a bibliography covering the field and an inventory of related CGIAR projects. Together with the World Agroforestry Centre, CAPRi held in November 2003 its first one-week training course on research on property rights, collective action, and natural resource management. Twenty-eight staff members from East African national agricultural research systems participated in the training, held in Nairobi. A South Asian observer attended the training to help guide the adaptation of the course for that region. CAPRi also co-organized (with the International Plant Genetic Resources Institute [IPGRI]) a September 2003 workshop in Rome on property rights, collective action, and local conservation of genetic resources, attended by 50 researchers from around the world.

Sustainable Development of Less-Favored Lands

A large share of agricultural development in recent decades has been targeted toward increasing productivity in prime agricultural areas. Such lands—either irrigated or blessed with regular rainfall, with good soils, long growing seasons, and relatively easy access to markets and services—have yielded tremendous growth in agricultural production in much of the developing world. They were the center of the Green Revolution, and growth in their output has led many countries to agricultural self-sufficiency.

However, more than one billion people live on less-favored lands. These areas face difficult biophysical conditions for agriculture, including poor soils, low and unstable rainfall, steep slopes, and short growing seasons; or they are remote from markets and services; or they are both remote and less endowed. As better-endowed areas have seen sharp increases in food production and economic growth, less-favored lands often have been left behind. Many of their residents find themselves in a trap of poverty and land degradation. IFPRI research in Uganda and northern Ethiopia, for example, has found that higher population density in highland areas leads to greater soil erosion, contrary to the optimistic "more people—less erosion" hypothesis. In other words, with rapid population growth, the land is worked ever harder to feed more mouths, agricultural yields fall, and poverty worsens.

Finding sustainable farming and income strategies for such areas requires close attention to local conditions and comparative advantage. The conventional wisdom rarely applies in less-favored lands. For example, high-input

production of cereal crops—an approach frequently promoted by agricultural officials—tends not to be the most effective economic path for less-favored lands. Farmers often find it unprofitable to purchase fertilizer, for example, because yields do not increase enough to justify the cost. In many cases, this is because of limited soil moisture. Low moisture and soil fertility can also limit the usefulness of some of the most commonly promoted improved crop varieties.

Instead, farmers in less-favored areas tend to do better when they use a low-external input approach to food crop production and diversify into other more profitable livelihood activities. For example, profitable alternative activities identified in drought prone areas of northern Ethiopia include raising poultry, dairy production, beekeeping, and tree planting. In addition, food crop production can be enhanced and land degradation reduced in this region by adoption of several low-external input technologies, including stone terraces on cultivated hillsides, contour plowing, reduced tillage, and application of manure and compost. All of these technologies help preserve or improve soil moisture and organic matter. Water-conserving practices and technologies are particularly helpful to farmers in drought-prone environments. Farmers also often do well by mixing subsistence farming with alternative livelihood strategies, including the cultivation of cash crops and employment outside the farm. Investments in various conservation practices often make more economic sense in the production of cash crops than in subsistence cereal farming.

Given existing levels of poverty, education, and infrastructure development in most less-favored areas, however, most farmers are unlikely to be able to successfully put such strategies in place without help. Governments, international institutions, and agricultural researchers need to devote more attention and investment to less-favored lands. If carefully targeted with an eye to an area's comparative advantage, investments in roads, other infrastructure, education, training, and credit can yield high returns. Roads, for example, play a crucial role in determining whether farmers can gain the market access needed to diversify into cash crops. Education is a key determinant of whether households can gain nonfarm employment. These and other investments are needed to reduce poverty and food insecurity in many of the less-favored rural areas studied by IFPRI researchers.

Water Resource Allocation: Productivity and Environmental Impacts

Clean freshwater is an essential resource for agriculture and other human activities, as well as for the ecosystems that support them. However, population and economic growth in much of the developing world are bringing household and industrial demand for water into conflict with agricultural use. At the same time, pollution of water sources and deterioration of irrigation systems and irrigated cropland are increasing. New sources of water are becoming increasingly difficult, if not impossible, to develop. In this context of intensifying competition for finite or dwindling resources, the principal challenge for policymakers—and researchers—is to determine the optimal allocation of the resource, while minimizing the negative environmental impacts of water use.

IFPRI works on water allocation issues on three different levels: the global, river basin, and local or irrigation-system levels. At the global level, IFPRI is collaborating with IWMI to model water availability and demand and how they relate to global food supply, demand, trade, and food security. To do so, researchers are developing the WATERSIM model, which builds upon previous work in

In this context of intensifying competition for finite or dwindling resources, the principal challenge for policymakers—and researchers—is to determine the optimal allocation of the resource, while minimizing the negative environmental impacts of water use.

this area under the IMPACT special project (see page 30). The model is the first of its kind: it integrates national-level policy and economic data with a fine-grained regional model of hydrology, irrigation, and food production. WATERSIM divides the world into 123 major river basins, 110 economic regions, and 275 "food-producing units." The approach promises a much more realistic view of the global water and food system.

In 2003, IFPRI's water team completed two major studies of water allocation at the river basin level in collaboration with a number of local institutions. One examined the Brantas River Basin in Indonesia, and the other the Dong Nai River Basin in Vietnam. Researchers analyzed a wide variety of economic, institutional, and hydrologic factors and impacts. These included water management, farmer production decisions, food production, urban and industrial water demand, and resource degradation. The studies also examined the potential benefits and impacts of different national-level and macroeconomic policies, and the implications of alternative water management regimes, including markets in tradable water rights. Partners and donors met to hear the results at a November 2003 conference in Ho Chi Minh City, Vietnam. Among the studies' findings:

- National-level crop input and output price policies have major effects on water allocation at the basin level.
- Public investment in irrigation accounted for 28 percent of the increase in agricultural output in Vietnam between 1991 and 1999, making it the single most important source of output growth; private irrigation pumps accounted for 6 percent more growth.
- Similarly, between 1985 and 2000, expanded irrigation and improvements in its quality accounted for about 23 percent of rice output growth in Indonesia.
- Market-based incentives are significantly more effective than administrative water prices for saving water while protecting farm incomes, employment, and welfare. In particular, an innovative brokerage mechanism for water that is both technically feasible and institutionally implementable in the two study basins—given recent changes in the water sectors of both Indonesia and Vietnam—should be considered by both countries in the face of growing water shortages and increasing rural-urban water transfers.
- A good case exists for resuming (in Indonesia) and continuing (in Vietnam) investment in irrigation. Such investment should be balanced between physical infrastructure and irrigation management reform, with increasing emphasis on the latter.

In 2003, the IFPRI water team also studied water allocation issues at the local level. Researchers conducted fieldwork in India, Nepal, and Sri Lanka to examine the impacts of urbanization on water used for agriculture. The studies have focused on transfers of water out of agriculture into other sectors, how such transfers happen, which water rights get recognized, who wins and loses, and what the consequences are for rural livelihoods. IFPRI staff are now analyzing the case studies and are planning a workshop to compare findings in 2004.

Food systems in disaster prevention and relief, and rebuilding after crises

HIV/AIDS and Food Security: RENEWAL

An estimated 25 million people are living with HIV in Sub-Saharan Africa—two-thirds of the global total. Every day during 2003 around 8,000 people in Africa were infected with HIV and 6,000 died. A minute proportion of these people have access to anti-retroviral therapy.

AIDS is cutting a swath across the continent, and is so much more than a health crisis. The disease is devastating agriculture, the principal livelihood for most Africans. AIDS disproportionately strikes at experienced farm hands in their most productive years, wrecking havoc on household finances. According to one World Bank study, the loss of the main breadwinner

can result in a household loss of income of more than 60 percent, forcing children to cut short their education, as well as eroding family savings due to medical and funeral costs.

The disease also magnifies the need for food and nutritional security as malnutrition increases susceptibility to HIV infection and vulnerability to the impacts of AIDS. Anti-retroviral therapy, even where it is available, needs to be combined with nutritional support.

To help African countries develop effective responses to HIV/AIDS, as well as the institutional capacity to implement them, IFPRI and the former CGIAR center ISNAR set up the Regional Network on AIDS, Rural Livelihoods, and Food Security, or RENEWAL, in 2001.

RENEWAL, a "network of networks" now facilitated by IFPRI, brings together national networks of agricultural institutions; public, private, nongovernmental, and farmer organizations; and partners working on AIDS and health issues in order to improve understanding of the complex linkages between HIV/AIDS and the food and agriculture sector.

The network concentrates its efforts on action research and developing tools for policymakers. It establishes research priorities through workshops that bring together all the various stakeholders. The first RENEWAL-sponsored studies are already underway in Malawi, Zambia, and South Africa—one study has been completed and others will follow over the next year.

A key goal of RENEWAL is the development and field-testing of an "HIV/AIDS lens," a practical framework for fostering a deeper understanding of the implications of the epidemic among food and agriculture decisionmakers, from farmers to government officials. It offers a step-by-step approach for evaluating how specific situations (for example, increased food insecurity) and actions (such as an extension program) might increase or reduce the risks and impacts of HIV/AIDS.

FOOD SYSTEM GOVERNANCE: Policies improving global and national governance, political participation, and institutions for pro-poor food, agriculture, and natural resource management systems.

Appropriate roles of state, market, and civil society in food, agriculture, nutrition, and natural resource management policy

Policy Processes in Nutrition and Food Security

We know little about the factors that influence the formulation and implementation of nutrition and food security policies. IFPRI seeks to provide information to policymakers about policy, but information is only one element that enters the policymaking process. This process is in fact affected by institutional and societal—and political—factors as well as research-based knowledge. The reality is, as IFPRI researchers put it in a recent paper, that "researchers and their institutions typically have little influence over the rough and tumble ways in which their research is embedded in social, political, and cultural processes." IFPRI's new program on Policy Processes in Nutrition and Food Security seeks to investigate these processes, to understand better how issues get on the agenda, how policy is shaped and implemented, and how research results are used. The knowledge generated by this program should help policymakers, donors, NGOs, IFPRI, and other research institutions focusing on nutrition and food security maximize the relevance and impact of their work.

One current project that is part of this program focuses on institutional learning and change in agricultural research policy. How do institutions that develop and disseminate agricultural innovations monitor and evaluate impact? How do they refocus research when needed? What factors affect the uptake of information about impact, and how might uptake be improved? IFPRI researchers and CGIAR partners have been working on Institutional Learning and Change (ILAC), an approach to research and evaluation that involves reflection and adaptation throughout the project cycle. IFPRI researchers recently undertook a multiyear study of the impact of five CGIAR innovations in Bangladesh, Zimbabwe, Kenya, and Mexico (see page 44). Rather than using only standard economic measures of success, researchers also conducted focus groups, individual interviews, and case studies of village households. The results—and the general question of how such evaluative studies can influence the strategies and activities of research centers—were discussed at a three-day workshop in February 2003, which was attended by researchers from eight CGIAR centers. If done well, impact studies can produce important insights about where agricultural research does or does not reduce poverty, but these insights are often lost or do not move beyond the small group of researchers involved. ILAC can integrate the dissemination and discussion of such information within institutions and throughout the research community.

The Agriculture-Nutrition Advantage project, also part of this program, looks specifically at how nutrition does or does not become part of the policy dialogue on agriculture and poverty reduction. A joint effort of IFPRI and the International Center for Research on Women, the project spans four countries in Africa. Its goal is to develop a better understanding of which factors account for the limited attention that policymakers pay to nutrition and food security concerns and how various sectors of government might work together to increase the resources directed toward improving food and nutrition security at the national, local

Declining investment threatens future growth in productivity and food supplies, as well as progress in reducing rural poverty and resource degradation.

government, and household levels. The project emphasizes that gender issues must be taken into account to effectively address food insecurity and malnutrition.

The study has shown that substantial institutional barriers exist to developing strong partnerships between the agricultural and nutrition communities in the four study countries. Despite quite rationally constituted institutional frameworks in these countries, national efforts to improve nutrition, in particular, have been poorly served. To effectively address malnutrition, action across sectors is needed, but such action is difficult to undertake precisely because it cuts across sectors. Most critically, advocates for food and nutrition security must act to build the knowledge of policymakers and their constituents about the actions, particularly gender-informed actions, needed to bring about food and nutrition security. How this can be done depends on the policymaking contexts both across countries and at different levels of government within a country; on local capacity and leadership to move issues into the various policy arenas; and on the degree to which political leaders seek to ensure and are held accountable for ensuring that their citizens attain food and nutrition security.

Pro-poor Public Investment: Priorities, Financing, and Governance

Public investment plays a major role in promoting agricultural growth, food security, and rural poverty reduction. However, macroeconomic reforms and structural adjustment have forced many developing countries to cut back their investments in rural areas. Declining investment threatens future growth in productivity and food supplies, as well as progress in reducing rural poverty and resource degradation. Given tight fiscal constraints, more efficient use of limited investment resources is now a high priority for most developing countries. Increased efficiency requires both more accurate targeting of resources and improved management of the agencies that provide public goods and services. IFPRI researchers have been studying how various types of investments in different countries have compared in their impacts on agricultural growth and poverty reduction.

