



INTERNATIONAL FOOD
POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty



2004-2005

ANNUAL REPORT

ESSAYS:
Lessons Learned from
the Dragon (China) and the Elephant (India)



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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Contents

Message from the Chair of the Board of Trustees	
Isher Judge Ahluwalia	2
Introduction from the Director General	
Joachim von Braun	3
Essays: Lessons Learned from the Dragon (China) and the Elephant (India)	4
Agricultural and Economic Development Strategies and the Transformation of China and India	
<i>Joachim von Braun, Ashok Gulati, and Shenggen Fan</i>	5
Reducing Poverty and Hunger in India: The Role of Agriculture	
<i>Montek S. Ahluwalia</i>	16
The Achievements and Experiences of Poverty Alleviation in Rural China	
<i>Jian Liu</i>	22
Overview: The International Food Policy Research Institute	26
Research and Outreach	32
Global Food System Functioning	32
Global and National Food System Governance	42
Food System Innovations	58
Food Policy Communications	65
Capacity Strengthening	72
Collaboration 2004	74
Publications 2004	78
Financial Statements 2003–2004	86
Personnel 2004	88
Board of Trustees 2004–2005	90
Donors 2004	91

Message from the Chair of the Board of Trustees



In 1975 IFPRI was created as a result of the realization that agricultural technologies, as important as they are, have limited capacity to overcome hunger and malnutrition in the presence of poorly designed and implemented policies. For three decades now, IFPRI has addressed the policy questions related to achieving food security among the world's poorest countries and people. Many of the issues that were important areas of research for IFPRI in 1975 are now better understood and require less research attention (such as the implications of food subsidies), whereas others (how can scarce natural resources best be managed?) remain burning questions today. The Institute has turned its attention to new food policy issues as well, including governance, gender roles, markets and global trade, and agriculture science policies.

We believe IFPRI has played a significant role in increasing understanding of policies related to food and agriculture in developing countries. To help shed light on this role and to commemorate IFPRI's 30th anniversary, the Board of Trustees has asked IFPRI management to look back to assess IFPRI's progress so far and to look into the future for how IFPRI's strengths and capacities can help fill future knowledge gaps.

Striving to improve well-being in developing countries, IFPRI has made significant progress on its efforts to increase its presence on the ground in those countries where research needs are identified and results can be used. To raise its profile and increase its local ties in Africa and Asia, IFPRI also opened new multidivisional offices housing outposted research staff in Addis Ababa and New Delhi, as well as project offices in other locations, including San José, Costa Rica, and Beijing, China. Staff members are also outposted in Haiti, the Netherlands, Senegal, South Africa, Uganda, and Zambia. In December 2004 IFPRI had a total of 19 internationally recruited staff who were outposted, compared with 5 in December 2003.

During 2004 IFPRI's management also began implementation of an integrated risk management process that encompasses risks and opportunities across all of the institute's activities. In January 2005 IFPRI became a member of the CGIAR Internal Audit Group, which is now working with IFPRI's management to refine the institute's approach to managing risk. IFPRI recognizes that research requires innovation, innovation brings change, and change can bring risk. IFPRI embraces the concept of assessing risks and opportunities so that the Institute avoids undue caution and encourages creativity. The Board of Trustees' Audit Committee is taking an active role in monitoring the risk management strategy, not only to include financial and fiduciary elements, but also to see that the broader substantive aspects of research are addressed.

In March 2005 the Board of Trustees was privileged to hold its meeting in India in conjunction with a host of activities held to launch IFPRI's New Delhi office and to highlight the Institute's South Asia Initiative. These events provided exciting opportunities to interact with policymakers, researchers, and many others in meetings and seminars held in India, Bangladesh, and Pakistan. The opening of the New Delhi office included an address by Indian Prime Minister Manmohan Singh, who welcomed IFPRI's stronger presence in the region, and highlighted the agenda for food and agriculture policy research for poverty reduction.

This was also the year of IFPRI's 4th External Program Management Review. The Board commends IFPRI on the results, which showed the Institute to be the world's preeminent source of applied research on food policy. The review panel confirmed the Board's view that IFPRI consistently produces high-quality research and outreach products that contribute to the world's understanding of the issues surrounding food security. We on the Board applaud IFPRI's impressive achievements over the past year while encouraging the Institute to keep its sights firmly fixed on the ultimate goal of eliminating poverty and hunger worldwide.

Isher Judge Ahluwalia

Chair, IFPRI Board of Trustees

Introduction from the Director General



In 2004–05 development attention focused on the Millennium Development Goals, and in particular on the goal to cut poverty and hunger by at least half by 2015. The year 2005 is a make-or-break year for lining up the required policy actions at the global level (for trade and development finance), at the regional level (in Africa), and, most important, at the national level (for making a difference for the poor). IFPRI contributed actively to the knowledge base that supports reaching the Millennium Development Goals, and it plans to continue to do so in 2006. In this annual report we draw special attention to the developments in China and India, as both of these countries matter so much for the future of the world food situation and of poverty reduction.

The past year has been a highly productive and active one for IFPRI. After a recent period of expansion and decentralization, IFPRI now finds itself in an even stronger position to deliver sound and effective research and outreach on solving the problems of hunger and malnutrition.

Feedback from outside the Institute offers an important perspective on our work, and during the past year IFPRI had its 4th External Program Management Review (EPMR). I am pleased that the review panel found IFPRI's overall performance to be highly positive. The panel acknowledged that we produce high-quality research and outreach outputs and are well positioned to face the challenges of the future. It noted that IFPRI has a widespread and long-standing high reputation as the world's premier source of applied research relevant to the whole range of food policy issues. The panel also made several thoughtful and constructive recommendations, which we are committed to addressing fully.

In response to new needs and realities, IFPRI recently revised its overall strategy spelling out its current priorities for research and outreach. Under this new strategy, IFPRI will devote itself to research and outreach efforts that meet four criteria: contribute to policy solutions that reduce hunger and malnutrition; address emerging issues that most directly affect food security, nutrition, and poverty; produce results applicable to many countries and global concerns; and involve wide consultation with stakeholders and partners. We believe this strategy and the activities within it fit well with the new agenda recently articulated by the Science Council of the Consultative Group on International Agricultural Research (CGIAR). In late 2004 and early 2005, the Science Council undertook a comprehensive consultative process to identify priority areas of research for CGIAR centers in the coming years. One of the five main priority areas the Science Council identified is "improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger."

I am also pleased to report that IFPRI's new International Service for National Agricultural Research (ISNAR) Division is now well under way. This division, based in Addis Ababa, Ethiopia, will focus its research heavily on capacity strengthening for agricultural development. IFPRI staff of the ISNAR Division are making strong progress in designing research programs and initiating projects.

Effectively addressing persistent poverty and food insecurity in Africa will require increased efforts not only within Africa, but also in the international community, and IFPRI has deepened its presence in Africa in several ways. Not only do we have a division (ISNAR) housed in Africa, but we also coordinated closely with other centers and we have initiated country strategy research programs in Ethiopia, Ghana, Nigeria, and Uganda. The past year has also seen extensive follow-up to our flagship event of 2004, the conference "Assuring Food and Nutrition Security in Africa by 2020." We have supported the efforts of the Conference Advisory Committee members to deliver the results of the conference to their various networks and forums in Africa, and the conclusions of the conference have received a hearing at the highest policy levels in Africa.

South Asia is another region where IFPRI has expanded its activities in the past year. In March 2005 IFPRI launched a New Delhi office, which will be a base of operations for research on South Asia for all of IFPRI's divisions. This office will give IFPRI a stronger presence on the ground, closer to its clients in South Asia and the issues that confront them, while also giving IFPRI better access to feedback on policy research needs in South Asia.

We believe these activities, together with the many other ongoing efforts pursued with our partners and sister centers of CGIAR described in this report, will do a great deal to support our mission of providing policy solutions that cut hunger and malnutrition. Yet much remains to be done in regard to food policy research and capacity strengthening in the coming years to even come close to reaching the Millennium Development Goal of cutting hunger in half by 2015, and to actually ending hunger soon thereafter.

Joachim von Braun
Director General, IFPRI

ESSAYS: Lessons Learned from the Dragon (China) and the Elephant (India)



The world made significant progress on reducing poverty between 1981 and 2001—the number of people in developing countries living on less than US\$1 a day fell from 1.5 billion to 1.1 billion, or from 40 to 21 percent of the world’s population. In fact, however, nearly all this progress reflects gains made in reducing poverty in China and India, two of the world’s fastest-growing economies. The rapid economic growth and enormous poverty reduction achieved by China, and to a lesser extent India, are remarkable accomplishments that bear closer investigation. What do the experiences of these two countries reveal about how to sequence reforms and about what kinds of reforms are most effective in stimulating growth and combating poverty? The three essays that follow compare the experiences of China and India to learn what steps each country took and what lessons they each have to offer.

AGRICULTURAL AND ECONOMIC DEVELOPMENT STRATEGIES AND THE TRANSFORMATION OF CHINA AND INDIA

Joachim von Braun, Ashok Gulati, and Shenggen Fan

By any measure, China and—more recently—India are striking economic success stories. A few decades ago, both countries were clearly among the world's poorest countries; now they are among the world's fastest-growing economies and are responsible for nearly all the recent global progress in poverty reduction.

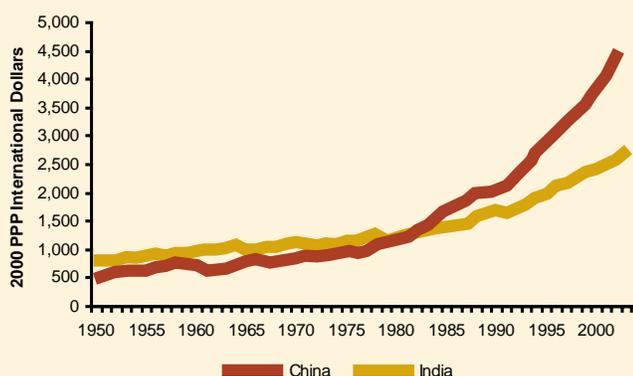
In 1978 per capita gross domestic product (GDP) in India was \$1,255—lower than the average for Sub-Saharan Africa, which stood at \$1,757.¹ Since then it has climbed steadily upward, reaching \$2,732 in 2003. Even more spectacularly, China's GDP per capita, which stood at \$1,071 in 1978, jumped to \$4,726 in 2003. China's GDP per capita growth rate is almost double that of India

(Figure 1). Moreover, the share of rural poor people fell from 33 percent in 1978 to 3 percent in 2001, according to official sources, or to around 11 percent, based on a poverty line of less than a dollar a day, according to World Bank estimates of 1998 (Figure 2). Despite ongoing controversies regarding measures of poverty in China, both benchmarks depict an extraordinary decline in the incidence of poverty. India also achieved a downward trend in poverty, although the outcomes were not as dazzling as in China. According to official estimates, rural poverty in India dropped from 50 percent in 1979/80 to 27 percent in 1999–2000, the latest year for which data are available. Together these two countries accounted for a substantial drop in global poverty levels, from 29.6 percent of the world's population in 1990 to 23.2 percent in 1999.²

¹ Figures for per capita GDP are in purchasing power parity terms with constant 2000 prices.

² Excluding China, world poverty actually increased in absolute terms, from 917 million to 945 million people.

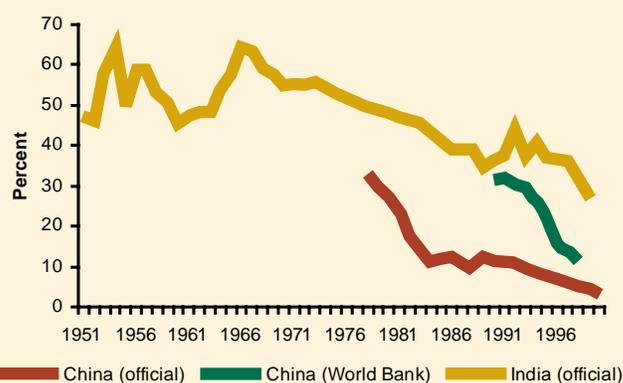
Figure 1 GDP per capita in China and India, 1950–2003



Sources: World Bank, *World Development Indicators 2005* (Washington, DC: World Bank, 2005), CD-ROM; and A. Maddison, *The World Economy: A Millennial Perspective* (Paris: Organization for Economic Cooperation and Development, 2002).

Note: The data for 2000–2003 are taken from the World Bank, while the data for 1950–99 are extrapolated using the trend of per capita GDP growth from Maddison. There have been conflicting reports on China and India's per capita GDP. Maddison reported that China and India's GDP per capita measured in 1990 PPP were \$439 and \$619 respectively in 1950, and \$3,259 and \$1,818 in 1999. But the World Bank reported a very different trend: as late as in 1978, China's GDP per capita was only \$674 measured in 2000 international prices, 56 percent of India's \$1,224. But in 2003 GDP per capita in China increased to \$4,726 and India's to \$2,732. Although we believe the World Bank has done a reasonably good job in estimating GDP in international prices in more recent years, it is not clear to us how the World Bank estimated it for earlier years. On the other hand, Maddison documented his estimates for all years from 1950 to 1999. But, his series ran only to 1999. Therefore, we have used World Bank estimates for 2000 to 2003, and then we used Maddison's trend to backcast the numbers before 2000.

Figure 2 Rural poverty rates in China and India



Sources: China, National Bureau of Statistics, *The Monitoring Report of Rural Poverty in China* (Beijing: China Statistics Press, 2002); www.indiastat.com, 2004.

Note: Poverty data for India are from large- and small-sample surveys by the National Sample Survey Organisation (NSSO). Large-sample surveys are generally conducted at five-year intervals. Since 1970, for example, they were conducted for the years 1973–74, 1977–78, 1983, 1987–88, 1993–94, and 1999–2000. The results from large-sample surveys are considered more robust and reliable than those from small-sample surveys.

Less well known than their recent blistering economic performance, however, is the role that agriculture has played in the transformation of these still heavily rural and agricultural countries. In China agricultural reforms were the starting point for economic liberalization—in other words, reforms began in the sector where the majority of poor lived, and they were largely the beneficiaries of reform—whereas in India reforms started with macroeconomic adjustment and trade and industrial policy, areas that did not benefit most of the poor. Although agricultural growth in India rose to more than 4 percent a year in the years immediately following the reforms (1992–96), it could not be sustained, and it slumped to about 2 percent a year during the period 1997–2003, severely affecting its contribution to economic growth and poverty reduction. The full potential of agriculture in India has yet to be unleashed. Now, in 2005, agriculture is once again high on the agenda of the Indian government, which wants to give a rural orientation to the entire reform and growth process. The reform experiences of China and India—similar in some ways and different in others—shed light on the enormous potential for investments and policies in support of pro-poor agricultural and rural growth to fight poverty and malnutrition in developing countries.

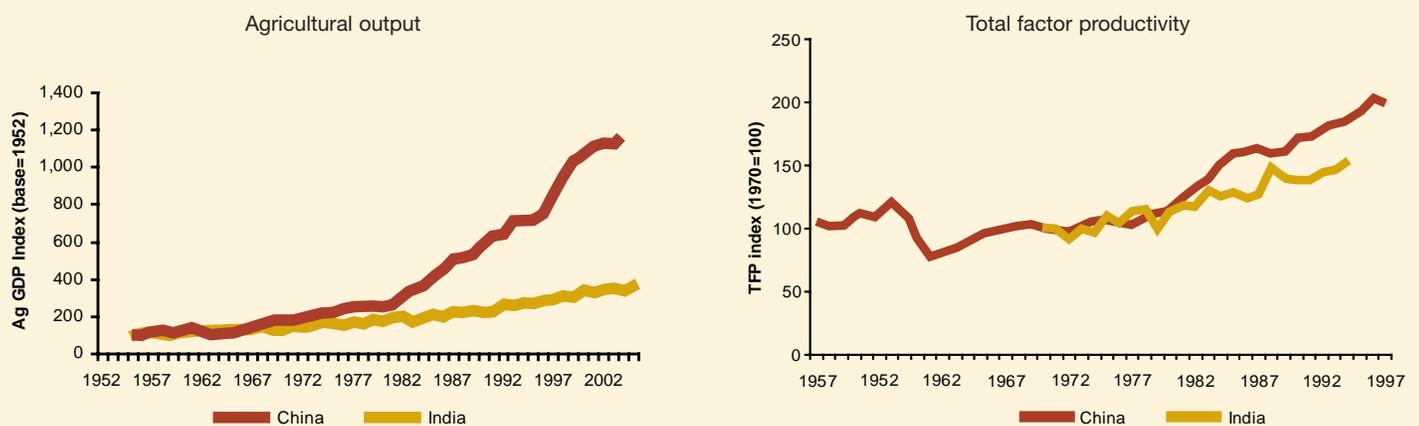
REFORMS IN CHINA AND INDIA

Reforms that directly strengthened agriculture were a major factor in China's economic growth and poverty

reduction. Between 1978 and 1989, China underwent two distinct phases of agricultural reform, which first decentralized agricultural production through the household responsibility system, giving farmers much more leeway to decide what and how much to grow, and then liberalized the systems for pricing and marketing agricultural goods. Reported agricultural production growth immediately shot up, from 2.6 percent a year during 1966–76 to 7.1 percent a year during 1978–84 (Figure 3). Furthermore, growth in agricultural productivity went from almost zero to 6.1 percent a year. Although production growth fell back to 2.7 percent a year during 1985–89 because of rising input prices, further reforms in the 1990s again raised production growth to 3.8 percent a year during 1990–97. As a result of the dramatic growth in agriculture, rural people found their incomes rising by 15 percent a year between 1978 and 1984.

But perhaps one of the most striking results of China's agricultural reforms was that they led to the creation of a whole new economic sector that became the most dynamic in China's economy: the rural nonfarm sector—the small-scale food-processing plants, machinery repair shops, and increasingly more modern and technology-intensive industries that cropped up to meet growing demand among increasingly well-off farmers and to employ the millions of people whose labor was no longer needed on farms. Indeed, the whole structure of China's economy shifted. Whereas agriculture provided more than

Figure 3 Agricultural output and productivity in China and India



Sources: Agricultural output: Authors' calculations based on China, National Bureau of Statistics, *The Monitoring Report of Rural Poverty in China* (Beijing: China Statistics Press, 2002); and www.indiastat.com, 2003; Total factor productivity: Shenggen Fan and Xiaobo Zhang, "Production and Productivity Growth in Chinese Agriculture: New National and Regional Measures," *Economic Development and Cultural Change* 50, no. 4 (July 2002), 819–838; and Shenggen Fan, Peter Hazell, and Sukhadeo Thorat, *Linkages between Government Spending, Growth, and Poverty in Rural India*, IFPRI Research Report 110 (Washington, DC: IFPRI, 1999).



half of the country's GDP in 1952, it fell to 14 percent in 2004. Over the same period, the rural nonfarm sector went from providing almost none of GDP to more than one-third. The growth of this sector not only played a large role in reducing rural poverty in China, but also put pressure to reform on the urban sector, which has been the main engine of growth since the 1990s.

The story of agriculture in India is somewhat different. During the 1960s and 1970s, the Green Revolution, in which Indian farmers adopted new high-yielding varieties of wheat and rice, led to dramatic leaps in agricultural production and raised farmers' incomes. As a result, rural poverty fell from 64 percent in 1967 to 56 percent in 1973 and to 50 percent in 1979/80. Production gains from Green Revolution technologies continued through the mid-1980s and then slowed sharply. In the 1970s India had adopted subsidies for agricultural inputs, such as fertilizers and electricity for pumping irrigation water, and these subsidies grew to help maintain agricultural production but started placing a strain on government budgets.

Beginning in 1991 India instituted a series of sweeping macroeconomic reforms. Although these initial reforms were not directed toward agriculture, they helped stimulate a rise in agricultural growth by generating greater demand for a wide range of agricultural

products and by leading to increased private investment in agriculture. From 1991/92 to 1996/97, agriculture grew at an annual rate of 4.1 percent and rural poverty fell only from 39.1 percent in 1987/88 to 37.3 percent in 1993, and further to 27.1 percent in 1999/2000. After the government opened the agricultural sector to international trade in the face of falling world prices of most agricultural products during the late 1990s, agricultural growth slowed again, averaging 2 percent between 1997/98 and 2003/04. Various studies have shown that whenever there is higher agricultural growth, there is greater poverty reduction in rural areas.

Now further steps are needed in India to again stimulate strong agricultural growth, including investments in roads, irrigation, and other infrastructure, improvements in education, and greater emphasis on growing high-value agricultural goods like fruits and vegetables instead of only cereals.

LESSONS FROM CHINA AND INDIA

What can we learn from the process of economic reform in these two countries? Does the sequencing of reforms matter? What lessons do the experiences of China and India offer for other developing countries and countries in economic transition? What could China and India learn from their own as well as each other's experiences?

To Reduce Poverty Faster, Begin with Agricultural Reforms

China's reforms led to acceleration in agricultural growth from 1978 to 2002 (4.6 percent per year, as opposed to 2.5 percent per year from 1966 to 1977). The most substantial decline occurred in the first phase of reform, from 1978 to 1984, when agricultural GDP jumped to 7.1 percent per year and the percentage of rural poor dropped from 33 to 11 percent of the population.

By launching market-oriented reforms in agriculture, China was able to ensure that economic gains were widespread and thus build consensus for the continuation of reforms. Besides, prosperity in agriculture favored the development of rural nonfarm activities, which, by providing additional sources of income beyond farming, were one of the main factors behind China's rapid poverty reduction after 1985. As the rural nonfarm enterprises became more competitive than the state-owned enterprises, the government expanded the scope of policy changes and put pressure on the urban economy to reform. Reforms of the state-owned enterprises in turn triggered macroeconomic reforms, opening up the economy further.

In India, on the other hand, even though overall economic growth was high, it is clear that slower growth in agriculture was the major reason behind the slower poverty reduction. Prompted by macroeconomic imbalances, India's reforms began with macroeconomic and nonagricultural policy changes. The reforms led to impressive rates of economic growth in the 1990s, but since reforms were largely focused on the nonagricultural sectors, they had limited impact on poverty reduction. Agricultural policy changes occurred only at later stages, and even then were only partial. Therefore, the evidence suggests that successful agriculture-led reforms reduce poverty faster.

Make Reforms Gradually and Carefully

At the outset of reforms in China, policymakers withdrew central planning and reduced the scope of government procurement while expanding the role of private trade and markets. Thus they first created the incentives and institutions required by the market economy; then, in the mid-1980s, they began to open up markets. Studies show that the incentive reforms—in the form of greater land use rights, decentralized agricultural production

management through the household responsibility system, and rises in procurement prices—from 1978 to 1984 had a greater impact on growth than did market liberalization reforms per se after 1984. Incentive reforms in China allowed markets to emerge gradually, so unlike other countries in transition, China did not experience a sudden collapse of central planning in the absence of market-based allocative mechanisms. Parallel with reforms in output markets, reforms in the pricing and marketing of inputs, including fertilizer, machinery, fuel, feed, seeds, and energy, have transformed a system of state-controlled quotas and prices into a largely market-driven system. Today the role of government is limited to quality control of input supplies. Subsidies for fertilizer and machinery imports and domestic manufacturing have also been eliminated. In the irrigation sector, the state is still responsible for large-scale investment, but farmers or local governments are responsible for local investments and maintenance of the lower end of the system.

This favorable sequence of reforms came about not so much through the planning of Chinese policymakers, but rather through their trial-and-error approach to reform. Instead of following a predetermined blueprint, they adopted new measures through experimentation—in the words of Deng Xiaoping, "crossing the river while feeling the rocks." Each new policy was field-tested and determined to be successful in selected pilot districts before the policy was applied nationwide and the next measure introduced. This gradual approach to reforms, beginning with the strengthening of market institutions and incentives and moving toward the opening up of markets, appears to lead to more substantial rates of growth and poverty reduction.

India's quite different experience also supports this assertion. India's reforms in the agriculture sector began with agricultural trade reforms, despite the fact that the incentive structure of Indian agriculture was highly distorted; the sector was, and still is, burdened with excessive regulations on private trading and most market activities. The liberalization of agricultural trade policies in the mid-1990s, coming before incentive and market reforms in the domestic arena, created a series of imbalances. Lowered protection against a backdrop of low international prices increased agricultural imports in the late 1990s and led to an unprecedented accumulation of foodgrain stocks at home.

Reform Incentives before Opening Markets

China's experience with marketing reforms can be valuable for other economies transitioning from a centrally planned to a market system. Policymakers embarking on the reform path should first increase incentives for production and build the institutions needed to operate efficiently in a market economy before rushing to open up markets.

In a situation of food oversupply and liberalization of agricultural trade, farm support policies geared toward self-sufficiency lose their original rationale. In India minimum support prices and input subsidies, initially intended to encourage the adoption of new technologies and fuel agricultural growth, increasingly turned from incentives into inefficient and costly income-support interventions. It is clear that once support measures have completed their function, they need to be abolished. Otherwise they lead over time to inefficiencies and the crystallization of vested interests, resulting in the slowing of growth and poverty reduction.

China could learn from the experience of India and seek to encourage agricultural growth in the future while at the same time avoiding the large inefficient subsidies provided to its agricultural sector. This issue is of increasing relevance given the recent introduction of the direct transfer program to farmers and the emphasis placed by many scholars and government officials on increasing government support to agriculture and rural areas.

Although agricultural marketing reforms in India were limited, state governments were

reluctant to implement them and thus their impact was reduced. In addition, a host of outdated domestic regulations under the Essential Commodities Act of 1955 continue to weaken the environment for agribusiness and private sector involvement in agricultural marketing, which could boost employment and efficiency. Against the backdrop of rising and diversifying food demand and liberalized agricultural trade, reform of these regulations is increasingly critical, as it has a direct impact on the capacity of the sector to adjust to the changing context.

Given that smallholder agriculture is predominant in both countries, farmers could be excessively penalized because they do not possess sufficient capital and information to manage the risks inherent in agricultural activities. While China and India are reconsidering current forms of agricultural and input subsidies, they should put in place well-targeted and innovative, cost-effective crop insurance policies to protect vulnerable farmers from drastic supply and price shocks.

One other important area is the strengthening of the network of support services for small farmers related to information, credit, and extension. India seems to be better off than China in these areas, particularly with regard to the institutional infrastructure of rural credit and marketing, although the reach of its services may not be perfect. The Indian experience shows that smallholder agriculture needs strong institutional support in these areas to grow and prosper.

The Indian experience shows that smallholder agriculture needs strong institutional support . . . to grow and prosper.





In terms of trade liberalization, both countries made progress in reducing protection levels, but the weighted average tariff in India, at 29 percent, is almost double China's 16 percent. India has been able to sustain its current growth rate with lower inflows of foreign direct investment and a weaker export orientation than China. If India is to attain the target of 8 percent growth in GDP, it may do well to follow through with reforms to foreign direct investment in view of their potential to transfer know-how, managerial skills, and new technologies. China can offer valuable lessons in this regard.

The inevitable restructuring and adjustments involved in opening up agricultural trade flows will produce both winners and losers. Domestic producers of crops for which the country lacks a comparative advantage (such as edible oils in India and wheat and maize in China) are likely to suffer increasingly from falling prices induced by an increase in imports. In addition, broad-based structural adjustments in the economy may depress rural incomes and increase opportunities in the manufacturing and service sectors, located primarily in urban areas. These intersectoral adjustments are likely to result in a reduction in the size of the primary sector, which will release additional unskilled labor into the labor markets. The rural population will gain if it is able to shift to more profitable off-farm occupations. Investment in rural education will be crucial in increasing farmers' ability to move out of farming. It will also be important to increase investments in rural R&D and infrastructure in order to enhance productivity.

Membership in the World Trade Organization (WTO) can provide useful external pressure to improve efficiency and implement reforms, particularly for tradable inputs

such as seeds, fertilizers, farm machinery, and pesticides, where markets are regarded as inefficient because of either government intervention or lack of infrastructure. The implementation of the various agreements under the WTO can facilitate the role of the government in providing services related to information, marketing facilities, technical assistance, and laws and regulations related to standards and quality control. Lastly, the WTO offers an opportunity for China and India to join hands and create a third bloc of countries besides the European Union and the United States in trade negotiations.

Improve Health, Education, Infrastructure, and Land Use at an Early Stage

The initial conditions of health, education, and land use also made a difference in the performance of reforms in China and India. In 1970 life expectancy was 49 years in India and 62 years in China; illiteracy affected nearly 70 percent of the Indian rural population compared with 49 percent in rural China. These differences may be accounted for by the fact that under the collective system in China, the government provided free basic health care and education to the rural population. After the start of reforms, both countries recorded a slowdown in the advancement of health and education. In India this was primarily due to the fiscal discipline imposed by the macroeconomic crisis, whereas in China market-oriented reforms introduced the logic of profit into the management of social services. This implied progressive privatization of supply agencies, a decline in government subsidies, and an increase in education and health costs, leading to an increase in school dropouts and in the health vulnerability of the population. In devising mechanisms to address the risks involved in the increased privatization of social services, China could perhaps learn from India's long experience with a vast array of government safety nets and welfare programs targeting the rural population.

China had also made more progress on rural infrastructure than India. Chinese government investment in power grew at 27 percent a year from 1953 to 1978, and rural electricity consumption grew at a rate of 27 percent a year from 1953 to 1980, then slowed to 10 percent a year from 1980 to 1990. In India rural infrastructure did not receive as much attention, particularly in the rural power sector, and thus rural electrification and the establishment of telecommunications connections proceeded more slowly in Indian



villages. This slow pace severely affected the growth of agroprocessing and cold storage in the rural nonfarm sector. It is no wonder, therefore, that the levels of processing in Indian agriculture remain abysmally low.

In China the egalitarian access to land ensured by the land distribution and tenure system performed a crucial welfare function, providing the bulk of the rural population with access to a basic means of subsistence and limiting the number of landless. In India, on the other hand, land reforms to make the agrarian structure more equitable after independence were not as successful and left a relatively large number of landless agricultural laborers exposed to the negative consequences of unemployment and underemployment. Replicating the Chinese agrarian system does not seem politically feasible in India at this stage of development, so marginal and landless farmers will require a strong social protection system involving well-targeted social security and employment policies. Effective social protection measures will also be required in China, where land distribution is likely to become more skewed following the adoption of the new agricultural lease law that enables farmers to transfer lease rights and thus allows for the possibility of a higher concentration of land.

FURTHER REFORMS ARE NEEDED IN BOTH COUNTRIES

While both countries have made remarkable progress in terms of growth and poverty reduction, much remains to be done given the sizeable share of the population still living in poverty. The two countries are confronted with

the formidable challenges of accelerating growth, improving efficiency, and ensuring that growth is equitable and sustainable.

Focus on Public Investments That Can Boost Agricultural Productivity Efficiently

Given the key role of agriculture in poverty reduction and growth in China, public investments that boost agricultural productivity appear warranted. Significant increases in public investments seem unlikely because of budget pressures, so China and India will need to invest existing resources more efficiently. Studies have found that investments in agricultural research, education, and rural roads hold the greatest potential to promote agricultural growth and poverty reduction in both countries.

Farmers will have little potential to increase the amount of land they cultivate, so agricultural research and technology development is needed to help them increase agricultural growth by boosting their yields. Agricultural R&D takes place in both the public and the private sectors, but managing public versus private agricultural R&D can be tricky. In a bid to increase research funding, China promoted the development of the public business sector through commercialization of technologies by public research institutes. This approach often led, however, to the duplication of research with state-owned traditional research institutes. Improved intellectual property rights (IPR) regimes have stimulated private research and patenting activity in both countries. However, weak implementation of IPR in both countries and the high costs of maintaining patents in China are obstacles to the entry of new private players.

Significant opportunities for public-private partnerships can arise in the areas of funding, improving efficiency, and extension. The private sector, however, tends to favor



The availability of food surpluses provided the government [China] with enough leeway to feed the increasing population and relax controls over the foodgrain sector.

higher-value crops and concentrate in areas where agriculture is already advanced. Given the potential of agricultural research for poverty reduction in marginal regions, public research spending should focus on addressing the needs of poorer farmers in less-favored environments, such as India's semiarid tropics and rainfed areas and China's poor western regions.