One recently completed IFPRI study estimated the effects of government expenditures on agricultural growth and rural poverty in Uganda. The study found that government investments in agricultural research and extension, rural infrastructure, rural education, and health contributed significantly to agricultural productivity growth and poverty reduction. But there were large differences in impact between types of investments. Spending on agricultural research and extension generated the largest returns to growth in agricultural production and made the largest impact on poverty reduction. Government spending on rural roads—especially low-grade, feeder roads, rather than highways—also substantially helped reduce rural poverty. The impact of education investments ranked below that of spending on research and roads. Health expenditures did not have a large impact on agricultural productivity or poverty, but researchers concluded that this was at least partly attributable to difficulties in measuring the effects of such spending. Researchers also found significant regional differences in return on public investments. Spending in the north of the country, a relatively poor region, had the most impact on poverty levels. Spending in the west, a relatively

well-developed region, showed the highest returns in terms of increased agricultural productivity.

Researchers also expanded on earlier work in India, investigating not only the effects of investment on agricultural growth and poverty reduction but also of government spending in the form of input subsidies. They found that the Green Revolution would not have been possible if India had not already invested heavily in irrigation, electricity, roads, and human capital before the Green Revolution technologies became available. Furthermore, subsidies in credit, fertilizer, and irrigation early on helped small farmers adopt the new technologies. Small farmers were often losers in the initial stages of the Green Revolution because the increased supply of crops from large farms pushed prices down. To avoid losses for small farmers during the initial stages, governments may have to use limited, targeted subsidies on credits, inputs, and new technologies to help small farmers. But as more and more farmers adopt the new technologies, continued subsidies may lead to inefficiencies in the overall economy.

The team also launched a study to assess the impact of different types of infrastructure investment on growth and poverty reduction using the case of China. The most significant finding of this study is that investment in low-quality roads, mostly rural roads, yielded higher returns than highways and other high-quality roads. The marginal return of low-quality roads on total GDP growth is four times higher than that of high quality roads. In terms of poverty reduction, the impact of low-quality roads exceeded that of high-quality roads in both urban and rural areas.

Empowering the Rural Poor under Volatile Policy Environments in the Near East and North Africa

How can we empower the rural poor to escape poverty? This research project, begun in June 2003, addresses the problems arising at the interface between institutional change and the design and implementation of investment projects aimed at helping poor communities and producers. Projects aimed at improving the situation of the rural poor sometimes fail not because they are poorly designed, but because the policy and economic environment in which they are initiated changes in unpredictable ways. This volatile policy environment makes it difficult for development institutions to design effective programs. Recognizing this problem, IFPRI is examining how to create local institutions that empower the poor and give them the flexibility to adjust to an evolving and unstable policy and economic environment. The research is being conducted from the perspective of the local player in interaction with the institutional environment. An important outcome of this study will be to examine the implications of the research findings for donors' operational strategies. The study is focusing on Morocco, Sudan, and Tunisia, with particular emphasis on the devolution of responsibility for natural resource management from the national governments to territorial communities.

Food and water safety policies

Food safety is a growing issue worldwide. Governments and trade organizations are increasingly regulating hazardous agents in food. These include disease-causing microbes, parasites, mycotoxins, allergens, and other contaminants. Genetically modified foods also are beginning to receive special regulatory attention. Food safety is coming to the fore for a variety of reasons. Global food trade is rapidly expanding. Growing numbers of immune-compromised people are more susceptible to food-related health risks. The threat of bio-terrorism is leading to more food testing.

Food safety is a universal concern, and a critical component of food security. However, varying levels of economic development, sanitation, and public health around the world create widely different public perceptions of which risks demand immediate attention. In the industrialized world, where good sanitation is largely taken for granted, complex, long-term risks in the food supply, such as residues of pesticides in fruits and vegetables, and of antibiotics in meat, are now hot topics. In developing countries, however, many basic food safety risks still remain to be thoroughly addressed. Food safety problems that are now rare in wealthy countries, such as contamination of food and water through poor sanitation, commonly pose acute threats to human health. The immediacy of such risks often overshadows the long-term, chronic health threats that tend to dominate the food safety debate in wealthy countries.

There are a number of reasons, however, for developing-country governments to be as concerned about complex, emerging food safety issues as their counterparts in the industrialized world. For one, their generally less-developed and less-funded regulatory systems mean that levels of exposure to food safety risks may well be higher for many of their residents. Another is the rapid expansion of global food trade, and the need for exporting countries to comply with increasingly tight rules on food contamination. While it can be difficult for developing countries to meet such standards, they may well have unintended beneficial impacts for developing-country food producers. For example, high levels of pesticide residues on vegetables may well indicate high pesticide exposure for those working in the fields that produced them.

IFPRI researchers have been examining a wide variety of issues related to food safety. In 2003, IFPRI published *Food*

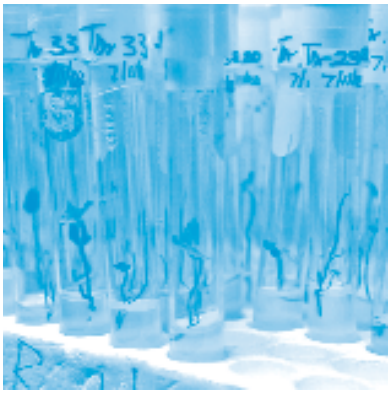
Safety in Food Security and Food Trade, a collection of 17 briefs on such issues. The briefs included discussions of food safety's implications for public health and international trade, studies of particular threats, such as mycotoxins, and an examination of the food safety implications of genetically modified crops. They also included nine case studies focused on various developing countries' attempts to address specific food safety issues.

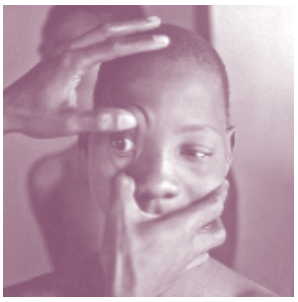
Policies addressing hidden hunger, enhanced food and diet quality for poor people, and the nutrition transition in developing countries

HarvestPlus: CGIAR Challenge Program

HarvestPlus aims to reduce micronutrient malnutrition among poor people in the developing world by breeding staple food crops rich in minerals and vitamins. The program was previously called the CGIAR Biofortification Challenge Program. IFPRI has been involved in promoting the concept of biofortification since 1993, and since 2002 has been developing the HarvestPlus program in partnership with CIAT. In 2003, the program achieved its goal of raising $37 million for its first four years of work, more than half of it ($25 million) in a single grant from the Bill and Melinda Gates Foundation. Other donors include the World Bank, the United States Agency for International Development, Danish International Development Agency, and the Asian Development Bank.

HarvestPlus is initially focusing on six major staple crops: beans, cassava, maize, rice, sweetpotato, and wheat. Ten additional crops will come on board with full-time breeding programs in the second 5-year phase of the program. Plant breeders will attempt to improve the nutritional quality of those crops by increasing levels of iron, zinc, and provitamin A, three critically important micronutrients.





More than two billion people worldwide are iron deficient. Iron deficiency anemia during childhood and adolescence impairs mental development and thus learning capacity. In adults, iron deficiency anemia reduces the capacity to do physical labor. Iron deficiency anemia prevalence among children exceeds 50 percent in South and Southeast Asia. Prevalence is equally high in Africa, although the number of persons affected is smaller.

Billions of people are also at risk for zinc deficiency. Like iron deficiency anemia, the prevalence of zinc deficiency is highest for South and Southeast Asia and Africa. Zinc deficiencies have equally serious consequences for health including diarrhea and rendering children highly vulnerable to infections. In addition, zinc deficiency is an important cause of stunting.

Vitamin A deficiency results in visible eye damage in approximately three million preschool-age children globally. Annually, an estimated 250,000 to 500,000 preschool children go blind from this deficiency, and about two-thirds of these children die within months of going blind. Children with subclinical vitamin A deficiency are more likely to experience anemia, impaired growth, and morbidity from common childhood infections such as respiratory and diarrheal diseases, measles, and malaria. Vitamin A deficiency compromises the immune systems of approximately 40 percent of the developing world's children under the age of five and leads to the deaths of approximately one million young children each year.

A crucial element of HarvestPlus is to develop and disseminate crop varieties that not only have enhanced nutrient content, but also possess superior agronomic properties, so farmers want to grow them. Other project goals include:

- demonstrating the nutritional effects of fortified crop varieties
- developing efficient, accelerated mechanisms for testing new varieties on farms—including those in areas that need such crops the most—to identify those most attractive to farmers and consumers
- promoting the adoption and dissemination of these varieties in selected countries in Africa, Asia, and Latin America
- measuring the impacts of the new varieties in community-based studies.

Diet Quality and Diet Change

Malnutrition is not just caused by not getting enough food. Poor diet quality is increasingly the main food consumption threat to poor people around the world. Diets can be poor in terms of what they don't contain: minerals and vitamins, for example, or sufficient quantities of whole grains, fiber, fruits, and vegetables. They also may be substandard because they contain too much of things that are harmful in excess, such as saturated fat, sodium, and added sugar.

Globalization, urbanization, and economic growth are rapidly changing consumption patterns and lifestyles in the developing world. People are becoming more sedentary and consuming diets that contain more calories than they need and too few essential micronutrients. Not surprisingly, such populations are seeing higher rates of obesity and diet-related chronic diseases, the so-called "diseases of affluence" previously restricted to the industrialized world. These kinds of problems are becoming common in countries still coping with a heavy burden of disease caused by nutritional deficiency or poverty. In Mexico, Egypt, India, Brazil, and Nigeria, for example, obesity and noncommunicable diseases are reaching epidemic levels, even as those countries are still struggling to eliminate childhood under-nutrition.

The new Diet Quality and Diet Change program seeks to move IFPRI beyond its emphasis to date on nutritional deficiencies and their consequences, to consider the whole spectrum of malnutrition-related problems, from under- to over-nutrition. IFPRI researchers are working to address these issues with partners including the World Health Organization

For decades, the primary goal of agricultural research was clear-cut: increase the supply and reduce the cost of food, especially of staple crops such as wheat, rice, and maize.

(WHO), the Food and Nutrition Technical Assistance Project (FANTA), Cornell University, and the University of California/Davis. The program's goal is to more clearly understand current trends in diet quality and diet change and their main drivers, and to identify policies that could reverse these trends and improve the diet quality of the poor, and reduce food insecurity and micronutrient malnutrition.

Policies and interventions for sustainable poverty reduction and nutrition improvement

Impact of Agricultural Research on Poverty

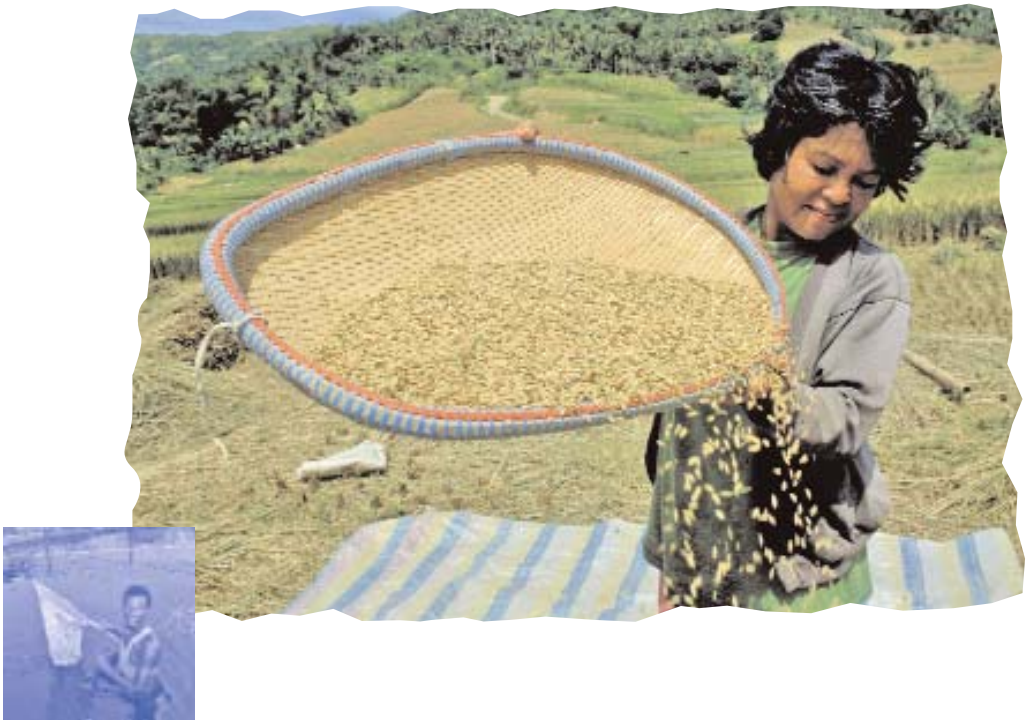
For decades, the primary goal of agricultural research was clear-cut: increase the supply and reduce the cost of food, especially of staple crops such as wheat, rice, and maize.

The Green Revolution successfully accomplished this in much of the developing world, allowing many countries—particularly in Asia and Latin America—to achieve food security. In such cases, higher output was accompanied by increased agricultural employment, lower food prices, more off-farm employment, and a general reduction in rural poverty. Elsewhere, however, the impact of new technologies has been mixed, and in some instances, they have benefited wealthier farmers while increasing poverty among those less well positioned to take advantage of these technologies.

Since the creation of the CGIAR and similar agricultural research institutions, poverty reduction has become the number one item on the agenda for most multilateral institutions, donors, and governments. With this in mind, IFPRI was asked by CGIAR's Standing Panel on Impact Assessment (SPIA) to lead a study of the effects of agricultural research on poverty. The aims of the project were, firstly, to identify the conditions under which agricultural research could be utilized to reduce poverty, and secondly, to improve ways of identifying research priorities in an environment where the needs of the poor are changing. The project conducted seven case studies to help researchers better understand the impact of their work on poverty. The studies examined:

- agricultural research, productivity growth, and poverty reduction in China and India
- modern rice varieties in Bangladesh
- polyculture fishponds and improved vegetables in Bangladesh
- soil fertility management in Kenya
- modern maize varieties in Zimbabwe
- creolized maize varieties in Mexico.

The studies found that a wide range of factors affected the impact that technology had on poverty. Among them were farmer perceptions of the risks involved in adopting the technologies and whether farmers had the assets needed to implement them. The nature of the institution disseminating the technology—whether it was an extension service, community-based organization, or farmer-to-farmer network—was also important. Cultural factors, such as gender roles and taste preferences, played a further part, as did the questions



of who would benefit from the proposed technologies and in what manner. Poor people often benefited from declining food prices, though this benefit was sometimes offset among farmers by lower producer prices. Poor households valued increased stability and were happy with even small improvements in agricultural production because these provided food security, making it easier to diversify into other activities. Increased agricultural employment was also a major benefit to the poor, improving incomes and stability of employment.

The case studies suggest that research should be designed with a number of considerations in mind. These include the priority poor people place on managing risk; the possible effects of social differentiation, such as gender, class, and ethnicity; the variety of traits (beyond yield alone) that farmers value; and the role of agriculture in livelihood strategies. The case studies also underscored the need to consider both direct and indirect impacts on the poor, and to avoid restricting analysis to only impacts that can be easily quantified.

Gender and Intrahousehold Aspects of Food Policy

The empowerment of women is key to achieving food security and reducing poverty. Despite progress in recent decades, women in developing countries still command considerably less resources than men. Women are critically important as farmers, income earners, and keepers of households, but generally are accorded fewer rights. They often are limited in their ability to own and control land and buildings, and to leverage such assets into access to credit. In Africa, for example, women commonly are responsible for agriculture, but men own the land. Upon divorce, or death of a husband, women may lose the right to work their land—and their families lose with them. Studies have repeatedly shown that women's control over assets has a positive impact on the next generation, particularly on education and health. They have also shown that agricultural productivity increases dramatically when women get the same amount of inputs men get.

A particularly strong example of the tremendous benefits of women's empowerment is to be found in child nutrition. IFPRI work has shown that increases in women's education and status (relative to men's status) within the household contributed more than half of the reduction in the rate of child malnutrition between 1970 and 1995. A new IFPRI study—*The Importance of Women's Status for Child Nutrition in Developing Countries*—published in 2003, investigated the relationship between women's status and children's nutrition in three developing regions: South Asia, Sub-Saharan Africa (SSA), and Latin America and the Caribbean (LAC). Using data from 36 countries, the study demonstrated clearly that higher women's status improves children's nutritional status

in all three regions. Women with higher status do better nutritionally themselves, receive better care themselves, and provide better care to their children. The study's results in South Asia—which has a strikingly high child nutrition rate compared to other regions of similar poverty—were especially compelling. There, the study estimated that the achievement of equal status for men and women would bring about a 13 percent reduction in the underweight rate for children less than three years old. That translates to 13.4 million fewer malnourished children in that age group alone.

In 2003–2004, IFPRI published two important books on gender issues. *Household Decisions, Gender, and Development: A Synthesis of Recent Research* is a major survey of the subject. It incorporates nearly a decade of IFPRI research on how gender relates not only to power and resources within households, but also to agriculture and natural resources, health and nutrition, social capital, legal institutions, property rights, and government interventions. It includes 27 chapters that highlight the lessons of both noneconomic and economic studies in more than 20 developing and developed countries. It also includes a CD-ROM containing complete studies for readers interested in the methodologies and detailed research results. *Land and Schooling: Transferring Wealth across Generations* analyzes how parents allocate land and education between sons and daughters in Ghana, the Philippines, and Sumatra, and how these practices influence welfare, gender equity, and policymaking. Based on solid field studies and intensive household surveys, the study uncovers unique situations—such as that Filipino women are more educated than men, in contrast to other Asian countries—and explains the factors behind them. It also looks at how gender-related practices are evolving. Husbands in western Ghana are increasingly giving land to their wives through gift transfers, for example, and in Sumatra, where land inheritance is traditionally matrilineal, more men now are inheriting land from parents.

With the completion of a major multi-country project on gender and intrahousehold issues, the importance of gender on IFPRI's agenda was reemphasized by a decision to set up a task force to oversee research on the issue. The bulk of gender-related research to date has been on welfare and bargaining power at the household level. The new task force, to be headed by senior research fellow Ruth Meinzen-Dick, will provide support to IFPRI researchers looking beyond the household, at gender issues in resource tenure, markets, poverty reduction, and overall economic development. It will serve as a focal point, supporting analytical innovation and helping to integrate gender analysis into a broad range of IFPRI research. It will also act as a liaison office, representing IFPRI on gender-policy research to interested external audiences. The task force has an initial term of two years.

Initiative to End Hunger in Africa

Hunger is common in Africa. One in three people there is estimated to be undernourished, and a third of the undernourished people on Earth live in Sub-Saharan Africa. To address hunger and poverty in the region, the Initiative to End Hunger in Africa (IEHA), a U.S. Presidential Initiative, was launched at the 2002 World Summit on Sustainable Development. The Initiative, implemented by USAID, calls for a rapid, sustainable increase in agricultural growth and rural incomes, along with complementary improvements in other sectors such as health, education, infrastructure, and the environment, as well as macroeconomic reform. The Initiative also calls for a global partnership and a broad-based political and financial commitment among public and private development partners, both in Africa and internationally, to help achieve the overarching Millennium Development Goals of cutting hunger and poverty in half by 2015.

Hunger is common in Africa. One in three people there is estimated to be undernourished, and a third of the undernourished people on earth live in Sub-Saharan Africa.

IFPRI is providing three kinds of support to IEHA, including:

- technical, communications, and outreach support
- special studies to quickly fill key gaps in knowledge needed for planning and implementing IEHA's strategy, and
- development of a Strategic Analysis and Knowledge Support System (SAKSS) to inform IEHA staff and the broader development community involved in rural development (African decisionmakers, donors, and NGOs, for example) as they set investment priorities and monitor and evaluate impact at the country and subregional levels.

With SAKSS, data (especially spatially oriented data), tools, and knowledge can be compiled, analyzed, and disseminated in order to provide a much stronger foundation for analyzing policy, making decisions regarding rural development strategies, and monitoring outcomes. The SAKSS program involves, for example, the construction of national and regional economic models to simulate growth, poverty, and hunger outcomes for various investment and policy scenarios. It also involves the provision of a framework for national monitoring and evaluation systems and databases for West, East, and Southern Africa that contain geographic information on agro-climatic conditions, infrastructure, population, trade, and markets. SAKSS will be available to governments, universities, NGOs, and development agencies, thereby facilitating broad-based sharing of knowledge and information. Already, IFPRI is working to develop a network of SAKSS partners and nodes within each region of Africa. As part of this process, IFPRI has been holding various consultations on SAKSS at the subregional level and with FAO and NEPAD. To broaden its support among multiple donors, SAKSS was mentioned at the June 2004 G8 conference and commended as an initiative worth supporting. With additional funding, IFPRI has begun the process of helping to implement SAKSS in three countries: Ethiopia, Ghana, and Uganda.

Pathways from Poverty

IFPRI's Pathways from Poverty project attempts to determine why, over the long run, some people manage to emerge from poverty, and others fail to do so. It does so through long-term studies that examine the experience of individuals and households attempting to achieve greater prosperity. The project's goal is to identify what kinds of policies and interventions lead to sustainable poverty reduction and nutritional improvements. Pathways from Poverty builds on IFPRI's wealth of experience studying policies for sustainable poverty reduction. Some elements of the program involve revisiting poor people first surveyed by IFPRI researchers decades ago. In 2003, the project completed project design, background work, and initial fundraising. This preparatory work demonstrated that such a project was technically feasible—in that it is possible to trace individuals and households over long periods of time—and analytically valuable, in that short-run shocks such as drought appear to have long-term effects on physical stature, schooling, and other welfare outcomes. Fieldwork began in 2003 in Guatemala and the Philippines and finished in early 2004; fieldwork has commenced in Ethiopia, South Africa, Bangladesh, and Malawi.

Targeted Interventions to Reduce and Prevent Poverty

Addressing the root causes of poverty, such as the lack of employment opportunities, is essential for long-term poverty reduction. However, policies promoting growth may miss many of the poorest people, or even worsen their situation. Targeted safety net programs can protect people against worsening poverty or malnourishment, and even offer pathways out of poverty.

IFPRI researchers are working around the world to study how to ensure that such assistance provides not only short-term help, but also reduces poverty over the long run.

Conditional cash transfers are a relatively new kind of social safety net. They deliver assistance directly to households identified as poor or vulnerable to poverty or malnutrition. In addition to providing cash transfers, they make attendance at school and/or health clinics a condition for receiving assistance. This ensures two things: first, that poor people get an income immediately, and second, that they invest in the human capital of the next generation. Such programs attack a basic cause of poverty: the inability of poor households to invest in their children's health, nutrition, and education early in life. Most of these programs also involve improvements in health, nutrition, and education services.

IFPRI has considerable experience with conditional cash transfer programs, starting with its evaluation of Mexico's successful Programa Nacional de Educacion, Salud y Alimentacion (PROGRESA) in 1998. In 2003, IFPRI researchers helped evaluate such programs in Nicaragua, Honduras, and Brazil. In Nicaragua, the program under evaluation was the pilot Red de Protección Social (social protection network). IFPRI's study included a quantitative household survey as well as ethnographic techniques. The study found that in its first two years, the pilot program, which operated in six municipalities, improved the nutrition and education of approximately 10,000 of the country's poorest families. The program brought about substantial increases in household food spending, an almost 20 percent increase in primary school enrollment rates, a similar increase in preventive health care visits for children under five years old, and a 5 percent decline in malnutrition—a level of improvement that very few programs match.

Nearly all these gains were even greater among the extremely poor, significantly reducing differences between their welfare and that of more prosperous households. On the whole the program accurately targeted poor areas and families, though there were some errors and this caused discontent, particularly because people did not understand the reasons for the exclusion of some households.

In Honduras, IFPRI researchers evaluated the Programa de Asignación Familiar (family allocation program). Researchers found that the conditional transfers brought about a 15-20 percent increase in the proportion of women receiving

prenatal care and children receiving postnatal check-ups. This helped ensure that children got an early start on immunizations, and that a much higher proportion of them were covered by growth monitoring programs.

In Brazil, IFPRI has been helping the government evaluate the Bolsa Alimentação (nutrition fund) program. Researchers found an unusual mix of results. Conditional assistance did increase food consumption, with approximately 67 cents of each Brazilian *real* given out spent on food. Aid recipients improved the diversity of their diets, especially in terms of fruit and vegetable consumption. Surprisingly, however, young children in beneficiary families grew more slowly than those in control groups. Researchers hypothesized that families may have deliberately kept their children underweight in order to continue receiving assistance. Anecdotal field evidence supported that hypothesis. The Brazilian government responded to IFPRI's analysis by revising the program to eliminate such perverse incentives.

IFPRI plans to produce a book summarizing its experience with conditional cash transfer programs in Latin America. The institute is also pursuing evaluations of such programs in South Asia and Sub-Saharan Africa.

Cross-cutting research on country and regional food, nutrition, and agricultural strategies

Macroeconomic Policies, Growth, and Poverty Reduction

Can developing countries implement macroeconomic and trade policies that combine both economic growth and poverty alleviation? IFPRI research has shown that economic and trade liberalization can increase national income over the long run, but may at the same time increase inequality, especially if most growth is stimulated in sectors from which the poor are not positioned to benefit. IFPRI's Macroeconomic Policies, Growth, and Poverty Reduction program examines how packages of policies can be designed to simultaneously drive economic growth and protect or improve the position of poor households. Such packages, which need to be carefully developed to match local conditions, can combine elements of economic liberalization with asset policies, public investments in infrastructure, and social safety nets.