Past government spending on irrigation, dominated by creation of large surface irrigation schemes, played an important role in promoting agricultural growth and poverty reduction, but today similar spending has smaller marginal returns, in terms of both growth and poverty reduction. It might be the case that investment in rainfed areas or traditionally lower-potential areas has higher returns today. Indeed, studies have shown that investments in rainfed areas of both countries have had high marginal returns for agricultural growth and poverty reduction. So major investments in harvesting rainwater through watersheds, through public-private partnerships, may help usher in a "multicolored revolution" (not just a "green" one) in agriculture. In both countries there is also vast scope for improving water use efficiency through institutional and management reforms of the existing water systems. India has had useful experiences with water user associations in some selected states, participatory watershed schemes, and community-based rain harvesting. But these successful experiments need to be scaled up to make a significant difference for agriculture growth and poverty reduction. In China providing irrigation system managers with incentives to improve user efficiency had a positive effect on crop yields, the groundwater table, and cereal production.

Providing the right incentives to farmers is crucial to promote water saving. Low water prices and profligate subsidies on power for operating tubewells encouraged wasteful use of water and depletion of groundwater resources. Ambiguous water use rights following decollectivization in China, and laws linking water rights to land ownership in India, also led to inefficiencies. For example, unfair water markets emerged over time, in which rich landholders who can afford modern water extraction technology profit by selling water to poorer cultivators. Increases in water use charges may not be feasible in the short to medium term, however, without changes in the institutional environment.

Another distinctive pattern among the two countries in the past two decades is the much higher savings rates in China (about 45 to 50 percent) than in India (about 25 to 30 percent). The high Chinese savings rates, which facilitated boosting investments, are a puzzle in international comparisons. They might have been stimulated by high expected returns, including from investments in education, a matter which warrants further research.

Promote Rural Diversification and Vertical Coordination

A major shift in farm production toward non-foodgrain products such as livestock, fish, and horticulture has been well under way in India and China since the 1980s. The experience of China shows that achievement of food self-sufficiency and the extraordinary growth in basic grain production experienced by the late 1970s was a necessary

precondition for diversification. The availability of food surpluses provided the government with enough leeway to feed the increasing population and relax controls over the foodgrain sector. Once food self-sufficiency was achieved, China gradually abandoned the policies biased in favor of rice and wheat, encouraging farmers to diversify production. In India, on the other hand, rising minimum support prices artificially boosted production of major cereals, discouraging diversification of production toward nongrain commodities. Moreover, policymakers must step up investment in research on and infrastructure for high-value products such as livestock and horticulture to boost yields and expand their cultivation and processing, given their export potential, positive impact on smallholders, and growing domestic demand.

Rising consumer demand for non-foodgrain products is a major force driving diversification. Without vertical coordination of production, processing, and marketing—that is, between “plow and plate”—the potential for growth inherent in the diversification process is likely to remain underexploited. Both countries must strengthen the innovative institutional arrangements that have emerged to promote the development of new products. India’s successful experience with contract farming in reducing risks, promoting the production and export of high-value foods, and increasing the income and employment of smallholders could be valuable for China. China’s experience with growth in retail food chains and supermarkets in recent years could benefit India, where restrictions on foreign investment and infrastructure bottlenecks are limiting development in these areas.

Another dimension of rural diversification is provided by the evolution of a vibrant rural nonfarm sector. China’s experience is instructive. The rapid growth of rural enterprises in China was a critical factor in the success of its reforms, especially in relation to poverty reduction. China’s township and village enterprises (TVEs) provided increasing job opportunities outside agriculture, thereby diversifying and expanding the sources of household income. TVEs benefited from the close connection with urban markets that had been established since the early stages of their development.

India’s nonfarm economy primarily produces for the rural population and markets and is dominated by tiny, family-operated units. These firms have low productivity because

of a poor technological base and policies aimed to protect rural employment by reserving certain activities for small-scale units. Limited growth of rural nonfarm job opportunities in India is also related to the lack of knowledge and skills on the part of the poorly educated rural labor force.

The role of nonfarm employment is expected to become increasingly significant in the context of smallholder agriculture as the average farm size gets smaller. Greater off-farm opportunities and migration to urban areas are required to increase average farm size as well as labor productivity and farmers’ income.

Use Well-Targeted Antipoverty Programs and Safety Nets to Help the Poorest

The role of safety nets in poverty alleviation came into focus during the 1990s as China and India recognized the need to address the negative effects of liberalization policies on income distribution. Poverty funds and programs have documented shortfalls and inefficiencies in terms of targeting and cost-effectiveness, but they have contributed significantly to limiting the severity and the extent of poverty. There are still more than 300 million rural poor in India and China, based on the international standard of one dollar a day (more than 100 million in China and more than 200 million in India).

Antipoverty programs can be more practical and agile instruments for tackling poverty in the short run than public investments or radical redistributive measures such as land reforms. Given the fiscal discipline imposed by macroeconomic stabilization reforms, however, it is crucial to address the shortcomings of antipoverty programs. The experience of India shows that using a variety of targeted programs directed to specific sections of the poor can help improve targeting compared with the broader income- or area-based approaches traditionally implemented in China.

Decentralized and participatory approaches are more effective at strengthening the impact of antipoverty programs than top-down strategies and involve a greater variety of agents (NGOs, civil society, and international aid) in the fight against poverty besides the government. In India the extensive participation of panchayats (forms of local government with heavy public participation) and civil society at various stages of formulating and

implementing antipoverty programs ensures that programs are tailored to local needs and can be carried out without extensive leakage.

Work to Make Governance Both Effective and Transparent

In both countries there was political will to carry out reforms, but in practice, outcomes have been shaped by the different patterns of governance. India is a "debating society" in which political differences are expressed freely, policymaking is exposed to pressure by various interest groups, and there are thus long debates before decisions are made. Subsequently, implementation is slowed by the lengthy bureaucratic procedures, set up to ensure checks and balances. This exercise, while compatible with the needs of a free and dynamic polity, considerably slows the pace of economic reforms. China, in contrast, is a "mobilizing society" in which decisions are made faster and state power is backed by mass mobilization. As a result, implementation of decisions is more effective, although the lack of extensive debate in China on major changes and reforms can also lead to disastrous courses of action, such as the "Great Leap Forward" in 1958, which resulted in massive famine, and the Cultural Revolution from 1966 to 1976. As the economic system opens up further and prosperity increases, it will become harder and harder to reconcile the centralized political setup with the more liberal economic system, and this is one of China's most important challenges today.

Although investments in rural infrastructure and other key public services are crucial, it is equally critical to develop suitable institutional arrangements for their delivery. In both countries the government is the major supplier of infrastructure services, but there are major failures and inefficiencies in provision owing to the lack of transparency and accountability. Strengthening the public institutions that provide public goods and services can lead to both fiscal sustainability (through significant cost reductions) and long-term growth (through improved quality of services provided). These goals can be achieved in different ways, including privatization, unbundling, decentralization, and contracting. Effective public institutions also require an adequate supply of trained and motivated personnel, as well as investments in training to help increase the supply.



Reforms have also been slowed at the implementation level by the regulatory environment and enforcement bureaucracy. In India, many inefficiencies remain in place, although reforms, including de-licensing, have been introduced to streamline the regulatory apparatus. During the reform years China relaxed regulations on mobility between rural and urban areas, which gave impetus to the development of the nonfarm sector and increased migration for economic purposes. In recent years the Chinese government has also started to relax the complex system of regulations affecting broad-based personal mobility.

Finally, with regard to the political systems, effective implementation of reforms in China was facilitated by a high level of centralization of decisionmaking, which minimized dissent. In the context of a democratic system and highly pluralist society such as India, consent is more difficult to achieve, and it is much more difficult to set clear objectives or timeframes for transition (such as for phasing out subsidies, reducing tariffs, or increasing prices). This situation slows the pace of change in the short and medium run. Although democracy and participation have intrinsic value and are not just instruments of development, the role of democracy in enhancing or hampering economic change and poverty reduction remains a complex subject for development research. Comparisons of China and India on these broad political matters may produce a fascinating set of insights in the coming years.



CONCLUSION

A number of factors help to explain the difference in growth during the pre-reform era: initial conditions, the sequencing and pace of reforms, and the political system, institutions, and regulatory environment. Yet special mention must be made of the fact that China and India achieved remarkable development and growth even as aid as a percentage of GDP in the two countries remained low. This is in direct contrast to most other developing countries and regions, where aid is much higher but commensurate development and poverty reduction outcomes have not been realized. This fact bears an important lesson for developing and developed countries, multilateral agencies, and local NGOs and groups. It questions the very basis of current policy prescriptions that accompany aid packages, not only raising issues related to the efficiency and effectiveness of external aid but also, conversely, revealing the extraordinary and often underestimated capacity of national initiatives and policy actions to halt—and in fact turn—the tide of poverty.

Both countries now face tremendous challenges on the path to further prosperity. Continued growth is a must, owing to pressure from population growth and the need for employment. It is also a condition for a more stable society. Given the high expectations of their citizens, the lack of growth or even slower growth could lead to



unrest in both countries. The limited natural resource base can be a critical constraint to growth. The future economic growth of both countries increasingly depends on imports of energy, for which future prospects are uncertain. Both countries are also among those most severely affected by water shortages. Consequently, future growth must be based on higher efficiency and will require China and India to invest in science and new technologies to harness energy and water, optimize their economic structures for allocative efficiency, and reform their fiscal, financial, banking, and insurance systems. Both countries must also pursue more pro-poor growth, which is not only a development objective in itself, but also a precondition for future growth in the long term.

China and India can both gain tremendously by learning from each other, as both nations still face a long road ahead. The dragon has attained height and the elephant is starting to gather momentum, but both need to address their weaknesses and build on their strengths in order to achieve their national goals and fulfill the aspirations of their people. The lessons learned from the experiences of China and India are also of relevance to other developing countries and the fight against global hunger and poverty.

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REDUCING POVERTY AND HUNGER IN INDIA

THE ROLE OF AGRICULTURE

Montek S. Ahluwalia

India's strategy for reducing poverty and hunger has always placed a great deal of importance on the agricultural sector, reflecting the fact that 70 percent of the population lives in rural areas and the overwhelming majority of them depend upon agriculture as their primary source of income. The focus of attention has of course changed over time.

EARLY FOCUS ON FOOD SELF-SUFFICIENCY

In the 1960s India was deficient in foodgrain production and dependent on imports of wheat, financed by PL 480 assistance from the United States. Understandably, the focus of Indian policy in this period was to increase foodgrain production with a view to ensuring food security. This objective was successfully achieved by the spread of the Green Revolution in the 1970s, beginning with wheat and then expanding to rice. This achievement must count as one of the major success stories in development, considering that influential groups such as the Club of Rome, in the early 1970s, had despaired of India's being able to feed its growing population.

AGRICULTURAL GROWTH FOR POVERTY ALLEVIATION

In the 1980s Indian policymakers shifted their focus from food self-sufficiency to generating additional income in rural areas as a means of tackling the problem of poverty, which was concentrated in rural areas. Acceleration of agricultural growth, with a special focus on improving the position of small farmers and extending the productivity revolution to non-irrigated areas, was seen as a critical part of the strategy for poverty alleviation. This effort was supplemented with targeted antipoverty programs to address the needs of vulnerable groups who

may not benefit sufficiently from general agricultural growth. India achieved considerable success with this approach in the 1980s. Growth of agricultural gross domestic product (GDP) accelerated to about 4.7 percent in the 1980s, compared with only 1.4 percent in the 1970s. This agricultural growth, together with the beginning of economic reforms in the nonagricultural sector, pushed up the growth rate of overall GDP to around 5.8 percent in the period 1980–81 to 1989–90 compared with about 3 percent in the 1970s.

India's growth was disrupted at the start of the 1990s by a major balance of payments crisis that led to the adoption of an extensive process of structural reforms. It took time to regain momentum, and it was only in 1993–94 that the economy got back on track, clocking an average growth rate of 6.8 percent in the three years 1993–94 to 1995–96. This acceleration in growth in the postreform period led policymakers to set a more ambitious GDP growth target of 8 percent a year for the Ninth Plan period (1997–98 to 2001–2002), to be supported by a growth rate of 4 percent a year in agriculture. The projected growth of 4 percent per year in agriculture was clearly in line with the average growth of 3.8 percent achieved in the period 1990–91 to 1996–97.

Actual performance since the mid-1990s, however, has been disappointing. Agricultural growth slowed to 2 percent a year in the Ninth Plan period, and overall economic growth was only 5.5 percent, well below the 8 percent target. Since agriculture accounted for about 25 percent of GDP, the shortfall of more than 2 percentage points in agricultural GDP growth, compared with the target, accounts directly for a shortfall of about half a percentage point in GDP growth. If the indirect effects of more rapid agricultural growth on other sectors are taken into account, the total impact on GDP growth may have been as much as one percentage point.



These shortfalls were known when the Tenth Plan (covering the period 2002–03 to 2006–07) was formulated, but it was assumed that the poor performance of agriculture was due to temporary factors such as poor monsoons and depressed agricultural commodity prices in world markets following the East Asian meltdown. The Tenth Plan therefore adopted the same targets of 8 percent growth in GDP and 4 percent growth in agriculture. Experience in the first three years of the Tenth Plan period has sounded some alarm bells. GDP growth has averaged about 6.5 percent, but agricultural GDP in these years (2002–03 to 2004–05) has grown by only 1.1 percent per year. The loss of dynamism in agriculture explains most of the shortfall in aggregate GDP growth.

Slower growth in agriculture also has direct implications for poverty reduction in rural areas. Official figures suggest that the incidence of poverty fell from 36 percent in 1993–94 to 26 percent in 1999–2000. The comparability of these numbers has been questioned because of recent changes (ostensibly improvements) in the methods for measuring consumption in household surveys, but there is a broad consensus that if corrections are made to ensure comparability, the percentage of the population in poverty has declined significantly, though less than in the official figures. Even the official figures, however, show a smaller decline than what had been

targeted, and this result is undoubtedly a reflection of the slowdown in agricultural growth.

Slow growth in agriculture is also at the root of growing evidence of distress in the farming community. Surveys show that a large percentage of farmers want to leave farming because they find it is no longer sufficiently profitable. The uncertainty associated with farming has also increased, and farmers lack effective means of insuring against such risks. There are larger market uncertainties associated with new crops and poultry because of greater vulnerability owing to falling groundwater levels. There is also evidence of increased indebtedness arising from the inability to cope with risks.

Recognizing these problems, the government has undertaken a comprehensive review of the strategy for agriculture in order to come up with a new deal for agriculture and the rural economy in general. Remedial action will be needed on several fronts, including increased public investment in irrigation and rural roads, better management of existing irrigation systems and of water resources in dryland areas, a strengthened agricultural research system and more effective extension, improvements in the production and distribution of certified seeds, improvements in the credit delivery system, and innovative steps in marketing and contract farming to support the diversification of Indian agriculture.



IRRIGATION

Water is a critical constraint to raising agricultural productivity, and much of the success of the Green Revolution came from improved productivity in areas of assured irrigation provided through canals or, much more significant, through groundwater utilization. The scope for expanding irrigation through large and medium-scale projects has yet to be fully exploited. Out of the total of 59 million hectares that could be irrigated through such projects, only 40 million hectares have been irrigated. The slow pace of exploitation of irrigation potential is due to lack of resources in state governments and the tendency to spread available resources thinly over too many projects. Additional public investments in this area are therefore essential for early utilization of the potential.

Effective maintenance of the existing system of canal irrigation also suffers because the irrigation departments of the states lack resources. This in turn is because water charges are kept too low, covering only 20–25 percent of the operations and maintenance cost of the system in most states. Poor maintenance leads to loss of water through seepage, with the result that water use efficiency is very low—around 25 to 40 percent instead of the 65 percent that should be attainable. Low water

charges also encourage highly water-intensive crops at the upper end of the canal network, leaving tail-end portions starved of water.

The solution lies in rationalization of water rates to ensure adequate financial resources to cover maintenance and use of participatory irrigation management to give farmers a stake in the operation and maintenance of the system. Some interesting experiments in these areas have promise. Maharashtra recently established a Water Regulatory Authority to set water charges in a nonpolitical manner. Several states are also experimenting with involving water user associations (WUAs) in the operation of the canal systems. Ideally the WUAs should be empowered to collect water charges and to retain part of the collection to maintain the portion of the distribution network operating in their area.