Understanding how the livelihoods of the poor are linked to the rest of the economy is a key focus of the program. IFPRI researchers have developed special expertise in analyzing the impact of macroeconomic policies on the incomes of the poor and their access to goods and services. To do so, they have developed unique policy models and databases that generate a complete and consistent picture of the economy, capturing linkages between different sectors, and yielding information about standard economic indicators, including poverty. The project has created such models for countries primarily in Sub-Saharan Africa, the Middle East, North Africa, and Latin America. Researchers have put particular emphasis on understanding and modeling agriculture and rural economies, since most of the poor live in rural areas. In Malawi and Zimbabwe, for example, a study by IFPRI researchers and collaborators examined opportunities for pro-poor agricultural growth strategies. The study concluded that such strategies needed to include several key features, including:

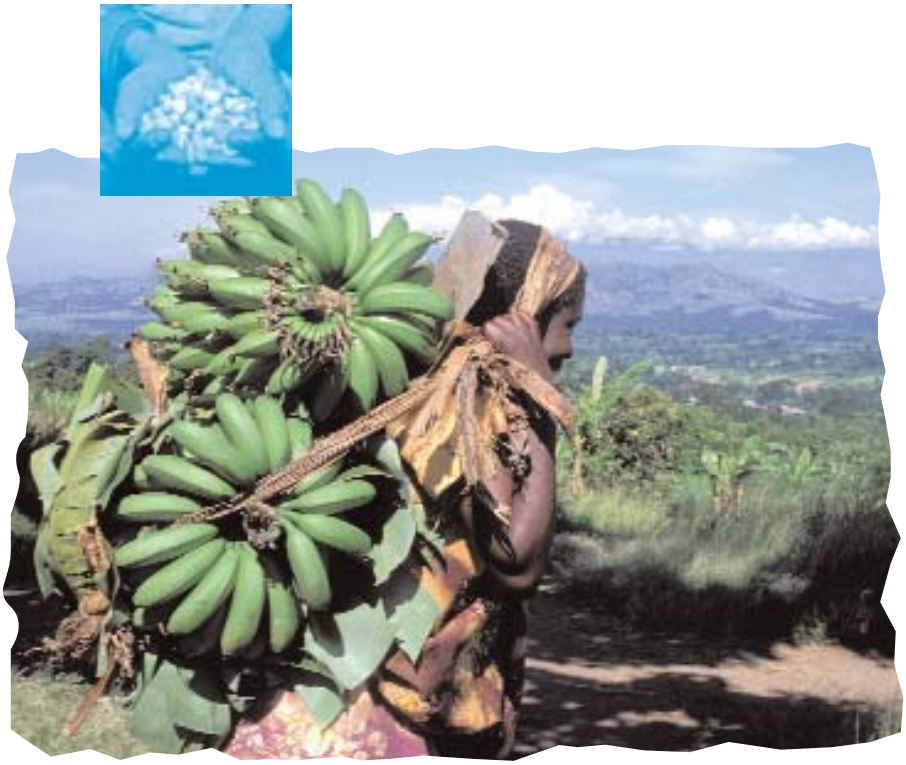
- technical change in agriculture to drive increased wage rates for unskilled labor
- growth in both agricultural and nonagricultural sectors
- reduced transaction costs, including those of transportation
- complementary policies supporting rural welfare
- access to long-term external finance.

IFPRI economists have also trained many of their colleagues from developing-country governments and research institutions to do such work themselves. The ultimate goal of the program is to enhance understanding of how economic policies can be used to alleviate and eventually eradicate poverty.

Public Policies for Rural Institutions, Markets, and Infrastructure Development

Agriculture plays a dominant role in the livelihoods of most Africans, and rapid growth in the agricultural sector is key to any strategy for slashing poverty and hunger on the continent. In order to boost agricultural output, major new investments are needed from governments and donors. However, without new markets for the additional production, major growth in the sector could lead to steep declines in commodity prices and farm incomes. African agricultural growth is now sharply constrained by poorly functioning markets, weak domestic demand, and lack of export possibilities stemming from external trade barriers.

IFPRI researchers have been studying opportunities to enhance markets for agriculture in Sub-Saharan Africa. They have found that African farmers have been losing ground on many of their traditional exports—cocoa, coffee, cotton, sugar, tea, and tobacco—upon which they still depend heavily. Downward global price trends have largely offset growth in output, and African farmers have faced growing competition from Asia and Latin America, where exporters have been increasingly successful at meeting industrial-country demands for greater product differentiation and quality assurance.



IFPRI economic modeling has found that even if Africa were to regain the world market share it has lost for its traditional exports, per capita real agricultural income for the continent would grow by only an additional 0.3–0.4 percent per year. Continuing declines in world commodity prices would likely reduce even these small gains. In this economic situation, the most promising opportunities to increase income from traditional exports lie not in output growth, but rather in increased product differentiation. Higher quality standards, grading systems, and segregation of different qualities could also help exporters secure higher prices. Africa's low labor costs, combined with better access by farmers to markets, inputs, and credit, could help the continent's exporters better compete in international markets for traditional crops.

Nontraditional exports, such as fresh vegetables, cut flowers, and fish, offer brighter prospects. These niche markets are newer and may have higher growth potential. Ghana, Côte d'Ivoire, Kenya, and Zambia have achieved notable success in increasing these types of exports. However, such markets tend to be highly competitive and specialized, with rigorous quality standards. In addition, they account for a small share of total agricultural exports and agricultural GDP in most countries. It would be unrealistic to look to these specialized exports for dramatic income growth at the regional level.

Domestic and regional markets offer another avenue for growth in African agriculture. Africans currently consume about US$50 billion per year of food staples. Much of this is consumed on farms, but it still represents a large and growing market. Africa now imports a quarter of its grain needs, so increased production could displace imports. One way for Africa to increase its competitiveness would be to invest in infrastructure and market development to reduce transport and marketing costs. This could reduce commodity prices, while not reducing the prices farmers receive, and reduced prices could stimulate demand. Increased demand could, in turn, increase farmer income.

IFPRI researchers are also interested in the infrastructure that supports food aid and public food distribution programs, which can have a dramatic impact on the food security of poor people in developing countries. With collaborators in Bangladesh, IFPRI researchers conducted a study, commissioned by the World Food Programme (WFP), of the efficiency of the public food distribution system in Bangladesh. They examined the entire system, tracking the movement of foodgrain all the way from the port of entry to its eventual distribution to beneficiaries. The study found considerable inefficiencies and suggested recommendations for the WFP and the Government of Bangladesh.

Among their findings:

- high rates of pilferage during unloading appear to be linked to the involvement of numerous agencies, poor incentive structures, and the presence of unhealthy unions and collusion; new technology is unlikely to reduce such losses
- unloading rates at Bangladesh's two grain ports could be increased with proper incentives at one port and new technology at the other
- storage and transit losses in domestic distribution of grain have declined substantially in recent years, but are still worth more than US$4 million per year
- grain is commonly shifted between local storage facilities within districts, under the rationale of conserving storage capacity; these movements could be reduced through more effective inventory tracking using GIS technology
- the current national food security stock level of 800,000 metric tons appears to be high; a stock of 600,000 metric tons (300,000 metric tons each of wheat and rice) would be cost effective, and would provide an adequate reserve for calamities.

East Africa Food Policy Network

The IFPRI East Africa Food Policy Network connects researchers, policymakers, and leaders from civil society in Ethiopia, Kenya, Malawi, Mozambique, Tanzania, and Uganda. Founded in 1998, its goals are to reduce poverty, improve food security and child nutrition, improve gender equity, increase agricultural productivity, and promote sustainable natural resource management in East Africa. The network conducts collaborative research, helps disseminate new information, and works to develop local capacity to undertake and communicate policy research.

The network is run on a collaborative basis. Country teams, made up of 6 to 10 policymakers, policy analysts, researchers, and NGO representatives, guide its operation in each of the participating nations. A Regional Advisory Committee, comprised of country team chairs and coordinators and chaired by Harris Mule of Kenya, provides overall guidance. The network's coordinator, an IFPRI research fellow, is based in Kampala, Uganda. The network works closely with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and the Eastern and Central Africa Programme for Agricultural Policy Analysis (ECAPAPA), which are also based in Uganda. IFPRI is also working with other regional organizations and international agricultural research institutes to develop and support the network.

The network funds and administers a competitive grants program for research on country and regional priorities. Since 2000, three rounds of grants have been awarded, with a total of 30 projects funded to date. In 2003, researchers completed 10 projects funded under the program, and the network published associated research reports and policy briefs on its website. Topics included:

- provision of animal health services in Kenya
- maize marketing in Kenya
- trade liberalization, agriculture, and poverty reduction in Kenya
- constraints on agricultural productivity in Uganda
- community forest governance systems in Ethiopia
- collective management of irrigation systems in Uganda
- land tenure and agricultural productivity in Kenya
- agricultural microfinance in Tanzania
- the impact of rice production on food security and women in Uganda
- seasonal food insecurity in Kenya.

The network organized four peer review and policy outreach workshops in 2003, two of them in Ethiopia, one in Tanzania, and one in Kenya. Collaborators on the forums included the Ethiopian Development Research Institute (EDRI), the Economic and Social Research Foundation (ESRF) in Tanzania, and the Kenya Institute for Public Policy Research and Analysis (KIPPRA). The network completed secondary data collection and descriptive analysis for its project on service provision to rural smallholders in East Africa. Econometric analyses and participatory rapid rural assessments for the project are now underway. The network also completed a proposal for a three-year, six-country project on strengthening agricultural markets in the region.

Successes in African Agriculture

The performance of African agriculture over the last few decades stands in disappointing contrast to the significant gains achieved in Asia and Latin America. Sub-Saharan Africa is the only region in the developing world where per capita food consumption has fallen over the past forty years. Efforts to reduce hunger and poverty have been frustrated partly because agricultural productivity has stagnated, thus constraining economic opportunities for the approximately 80 percent of the continent's poor who live in rural areas. Agriculture is central to African development, and only agricultural growth offers the broad potential simultaneously to raise rural incomes, reduce hunger, expand employment, and reduce urban food prices.

Against this stark background, however, IFPRI research has found many bright spots in the African agricultural picture. Based on an expert survey of African agricultural specialists, IFPRI researchers identified several hundred success stories, from which eleven were selected for in-depth case studies. The subjects included maize breeding in East and Southern Africa; cotton production in West Africa; dairying and export horticulture in Kenya; cassava production in Nigeria, Ghana, Malawi, and Zambia; planting of nitrogen-fixing trees in fallows in Kenya and Zambia; conservation farming in Zambia; and the use of zaï (planting basins) in Burkina Faso.

In December 2003, the New Partnership for Africa's Development (NEPAD—an initiative by African leaders to eradicate poverty and promote development by entering into new partnerships with the international community), InWent (the German government's agency for human resources development), the Technical Center for Agricultural and Rural Cooperation (CTA), and IFPRI jointly convened a three-day conference in Pretoria, South Africa, to discuss the project's results. Researchers presented the case studies and three additional commissioned background papers. Attendees included high-level policymakers, researchers, and representatives from farmer groups, the private sector, and international development agencies. Conference participants issued a consensus statement—the Pretoria Statement on the Future of African Agriculture—that outlined a set of principles and opportunities for agricultural development on the continent. In 2004, IFPRI released summaries of the case studies as a collection of briefs: *Building on Successes in African Agriculture*.

South Asia Initiative

South Asia is both populous and poor. It is home to nearly a quarter of the people on Earth, but generates less than 2 percent of world income. Forty four percent of those who learn less than a dollar a day live in South Asia. Agriculture is a crucial component of South Asian economies: it accounts for a quarter of the region's GDP, 60 percent of the labor force is engaged in it, and most of the region's poor depend on it for their survival. To better address food security and poverty alleviation issues in the region, IFPRI launched its South Asia Initiative (SAI) in 2002. The initiative, which includes the countries of Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka, has three main components. The first is the Policy Analysis and Advisory Network for South Asia (PAANSA).

PAANSA is a network of agricultural policymakers, advisors, and analysts in South Asia. A "bottom up" process drives its policy agenda. Groups of policymakers, advisors, and researchers from each member country meet to identify high-priority issues and research opportunities. Then the leaders of the country groups meet to share the critical issues identified in each country, and to compare and discuss policy responses. In 2003, PAANSA grew from about 30 to about 50 members, and identified a set of critical research issues:

- Institutional issues related to vertical integration in the agricultural sector (farm-firm-fork linkages)
- The need for institutional and policy reforms to help augment the income of smallholders and reduce poverty
- Constraints to smallholder participation in vertical integration, with a focus on credit access
- Diversification of agricultural production into high-value and postharvest value-added products
- The importance of food retailing, its implications for smallholders, and related food safety issues.

The second component of the South Asia Initiative is applied research. The initiative supports and disseminates applied research by experts from each member country on issues related to the region's food, agriculture, and natural resource sectors. Broad research themes in 2003 included the impacts of trade policy and the WTO on food security in South Asia, agricultural diversification, and agro-processing. A dozen of the initiative's collaborators from the region visited Washington, D.C., to present their research findings to IFPRI staff.

SPARG investigates the roles that location, spatial patterns, and geographic change play in agricultural production and productivity and the welfare of the rural poor.

Finally, the third component of the initiative is an effort to strengthen local research capacity, through collaborative research, training and exchange programs with local institutions, NGOs, and the private sector. It is closely intertwined with PAANSA and the applied research program. IFPRI is actively working with more than 20 research centers and government offices on the initiative, and plans to hold two regional training seminars in the next year.

Spatial Analysis Research Group (SPARG)

A map can be worth a thousand words. No matter how fascinating the subject, trying to develop insights by paging through raw data can numb the mind. A good map turns words and numbers into colors and shapes, making use of human beings' most powerful tool for pattern recognition: sight. IFPRI's Spatial Analysis Research Group uses today's sophisticated mapping tools—geographical information systems (GIS)—to make sense of spatial patterns in agriculture, nutrition, natural resources, poverty, and related issues. The group's central goals are to create an improved understanding of the spatial dimensions of agriculture-based economic growth, and to translate that understanding into more effective interventions on behalf of the poor. SPARG investigates the roles that location, spatial patterns, and geographic change play in agricultural production and productivity and the welfare of the rural poor. It then tries to create practical concepts, databases, tools, and visual displays to foster the integration of spatial thinking into the routine of policy researchers, development specialists, and policymakers.

SPARG both conducts its own research and assists other IFPRI researchers in their work. Among its major projects in 2003 were to:

- co-lead the preparation of two chapters of the Millennium Ecosystem Assessment, *Food Provision* and *Cultivated Systems*, and coordinate the assessment of spatial patterns in both sets of issues
- help identify, through the Functional Value of Biodiversity Project (a collaboration with the World Agroforestry Centre, the World Bank, and University of New Hampshire researchers), the coincidence of areas rich in biodiversity with areas of major hydrological importance, and quantify the potential losses of habitat, biodiversity, and hydrological services—and the human consequences of such losses—if such areas are not conserved
- coordinate the development of a unique, high-resolution, mapped global database of crop production, in collaboration with technical specialists from FAO, the University of Wisconsin, and several CGIAR centers
- support IFPRI's contributions to the U.S. Agency for International Development's (USAID's) Initiative to End Hunger in Africa, by helping to develop the effort's spatially based approach to development strategy formulation, monitoring, and evaluation, and
- lead the SCRIP (Sustainable Criteria for Rural Investment in Productivity) project to support USAID's agriculture-focused rural investment program in Uganda.

FOOD SYSTEM INNOVATIONS: Policies to foster scientific and institutional innovation and technology use for the benefit of poor people in developing countries, and development of related comprehensive food and agriculture strategies.

Food- and nutrition-related science and technology policy (molecular biology, biosafety, and information and communications) serving poor people

Agricultural Science and Technology Indicators (ASTI)

As part of their efforts in 2003 to keep tabs on the rapidly changing world of food and nutrition science, IFPRI and ISNAR continued to manage the ASTI initiative, which is the most comprehensive database of information on agricultural research trends in the world.

The initiative, now managed by IFPRI, gathers, processes, and makes available comparable data on institutional developments and investments in agricultural R&D around the world. It further analyzes and reports on these trends in the form of digests, which are released to decisionmakers to help them formulate research policy and set priorities.

Such information is crucial for policymakers seeking to stay abreast of agricultural science issues, especially at a time when the distinction between public and private research has become increasingly blurred, and as public agencies are being pushed to pursue new sources of funding and develop new organizational structures to manage and allocate research funds.

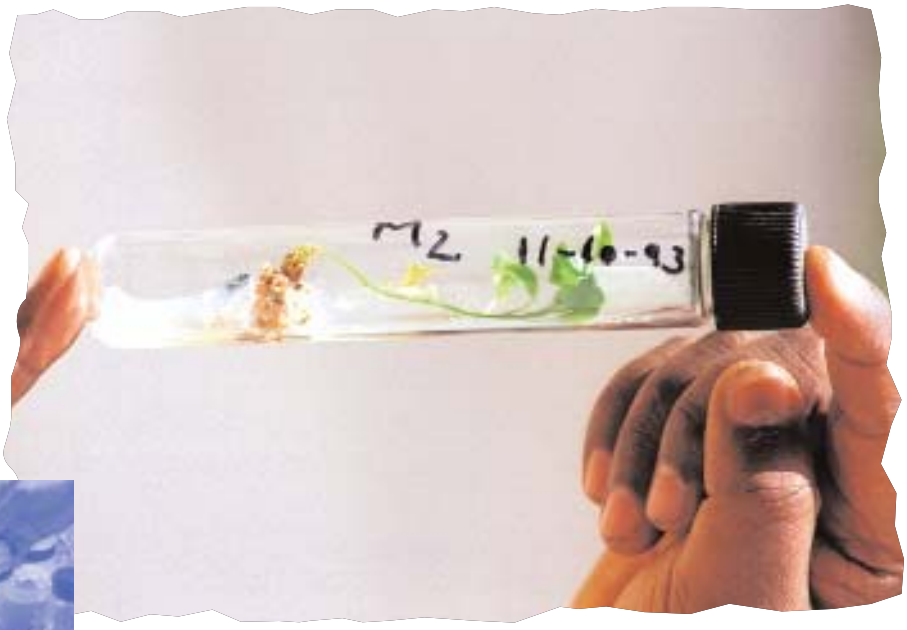
The ASTI initiative helps decisionmakers keep track of R&D and policy changes and to make comparisons within and among countries and types of agencies and at different points in time.

Such work is particularly helpful in providing insights into policies that can improve the funding, performance, and impact of public and private agricultural science and technology institutions, including their productivity and their environmental and poverty consequences.

In 2003, the ASTI initiative put the final touches on a new survey of Sub-Saharan Africa and published the first 12 of 27 ASTI country briefs. All the work is being coauthored and copublished with national partners.

During the year, the initiative also began survey rounds in Asia and North Africa. New survey rounds for Latin America and the Middle East are awaiting funding support.

A preliminary regional analysis of ASTI's Sub-Saharan survey served as an input for the InterAcademy Council report *Realizing the Promise and Potential of African Agriculture.* A summary of the completed regional analysis served as a background report for the 2020 Africa Conference that IFPRI organized in April 2004. A CD-ROM, also developed in collaboration with the 2020 Vision Initiative, will include all these country briefs, the datasets, and other related information for researchers to use. A more extensive analytical synthesis of the Sub-Saharan regional survey will be published during 2004.



Genetic Resources: Biodiversity and Biotechnology

If seed improvement is to make an appreciable mark on rural poverty in the decades to come, it will be to a large extent in the crops and lands left out of the Green Revolutions of the 1960s to 1980s. Biotechnology innovations have the potential to reach farmers growing these crops and farming these lands, but whether they will depends on a nexus of institutional and policy-related factors.

At the heart of the matter is that most industry-led research efforts in agricultural biotechnology address the needs of farmers and consumers in the lucrative markets of some industrialized countries. Are there innovations that can overcome the constraints faced by smallholder farmers in the harsher environments of less-industrialized countries?

Also at issue is that a few developed countries with strong intellectual-property protection laws supply key biotechnology research tools. Are there contractual arrangements that can provide developing country scientists with the tools they need to innovate?

Smallholder farmers in poorer countries often sell produce and purchase inputs in unreliable, distant markets. Though controversies about the ethics of biotechnology swirl around them, many of these farmers know little about the debate, let alone the technology. Which public investments can enable poor farmers to successfully adopt promising crop biotechnologies?

These are some of the questions IFPRI's research on biotechnology seeks to answer. At the same time, the risks that biotechnology, including genetic engineering, presents for smallholder farming systems, poor consumers, ecosystems, and trade are given high priority.

In 2003, IFPRI refocused its broad research program about agricultural science and technology more closely on the use of genetic resources in two theme areas: biotechnology and biodiversity. In 2002, IFPRI joined with IPGRI to implement research about managing the biodiversity of cultivated crops on farms (in situ) and off-farm (ex situ) in breeders' collections or gene banks. In 2003, a second set of briefs in IFPRI's Research at a Glance series was published with IPGRI and the Systemwide Genetic Resources Program about the costs and benefits of conserving genetic resources in gene banks. In 2004, CABI Publishing published the book *Saving Seeds*, a comprehensive analysis of the economics of *ex situ* conservation undertaken with gene bank managers. In 2005 CABI will publish a parallel collection of case studies undertaken in centers of crop diversity in Africa, Latin America, and Asia. That volume will explore farmer demand for and the value of crop diversity during economic change.

IFPRI is also collaborating with a larger number of institutions on the Program for Biosafety Systems, which brings together international experts, national governments, and regulatory organizations, to help African and Asian governments manage the benefits and risks of biotechnology and its effects on the environment and human health. Launched in May 2003 the program organizes activities to boost regional collaboration, improve biosafety management skills, such as the ability to conduct safe experimental field trials, and bolster capacity to build an effective biosafety system.

The future of smallholder farming in efficient and equitable food systems

Promoting Growth and Diversification through Markets for High-value Agricultural Products

Markets for high-value agricultural products, such as meat, milk, eggs, fish, fruits, and vegetables, are growing rapidly around the world. This growth offers major opportunities for smallholders who have traditionally dominated markets for such products in developing countries. However, even as market opportunities grow, small producers are finding it more difficult to exploit them. Consumers in the developed world increasingly demand assurance of food quality and safety, and export standards are becoming more complex and difficult to meet. A similar trend has started in the urban areas of developing countries, as evidenced by the rapid growth in the share of foods sold through supermarkets and processor-owned meat, milk, and vegetable stores. These value chains tend to prefer to deal with larger producers, who are displacing small farmers. But expanding the role of small-scale and poor producers, especially vulnerable groups such as rural women, in domestic and international markets for high-value commodities would help boost rural incomes and reduce poverty.

IFPRI researchers are working to understand how these trends are affecting small producers and what kinds of policies and institutions make it easier for small-scale and poor producers to compete in growing and changing markets. For example, a recent IFPRI study on industrialization of the livestock sector in Brazil, Thailand, India, and the Philippines found that the industry was concentrating rapidly, mostly around urban centers. Small farmers continued to do well in low-end local markets, where they actually remain more competitive than large producers, mainly because of cheap family labor. In large urban and export markets, however, the bigger producers had the advantage because they had better access to technology, inputs, information, and quality and safety accreditation, and could reap price premiums for safer food of a more reliable quality. For small producers to compete in such markets, they need to band together, or associate themselves with larger producer institutions. IFPRI is exploring such issues in greater depth in collaboration with the International Livestock Research Institute (ILRI). The joint program will examine how small farmers can surmount such barriers to competition in high-value livestock markets.

Two other recent IFPRI studies examined how Vietnam's small farmers are diversifying their production. The first study focused on fruit and vegetable consumption. Comparing survey results for 1993 and 1998, it found that more farmers began growing fruits and vegetables over this period and the share of output sold increased to over two-thirds. This increased incomes because the net revenue per hectare of fruits and vegetables is 2 to 7 times that of rice. Most households used fruit and vegetable production as a supplementary income-producing activity, but more than 15 percent specialized in these crops. Vietnam's fruit and vegetable exports have expanded rapidly, though they remain vulnerable to policy and market change in China, the country's principal export market.

The second study looked at trends in and impact of agricultural diversification in the northern uplands of Vietnam, the country's poorest region. The study revealed that living standards, agricultural output, and incomes in the area were rising. The agricultural sector showed signs of diversification, including a falling share of cropland devoted to rice, rising commercialization, and an increasing average number of economic activities. However, the bulk of income growth in the area came from higher yields, particularly for rice, and only a small portion—8 percent—from diversification into high-value crops. The study concludes that income diversification is an important strategy for raising incomes, but that agricultural research to improve yields is necessary to maintain income growth.

Urban-rural linkages and nonfarm rural development

Urban Challenges to Food and Nutrition Security

Urbanization is a pervasive and accelerating phenomenon in the developing world, and it is shifting the locus of poverty and food insecurity away from rural areas. In just two decades, more poor and undernourished people will live in cities than in rural areas. By 2020, close to 85 percent of the population in Latin America and more than half the residents of Africa and Asia will live in urban areas. National governments, international organizations, and researchers have traditionally focused on rural poverty and development of agriculture, which is central to most rural economies. Urbanization is forcing them to shift their focus to understanding and addressing the complex factors that influence urban poverty, food insecurity, and malnutrition. IFPRI's Urban Challenges to Food and Nutrition Security program was established in 1995 toward that end.

Cities bring their own development challenges. Crime, for example, is a more significant development issue in cities than in rural areas. In Bangladesh, IFPRI researchers have been studying the impact of crime and violence in Dinajpur, a city in the north of the country. Over the course of a year, some form of crime affects one of every six households in slum areas. Although most survey respondents do not fear for their physical safety, crime clearly has a potentially significant impact on households. The average cost of a crime is large—64 percent of monthly expenditures. In addition to the mental and physical distress of a crime, the economic shock to a household can create serious problems with cash flow and the purchase of basic needs. The study also found that victims place little trust in the police force and report crimes infrequently. In general, the poor do not receive justice, and barely interact with formal security forces and legal institutions. Instead, they turn to informal community authorities or take justice into their own hands.