Groundwater utilization played a major role in expanding irrigation in the 1980s, but uncontrolled exploitation of groundwater has led to serious depletion of the water table in many parts of the country. Overexploitation is encouraged by the policy of massive underpricing of electricity for agricultural use, with a few states having made electricity for farmers completely free. Even where it is not free, the charge for electricity is a fraction of the

average cost and is not based on metered use. Instead there is a fixed charge for presumed usage based on the capacity of the pump, an arrangement that implies that the marginal cost of electricity for pumping groundwater is zero. Underpriced canal water and electricity are clearly highly distortionary, given the need to conserve water use. They are also distributionally unfair because the benefits of underpriced water accrue disproportionately to upper-end farmers, whereas underpriced power enables those able to afford larger pumps to lower the water table, denying water to farmers who can only afford shallow wells.

The investment requirements of irrigation are massive. Completion of all unfinished projects alone is estimated to cost approximately US\$20 billion. In addition, provision must be made for new irrigation projects (large, medium, and small), which together will require about US\$45 billion. The total requirement is therefore about US\$65 billion.

WATER MANAGEMENT IN RAINFED AREAS

About 60 percent of India's cultivable area will remain dependent on dryland farming even after all irrigation potential is fully exploited. Productivity growth in these areas is obviously essential for rural income growth and poverty alleviation, and it depends critically upon better moisture conservation and the development of varieties suited to dealing with moisture stress. Schemes for water retention, moisture conservation, and groundwater recharge have been implemented for many years in India but with mixed results.

Experience suggests some pointers for the future. Greater use of technology inputs can help a great deal. Satellite mapping by the Indian Space Research Organisation has been particularly helpful in planning watershed management schemes to achieve optimal results. It is also important to adopt a holistic approach. For example, if deforestation problems upstream are not tackled, water retention structures downstream will quickly silt up. Community participation is critical to impart ownership and ensure an acceptable distributional outcome. In the past these multiple factors were not effectively integrated into watershed development schemes. Now a National Rainfed Area Authority has been proposed to help coordinate the work of different implementing agencies.

The cost of treating rainfed areas to ensure optimum use of available water is approximately Rs. 10,000 per hectare, and the untreated area is about 80 million hectares, yielding a total cost of approximately US\$20 billion. If this amount is added to the cost of irrigation development and the target is to be achieved over a 10-year period, it would require a doubling of public investment in irrigation.

OTHER INPUTS

Increasing agricultural productivity also depends on the efficient delivery of several other inputs. The quality of seeds and planting material needs to be greatly improved, and this calls for strengthening the research effort to make it more effective. Two expert committees have recently reported on how to restructure the agricultural research system to make it more results oriented, and their recommendations are under consideration. The system for producing and marketing certified seeds of existing varieties at reasonable prices also needs to be improved. Seed replacement rates in most parts of the country are only one-third to one-half of what they should be, a situation that reflects partly a lack of knowledge of the importance of seed replacement and partly a lack of availability of reliable seeds.

There is evidence that the use of fertilizers is at present highly imbalanced, suggesting that scientific application of fertilizers holds potential for raising productivity. Nitrogen fertilizers are oversubsidized compared with phosphorus and potassium fertilizer. The structure of fertilizer subsidies should be rationalized to avoid excessive and wasteful use of nitrogen fertilizers. Lack of knowledge of micronutrient deficiency in the soil is also a serious problem. There is need for much more extensive soil testing to encourage balanced application of nutrients. Underlying these problems is the deterioration of the extension services, which makes it difficult to disseminate best farming practices. Strengthening the extension system therefore needs special attention.

The government has also identified credit to farmers as a critical area for corrective action. The public sector commercial banks are being pushed to provide credit to agriculture and have responded commendably. The cooperative credit system, however, which was meant to be the backbone of agricultural credit, has become financially weak. Part of the problem has been the politicization of cooperative institutions as a consequence

of interference by state governments. The central government is considering ways of reviving the cooperative credit system by recapitalizing the cooperative banks, provided state governments agree to changes in the system of governance that would ensure professional management of cooperative banks without state government interference.

AGRICULTURAL DIVERSIFICATION

India's future agricultural strategy must also be oriented to the need for agricultural diversification. India's foodgrain production capacity has increased significantly over the years, and there is evidence that household consumption patterns are changing away from foodgrain toward higher-value crops such as vegetables, fruits, milk, and eggs. Future growth in agriculture must come from diversification into these non-foodgrain areas, and this will pose a special challenge because marketing these perishable products is much more complicated than marketing foodgrains.

Horticulture development is currently constrained by poor marketing arrangements. The gap between prices received by the farmers and those paid by urban consumers is large, reflecting inefficient marketing arrangements. Horticultural produce is typically collected from farmers by market agents, who sell it in organized markets established under the Agricultural Produce Marketing Acts. Unfortunately, these markets are controlled by a few traders and operate on a highly nontransparent basis. Facilities for grading and handling are poor, and methods of price discovery in the markets are not transparent. Wastage is high owing to poor



logistics and the absence of cold chains. The net result is much lower realization of income by the farmer.

It is necessary to amend outdated laws restricting the establishment of markets to allow cooperatives and private entrepreneurs to set up modern markets with grading facilities, cold storage, and transparent auction procedures. Half a dozen states have already amended their existing laws on agricultural marketing to allow such markets to be established, and a dozen others are in the process of doing so. These changes are being resisted by those who control the existing structure, but this opposition will weaken over time.

Contract farming is another innovation that has been introduced in many states and could accelerate diversification. India's laws on agricultural land do not allow corporate bodies to purchase land and operate large-scale farms—a national policy to prevent displacement of a large number of small farmers—but corporate buyers, who know what is needed in export markets, in high-end domestic markets, or in agroprocessing, can engage in contract farming to procure high-quality produce. Buyers select areas suitable for the crops they are interested in and organize farmers to produce these crops under contract, while providing planting material of the right quality as well as technical supervision. The process enables the farmer to eliminate marketing risk while allowing the corporate buyer to ensure quality supplies by selecting planting material and providing access to scientific advice on disease and other types of stress.

The development of agroprocessing will spur agricultural diversification, and the government is paying special attention to this area. At present, the proportion of India's agricultural output that is processed is very small compared with that in most developing countries, and the demand for processed food is bound to increase as incomes rise. There are several obstacles to the more rapid development of food processing. Taxation structures often discriminate against food processing because processed food is the first stage at which indirect taxes are applied, and the absence of a tax rebate on taxes paid on inputs means the effective tax on value added is very high. Another impediment is the reservation of certain categories of products for small-scale production. The absence of a modern food-processing law has meant that this sector is



governed by multiple laws, making it difficult to operate effectively. An Integrated Food Processing Law has been introduced in Parliament, and its passage, expected in the current year, will make a qualitative difference to the operating environment.

TARGETED ANTIPOVERTY PROGRAMS

Although efforts to increase agricultural productivity and thereby increase farm incomes and employment are a major instrument for poverty alleviation, they will need to be supplemented by special targeted programs aimed at improving the welfare of vulnerable groups in rural areas. Employment programs in rural areas have been the most important of these antipoverty programs, and India has a long history of such programs. Building on this tradition, a Rural Employment Guarantee Act has been enacted that provides assurance of up to 100 days of employment at the minimum wage to each household in rural areas wishing to make use of it. The employment would be provided on projects chosen by the elected village councils, and the guidelines specify that top priority should be given to irrigation and water management schemes. Unlike earlier employment programs, this scheme includes a guarantee in the sense that if employment cannot be provided, unemployment compensation of at least 25 percent of the wage will be provided. Although the program is open to each household, actual demand for employment is expected to be limited to households below the poverty line. The act

will initially be implemented to cover 200 of the most backward districts (about one-third of the total districts in the country). Together with other special programs relating to provision of housing for the poor, old-age insurance, and schemes for supporting self-employment, this program will provide an element of social security that should help to reduce poverty.

THE ROLE OF PUBLIC INVESTMENT

An important implication of the new agricultural strategy is that it involves a substantial increase in public investment. This is an area where past trends need to be reversed. Public investment in agriculture began to decline in the 1980s, but initially the decline was offset by the fact that private investment in agriculture was increasing. Since the mid-1990s, private investment in agriculture has stagnated while public investment has continued to decline. It is essential to reverse these trends, especially for public investment in irrigation and water resource management. It is also essential to increase public investment in rural roads and rural electrification. Success in these areas will stimulate private investment and contribute to a revival of growth momentum in agriculture.

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THE ACHIEVEMENTS AND EXPERIENCES OF POVERTY ALLEVIATION IN RURAL CHINA

Jian Liu

 China is the most populous developing country, with most of its impoverished population concentrated in the rural areas for historical reasons. Since 1978 the Chinese government has moved away from a planned economy and pushed socialist market reforms, as well as liberalizing the rural economy, raising rural productivity, and alleviating widespread poverty through the household responsibility system. Furthermore, in the mid-1980s the Chinese government started a systematic, large-scale poverty reduction and development effort. As a result of this 26-year effort, the number of impoverished people without enough food and clothing declined from 250 million in 1978 to 26.1 million in 2004, with the share of the population living in poverty falling from 30 percent to 2.8 percent. China has achieved the first Millennium Development Goal (MDG) of halving poverty ahead of schedule. At the same time, conditions for economic activity as well as living conditions in poverty-stricken areas have greatly improved. By 2004 the shares of villages with access to roads, electricity, and television reached 77.6 percent, 95.1 percent, and 87.8 percent, respectively, in 592 key counties of the state's helping-the-poor development program.

In its pursuit of poverty alleviation and development, China has charted its own path, suitable for its own conditions. This path involves government leadership, social participation, self-reliance, an orientation toward economic development, and an integrated development approach.

GOVERNMENT LEADERSHIP

For the Chinese government, the policy of supporting impoverished groups and achieving wealth for all is an unswerving tenet. In order to keep economic development healthy, stable, and sustainable and prevent impoverished people from being marginalized, the Chinese government

has adhered to a concept of rapid economic development that is human oriented. Its guidelines call for an integration of urban and rural development, integration of regional development, integration of economic and social development, integration of development between human beings and nature, and integration of domestic development and openness to the outside world. Meanwhile, governments at different levels have not only incorporated poverty alleviation and development into their overall economic and social strategies, but also increased budgetary allocations for poverty alleviation. They have established supporting policies and enhanced the corresponding organization and leadership to fulfill the helping-the-poor program.

Specifically, the Chinese government took the following actions: First, it set up the Leading Group Office of Poverty Alleviation and Development with a hierarchical structure at the national, provincial, prefecture, and county government levels. These offices are responsible for organizing and coordinating national and local poverty alleviation and development. At the same time, China established an administrative system that holds the authority, responsibility, and funds for poverty alleviation at the provincial level.

Second, we brought poverty alleviation and development into the overall economic and social strategies of government at different levels. We issued successively the National 8-7 Poverty Alleviation Program and the Outline of Poverty Alleviation of Rural China. We also identified 592 poverty alleviation counties as key areas for state help.

Third, we increased investment in poverty alleviation and strengthened the management of budgetary poverty funds. Between 1986 and 2004, the total budget support allocated reached 112.6 billion yuan, and subsidized loans reached 162 billion yuan. In 2005 the



budgetary support for poverty alleviation totals 13 billion yuan. To ensure that budgetary poverty funds reach the designated impoverished farmers, the use of funds is to be proclaimed, published, or reimbursed, adding transparency and public supervision.

Fourth, we implemented supporting policies. This year the 592 key state-helped counties exempted from agricultural tax are being compensated with a special transfer of 14 billion yuan. In addition, central finance has appropriated a total transfer of 15 billion yuan to grain-producing counties or counties with financial difficulties.

SOCIAL PARTICIPATION

China has taken a number of steps to mobilize and organize people in all walks of life, including in the eastern coastal provinces and in multilevel party and government organs, to join the development and construction effort in poverty-stricken regions, in an approach that reflects the socialist system.

It has organized 15 eastern provinces and cities directly under the state to support development in 11 corresponding poverty-stricken provinces, districts, and cities in western regions. It has organized 116 central

party and government organs and 156 large state firms to help and support 481 key targeted counties. And it has organized all social sectors to participate in the process of poverty alleviation. For example, the Glorious Enterprise program encourages private firms to invest in impoverished areas. The Hope Project organized by the Communist Youth League Central Committee sponsors children in poor households to help them finish compulsory education. The Knowledge-oriented Poverty Alleviation Program organized by democratic parties utilizes their own advantages to help poor regions extend practical technologies. The Happiness Project organized by the Chinese Population Foundation sponsors poor mothers, and the Women-oriented Poverty Alleviation program organized by the Women's Federation aims to increase women's income.

SELF-RELIANCE

China's approach is to support poor people and encourage them, with assistance from government and all walks of life, to overcome the common attitude of "wait, depend on, and ask" and establish a spirit of self-reliance and hard work. They can help improve their basic production and living conditions and overcome their poverty through their own efforts. The emphasis is on respecting impoverished people and stimulating their



initiative to participate in designing and implementing the poverty alleviation plan.

AN ORIENTATION TOWARD ECONOMIC DEVELOPMENT

We have mobilized and organized poor people to develop the economy, increase their income, improve their ability to save, and develop their capabilities. We have emphasized the following three key tasks in recent years: First, we push the whole village toward poverty alleviation and development. We picked 148,000 poor villages across the country, covering 80 percent of impoverished people. Each year, we focus on improving production and living conditions in a batch of key villages. In five years, by 2010, we will fundamentally change the impoverished appearance of those villages.

Second, we are enhancing worker training in poor areas to encourage nonagricultural employment. We have begun a special worker training plan for impoverished peasant households, in which at least one worker in each impoverished household will receive training during the next five years. The State Council Leading Group Office of Poverty

Alleviation and Development certified 30 state-level training bases to facilitate labor transfer from agricultural to nonagricultural sectors. Each province (district and city) is doing the same, which generates a top-down training network. More than 90 percent of peasants trained so far have found nonagricultural employment.

Third, we are supporting the efforts of leading industrialized enterprises to engage in poverty reduction by promoting agricultural structural adjustment, moving from staple foods to high-value crops in poor areas and thereby increasing peasants' income. The State Council Leading Group Office of Poverty Alleviation and Development certified 260 leading industrialized enterprises to participate in poverty reduction, covering 3 million impoverished households and 12 million poor people.

AN INTEGRATED DEVELOPMENT APPROACH

Our goal is to reduce and control poverty from various angles and to integrate poverty alleviation with development in science, education, health, and culture to improve the overall capabilities of impoverished people.



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To promote education in the western regions, we are implementing the National Poor Regions Compulsory Education Project and Two Basic Plans (to universalize nine-year compulsory education and to eradicate illiteracy among middle-aged and young people). Central finance has also appropriated a special fund to support compulsory education, rebuild and expand rural junior high schools, and subsidize the pay of teachers and administrative staff in poverty-stricken regions. We offer free textbooks and waive general expenses completely, as well as subsidizing living allowances for boarding students, for about 16 million rural primary and junior secondary school students from poor households in 592 key counties.

In the area of health care, we administer a medical relief system for impoverished peasant households coping with severe illness and for peasants in rural villages as part of the "five guarantees"; that is, old, weak, orphaned, widowed, ill, or handicapped people in rural villages are beneficiaries of guaranteed food, clothing, housing, medical care, and burial expenses. At the same time we are launching a pilot project for a new rural cooperative medical system.

In population and family planning, we encourage poor peasant households to decrease their births and increase their income quickly.

In developing the poverty reduction program, we especially target impoverished groups and keep full-scale files on poor households. Some provinces have started to manage files with computers. Although targeting is a difficult job, we will continue our efforts and treat it as one of our basic projects. To administer such dispersed grant funds for poverty reduction, we have adopted the principles of comprehensive planning, individual responsibility, ordered channels, and separate achievement. Our focus is on mobilizing and concentrating the forces of different sectors to participate in poverty alleviation and development and on developing projects to address the different causes of poverty, and this approach has achieved excellent results.

Although China has made enormous progress in poverty alleviation and development, it still faces many problems. To address these problems, the Chinese government will increase support for poverty-stricken regions and impoverished people and continually improve the mechanisms of poverty alleviation according to its pace of economic and social development. It will also pay attention to needy groups that emerge from economic structural adjustment and will promote the capacity for sustainable development among poor people and regions through investments in infrastructure and human capital.

Jian Liu is director of the State Council Leading Group Office of Poverty Alleviation and Development of China.

Overview: The International Food Policy Research Institute



The numbers are no doubt familiar: More than 800 million people worldwide are malnourished. More than 1 billion subsist on less than a dollar a day. Through the Millennium Development Goals, the international community has made an explicit commitment to halving the share of people living in poverty and hunger by 2015. Yet success in achieving these goals is by no means assured, and even if the goals are met, half of the world's poor and hungry would remain.

How can we accelerate progress in reducing hunger and poverty? Part of the solution will have to lie in better policies in both developing and developed countries—policies that will promote rather than impede sustainable food and nutrition security and poverty reduction. This is where IFPRI comes in. For 30 years IFPRI has studied policy options for meeting the world's food needs in a

sustainable manner, applying careful policy analysis to a variety of issues affecting food and agriculture in developing countries. Through its outreach efforts, it has conveyed its research findings to policymakers, advisers, donors, opinion leaders, researchers, and media that influence national and international decisionmaking. And through its capacity-strengthening activities, it has enhanced the ability of developing countries to carry out their own policy research and analysis.

In 2004–05 IFPRI conducted research and outreach concerning a wide range of topics, including sustainable intensification of agricultural production, access to food for the poor, improved nutrition, strengthened agricultural markets and trade, sound development strategy and governance, and effective agricultural science and technology policy. At the same time, IFPRI updated its strategy for pursuing future research and outreach,

IFPRI'S MISSION

IFPRI's mission is to provide policy solutions that cut hunger and malnutrition. This mission flows from the mission of the Consultative Group on International Agricultural Research (CGIAR): "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 policies are essential to achieving sustainable food security and nutritional improvement. Second, research and dissemination of its results are critical inputs into the process of raising the quality of food policy debate and formulating sound and appropriate policies.

deepened its presence in South Asia, intensified its focus on Africa, continued to decentralize its operations, and expanded its capacity-strengthening efforts.

This overview gives an introduction to IFPRI's research activities and organizational changes during 2004 and part of 2005. The rest of this report expands on the information highlighted here.

STRATEGIC DIRECTION

Although IFPRI's mission remains constant, its strategy for pursuing this mission changes in response to changing circumstances. Recently, significant changes have taken place at IFPRI, in the CGIAR system, and in the larger global community. Globally, there is a heightened emphasis on the Millennium Development Goals (MDGs), a greater focus on capacity strengthening, and a strong recognition that there is no one-size-fits-all development strategy. Restructuring in the CGIAR and at IFPRI has resulted in the integration into IFPRI of a new division, the International Service for National Agricultural Research (ISNAR). In response to these new realities, IFPRI updated its strategy in spring 2005.

To set its strategic priorities, IFPRI used four criteria: (1) the work program must conform to IFPRI's mission to provide policy solutions that reduce hunger and malnutrition; (2) research and outreach should address emerg-



ing issues that most directly affect food security, nutrition, and poverty; (3) research, capacity-strengthening, and policy communications activities should contribute toward producing international public goods; and (4) stakeholders and partners should be consulted to identify food policy research that all parties believe will help develop policies to reduce hunger and malnutrition. Research and outreach activities had to meet all four criteria to be included on IFPRI's agenda.

IFPRI's strategy now contains 15 partly interlinked strategic themes for the next decade, grouped into three overarching research priorities: improving global food system functioning, global and national food system governance, and food system innovations. Over the coming decade IFPRI will expand its research on development strategy and governance and pursue a new research theme on knowledge systems and innovation. The updated strategy also reflects an increased commitment to policy communication and capacity strengthening.

The institute's work in pursuit of this strategy is organized in six research and outreach divisions and one initiative.

IFPRI's Development Strategy and Governance Division (DSGD), created in 2003, seeks to play a useful supporting role in the current policy environment by helping to iden-



tify the preconditions for successful pro-poor growth, developing practical frameworks and methods for strategic analysis, and strengthening the capacity of some developing countries to formulate and implement national strategies. To help outline development strategy options for different types of countries, DSGD engages in cross-country analysis, country case studies, and research on cross-cutting issues like public investment and governance. It is also taking the lead in developing Strategic Analysis and Knowledge Support Systems (SAKSS), intended to help developing countries build up analytical tools and databases for understanding and choosing among investment, governance, and policy reform options. To maintain close relations and interactive dialogue with policymakers and donors in selected countries and regions, a large share of the staff of DSGD is posted in the field. Peter Hazell was the director of DSGD until August 2005, when Shenggen Fan became director of the division.

The majority of the world's hungry people depend heavily on agriculture for their food and livelihoods, but the natural resource base that supports agriculture is often fragile. To achieve agricultural growth that is sustainable, developing countries need technologies to improve yields, strategies for sound management of natural resources, and institutions and policies that create opportunities for the poor. IFPRI's Environment and Production Technology Division (EPTD) identifies policies and builds both national

and local capacity to support agricultural production and conserve natural resources. EPTD leads IFPRI's research in the areas of global food projections and scenarios, natural resource management, and support for the development of food- and nutrition-related science and technology policy. The division is a partner in a consortium called the Program for Biosafety Systems (PBS), which seeks to increase countries' ability to make biosafety decisions based on science and to improve the understanding and safe use of biotechnology to support farmer welfare. The director of EPTD is Mark Rosegrant.

Producing plentiful, high-quality food in a sustainable fashion is the vital first step toward food and nutrition security. But production is not enough to attain optimum nutrition for all. All people must have access to the right quantity and quality of foods, and to foods that are safe and culturally acceptable. The Food Consumption and Nutrition Division (FCND) takes the lead at IFPRI in research to reduce household poverty and ensure food and nutrition security among the world's poor. Research within FCND explores far-reaching questions, including: How can programs and policies best help families rise out of poverty and achieve food and nutrition security? With overnutrition and obesity on the rise in developing countries where millions still go hungry, how can policies and programs



encourage healthy diets and facilitate a transition from hunger to health? And how might food and nutrition policies and programs help prevent the spread of HIV/AIDS and mitigate its impacts? Marie Ruel directs the division.

How can developing countries best promote innovations to eliminate hunger and poverty and organize research so that it can be an effective means of supporting such innovation? IFPRI's ISNAR Division embraces a broad perspective on food and agricultural innovation systems by emphasizing the roles of and relationships among diverse actors engaged in generating and using new and existing 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 ISNAR Division conducts research and outreach activities on agricultural science and technology policy, institutional change and innovation systems, organization and management of agricultural research, and capacity strengthening and learning. The director of the division is Wilberforce Kisamba-Mugerwa.

Inadequate policies, institutions, and rural infrastructure lead to agricultural markets that do not function efficiently. As a consequence, the poor pay more for their food and receive less for their produce. Moreover, countries moving from a subsistence or centrally controlled economy to a commercial market-oriented economy face a difficult period of transition. This transition is typically accompanied by changes in product mix, sources of income, the structure of employment, and the productivity of labor. The prospects for reducing rural poverty, assuring food security, and improving rural livelihoods depend on how governments manage this change. To enhance the efficiency of markets, and support their

development, the Markets, Trade, and Institutions Division (MTID) analyzes agricultural market reforms, crop and income diversification, postharvest activity, and agroindustry. Its researchers seek to understand how countries can best develop markets, institutions, and infrastructure in ways that contribute to agricultural growth, help alleviate poverty, and ensure food security for all. The division director of MTID is Ashok Gulati.

IFPRI's Communications Division aims to enhance the impact of IFPRI's research work. It provides information for policymaking, strengthens the capacity of developing countries to conduct food policy research, promotes information exchange between IFPRI and those involved with policymaking, and facilitates the implementation of food policies. The division also provides media and advocacy groups with science-based material on important food policy issues. It accomplishes these tasks by disseminating information through publications, public awareness activities, meetings, and dialogues. In close cooperation with the research divisions, the Communications Division supports training and capacity-building activities and provides communications and media training for food policy analysts, advisers, and researchers. The Communications Division also conducts research that is closely connected with collaborative training and capacity-strengthening activities. The division is under the leadership of Klaus von Grebmer.

The 2020 Vision Initiative, headed by Rajul Pandya-Lorch, has two primary objectives. First, it seeks to develop and promote a consensus for action for meeting food needs while reducing poverty and protecting the environment. Second, it aims to generate information and debate that will lead to action by national governments, nongovernmental organizations (NGOs), the private sector, international development institutions, and



other elements of civil society. To realize its objectives, the 2020 Initiative engages in four major activities: (1) generating timely, state-of-the-art information on key topics related to food, agriculture, and the environment; (2) raising public awareness of the world's food and environmental problems and what can be done to solve them; (3) providing fora for dialogue, debate, information sharing, and consensus building among policymakers, researchers, and leaders in NGOs, the private sector, and the media; and (4) undertaking pilot activities in research, policy communications, and capacity strengthening to support IFPRI's long-term strategy.

Finally, IFPRI benefited from an External Program Management Review in 2004–05. A review panel of outside experts spent hundreds of hours learning about all facets of IFPRI's research and operations. Their February 2005 final report praised IFPRI's performance and impact, noting that IFPRI has produced a great deal of highly relevant research and earned a strong reputation among its peers and partners. The report also offered several suggestions for strengthening IFPRI's priority setting and programs, and IFPRI staff are now following up on them.

HEIGHTENED ATTENTION TO AFRICA

Africa has climbed onto the development policy agenda, with new initiatives gaining momentum both inside and outside the continent. The African Union and the New Partnership for Africa's Development (NEPAD) exemplify the new commitment to change emerging at the highest political levels in Africa. Internationally, the Group of Eight industrialized-country governments focused on Africa at the 2003 and 2005 summits, and donor

institutions are also devoting more resources to the continent. Given that Africa is the only region of the world where the share of people who are malnourished has been rising rather than falling, IFPRI is also increasing its attention to this region.

In April 2004 IFPRI facilitated an African-driven conference, "Assuring Food and Nutrition Security in Africa by 2020: Prioritizing Actions, Strengthening Actors, and Facilitating Partnerships." The conference, which gathered more than 500 participants from across the continent—including three heads of state—focused on how to bring about change and action to reduce hunger and malnutrition in Africa. It culminated with the development of a framework pointing the way toward a food- and nutrition-secure continent.

In the wake of the conference, acknowledging the need for a coherent program of research in Africa, IFPRI identified high-priority areas for food policy research in Africa. The institute has also launched a number of research programs on country strategies that provide international public goods knowledge. And IFPRI facilitates a regional food policy network for East Africa, provides Africa-wide research support for NEPAD, and cooperates with partners in the region and with CGIAR centers for coherent and complementary food policy research. IFPRI's presence in Africa is greater than ever, with its newest division, ISNAR, housed in Addis Ababa, Ethiopia. It has also posted a staff member at the NEPAD Secretariat in Pretoria, South Africa. It is IFPRI's hope that these efforts, in combination with the actions taken by other African and non-African institutions and individuals, will set Africa squarely on a path to food and nutrition security for all of its people.



A DEEPENED PRESENCE IN SOUTH ASIA

IFPRI has intensified its research and outreach aimed at addressing poverty and hunger in South Asia, which is home to 39 percent of the world's poor who earn less than a dollar a day. As part of this effort, IFPRI inaugurated an office in New Delhi in March 2005. IFPRI's New Delhi office will have representation from all of the institute's research divisions. Besides strengthening IFPRI's ability to conduct research in South Asia, the institute's South Asia Initiative and office will promote communication and mutual learning among researchers and policymakers in the countries of the region. This office also contributes to IFPRI's larger goal of enhancing its presence in the field, where policy research is needed and where feedback on such research is readily available. The March 7 ceremony marking the opening of the New Delhi office drew hundreds of guests, including His Excellency Manmohan Singh, the prime minister of India, who spoke at the event. The opening of the South Asia office kicked off a full week of activities in the region, including the annual meeting of IFPRI's Board of Trustees in New Delhi and Rajasthan. In addition, IFPRI and other local cosponsoring organizations held a number of meetings and seminars on high-value agriculture and vertical integration, policy research and capacity strengthening in South Asia, biotechnology, food policy in Bangladesh, and poverty in Pakistan.

Altogether, the IFPRI seminars and workshops held in South Asia drew several hundred participants from



around the region for free and frank exchanges of perspectives and ideas, helping to identify key issues for future research in the region. Through these exchanges, IFPRI not only launched relationships with new partners, but also deepened its contacts with existing partners. Drawing on the close interactions initiated in March 2005, IFPRI will seek to provide information that can contribute to reducing poverty and hunger among the people of South Asia.

All in all, IFPRI has had a year of tremendous activity and growth, yet it has remained committed to fulfilling its ultimate mission: finding policy solutions that lead to food and nutrition security for all people. This mission also charts the path for IFPRI's future.

The following pages describe research in 2004-2005 carried out under IFPRI's fifteen strategic research themes.

Research and Outreach

GLOBAL FOOD SYSTEM FUNCTIONING



Global Food Situation and Scenarios of Policy Risks and Opportunities

GLOBAL TRENDS IN FOOD SUPPLY AND DEMAND

Since the 1960s, world food production has expanded substantially, helping to reduce global malnutrition. It is uncertain, however, whether agriculture can continue to grow rapidly enough to meet increasing food needs in the developing world. Populations are still growing, and increasing

affluence in some countries is also driving growth in food demand. Nearly all of the developing world's arable land is already being cultivated, and Green Revolution advances, such as increased irrigation, improved crops, and greater fertilizer use, are now largely exploited. It is becoming harder for agricultural researchers to identify new opportunities for increased output.

Since its genesis in the early 1990s, IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) has evolved into a powerful tool for examining such issues and what they imply for the future of the global food system. IMPACT is a computerized economic model that projects and analyzes future scenarios of global food supply, demand, trade, prices, and food security. It covers 32

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.



commodities and 43 countries or economic regions and covers all cereals, soybeans, roots and tubers, meats, milk, eggs, oils, meals, vegetables, fruits, sugar and sweeteners, and fish. The modeled commodities account for nearly all world food production and consumption, and individual country models are linked through trade. IMPACT develops future scenarios of food security by projecting the percentage and number of malnourished preschool children in developing countries. Such projections are based on estimates of food availability per person, women's educational status and life expectancy, and the availability of safe water, all of which have been shown to be important indicators of children's nutritional status.

IFPRI researchers have enhanced IMPACT in many ways in recent years. They have expanded its coverage to include food sectors such as fish and livestock, and supplemented its model of food commodity demand, supply, and trade with information on other factors, such as the use of water resources. The IMPACT-WATER model, for example, incorporates water availability to examine its impact on food supply, demand, and prices,

allowing exploration of these relationships at a variety of spatial scales, from river basins, to countries, to aggregated regions and the world as a whole. While the primary IMPACT model divided the world into 36 countries and regions, the IMPACT-WATER model uses a finer disaggregation of 69 basins, and is being further developed to cover 126 river basins, 115 countries and regions, and 281 spatial units of food production.

Another recent landmark for the IMPACT program is the development and dissemination of a distributable version of the model, known as IMPACT-D, in response to widespread interest from researchers around the world. Those interested can download the model from the IFPRI web site and run their own scenario analyses, without the need for training in advanced mathematical programming. The software runs on top of free versions of the software used to develop the model, and delivers results in Excel spreadsheet files. Users can adjust assumptions for a variety of factors, such as yield, crop area, herd size, irrigation, population, and income. The software is also available on CD for users without adequate Internet access.



IFPRI looks at trade policies, economic reforms, and agricultural markets, from both local and global perspectives, with an eye to their effects on small farmers and the poor.

Globalization, Retail Food Industries, and Trade Negotiations Related to Food and Agriculture

GLOBALIZATION AND MARKETS

Globalization and market liberalization are important aspects of today's world economy. Together they pose considerable opportunities and challenges to farmers in the developing world. IFPRI looks at trade policies, economic reforms, and agricultural markets, from both local and global perspectives, with an eye to their effects on small farmers and the poor. Growth in the agricultural sector is especially important in the developing world, where rural poverty is predominant and agriculture is central to rural livelihoods. In many of those countries, agricultural growth has often been constrained by poorly functioning markets, weak domestic consumer demand, and lack of export possibilities. Countries frequently have suppressed agricultural prices, keeping food cheap for consumers but reducing farmers' potential returns from investing to increase production. Reforms that create more market-driven incentives for farmers can boost agricultural output and economic growth. At the same time, domestic market reforms may hurt urban consumers—especially the urban poor, who are unlikely to share in the returns from increased agricultural production—if not carefully managed. They also may disproportionately benefit operators of larger agricultural

operations, who often have better access to credit and other resources than small farmers.