Politics is another major factor complicating urban development. Researchers looked at the history of a CARE initiative promoting community-driven development (CDD) in peri-urban areas of Lusaka, Zambia. They found that political conflict erupted between city councilors and the members of newly established community-based organizations as the organizations began to manage substantial resources and generate investment in the community, activities that the councilors had traditionally considered their own prerogative. Feeling threatened, the councilors managed to disrupt the activities of the community-based organizations for several years, until a new initiative brought the stakeholders together for consultation. As a result of the dialogue, the community organizations and the councilors identified specific roles and responsibilities they could each take on, and they saw how each one's work could benefit the other. The study illustrated the necessity of involving government structures, rather than ignoring them, in promoting community-driven development, especially in urban areas, and of making sure stakeholders understood and agreed to their role in development. Involving and informing all stakeholders—from community residents to municipal authorities—can ameliorate political tensions that are almost certain to arise in community-driven development and can ultimately help to construct important working relationships.

Collaboration 2003

In 2003, IFPRI worked with numerous local, national, regional, and international institutions and many individual researchers.

Collaborating Institutions in Developing Countries

AFRICA

BOTSWANA
Department of Agricultural Research

BURKINA FASO
Institut de l'Environment et de Recherches Agricoles

BURUNDI
Institut des Sciences Agronomiques du Burundi

DEMOCRATIC REPUBLIC OF CONGO
Institut National pour l'Étude et la Recherche Agronomiques

ERITREA
Department of Agricultural Research and Human Resource Development

ETHIOPIA
Addis Ababa University, Department of Economics
Alemaya University
Ethiopian Agricultural Research Organization
Ethiopian Civil Service College
Ethiopian Development Research Institute, Prime Minister's Office
Ethiopian Grain Trade Enterprise
Mekelle University, Ethiopia
Ministry of Agriculture, Tigray Agriculture Office
Ministry of Economic Development and Cooperation
Prime Minister's Office, Ethiopian Development Research Institute

GABON
Institut de Recherches Agronomiques et Forestières

GAMBIA
National Agricultural Research Institute

GHANA
Ministry of Health
Science and Technology Policy Research Institute, Council for Scientific and Industrial Research
UNICEF—Ghana
University for Development Studies, Tamale, Nutrition Security Unit
University of Ghana, Noguchi Memorial Institute for Medical Research

GUINEA
Institut de Recherche Agronomique de Guinée

KENYA
Egerton University
Institute for Policy Analysis and Research
Kenya Agricultural Research Institute
Kenya Institute of Public Policy Research and Analysis
Kenya Trypanosomiasis Research Institute
Ministry of Agriculture and Rural Development
Ministry of Finance and Planning
National Council for Science and Technology
Top Investment Management Services, Ltd.
University of Nairobi, Institute of Development Studies

MADAGASCAR
CARE—Madagascar
Centre National de Recherche Appliquée au Développement Rural

MALAWI
CARE—Malawi
Chancellor College
CONCERN—Malawi
Malawi Polytechnic
Ministry of Agriculture and Irrigation, Department of Agricultural Research and Technical Services
Ministry of Agriculture and Irrigation, HIV/AIDS and Agriculture Sector Action Research Network
National Research Council of Malawi
National Statistics Office
University of Malawi, Bunda College of Agriculture
University of Malawi, Center for Social Research

MALI
Environment Développement en Afrique
Fondation pour le Développement du Sahel
Institut d'Économie Rurale

MAURITANIA
Centre National d'Élevage et de Recherches Vétérinaires

MAURITIUS
Food and Agricultural Research Council

MOZAMBIQUE
Eduardo Mondlane University
Ministry of Agriculture and Rural Development
Ministry of Agriculture and Rural Development, Instituto Nacional de Investigação Agronómica
Ministry of Education
Ministry of Planning and Finance
National Institute of Statistics

NIGER
Institut National de Recherches Agronomiques du Niger

NIGERIA
University of Ibadan

REPUBLIC OF THE CONGO
Délégation Générale à la Recherche Scientifique et Technologique

RWANDA
Institut des Sciences Agronomiques du Rwanda

SENEGAL
Institut Sénégalais de Recherche Agricole
Conseil Ouest et Centre Africain pour la Recherche et Developpement Agricoles

SOUTH AFRICA
AfricaBio
Department for Social Development
Human Sciences Research Council of South Africa
University of Cape Town
University of KwaZulu Natal, School of Development Studies
University of Pretoria
University of the Western Cape

SUDAN
Ministry of Finance and National Economy
Ministry of Science and Technology, Agricultural Research Corporation

TANZANIA
Agricultural Research and Development Institute
Economic and Social Research Foundation
Ministry of Agriculture and Food Security, Department of Research and Development
Ministry of Cooperatives and Marketing
Ministry of Finance, Policy Analysis Department
Ministry of Water and Livestock Development
National Bureau of Statistics
Research on Poverty Alleviation
Sokoine University of Agriculture
University of Dar es Salaam
University of Sokoine

TOGO
Institut Togolais de Recherche Agronomique

UGANDA
Africare
Allied Business Consultants and Management Services Ltd.
Appropriate Technology–Uganda
Economic Policy Research Centre
Government of Uganda: Plan for Modernization of Agriculture
HIV/AIDS and Agriculture Sector Network
Livestock Health Research Institute
Makerere University
Makerere University, Business School
Makerere University, Makerere Institute of Social Research
Ministry of Agriculture, Animal Industry and Fisheries
Ministry of Finance, Planning and Economic Development
Ministry of Gender, Labour, and Social Development
National Agricultural Research Organization
Office of the President
Uganda Bureau of Statistics
Uganda National Council of Science and Technology
Uganda National Farmers Association

ZAMBIA
CARE—Zambia
Ministry of Agriculture

ZIMBABWE
University of Zimbabwe, Deptartment of Agriculture

ASIA

BANGLADESH
Bangabandhu Sheik Mujibur Rahman Agricultural University
Bangladesh Agricultural Research Council
Bangladesh Institute of Development Studies
Bangladesh Rice Research Institute
Bangladesh Rural Advancement Committee

CARE-Bangladesh
Dhaka University, Centre for Social Studies
Data Analysis and Technical Assistance Limited
Ministry of Agriculture
Power and Participation Research Center
University of Dhaka
University of Rajshahi

BHUTAN
Ministry of Agriculture

CHINA
Association of Deans of Agricultural Economics
Beijing University, China Economic Research Center
Chinese Academy of Agricultural Sciences
Chinese Academy of Agricultural Sciences, Institute of Agricultural Economics
Chinese Academy of Sciences, Center for Chinese Agricultural Policy
Chinese Academy of Social Sciences, Institute of Economics
Gansu Agricultural University
Guizhou University
Ministry of Agriculture, Rural Economic Research Center
Nanjing Agricultural University

INDIA
CARE—India
Center for Economic and Social Studies
Indian Council of Agricultural Research
Indian Council for Research on International Economic Relations
Indian Institute of Management, Ahmedabad
Indira Gandhi Institute of Development Research
Institute for Social and Economic Change
Jawaharlal Nehru University
Ministry of Agriculture
National Bureau for Plant Genetic Resources
National Centre for Agricultural Economics and Policy Research
National Centre for Agricultural Policy Analysis
National Council of Applied Economic Research
National Institute of Science, Technology and Development Studies
Punjab Agricultural University
Research and Information System for Non-Aligned Countries
Sardar Patel Institute for Economic and Social Research
Society for Research and Initiatives for Sustainable Technologies and Institutions
Tamil Nadu Agricultural University
University of Agricultural Sciences

INDONESIA
Badan Perencanaan Pembangunan Nasional
Center for Agro-Socioeconomic Research
Center for Regional Resource Development and Community Empowerment
Jasa Tirta I Public Corporation (PJT), Malang
Ministry of Agriculture, Agency for Agricultural Research and Development
Ministry of Settlement and Regional Infrastructure

MALAYSIA
Malaysian Agricultural Research Development Institute

NEPAL
CARE—Nepal
Institute for Social and Ecological Transition
National Agricultural Research Council, In Situ Agrobiodiversity Conservation Project

PAKISTAN
Pakistan Agricultural Research Council

PAPUA NEW GUINEA
National Agricultural Research Institute

PHILIPPINES
Department of Science and Technology, Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
University of the Philippines, Los Baños
Xavier University, Research Institute for Mindanao Culture

SRI LANKA
University of Peradeniya

THAILAND
Thailand Development Research Institute

VIETNAM
General Statistical Office
Ministry of Agriculture and Rural Development, Department of Agricultural and Rural Development Policy
Ministry of Labor, Invalids, and Social Affairs
Ministry of Planning and Investment
Ministry of Planning and Investment, Central Institute for Economic Management
Sub-Institute for Water Resources Planning

LATIN AMERICA/CARIBBEAN

ARGENTINA
Instituto Nacional de Tecnología Agropecuaria

BARBADOS
University of West Indies

BRAZIL
Applied Economic Research Institute
Empresa Brasileira de Pesquisa Agropecuária
Federal University of Bahia, School of Nutrition
Federal University of Goiás
Federal University of Pará
Federal University of Paraná
Federal University of Pelotas
Federal University of Pernanbuco, Instituto Materno Infantil de Pernanbuco
National School of Public Health, Oswaldo Cruz Foundation
University of Brasília
University of Brasília, Fundacao de Empreendimentos Cientificos e Tecnológicos
University of São Paolo, Center for Advanced Studies on Applied Economics
University of São Paolo, Public Health School

CHILE
Instituto de Investigaciones Agropecuarias

COLOMBIA
Centro Virtual de Investigación de la Cadena Agroalimentaria de la Papa
Corporación Colombiana de Investigación Agropecuaria
Federación Colombiana de Productores de la Papa
Universidad de los Andes
Universidad Nacional de Bogotá

COSTA RICA
Alianza de Familias Productoras de Café Orgánico
Centro Internacional de Política Económica para el Desarrollo Sostenible
Facultad de Agronomía de la Universidad de Costa Rica
Facultad de Economía de la Universidad de Costa Rica
Fondo Nacional para el Fomento de Inversiones Forestales
Instituto de Politicas para la Sostenibilidad
Instituto Nacional de Tecnología Agropecuaria
Ministerio de Agricultura

DOMINICAN REPUBLIC
Centro de Desarrollo Agropecuario y Forestal
Consejo Dominicano del Café
Frito Lay Dominicana
Instituto Dominicano de Investigaciones Agropecuarias y Forestales
Unión de Asociaciones de Caficultores del Norte, Inc

ECUADOR
Corporación de Promoción de Exportaciones e Inversion
Escuela Politécnica Nacional
Fundación Mango
Instituto Nacional de Investigaciones Agropecuarias

EL SALVADOR
Asociación de Productores de Loroco de R.L.
Centro Nacional para la Tecnología Agropecuaria y Forestal
Ministry of Agriculture

HAITI
World Vision Haiti

HONDURAS
Government of Honduras
Programa de Asignación Familiar
Zamorano College

MÉXICO
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias

NICARAGUA
Red de Protección Social, Ministry of the Family

PARAGUAY
Dirección de Investigación Agrícola

PERU
Catholic University of Peru
Instituto Nacional de Investigación Agraria
La Molina National Agrarian University
Ministerio de Comercio

URUGUAY
Instituto Nacional de Investigación Agropecuaria

VENEZUELA
Instituto Nacional de Investigaciones Agrícolas

NORTH AFRICA/MIDDLE EAST

ALGERIA
Haut Commissariat pour le Développement de la Steppe

EGYPT
Ministry of Agriculture and Land Reclamation, Agricultural Research Center

IRAQ
IPA Agricultural Research Center

JORDAN
Jordan University of Science and Technology
Ministry of Agriculture, National Program for Rangeland Rehabilitation and Development
National Center for Agricultural Research and Technology Transfer
University of Jordan

LEBANON
Agricultural Research Institute
American University

LIBYA
Ministry of Agriculture, Agricultural Research Center

MOROCCO
Institut Agronomique et Vétérinaire Hassan II
Institut National de la Recherche Agronomique
Centre Régional de Recherche Agricole de Settat

SYRIA
Directorate of Agricultural and Scientific Research
Syrian Ministry of Agriculture and Agrarian Reform
Steppe Directorates in Palmyra and Aleppo

TUNISIA
École Nationale d'Agriculture de Mograne
Institut National de la Recherche Agronomique de Tunisie
Institution de la Recherche et de l'Enseignement Supérieur Agricoles
Ministry of Agriculture

Collaborating Institutions in Developed Countries

ASIA/PACIFIC

AUSTRALIA
Australian Centre for International Agricultural Research

JAPAN
Foundation for Advanced Studies on International Development
National Graduate Institute for Policy Studies

EUROPE

DENMARK
Danish International Development Agency
Royal Veterinary and Agricultural University

FRANCE
Centre de coopération internationale en recherche agronomique pour le développement