Integration with regional and global markets is often an important first step toward export growth. However, achieving market integration may entail substantial changes in domestic agricultural policies. To help developing-country policymakers get a clearer picture of how their trade and support policies measure up, IFPRI has been studying the degree to which developing countries subsidize their agricultural sectors. Researchers have developed producer support estimates (PSEs), a standard measure of annual domestic support to agriculture used by member countries of the Organisation for Economic Co-operation and Development (OECD), for India, Indonesia, and Vietnam, and have also examined the effects of exchange rate misalignment for India and China. The research ties the PSE measures with the aggregate measure of support (AMS), which the World Trade Organization (WTO) uses as the basis for negotiations toward trade liberalization.

The researchers found that, in spite of policy reforms undertaken in the 1990s, Indonesia has been subsidizing agriculture over the past 20 years, although the effects vary by commodity. In India agricultural policy has been countercyclical, supporting farmers in periods of low world prices but keeping domestic prices below world levels when world markets are stronger. In Vietnam, most agricultural products were taxed, rather than subsidized, from the 1980s until the mid-1990s. However, since the country began to reform and open up its economy, and

shifted from an import-substitution strategy toward export promotion, the gaps between domestic and international prices were reduced. As a result, since the mid-1990s, support for agriculture increased. In China also, preliminary results indicate that agriculture was effectively taxed, but that the level of such taxation is decreasing. The exchange-rate analyses revealed that the Indian currency was most overvalued before 1991, while the recent undervaluation of the yuan has provided indirect support to Chinese producers of exported agricultural products.

Globalization combined with market reforms also poses risks for developing-country farmers. Rapid integration of local and global markets may render them newly susceptible to swings in global commodity prices, or to rich-country producer subsidies that depress global markets. IFPRI researchers are tracking how regional and international trade agreements may affect agriculture in developing countries. In 2004, work focused on the implications of various countries' positions in the WTO's Doha Round negotiations. During the year, IFPRI staff presented their analyses on the subject at more than a dozen international conferences.

Managing Natural Resources of Importance to Food, Nutrition, and Agriculture

WATER RESOURCE ALLOCATION: PRODUCTIVITY AND ENVIRONMENTAL IMPACTS

Clean freshwater is a critical agricultural resource, and essential for people and the environment. Growing populations and economies put increasing pressure on limited water supplies, particularly in developing countries. Pollution of ground and surface water is on the rise, and many watersheds and irrigated areas are deteriorating. Transfers of water from agriculture to other uses threaten food production and rural economies. Economic and environmental limits to the development of new water sources are increasingly forcing policymakers to improve the efficiency of existing water systems to meet the growth in demand. IFPRI's work on water resource allocation examines how

different approaches to water management affect food production, rural livelihoods, poverty, and the environment, and looks for answers on how to allocate and use water fairly, efficiently, and economically.

In 2004, IFPRI completed a research project on the social, environmental, and economic consequences of transfers of water out of agriculture in South Asia. Case studies of three sites—the Bhavani basin in India, the Kathmandu basin in Nepal, and the Anuradhapura area in Sri Lanka—showed that water transfers from agriculture to municipal and industrial uses are becoming quite widespread in South Asia. Such transfers can be a source of conflict, but not necessarily between the rural users who give up water and municipal and industrial users who gain it. In Nepal, the impacts of water transfers were confined mostly to local areas, generating relatively minor protests. In India, a series of water transfers—each of which might have seemed relatively minor—added up to serious problems with lack of water for rural areas during a dry year. Well-organized farmers protested, and even took the issue to court, but the situation developed more as a conflict between various groups of farmers than between rural people and cities. In Sri Lanka, farmers fought transfers from a reservoir serving them more because they feared losing control of it than because of any demonstrated economic loss. This highlights the importance of clear communication and negotiation with rural communities affected by water transfer projects.

The South Asia case studies revealed that transfers of water to industry more frequently triggered protests than those for municipal use, even though rural people were more likely to gain employment opportunities as a result of industrial development. Farmers who lost water generally gained little from transfers for municipal water supplies. People in the study areas recognized the importance of water for domestic needs, especially drinking water, and viewed municipal transfers as serving basic needs. Damage to water quality from industrial use was a common cause of protest from farmers and other rural residents. These findings make it clear that it is important to analyze the public debate, as well as economic impacts, in order to understand community responses to water transfers, and that water quality issues deserve at least as much attention as water quantity.



IFPRI also completed a project in 2004 on water use and valuation in rice cultivation in the Brantas basin in East Java, Indonesia. Rice cultivation has long been the dominant water use in the basin. Domestic and industrial demand has been rising, however, leading to rationing, which has sometimes left farmers with inadequate supplies. Researchers examined the potential effects of alternative water pricing and allocation schemes. They found that, while the average value of water to farmers was greater than the cost of supply, charging farmers full-cost prices for water would significantly reduce their incomes, while only yielding modest water savings. Key factors limiting farmers' ability to conserve water were the relative profitability and lack of efficient technologies for paddy cultivation, the structure of local irrigation systems—in which water flows across terraces rather than through canals—and the lack of local control over water supply reliability.

Rather than volume-based water charges to farmers, the study recommended an allocation approach combining water rights with a water brokerage mechanism that achieves efficient outcomes and appears to be politically and administratively feasible. A fixed base rate would be charged to cover an appropriate portion of operating and maintenance costs and depreciation. The base right would reflect historical allocation levels, and user groups would be responsible for internal water allocation. The water user group would then be charged (or paid) an efficiency price equal to the value of the water in

alternative uses for demand above (or below) the base. This approach requires further development, including pilot testing to overcome the politically difficult, but feasible, challenge of establishing base water rights, base charges, and the efficiency price. The cornerstone of this approach is strengthening irrigators' water use rights so that farmers can directly benefit from any improvements in irrigation water use efficiency that are passed on to other sectors.

PROPERTY RIGHTS AND COLLECTIVE ACTION

The nature and security of property rights can dramatically affect how farmers and herders use natural resources. Who holds various property rights—private landholders, the state, communities, or tribes—often drives decisions on how resources are managed and influences farmers' willingness to invest in improving them. Additionally, managing and investing in the natural resource base is often best done through collaborative efforts. Thus, property rights and collective action are critical to agricultural productivity and sustainability. Devising effective solutions to agricultural problems around the world requires an understanding of local and national institutions through which property rights and collective action are mediated and enforced. Understanding such issues is particularly important now, since many developing-country governments are devolving responsibility for natural resources, often with

IFPRI is also studying how innovations in small livestock production by the poor can be scaled up and replicated.



mixed consequences for the poor. IFPRI's work on property rights and collective action integrates traditional concerns regarding efficiency and sustainability with a more recent emphasis on equity and poverty alleviation.

Property rights can be an important driver of conflict over natural resources. In 2004, IFPRI completed its project on land tenure, institutions, and conflict management in sustainable use of arid lands in the Middle East and North Africa (MENA) and Africa. The study examined conflicts over land, forest, and water resources, reviewing related natural resource trends, laws, and institutions in Jordan, Morocco, Tunisia, Mali, Niger, and Senegal. Researchers prepared country case studies on conflicts over natural resources in Jordan, Morocco, Tunisia, Mali, and Senegal. Except for Jordan, all the study countries have been reforming national policies to give local communities greater responsibility for land management. The analysis of the studies revealed that the frequency of resource-related conflict was higher in countries with state-managed resources—especially forests and rangeland—than in countries that recognized community collective ownership rights.

Comparative studies of property-rights regimes can help guide countries' long-term decisions about what mix of tenure systems can promote agricultural productivity, profitability, and other goals most effectively. A comparative study is examining property rights regimes in the Mashreq and Maghreb (M&M) region, which includes a

wide swath of low-rainfall areas in West Asia and North Africa. The aim of the study, a cooperative effort with the International Center for Agricultural Research in the Dry Areas (ICARDA) and other institutions, is to determine how different land tenure systems in the region have influenced land management and farm and herd profitability. Countries in the region have taken widely differing approaches to property rights. Morocco has recognized customary private ownership rights and collective tribal rights, while Tunisia has opted to privatize all land rights and grant titles.

In Morocco, the study's findings matched the conventional wisdom that farmers invest less in water, fertilizer, and related inputs, and use less mechanization on the fields they operate under incomplete land rights (perpetual collective use-rights) than on the fields they operate under complete land rights (private ownership). Profit margins from privately owned fields were much higher than those from collectively held lands. In Tunisia, however, the nature of land tenure did not similarly affect agricultural investment and profitability. The most important factor in profitability there was not ownership but choice of crop, with vegetable fields more profitable than those growing cereals. One important reason for the difference appears to be that in Tunisia, farmers have relatively even access to credit, which largely determines their ability to invest in their land. Investments in new technologies and diversified production are the key factors in whether farms become more profitable.



In collaboration with the International Fund for Agricultural Development (IFAD), ICARDA, and other partners, IFPRI is also studying how innovations in small livestock production by the poor can be scaled up and replicated. The project focuses on new approaches that blend improved technologies with indigenous knowledge and practices, cut natural resource degradation, empower women and pastoral groups, and reduce poverty. Researchers selected three innovations for study in the first phase of the project: a new approach to smallholder production of poultry in Bangladesh (based on a model originally developed in Vietnam), the use of community-based animal health workers in Cambodia, and community-based rangeland management in Morocco. They prepared seven case studies, and also conducted survey research among stakeholders in the areas under study. Poor monitoring and evaluation systems were a key hindrance to the replication and mainstreaming of innovative projects. Most projects were replicated based on conceptual approaches, rather than actual duplication of on-the-ground innovations, because of the lack of adequate documentation and evaluation of previous efforts.

Another IFPRI project focuses on collective action for integrated resource management, looking at the drivers

of successful collective action, the decisionmaking processes of community institutions that manage natural resources, and—specifically—the role of collective action in farmers' and herders' responses to rainfall variation. Herding tends to predominate in such areas, though cropping can also be an important activity.

In 2004, the project published a report comparing research results from Burkina Faso, Ethiopia, and Niger. The report recommended that policymakers designing strategies to mitigate the impact of drought and other crises pay close attention to their impacts on herd mobility and size. The report concluded that communities that cooperate better tend to have less stock per unit of land, and greater herd mobility. Herd movement has traditionally been an important response to climate variability, and herders' rights to access traditional grazing areas are generally eroding within all the study areas, reducing opportunities for mobility. Better cooperation tended to be associated with smaller community size, more equal distribution of wealth, and a smaller proportion of community members migrating for wage work. The report also warned that some policies—such as feed subsidies—could lead to sharp increases in national herd size.

SYSTEMWIDE PROGRAM ON COLLECTIVE ACTION AND PROPERTY RIGHTS

IFPRI convenes the CGIAR's Collective Action and Property Rights initiative (CAPRI), which was established in 1996. The program 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. Research centers on the roles of voluntary, self-governing community organizations and various types of property regimes in natural resource management, and what kinds of policies can foster the development of effective institutions. CAPRI also works toward strengthening and connecting national and CGIAR research centers, nongovernmental organizations (NGOs), universities, and local organizations in order to promote research on collective action and property rights issues. Priority themes include

- adoption of natural resource management technologies,
- accommodation of multiple resource uses and users,
- devolution and how it can be structured,
- environmental risk,
- feminization of agriculture and demographic change,
- changing market relationships, and
- management of local genetic resources.

In 2004, CAPRI developed a conceptual framework and series of studies on the links between collective action, property rights, and poverty reduction—a relatively new focus for the program, which has previously emphasized natural resource management. CAPRI also held another round of research grant competition, and awarded four grants for empirical research to CGIAR centers, plus two to German collaborators. As part of this research program CAPRI and the Center for International Forestry Research (CIFOR) brought together stakeholders to forge common understandings on concepts, methods, and strategies for research implementation.

The program also prepared a background paper for the U.N. Millennium Development Goals' Hunger Task Force. The success of CAPRI's weeklong training course on research on property rights, collective action, and natural resource management—held in April 2004 for staff from East African national research institutions—set in motion plans for another such event in South Asia in 2005.

SUSTAINABLE DEVELOPMENT IN LESS-FAVORED LANDS

Since the Green Revolution, researchers, governments, and international institutions have put much of their attention toward high-yielding crop varieties and initiatives for their deployment in the developing world. Such varieties flourish in good soils, and respond well to the combined application of fertilizer and water. The bulk of agricultural investment has gone toward irrigation, infrastructure, and other initiatives to enhance and expand the base of prime lands in which high-yielding varieties can thrive. The benefits have been huge for the many developing countries that have gone from food shortage to self-sufficiency and beyond.

At the same time, however, the focus on well-watered lands with favorable climates and good soils, and areas relatively accessible to markets, has left large areas of less-favored lands to languish in neglect. With rapid population growth, these lands are becoming major areas of rural poverty, food insecurity, and resource degradation. More than one billion people live in less-favored lands. IFPRI's work on these areas examines the productivity, poverty, environmental, and food security consequences of targeting agricultural investments—and research—toward them. It also aims to identify the most effective development strategies for such areas, with careful attention to local conditions. The program includes research on hillsides in Central America, highlands in East Africa, dryland areas in West Africa and North Africa, and uplands in Southeast Asia.

In 2004, IFPRI research in Uganda examined local livelihood strategies, the effects of local policies and program interventions, and how they related to economic success, agricultural productivity, and land degradation. It found that the most promising strategies for

reducing rural poverty were improvement in farmers' education and development of livestock production. The value of agricultural production was greater for those involved in livestock, nonfarm activities (because farmers used earnings from them to buy agricultural inputs), and higher value crops such as bananas. Livestock producers earned significantly more than crop producers and also had lower rates of soil nutrient depletion, as did households more focused on nonfarm activities. Agricultural extension and training programs, specialization in cash crops, and improved access of small farmers to land were also important factors in increasing the value of crop production. The report also found that land degradation was most likely to be reduced through a combination of support for NGOs focusing on agriculture and the environment, promotion of nonfarm activities, and reduction of population growth or increased emigration from the highlands.

More than 65 million people live in the Ethiopian highlands, and land degradation and droughts threaten the area's food security. Soil erosion in Ethiopia averages nearly 10 times the rate of soil formation. Such land degradation cuts agricultural productivity and increases farmers' vulnerability to drought by reducing the soil's depth and ability to hold moisture. The report concluded that better access to off-farm income can improve household income and reduce vulnerability to drought, but at the same time it might reduce incentives for food production and land conservation. Planting trees, especially eucalyptus, on agriculturally marginal land appears to be a promising option for Ethiopian farm households, and could work especially well if combined with food-for-work (FFW) programs for land conservation.

IFPRI is also working to strengthen the capacity of affected countries to address questions of poverty and development in less-favored lands. The RESPONSE program, a collaborative effort between IFPRI and Wageningen University and Research Center (WUR) in the Netherlands, conducts field research and trains Ph.D. candidates from developing countries. Focus countries include Bangladesh, China, Ethiopia, and the Philippines. IFPRI also started a new program in 2004 that will examine the issue of rewards for environmental services. The program will focus initially on assessing a government program in Indonesia that provides long-term land tenure contracts to farmers who both plant agroforestry trees in degraded state forest land and protect the remaining forest.

Food Systems in Disaster Prevention and Relief, and Rebuilding After Crises

HIV/AIDS AND FOOD SECURITY

Two-thirds of all people living with HIV live in Sub-Saharan Africa, though it is home to only about 10 percent of the world's population. At the end of 2004, an estimated 25 million people in the region were infected with HIV. In southern Africa several countries have a national HIV prevalence of 20–30 percent and some even higher. A very small proportion of those infected have access to antiretroviral drugs that have dramatically prolonged the lives of HIV-positive people in the developed world.