GERMANY
Gesellschaft fuer Technische Zusammenarbeit, Programme Sahelian Burkinabe
Institut fuer Agraroekonomie und Soziologie in den Tropen und Subtropen, Universitaet Hohenheim
University of Bonn, Center for Development Research (ZEF)

HUNGARY
Agrobotany Institute
Szent István University, Institute of Environmental Management

IRELAND
University College of Cork

NETHERLANDS
Free University
InterAcademy Council
Wageningen University and Research Centre, Department of Human Nutrition
Wageningen University and Research Centre, Department of Rural Sociology

NORWAY
Norwegian Institute for Urban and Regional Research

SWITZERLAND
Centre for Applied Studies in International Negotiations

UNITED KINGDOM
Department for International Development
Imperial College
London School of Economics , Department of Social Policy
London School of Hygiene and Tropical Medicine, Centre for Population Studies
Save the Children
University College, London
University of Bath, Economic and Social Research Council Research Programme on Well-Being in Developing Countries
University of Cambridge
University of London
University of Oxford, Centre for the Study of African Economies

NORTH AMERICA

CANADA
Agriculture and Biotechnology Strategies, Inc.
University of Guelph, School of Rural Planning and Development and Department of Plant Agriculture

USA
Abt Associates, Inc.
Associates for International Resources and Development
Auburn University
Berkeley Economic and Advisory Committee
Columbia University, Earth Institute
Cornell University
Donald Danforth Plant Science Center
Development Associates Inc.
Emory University, Rollins School of Public Health
Food and Nutrition Technical Assistance Project
Iowa State University
Michigan State University
Population Council
Purdue University
University of California, Berkeley, Department of Agricultural and Resource Economics
University of California, Davis
University of Maryland
University of Minnesota
University of Nebraska-Lincoln
University of Pennsylvania
University of Wisconsin, Madison, Department of Applied and Agricultural Economics
U.S. Agency for International Development
U.S. Department of Agriculture
Wellesley College
Western Michigan University
W.K. Kellogg Foundation

Collaborating International and Regional Organizations

African Institute for Corporate Citizenship
Asian Development Bank
Asia-Pacific Association of Agricultural Research Institutions
Asian Vegetable Research and Development Center
Association for Strengthening Agricultural Research in Eastern and Central Africa
Canadian Hunger Foundation
Center for International Forestry Research
Centro Internacional de Agricultura Tropical
Centro Internacional de la Papa
Centro Internacional de Mejoramiento de Maíz y Trigo
Council of Central American Ministers
East Africa Market Information and Postharvest Network (Foodnet)
East Africa Regional Agricultural Research and Development Network
Eastern and Central Africa Maize and Wheat Program
Eastern and Central Africa Programme for Agriculture Policy Analysis
Farming in Tsetse Control Areas for East Africa
Food and Agriculture Organization of the United Nations
Forum for Agricultural Research in Africa
Institute of Nutrition in Central America and Panama
Instituto Nacional de Investigación Agraria
Inter-American Development Bank
Inter-American Institute for Cooperation on Agriculture
International Center for Agricultural Research in the Dry Areas
International Center for Research on Women
International Crops Research Institute for the Semi-Arid Tropics
International Development Research Centre
International Fertilizer Development Center
International Fund for Agricultural Development
International Institute for Environment and Development
International Institute of Tropical Agriculture
International Livestock Research Institute
International Network for Improvement of Banana and Plantain
International Plant Genetics Resources Institute
International Rice Research Institute
International Service for National Agricultural Research
International Water Management Institute
The New Partnership for Africa's Development
Programa Cooperativo de Innovación Tecnológica Agropecuaria para la Región Andina
Programa Cooperativo de Investigación y Transferencia de Tecnología de los Trópicos Suramericanos
Programa Cooperativo para el Desarrollo Tecnológico Agroalimentario y Agroindustrial del Cono Sur
Regional Agricultural Technology Fund
Regional Unit for Technical Assistance
Southeast Asian Ministers of Education Organization's Regional Centre for Graduate Study and Research in Agriculture
Southern African Regional Poverty Network
Study and Research in Agriculture
United Nations Development Programme
United Nations Economic Commission for Africa
United Nations Regional Inter-Agency Coordination Support Office
West Africa Rice Development Association
West and Central African Council for Agricultural Research and Development
Winrock International
World Agroforestry Centre
World Bank
World Food Programme
WorldFish Center

Collaboration with Individuals

In some cases, IFPRI collaborates directly with individuals. These collaborations benefit IFPRI as well as the individuals and the institutions with which they are affiliated. In 2003, IFPRI researchers worked with the persons listed below.

Abizari Abdul-Razak, Wageningen University, Netherlands, and University for Development Studies, Ghana

Awudu Abdulai, University of Kiel, Germany

Akin Adesina, Rockefeller Foundation, Kenya

G.B. Ayoola, University of Agriculture, Nigeria

Bernard Bashaasha, Makerere University, Uganda

Suraiya Begum, Centre for Social Studies, Dhaka University, Bangladesh

Gilles Bergeron, Private Consultant, USA

Ayalneh Bogale, Alemaya University, Ethiopia

Michael Bourdillon, University of Zimbabwe

Ken Cassman, University of Nebraska, USA

Rafael Celis, Director, PRODESARROLLO S.A., Costa Rica

Yanjing Chen, Private Consultant, USA

Sara Dalafi, George Washington University, Italy

Daniel Daloloun, Private Consultant, Benin

John Dixon, Private Consultant, USA

Marcel Fafchamps, University of Oxford, United Kingdom

Jeffrey Fine, Consultant/Planning Advisor, Collaborative Masters Program in Agricultural and Applied Economics for Eastern, Central, and Southern Africa, Canada

Margarita Flores, Food and Agriculture Organization of the United Nations, Italy

Jorge Garza, Universidad de El Salvador, El Salvador

Kang'ethe W. Gitu, Private Consultant, Kenya

Marie Godquin, University of Paris 1, La Sorbonne, France

Luis Gomez, Private Consultant, Costa Rica

Kelly Hallman, Population Council, USA

Franz Heidhues, University of Stuttgart-Hohenheim, Germany

Krista Jacobs, University of California, Davis, USA

Isatou Jallow, National Nutrition Agency, The Gambia

Suzanne Jeurnink, Wageningen University, Netherlands

Wais Kabir, Private Consultant, Bangladesh

David Muturi Kabiru, Private Consultant, Uganda

Thomson Kalinda, University of Zambia, Zambia

Ahmed Kamaly, American University in Cairo, Egypt

Kavita Kapur, Harvard University, USA

Joseph T. Karugia, University of Nairobi, Kenya

Ravneet Kaur, Punjab State Civil Supplies Corporation Ltd., India

Vivian Kazi, Private Consultant, Tanzania

Asres Kebede, Private Consultant, Ethiopia

Jomo Kenyatta, University of Agriculture and Technology, Kenya

Bill Kinsey, Free University, the Netherlands

Johann Kirsten, University of Pretoria, South Africa

Adama Konseiga, Centre d'études et de recherches sur le développement international, France

Pramila Krishnan, University of Cambridge, United Kingdom

Jean-Charles Le Vallée, Food Security Guide, Development Gateway, Canada

Weibo Li, USA

Michael Lipton, University of Sussex, United Kingdom

Christo Lombaard, National Department of Education, South Africa

Jennifer Long, University of California, Los Angeles, USA

William Lyakurwa, African Economic Research Consortium, Kenya

John Lynam, Rockefeller Foundation, Kenya

Charles Machethe, University of Pretoria, South Africa

Maartje Mangelaars, Wageningen University, Netherlands

Emmanuel Mbiha, Sokoine University of Agriculture, Tanzania

Juan Manuel Medina, Private Consultant, Honduras

Wendmsyamregne Mekasha, Private Consultant, Ethiopia

Joseph Mensah-Homiah, Cornell University, USA, and University for Development Studies, Ghana

Ellen Messer, George Washington University and Tufts University, USA

Isaac Minde, Eastern and Central Africa Programme for Agricultural Policy Analysis, Uganda

Dubravka Mindek, Independent Consultant, Mexico

Gilead Isaac Mlay, Eduardo Mondlane University, Mozambique

Samuel A. Morley, Private Consultant, USA

Martin Mugenzi, Université Nationale du Rwanda, Rwanda

Harris Mule, Top Investment Management Services, Ltd., Kenya

Idelphonce Geoffrey Mwambe, Private Consultant, Tanzania

Davis Ng'ong'ola, University of Malawi, Malawi

Shinichi Nishiyama, Congressional Budget Office, USA

George Norton, Virginia Polytechnic Institute and State University, USA

Hezron Nyangito, Kenya Institute of Public Policy Research and Analysis, Kenya

Gideon Obare, Egerton University, Kenya

Mark Odhiambo, Moi University, Kenya

Willis Oluoch-Kosura, Consultant/Planning Coordinator, Collaborative Masters Program in Agricultural and Applied Economics for Eastern, Central, and Southern Africa, Kenya

Mary Omosa, Institute of Development Studies, University of Nairobi, Kenya

John Joseph Otim, Agricultural Council of Uganda, Uganda

Keijiro Otsuka, Foundation for Advanced Studies on International Development, Japan

Luke Oyugi, University of Agriculture and Technology, Kenya

Anthony Panin, University of Swaziland, Swaziland

Danielle Perrot-Maitre, Private Consultant, USA

Detlev Puetz, Private Consultant, USA

Olman Quirós, Universidad de Costa Rica, Costa Rica

Manitra Rakotoarisoa, Seoul National University, South Korea

Terry Roopnaraine, Private Consultant, Nicaragua

Lovemore Rugube, University of Zimbabwe, Zimbabwe

Tebogo Seleka, Botswana College of Agriculture, Botswana

Ghada Shields, Private Consultant, USA

Tobias Takavarasha, Food, Agriculture, and Natural Resource Policy Analysis Network, Zimbabwe

Bino Teme, Institute of Rural Economy, Mali

Anna Temu, Sokoine University of Agriculture, Tanzania

Laurian Unnevehr, University of Illinois, Urbana-Champaign, USA

Nick Vink, University of Stellenbosch, South Africa

Haochi Zheng, Department of Economics, Boston University, USA

Publications 2003

Research Reports

Number 132
Rebuilding after War: Micro-level Determinants of Poverty Reduction in Mozambique, by Kenneth R. Simler, Sanjukta Mukherjee, Gabriel L. Dava, and Gaurav Datt.

Number 131
The Importance of Women's Status for Child Nutrition in Developing Countries, by Lisa C. Smith, Usha Ramakrishnan, Aida Ndiaye, Lawrence Haddad, and Reynaldo Martorell.

Policy implications of each research report are summarized in the 2-page IFPRI Abstract series.

Food Policy Review

Number 6
Measuring Childcare Practices: Approaches, Indicators, and Implications for Programs, by Marie T. Ruel and Mary Arimond.

IFPRI/Johns Hopkins University Press Book

Ending Hunger in our Lifetime: Food Security and Globalization, by C. Ford Runge, Benjamin Senauer, Philip G. Pardey, and Mark W. Rosegrant.

Other Books *(also see 2020 Vision section)*

The Double Burden of Malnutrition in Asia: Causes, Consequences, and Solutions, by Stuart Gillespie and Lawrence J. Haddad. Published by Sage, India, for IFPRI.

From Social Assistance to Social Development: Targeted Education Subsidies in Developing Countries, by Samuel A. Morley and David Coady. Published by the Center for Global Development and IFPRI.

Household Decisions, Gender, and Development: A Synthesis of Recent Research, edited by Agnes Quisumbing. With CD-ROM. Distributed by Johns Hopkins University Press.

Research at a Glance

Briefs 7–12
Biotechnology and Genetic Resource Policies: What Is a Genebank Worth?, edited by Melinda Smale and Bonwoo Koo.

Briefs 1–6
Biotechnology and Genetic Resource Policies, edited by Philip G. Pardey and Bonwoo Koo.

Essays

Trade Policies and Food Security, reprint of two essays from IFPRI's 2002–2003 annual report, by Kevin Watkins and Joachim von Braun and by Eugenio Díaz-Bonilla and Ashok Gulati.

Issue Briefs *(also see 2020 Vision section below)*

Ending Hunger by 2050: Crucial Investments and Policies, by C. Ford Runge, Benjamin Senauer, Philip G. Pardey, and Mark W. Rosegrant.

IFPRI Forum *(IFPRI/2020 Vision Initiative newsletter)*

December 2003
Will Supermarkets be Super for Small Farmers?

September 2003
Revitalizing the Drive for Rural Infrastructure

June 2003
Food Security when the Fighting Stops

March 2003
A Level Playing Field for Farmers

A 2020 Vision for Food, Agriculture, and the Environment

Book

Fish to 2020: Supply and Demand in a Changing Global Market, by Christopher Delgado, Nikolas Wada, Mark Rosegrant, Siet Meijer, and Mahfuzuddin Ahmed. Published with the WorldFish Center.