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For Africa, AIDS is thus a development problem, not just a health issue. The virus strikes at the heart of societies and economies, killing most people in the prime of their productive years. Its toll on the agricultural sector—the main source of livelihood in Africa—is particularly significant, as the virus saps the strength of infected individuals, making manual labor difficult or impossible. At the same time as food and nutrition security is being undermined, it is becoming more important—malnourished people are more susceptible to HIV infection and less capable of mounting a viable immune response, hence they are more likely to become sick and to die earlier.

In response to this reality, IFPRI established a program that focuses on HIV/AIDS and food security. Its centerpiece is RENEWAL—the Regional Network on HIV/AIDS, Rural Livelihoods, and Food Security (www.ifpri.org/renewal). RENEWAL is a “network of networks” in eastern and southern Africa. It brings together agricultural institutions and other food and nutrition-relevant organizations, NGOs, governments, and farmers’ organizations with partners in AIDS and public health work. Networks are active in Malawi, South Africa, Uganda, and Zambia, with Kenya and Ethiopia to join in 2005. Their purpose is to show that fresh thinking and

concerted action in food and nutrition-relevant policy can help prevent HIV infection and lessen the impact of AIDS. A central goal is the integration of HIV-related concerns into all aspects of development policy for the region.

RENEWAL focuses on action research, capacity development, and communications. Over the past two years, the network held several multi-stakeholder workshops in eastern and southern Africa to generate consensus on priorities for research and action. Study proposals were prepared with multi-organizational teams and work was initiated. Of this first set of studies, one (in Malawi) is now complete, and the remaining seven will be completed in 2005. Researchers also began work in 2004 on a multicountry study of food and nutrition security of orphans and vulnerable children. In 2004, IFPRI worked with a broad range of partners to organize an international conference on HIV/AIDS and food and nutrition security, which was held in April 2005 in Durban, South Africa.

Research and Outreach

GLOBAL AND NATIONAL FOOD SYSTEM GOVERNANCE

Governance Structures and Policy Processes in Food and Agriculture: The Role of the State, the Private Sector, and Civil Society

GOVERNANCE FOR AGRICULTURAL AND RURAL DEVELOPMENT

Acknowledging the role of governance in achieving its mandate, IFPRI launched a new research program in 2004,

Governance for Agricultural and Rural Development. Planned research under the program centers around agricultural institutions, decentralization and local governance, and agricultural and development policy processes.

Research on agricultural institutions focuses on analyzing innovative approaches to service delivery—such as through agricultural extension—with a view to

fostering pro-poor growth. In terms of decentralization and local governance, the program is analyzing the efficiency and effectiveness of local governments and partner institutions in providing basic services and infrastructure to the rural poor. A study of the impact of decentralization and local governance on the provision of public services and infrastructure in China and India has been initiated in collaboration with IFPRI's public investment program. Researchers have also begun to analyze the implications of decentralization on water resources management in northern Ghana, along with options for establishing a platform for participatory development planning processes. Another project, on empowering the rural poor in volatile policy environments, addresses both decentralization and policy issues by studying policy and economic reforms in MENA, including sector and structural adjustment programs to effect economic liberalization, privatization, and decentralization—that have created a volatile policy environment, in turn making it difficult for development institutions to design programs that effectively empower the poor. Through case studies in Morocco, Sudan, and Tunisia, researchers have developed a methodology for assessing community capability, which would be useful for donor organizations in developing project design and implementation strategies. Researchers conducted extensive stakeholder interviews in Sudan to analyze the determinants of policy volatility; they also analyzed the governance implications of managing conflict over natural resources in Greater Kordofan, Sudan.

Given that governance issues cut across much of IFPRI's research, the Institute established a Governance Task Force in 2004 to promote and coordinate research and outreach activities in this important field. The task force began by organizing a seminar series in which leading experts, including political scientists and sociologists, discussed governance issues related to poverty reduction, including the role of NGOs, prospects for using aid for institutional reform, and the implications of civil conflict.



GLOBAL AND NATIONAL FOOD SYSTEM GOVERNANCE

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



POLICY PROCESSES RELATED TO NUTRITION AND FOOD SECURITY

Decades of research and program experience have produced a wealth of information for policymakers on how to increase food security and reduce malnutrition. Nonetheless, hundreds of millions of people remain hungry and malnourished. One explanation is that nutrition and food issues often do not rise high enough on the policy agenda to be translated into effective programs. IFPRI's program on Policy Processes Related to Nutrition and Food Security, which was established in 2003, explores the real-world factors—politics, economics, social issues, institutional structures, and so on—that impede progress on food security. Understanding these factors better could help IFPRI and others in the research community focus and enhance the impact of their work.

In 2004, IFPRI researchers completed a project examining how community-driven development (CDD) projects can be scaled up. CDD is an approach that recognizes poor people as prime actors in the development process, not targets of externally designed poverty reduction efforts. In such projects, community groups make decisions and control resources, working in partnership with support organizations and service providers, such as elected local governments, the private sector, NGOs, and central government agencies, who respond to community

demands. Studies have shown CDD's potential to increase the effectiveness, efficiency, and sustainability of projects or programs, making them more pro-poor and responsive to local priorities. However, most CDD initiatives are small-scale, "boutique" projects. For CDD to make a serious contribution to national and international development goals, it will have to be practiced on a much larger scale.

To examine the potential for scaling up CDD projects, IFPRI conducted five case studies. The studies' subjects were poverty alleviation in Kerala, India; urban livelihood programming in Zambia; community-directed development in the Kyrgyz Republic; microfinance in India and Nepal; and HIV/AIDS and food security in Malawi. Researchers concluded that in CDD projects, attention to process, principles, and a culture of "learning by doing" are more important than the application of models or best practices based on other projects. Key CDD principles are the value of diversity versus standardization, and synergy rather than substitution or competition. Governments and donors need to consider the ongoing development process beyond the project itself, and think about long-term transformation or transition rather than sharply defined endpoints. The development of local capacity—institutions, leaders, and facilitators—is also crucial the success and large-scale application of CDD projects. Capacity should not only be

The increasingly complex food system, involving food chains and processing systems, has heightened public interest in food and water safety.



viewed as the development of resources but also as the building of motivation and commitment, which, in turn, stem from appropriate incentives. In the long run, the goal of CDD projects is to anchor effective development processes in national policies, and embed them within the social, cultural, and institutional fabric of the country.

Institutional fragmentation and minimal collaboration across policy sectors are important reasons why some countries are not doing as much as they could to reduce malnutrition. IFPRI's agriculture–nutrition linkages project worked with a number of collaborating partners to conduct an institutional study in Uganda, Mozambique, and Nigeria that examined the opportunities and barriers to expanding linkages between the agriculture and nutrition communities. The study found a lack of cross-sectoral collaboration on nutrition issues in all the study countries. It also found that the organizational structure of governments and limited state resources were key factors impeding collaboration, along with a lack of advocacy and leadership on nutrition. Advocacy can bring increased attention to such issues, help expose hidden aspects of malnutrition, and dispel popular misconceptions about what constitutes food security. Researchers found little recognition in the study countries of the critical

contribution that better nutrition makes to economic growth, the immense costs of malnutrition to society, and the importance of considering gender in nutrition interventions.

While it is often left unstated, food is a fundamental right. In 2004, IFPRI initiated a new project focusing on the use of litigation and the court system to advance the right to adequate food and food security.

Food and Water Safety Policies

The overall objective of IFPRI's work on food and water safety is to improve policies for governance, political participation, and institutions for pro-poor food, agriculture, and natural resource management systems. The increasingly complex food system, involving food chains and processing systems, has heightened public interest in food and water safety. These issues feature increasingly in both international trade and rural development. Research is being initiated to determine the cost of compliance with food safety standards in smallholder economies, in order to see which institutional structures are most suitable for meeting safety standards while promoting rural development.



Policies Addressing Hidden Hunger, Enhanced Food and Diet Quality for Poor People, and the Nutrition Transition in Developing Countries

DIET QUALITY AND HEALTH OF THE POOR

Food insecurity has traditionally been defined as a lack of food, or insufficient energy intake, to allow individuals to live a healthy and productive life. Although food deficits are still widespread in poor countries, poor diet quality is increasingly recognized as the main dietary constraint faced by poor populations worldwide. Poor dietary quality refers to diets with inadequate amounts of essential nutrients (usually micronutrients), with or without adequate energy intakes. Poor dietary quality can also result from diets that contain disproportionately high amounts of certain foods or food components like saturated fat, sodium, and added sugar, and low intakes of whole grain cereals, fiber, fruits, and vegetables.

To examine poor diet quality in all its forms, IFPRI launched its program on Diet Quality and Diet Changes of the Poor in 2003. A 2004 report put forward new estimates of food insecurity based on food acquisition

data from household expenditure surveys in 12 Sub-Saharan African countries. The study, which examined both diet quantity and diet quality, confirmed that food insecurity is a major problem in Sub-Saharan Africa. For instance, 37 percent of Ugandans and 76 percent of Ethiopians were found to have an inadequate caloric intake. Diet quality problems, especially micronutrient deficiencies, were also found to be widespread. Poor diet quality and inadequate diet quantity were not, however, strongly correlated. In other words, efforts to address one problem are unlikely to help with the other. Food policy clearly needs to address both diet quality and diet quantity to overcome food and nutrition insecurity effectively.

Measuring diet quality is an important focus of IFPRI's research. IFPRI researchers have worked to develop and validate simple indicators of dietary diversity (the consumption of a larger number of foods or food groups). An analysis of data from Kenyan school-age children, done with colleagues at the University of California–Davis and the University of Hawaii, was the first to document the effectiveness of indicators of dietary diversity in predicting whether children are likely to meet their daily requirements of micronutrients. Another study, a collaboration with the World Health Organization (WHO), showed similar results for infants and young children. The indicators could provide an important new tool for aid providers working to measure the quality of complementary foods.

In 2004, IFPRI's Diet Quality program started to place greater emphasis on the worldwide trend toward poor-quality diets characterized by excessive consumption of energy-dense, nutrient-poor foods. While energy is increasingly available in these contexts, it tends to come from energy-dense micronutrient-poor sources, such as added sugars and edible oils, while intakes of micronutrient-rich foods, such as fruits, vegetables and high-quality animal-source foods, are often limited. In 2004, the 192 Member States of WHO called for action on this "nutrition transition." The trend is associated with increases in obesity and related chronic diseases, including heart disease, diabetes, and some cancers. No longer just diseases of affluence, obesity and related diseases are now problems for poor countries and poor people. Today, 80 percent of those who die from cardiovascular disease are from low- and middle-income countries. The increase in obesity and chronic diseases is creating a new, double burden for health care systems in developing countries that still struggle with the effects of hunger and infectious diseases. For example, the total cost of diabetes in Latin America and the Caribbean is over \$65 billion every year.

IFPRI's program is focused on the impacts of the dietary and nutrition transitions on the poor, which are likely to worsen over time. As poor countries' incomes rise, obesity tends to become more prevalent among the poor. In low-income communities, IFPRI research revealed the coexistence of malnutrition and obesity in the same household, with overweight mothers tending to undernourish children. And research begun in late 2004 examined the overlap between overweight/obesity and micronutrient deficiencies in the same person. In the future, greater attention will be placed on the dietary patterns associated with excess energy intake and inadequate intake of micronutrients and their socioeconomic determinants.

Driving the nutrition transition are a variety of factors: globalization of trade, finance, information and culture; technological change in food production, processing, and distribution; higher incomes; demographic shifts; and urban growth. The Diet Quality program is examining these changes in the context of their implications for the rural poor—since globalized food distribution affects how and what farmers can sell.

One positive element to these shifts is that the market for high-value food products, such as micronutrient-rich meats, fish, fruits, and vegetables, is growing. Such products can benefit both producers and consumers. Another component of the program is thus to examine the linkages between agriculture and poor diet quality, and identify the "win-win" policy solutions to benefit both agriculture and dietary health.

HARVESTPLUS

HarvestPlus, the CGIAR Challenge Program that works to reduce micronutrient malnutrition by breeding nutrients directly into the staple food crops poor people depend on, began its first full year of operation in 2004. By year's end, six crops were engaged in full plant breeding and nutrition research programs that select and breed for higher amounts of iron, zinc and beta-carotene (a vitamin A precursor). Ten additional crops were given a financial boost to begin exploratory research to screen varieties for potential nutrient-dense parent material. HarvestPlus is co-convened by IFPRI and CIAT.

During 2004, the six crops involved in the first phase—wheat, sweetpotato, beans, rice, maize, and cassava—showed varying levels of progress, depending on the genetic variation in their nutritional content and on earlier biofortification research. Some crops have moved ahead through the experimental field testing process; other crops are proving more difficult. Some nutrients show stable expression in the edible portion of the plant. For others, expression appears to be constrained by growing conditions, which can ultimately lead to insufficient nutrient density once the crop is processed and consumed.

Wheat has been shown to be receptive to increasing levels of iron and zinc under experimental conditions. Orange-fleshed varieties of sweetpotato have proven to be reservoirs for adequate amounts of beta-carotene and are now being bred to meet consumer preferences and growing requirements in Southern Africa. Plant breeders have substantially increased the iron content of beans, but it remains to be seen whether the nutrient levels will be high enough to improve the nutritional status of humans. Researchers have found substantial nutrient variation in the iron density of rice, a staple food for



many of the world's undernourished people, but for now much of it is lost when the rice is polished to commercial standards. When it comes to increasing the vitamin A content of rice, research has determined that transgenic technologies will provide the only pathway to bring the essential vitamin into the grain.

Vitamin A, essential for healthy eyes and strong immune systems, is a fragile nutrient that often does not exist naturally in grains and dissipates during storage and processing. Because beta-carotene presents itself as yellow or orange, researchers can often, as a first step, select for beta-carotene based on grain color. In maize, however, yellow color alone is not proving to be a foolproof indicator of beta-carotene content. Beta-carotene color in maize can be masked by other yellow pigments and nutrients in the grain. Cassava, the staple food for many undernourished people across Africa, shows promise for natural variation in beta-carotene content, but not yet at sufficient levels to withstand the harsh processing that must take place before cassava is consumed.

In 2004 HarvestPlus developed formal research and implementation agreements with more than 70 agriculture and nutrition research institutions in both the developing and developed world. Eight CGIAR institutes are at the center of the research activities and are helping HarvestPlus establish an alliance that places nutrition research at the center of an agriculture-based public health intervention. Perhaps the greatest advance made by HarvestPlus in 2004 has been to draw renewed attention to food as a means for improving public health.

Policies and Interventions for Sustainable Poverty Reduction and Nutrition Improvement

PATHWAYS FROM POVERTY

Why do some people find a way out of poverty, and others fail to do so? This is the central question of IFPRI's Pathways from Poverty program, which focuses on long-term studies of poor people. Using individual- and household-level data spanning a decade or more, researchers examine the effects of broad social and economic trends on the evolution of poverty, as well as those of short-term shocks, such as drought and floods. They also try to identify what kinds of policies and interventions most effectively reduce poverty, hunger, and malnutrition over the long run. The program applies a common approach to four countries—Ethiopia, Guatemala, the Philippines, and South Africa—with a more restricted set of activities in Bangladesh, Malawi, and Mozambique. In each, work addresses a wide range of policy issues, combines qualitative methods with quantitative analysis, and is done in partnership with local institutions. Each project also aims to build the capacity and information base of collaborators, policymakers, and technical personnel in government research institutions.

In Bukidnon, the Philippines, IFPRI researchers and collaborators are studying how access to credit in rural



Life histories of respondents revealed that over the course of two decades, households that were able to successfully move out of poverty tended to have at least a high-school education, a strong work ethic, the ability to take risks, entrepreneurial skill, and diversified income-earning activities.

areas affects the welfare of the poor over the long run. The investigators are revisiting 448 families originally studied in 1984–85, interviewing original respondents as well as their children who have formed separate households. In 2003 and 2004, they completed two waves of interviews, the first in the original study area, and the second of migrants who were tracked to their current homes. The study found that almost two-thirds of sample households are constrained by limited access to credit. Credit constraints affect production scale, technology or input use of about a third of the farming households and a third of those in nonagricultural businesses. They also affect the consumption choices of 20 percent of sample households. Most poor rural households in Bukidnon borrow in the informal sector, with 40 percent of households operating exclusively in this sector. Larger cultivators borrow more and have better access to credit, but nonagricultural households are increasingly able to obtain credit from both formal and semi-formal sources.