Food Policy Report

Outlook for Fish to 2020: Meeting Global Demand, by Christopher L. Delgado, Nikolas Wada, Mark W. Rosegrant, Siet Meijer, and Mahfuzuddin Ahmed. Published with the WorldFish Center.

Issue Brief

The Future of Fish: Issues and Trends to 2020, by Christopher L. Delgado, Nikolas Wada, Mark W. Rosegrant, Siet Meijer, and Mahfuzuddin Ahmed. Published with the WorldFish Center.

Focus Brief

Number 10
Food Safety in Food Security and Food Trade, edited by Laurian J. Unnevehr.

General Information

IFPRI's Strategy: Toward Food and Nutrition Security, April 2003

IFPRI at a Glance, revised version.

Assuring Food And Nutrition Security in Africa by 2020 (2020 Africa Conference flyer)

A number of other flyers and brochures were also published, including for the Global Open Agriculture and Food University and the book *Ending Hunger in Our Lifetime*.

2003 Translations

General Information

Spanish
Estrategia del IFPRI: hacia la seguridad alimentaria y nutricional
(Translation of *IFPRI's Strategy: Towards Food and Nutrition Security*)

French
Stratégie de L'IFPRI: vers la sécurité alimentaire et nutritionnelle
(Translation of *IFPRI's Strategy: Towards Food and Nutrition Security*)

Japanese
国際食糧政策研究所の概要
(Updated version of *IFPRI at a Glance*)

IFPRI/Johns Hopkins University Press Book

Spanish
La Política de la Precaución: cultivos modificados genéticamente en países en desarrollo
(Translation of *The Politics of Precaution: Genetically Modified Crops in Developing Countries*, by Robert Paarlberg)

Food Security in Practice

Spanish
Métodos para Proyectos de Desarrollo Rural
(Translation of *Methods for Rural Development Projects*, edited by John Hoddinott)

Issue Briefs

Spanish
La banca para los pobres: cómo liberar los beneficios de las microfinanzas
(Translation of *Banking on the Poor: Unleashing the Benefits of Microfinance*)

French
Mettre fin à la famine en Afrique: seuls les petits agriculteurs peuvent y parvenir
(Translation of *Ending Hunger in Africa: Only the Small Farmer Can Do It*, by Peter Hazell and Michael Johnson)

Japanese
飢餓との戦い アフリカ南部における危機からの脱出
(Translation of *Fighting Famine in Southern Africa: Steps Out of the Crisis*)

Essays

Spanish

El SIDA y la Seguridad Alimentaria
(Translation of *AIDS and Food Security,* two essays reprinted from IFPRI's Annual Report 2001-2002, by Peter Piot and Per Pinstrup-Andersen and by Stuart Gillespie and Lawrence Haddad)

A 2020 Vision for Food, Agriculture, and the Environment

French

Garantir la sécurité alimentaire et nutritionnelle d'ici 2020
(Translation of *Assuring Food And Nutrition Security in Africa by 2020,* Africa Conference flyer)

Web Only Publication

Spanish

Cuánto daño causa: impacto de las políticas comerciales agrícolas sobre los países en desarrollo
(Translation of *How much does it hurt? The impact of agricultural trade policies on developing countries,* media brief)

Other Published Works by IFPRI Staff in 2003

Adato, Michelle (with R. Meinzen-Dick). Assessing the Impact of Agricultural Research on Poverty and Livelihoods. Quarterly Journal of International Agriculture 42 (No. 2).

Adato, Michelle (with F. Lund and P. Mhlongo). Innovations in mixed methods to understand poverty dynamics: A multidisciplinary approach to longitudinal research in KwaZulu-Natal, South Africa. In Caroline Moser, ed., Urban Longitudinal Research Methodology: Objectives, Contents and Summary of Issues raised at the Joint DPU-ODI-Worldbank-DFID Workshop. Pp. 78–82. London: University College London. (Working Paper)

Ahmed, Akhter (with H. Bouis). Proxy Indicators of Income for Targeting Food Subsidies. In Does Agricultural Policy Reform Work? eds. G. Ender and J. S. Holtzman. Washington, D.C.: Abt Associates Inc.

Arimond, Mary (with M. Ruel). Generating Indicators of Appropriate Feeding of Children 6 through 23 months from the KPC 2000+. Food and Nutrition Technical Assistance Project. Washington, D.C.: Academy for Educational Development.

Babu, Suresh (with V. Rhoe). Assessing Agricultural Biotechnology: Applications of Ex-ante and Ex-post Methods to Genetically Modified Crops. Asian Biotechnology and Development Review 5 (No. 3).

Babu, Suresh (with V. Rhoe). Food Security, Regional Trade and Food Safety in Central Asia—Case Studies from Kyrgyz Republic and Kazakhstan. In Perspective of the Agri-Food System in the New Millennium, eds. R. Fanfani and C. Brasili. Bologna, Italy: CLUEB Press.

Babu, Suresh (with V. Rhoe). Food Security in West Africa—Emerging Issues and Challenges. Proceedings of the SADAOC Regional Conference held in Bamako, Mali on September 9, 2003. Ouagadougou: SADAOC.

Babu, Suresh (with A. Bhouraskar). Mitigating the Food Crisis in Southern Africa: From Relief to Development. World Bank African Regions Findings 224 (March).

Babu, Suresh. The Real Economics of Linking Rivers. Sify News Online. 10 July.

Benson, Todd (with S. Mukherjee). The Determinants of Poverty in Malawi, 1998. World Development 31 (No. 2).

Bouis, Howarth (with A. Bhargava, K. Hallman, and B. A. Hoque) Coliforms in the Water and Hemoglobin Concentration are Predictors of Gastrointestinal Morbidity of Bangladeshi Children Aged 1–10 Years. American Journal of Human Biology 15 (No. 2).

Bouis, Howarth. The Economics of Micronutrient Interventions and the Niche for Biofortification. In Rice Science: Innovations and Impact for Livelihood, eds. T. W. Mew, D. S. Brar, S. Peng, D. Dawe, and B. Hardy. Proceedings of the International Rice Research Conference, 16–19 September 2002, Beijing, China. Manila: International Rice Research Institute.

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Cai, Ximing (with D.C. McKinney and L.S. Lasdon). An Integrated Hydrologic-Agronomic-Economic Model for River Basin Management. Journal of Water Resources Planning and Management 129 (No. 1).

Cai, Ximing (with C. Ringler and M. Rosegrant). Physical and Economic Efficiency of Water Use in the River Basin: Implications for Efficient Water Management. Water Resources Research 39 (No. 1).

Cai, Ximing (with D. C. McKinney and M. Rosegrant). Sustainability Analysis for Irrigation Water Management in the Aral Sea Region. Agricultural Systems 76 (No. 3).

Cai, Ximing (with M. Rosegrant). Water Availability and the Future of Irrigated and Rainfed Cereal Production. In Land Quality, Agricultural Productivity, and Food Security: Biophysical Processes and Economic Choices at Local, Regional, and Global Levels, ed. K. D. Weibe. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing Limited.

Cai, Ximing (with M. Rosegrant). Water Productivity and Food Security: Current Situation and Future Options. In Water Productivity in Agriculture: Limits and Opportunities for Improvement, ed. J. W. Kijne. Wallingford, UK; Northampton, MA: CABI Publishing.

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Cohen, Marc (with P. Pinstrup-Andersen). Biotechnology and the CGIAR. In Sustainable Agriculture in the New Millennium: The Impact of Biotechnology on Developing Countries, eds. K. Plenderleith and P. De Meyer. Brussels: Friends of the Earth Europe.

Cohen, Marc. Crop Circles: Spin Notwithstanding, Can GM Food Still Save the World? Natural History 112 (No. 9).

Cohen, Marc. Human Nutrition and Access to Food. In Feed the Soil to Feed the People: The Role of Potash in Sustainable Agriculture, ed. A.E. Johnston. Vol. I. Proceedings of the IPI Golden Jubilee Congress held in Basel, Switzerland from October 8 to 10, 2002. Basel: International Potash Institute.

Cohen, Marc (with P. Pinstrup-Andersen). Overview of the World Food Situation and Outlook. FoodInfo Online (February 14).

Cohen, Marc (with P. Pinstrup-Andersen). The World Food Supply: Prospects and Constraints. In Sustainable Agriculture in the Third World: Defining a Role for Transgenic Crops and Research. Brussels: Belgian Royal Academy of Overseas Studies.

Delgado, Christopher. Animal Source Foods. In Food Policy Options: Preventing and Controlling Nutrition-related Noncommunicable Diseases, ed. World Health Organization and World Bank. Washington, D.C.: World Bank.

Delgado, Christopher (with M. Rosegrant and N. Wada). Fish as Food: Projections to 2020. In Fisheries in the Global Economy, ed. B. Shallard. Proceedings of the International Institute of Fisheries Economics and Trade 2002. Wellington, New Zealand: International Institute of Fisheries, Economics, and Trade.

Delgado, Christopher. A Food Revolution: Rising Consumption of Meat and Milk in Developing Countries. Journal of Nutrition Supplement II 133 (No. 11).

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Diao, Xinshen (with T. L. Roe). Can a Water Market Avert the "Double-Whammy" of Trade Reform and Lead to a 'Win-Win' Outcome? Journal of Environmental Economics and Management 45 (No. 3).

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Financial Statements 2002–2003

Presented here is a summary of financial information for the years ended December 31, 2003 and 2002. The full financial statements and the independent auditors' report are available from IFPRI on request.

Balance Sheets

December 31, 2003 and 2002 (US$ thousands)

Assets		2003	2002
Current Assets	Cash and cash equivalents	$ 2,667	$ 4,682
	Investments	4,344	2,648
	CGIAR grants receivable	1,591	760
	Restricted projects receivable (net)	4,966	4,870
	Other receivables	462	342
	Other current assets	267	232
	Total Current Assets	14,297	13,534
	Investments—long term	10,509	7,895
Other assets	Property and equipment, net	442	481
	Total assets	$ 25,248	$ 21,910
Liabilities and net assets			
Current liabilities	Accounts payable and accrued expenses	$ 1,296	$ 1,508
	Accrued vacation	944	821
	Advance payment of CGIAR grant funds	1,531	975
	Unexpended restricted project funds	6,754	7,160
	Amount held for Challenge Program	4,044	1,500
	Total current liabilities	14,569	11,964
Noncurrent liabilities	Deferred rent	709	858
	Accrued post-retirement benefits	795	661
	Total noncurrent liabilities	1,504	1,519
	Total liabilities	16,073	13,483
Net assets—unrestricted	Operating reserves	6,172	5,390
	Reserves allocated for subsequent year expenditure	2,560	2,556
	Net investment in property and equipment	443	481
	Total net assets	9,175	8,427
	Total liabilities and net assets	$ 25,248	$ 21,910

Statements of Revenue, Expenses, and Changes in Operating Reserves

For the Years Ended December 31, 2003 and 2002 (US$ thousands)

Revenue		2003	2002
Grant and contract income			
	Unrestricted	$ 8,148	$ 7,692
	Restricted	17,085	15,712
Investment income		280	397
Foreign exchange gain		405	227
	Total revenue	25,918	24,028
Expenses			
Program services	Direct research and outreach	21,658	20,402
Other services		69	100
Management and general		3,443	2,954
	Total expenses	25,170	23,456
	Excess of revenue over expenses	748	572
Transfer from reserves allocated for subsequent year expenditure		72	162
Transfer to net investment in property and equipment		(38)	(37)
	Increase in working capital fund	783	697
Operating reserves, beginning of year		5,390	4,693
Operating reserves, end of year		$ 6,172	$ 5,390

Schedule of Expenses by Type

(US$ thousands)

Expenses	2003	2002
Personnel	$ 12,065	$ 11,483
Collaboration/field expenses	4,280	4,425
Travel	2,226	1,868
Trustees' expenses (nontravel)	65	95
Operations, supplies, and services	6,248	5,263
Depreciation/amortization	286	322
Total	$ 25,170	$ 23,456

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This list reflects personnel employed by IFPRI in 2003 including part-time staff members. *Indicates staff who departed in 2003; **indicates staff who commenced in 2003; ***indicates a new division in 2004. Country indicates citizenship of staff member.

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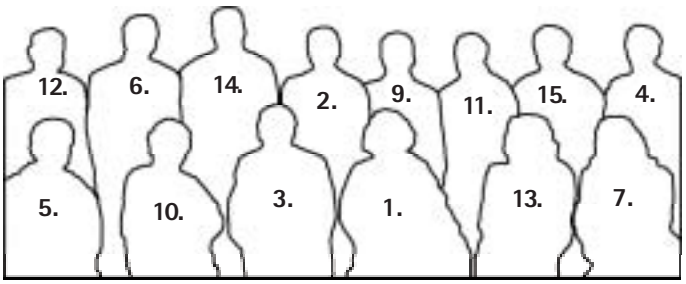

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Finally, we thank our intended beneficiaries: the poor rural farmers and urban dwellers who have freely given of their time and shared information about their households and lives with us. Without them, our work would lack both purpose and the essential data that make formulating better public policies possible.

Joachim von Braun

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