Life histories of respondents revealed that over the course of two decades, households that were able to successfully move out of poverty tended to have members with at least a high-school education, a strong work ethic, the ability to take risks, entrepreneurial skill, and diversified income-earning activities. Some families fell back economically because of shocks, such as illness or the death of a household member. The most disadvantaged group of households was the landless, who, because of lack of

resources, often could not send their children to school, perpetuating the intergenerational cycle of poverty.

In Mozambique, one of the world's poorest countries, IFPRI researchers are trying to understand how the location of the poor affects the targeting of anti-poverty interventions. Most analyses of poverty or inequality in low-income countries are based on household surveys with small sample sizes or limited geographic coverage. As a result, estimates of poverty are usually only possible at state, provincial, or regional levels, and without detailed geographical or occupational information. This can be a severe constraint for policymakers, who want to know not only which provinces are the poorest but also which areas within a province are the poorest. IFPRI's answer to this problem has been to combine census data, which has limited information on a vast number of households, with survey data that has detailed information on a relatively small number. By exploiting the strengths of each data source, it is possible to estimate poverty and inequality measures for population subgroups as small as a few thousand households.

Use of this technique to map the poor in Mozambique has revealed a surprise: distribution tends to run counter to poverty rates. That is, areas with lower poverty rates are more densely populated, so that most poor people live in areas where poverty indices are lower than the national average. In other words, the poor frequently live alongside the nonpoor, rather than



in intense pockets. This suggests that targeting antipoverty efforts on purely geographic criteria is almost certain to be inefficient, with leakages to the nonpoor and undercoverage of significant numbers of poor households in areas that are “less poor.”

In South Africa, IFPRI is studying the long-term legacy of generations of inequality. Supplementing detailed quantitative surveys with qualitative research on a smaller subset of households, researchers have examined the lives and livelihoods of households that surveys revealed had progressed or fallen behind over the 1993–98 period. Analysis revealed the existence of a poverty trap: most of those studied found a ceiling to their upward mobility. Those with access to stable employment and state pensions tended to become better off, while those without such opportunities languished in poverty. The communities studied displayed considerable social capital and networks, but these, at best, helped stabilize livelihood at low levels, doing little to promote upward mobility.

LARGE-SCALE INTERVENTIONS TO ENHANCE HUMAN CAPITAL

One reason poverty tends to endure over generations is the inability of poor households to invest in their children. Efforts to improve the quality and availability of education and health services often fail to address this problem because poor households frequently cannot afford the private costs of such services. Several Latin American countries have introduced programs that address this issue by combining cash transfers and social services for the poor with incentives to invest in human capital. The programs act as a social safety net to protect

poorer households from the short-term consequences of economic reforms aimed at stimulating broad-based growth. They target transfers to the poorest communities and households and make them conditional on attendance at school and health clinics. This effectively converts cash transfers into human capital subsidies for poor households, investing in their long-run capacities and improving their future prospects.

While, at first glance, stimulating economic growth and investing in social safety nets seem quite different strategies for economic development, both are important. They can actually complement one another, as effective social safety nets may directly contribute to economic growth via improved human capital, particularly in the long term. One reason for the growing popularity of conditional transfer programs is that, in addressing various elements of human capital, including nutritional status, health, and education, they can influence many of the key indicators highlighted in national poverty reduction strategies.

One of the first, and largest, conditional transfer programs was the *Programa Nacional de Educación, Salud y Alimentación* (Progresá) in Mexico, begun in 1997. An integrated combination of education, health, and nutrition interventions, it rapidly became one of the Mexican government's largest programs. In 1999, with a budget of about \$777 million (equal to 0.2 percent of Mexico's GDP) Progresá covered approximately 2.6 million families in almost 50,000 localities—about 40 percent of all rural families or just under 10 percent of all Mexican families. In 1998, IFPRI was asked to assist the Mexican government in evaluating Progresá. IFPRI found it to have had a significant positive impact on the welfare and human capital of poor rural families. The program has boosted school enrollment, especially at the secondary level, mostly because children, especially boys, are working less to earn money for their families. Both children and adults are also experiencing improved health: children receiving benefits have a 12 percent lower incidence of illness, and adults report a decrease of 19 percent in sick or disability days. The program also has improved nutrition among its participants. It has significantly reduced stunted growth for children 12–36



months old, and program beneficiaries report higher caloric consumption and a more diverse diet, including more fruits, vegetables, and meat. Financial analysis showed strong evidence that Progresa is cost-effective. Only 9 of every 100 pesos allocated to the program went to administration—a low overhead level given the program's complexity. IFPRI's evaluation of Progresa has been politically significant. The Mexican state continued the program after the 2000 elections despite the historic change in government. It has since been renamed *Oportunidades*.

In 2004, drawing on its experience with Progresa, IFPRI published a research report on the direct and indirect effects of transfer programs. The report shows how the combination of economic modeling results and information from standard household surveys can provide an integrated analysis of the impacts of such programs, including those associated with how they are financed. This approach reflects the view that any credible poverty alleviation strategy must have a credible financing strategy underlying it, and this need for domestic financing can have important consequences for both the level and the distribution of household incomes. Researchers found that the taxes introduced to finance Progresa adversely affected the urban poor, who at first did not benefit from the transfer program because it was targeted to rural areas. However, combining the transfer program with a more efficient tax system has the potential not only to minimize this adverse impact but also to help the urban poor through the broad economic benefits that stem from the tax reform.

Among the other countries that have implemented targeted transfer programs are Honduras (*Programa de Asignación Familiar [PRAF]*), Brazil (*Bolsa Alimentação*), and Nicaragua (*Red de Protección Social [RPS]*). IFPRI has been involved in evaluating all of these programs. In Nicaragua, researchers found in a 2004 report that RPS boosted annual per capita household spending by 18 percent. It also pushed up school enrollment by a remarkable 18 percent—and by 23 percent within the targeted population. The participation of children under age three in a government health-care program went up 11 percent. Household diets became more varied, and the nutritional status of beneficiary children under age five improved, with a net effect of a 5 percentage point decline in children whose growth was stunted. This decline was more than 1.5 times faster than the national rate of annual improvement between 1998 and 2001. However, despite wide distribution of iron and anti-parasite supplements, anemia remained high—32 percent—among children under five. In another 2004 report, IFPRI researchers found several reasons why children were not taking the supplements, relating to taste and beliefs about induced stomach and teeth problems. Previous research has shown that the program is well targeted toward the poor—81 percent of its beneficiaries came from the poorest 40 percent of the population. However, similar to earlier Progresa findings, a 2004 report found that targeting mechanisms were not well understood at the local level, generating dissatisfaction where people felt they could not rectify errors and pointing to the need for a reliable appeals process. Following 2004 findings of some stigmatization

felt by children not in the program, RPS extended partial benefits to these children—a small offering given to teachers on behalf of the child.

In 2004, IFPRI and the World Bank published *Targeting of Transfers in Developing Countries: Review of Lessons and Experience*. The book discusses 122 antipoverty interventions in 47 countries. Among the subjects covered are quantitative program analysis, program costs, methods of targeting, and appropriate circumstances for implementing targeted transfer programs. The book offers policymakers, program managers, donor agencies, and nongovernmental organizations considerable guidance for the design of effective antipoverty interventions.

Cross-Cutting Research on Country and Regional Food, Nutrition, and Agricultural Strategies

SPATIAL PATTERNS AND PROCESSES IN THE AGRICULTURE, ENVIRONMENT, AND POVERTY NEXUS

IFPRI uses sophisticated mapping tools to analyze and illustrate spatial patterns in agricultural development, livelihoods, nutrition, and many other issues covered by the institute's research. With the aid of geographic information systems (GIS), researchers can translate volumes of data into clear, concise visual presentations. In 2004, IFPRI worked to integrate spatial analysis more closely with research, particularly in modeling global risk scenarios—such as climate change and extreme weather events—and to explore the geographic dimensions of human demographics, natural resource use, and biotechnology, emphasizing impacts on poor and vulnerable groups.

From its inception, spatial analysis at IFPRI has been involved with assessing and mapping the consequences of technical change. The group developed a software tool for such assessments, DREAM (Dynamic Research EvaluAtion for Management), which can be downloaded from the IFPRI web site. DREAM is a menu-driven package for evaluating the economic impacts of agricultural research and development. With the

program's flexible economic model and integrated database, users can define their own conditions for technology investment, development, and adoption, and simulate a range of scenarios. DREAM generates outcomes for prices; quantities of commodities produced, consumed, and traded; and economic benefits to producers, consumers, and government. It can simulate various types of market systems, can model multiple geographical regions, and can simulate the "spillover" of technology from one region to another. In 2004, DREAM was used to assess the potential payoffs to the adoption of biotechnologies in bananas in Uganda. The study examines the distribution of banana systems in East Africa and assesses the likely distribution of banana pests and diseases—hence, the likely pattern of the impacts of new resistant cultivars, if adopted.

Another use of GIS is to generate relatively fine-grained estimates of crop production for areas where detailed production statistics are not available. Agricultural production is usually reported in the aggregate, within political boundaries, rather than for ecological or hydrological regions of greatest interest to researchers. In Brazil, IFPRI researchers have used a combination of state-level production statistics (for eight different crops), farming system characteristics, satellite data on land cover, biophysical crop suitability assessments, and population density to generate production estimates for 80-square-kilometer "pixels." With this technique, pixel-level estimates can be combined to produce estimates for specific subregions, watersheds, or agroecological zones. Comparisons of small-area production estimates generated this way with actual local production statistics have revealed that IFPRI's GIS-based technique is significantly more reliable than the usual methods for estimating production in areas where data are not reported. The researchers also began work to extend this approach to Sub-Saharan Africa in 2004.

IFPRI researchers are also using GIS analysis to better understand the impact of improved crop varieties on agricultural yields. In recent decades, the rapid diffusion of improved crop varieties has been a major source of agricultural productivity growth. New, high-yielding varieties were the engine of the Green Revolution. Yield increases did not occur everywhere, however, and have become increasingly difficult to emulate over time. IFPRI researchers have used GIS to analyze the evolution of



Studies have shown that public investments in agriculture and rural areas are major contributors to agricultural growth and rural poverty reduction.

yields over recent decades in Latin America and the Caribbean. Though it is commonly assumed that yields over geographical areas tend to converge, as new varieties and technologies spread, IFPRI's study showed that yields of three major crops in the Latin American and Caribbean region have not converged over time. Maize yields have even become increasingly varied for different areas. Understanding the reasons behind the failure of yields to rise evenly in different areas could better inform the search for new sources of productivity growth.

IFPRI's GIS experts have also been closely involved with the Millennium Ecosystem Assessment, developing regional and global assessments of the tradeoffs between agriculture and ecosystem services.

PUBLIC INVESTMENT: PRIORITIES, FINANCING, AND GOVERNANCE

In an era of tightened budgets, how can developing countries balance competing priorities for public investment, while still making progress toward development goals? This is the central concern of IFPRI's program on public investment. Governments use public spending to achieve both economic growth and equity goals. They must also balance long-term investments, such as research and development, education, and infrastructure, with short-term social spending on education, health, social security, and direct food subsidies to poor households. Spending must also be allocated between relatively backward areas—where many of the poorest people live—and dynamic areas

with much higher growth potential. Another key question is how to ensure that public spending is as efficient and effective as possible. Studies have shown that public investments in agriculture and rural areas are major contributors to agricultural growth and rural poverty reduction. These kinds of investments, however, are increasingly being cut as developing countries struggle with macroeconomic reforms and structural adjustment, declines in international commodity prices, and reduced private investment and aid to agriculture.

IFPRI's studies in this area are unique in that they assess the impacts of many different public investments within one framework, attempting to capture the synergies and dynamics that occur with multiple investments. Previous studies on government spending and investment have generally considered either one type of investment at a time or the effects of total public spending on development outcomes. The new approach allows researchers to rank the returns of various public investments; identify the channels through which investments affect growth, inequality, and poverty in the long run; and calculate how many poor people are raised above the poverty line by additional units of spending on various items. These kinds of results offer policy insights that are extremely useful in making government strategies to alleviate poverty more effective.

In 2004, IFPRI completed a retrospective study analyzing the use of government subsidies—such as those for fertilizer and credit—in the initial stage of the Green Revolution in India. The project was intended to provide

insights for agricultural development and poverty reduction in Africa. Researchers concluded that government spending priorities need to change to match different stages of growth, and that the timing of subsidy introduction is very important. Fertilizer and credit subsidies, for example, may be appropriate for areas that have yet to achieve agricultural transformation, but they may not be effective unless preceded by investments in infrastructure, technology, and land reform. They must also be carefully administered and efficiently targeted—a major challenge for most governments in poor countries—and withdrawn when they are no longer needed, which is politically difficult.

Another set of IFPRI studies is examining public investment, agricultural growth, and poverty reduction in Africa. In 2004, researchers focused on two countries, Tanzania and Uganda. They found that agricultural growth is a dominant source of poverty reduction in Africa, and that any investment that promotes higher agricultural growth will also substantially reduce poverty. For example, investments in agricultural research and feeder roads yield the highest returns of both agricultural production and reduced poverty. This is quite different from many Asian countries, where nonfarm employment and migration has become a major pathway out of poverty. Another conclusion was that investments in both high- and low-potential areas have high returns, as long as security is guaranteed. In contrast, high-potential areas have experienced diminishing marginal returns in many Asian countries. The findings from Tanzania and Uganda have been used by the World Bank in its agricultural strategy for East Africa, and in formulating its lending policy.

IFPRI research has also yielded similar conclusions in China on the value of feeder roads for economic growth and poverty reduction. A study of road development in that country over the past two decades found that investing in low-quality and rural roads generates larger marginal returns, raises more people out of poverty per yuan invested, and reduces regional disparities in development more sharply than investing in high-quality roads. The study has considerable implications for China's infrastructure policy, given that since 1985 the Chinese government has given high priority to building roads and has emphasized high-quality roads that connect industrial centers.

Building on the successes in Asia, research will focus on Africa, where data and local analytical capacity is weak. New methods have to be developed to take these constraints into consideration. For example, household survey data and modeling may need to be used rather than subnational time series data, which was used in Asian studies but is not readily available for most African countries.

COUNTRY DEVELOPMENT STRATEGIES

Many developing countries need to achieve faster and more sustained pro-poor economic growth to overcome poverty, hunger, environmental degradation, unemployment, and human diseases. At the same time donors are placing more emphasis on targets, such as the Millennium Development Goals (MDGs), to develop a vision of development and monitor progress. This development framework has created a renewed need for designing and implementing national development strategies. To respond to this new context, IFPRI created a development strategy program in 2004 to focus on key development strategy issues. The program aims at understanding the process of economic development, identifying the preconditions for successful pro-poor growth, and developing practical conceptual frameworks and methods for strategy analysis.

Cross-Country Analysis and Typology

In 2004, the main focus of IFPRI's work on typology focused on Africa, given that the design of viable strategies to stimulate economic growth and development in the region generates considerable debate among development theorists and practitioners, donors, and African policymakers. With the current focus on the MDGs, the New Partnership for Africa's Development (NEPAD), and poverty reduction strategy papers (PRSPs), there is a practical need for an analytical framework that explores cross-country typologies to inform the design of development strategies.

Part of the thinking on development involves the idea that all countries follow the same linear development process. Now, however, thresholds and nonlinearities are increasingly recognized as an important part of the development process. In May 2005 IFPRI organized an international conference on this topic, drawing 30 leading

scholars in the field. To complement this research, IFPRI is collaborating with leading econometricians to create a database of country data to test new methodologies.

Country case studies offer another way of testing the analysis of the development process. In 2004 the research team focused on China's reform process. To get access to first-hand accounts of the political process involved in the reforms, a Chinese collaborator who is a leading expert on the reform era carried out a series of interviews of the architects of China's reforms.

In-depth Country Case Studies

In 2004, research was conducted on growth options and poverty reduction in the Arab region, Ethiopia, Ghana, Kenya, Kuwait, Malawi, Morocco, Peru, Rwanda, Uganda, and Zambia. For each country, the IFPRI team collaborated closely with national researchers and other international organizations, such as the World Bank. Researchers designed innovative economywide models incorporating spatial, geographic information system and household-level analyses. The research outcomes are highly relevant for identifying strategies that can contribute to achieving the MDGs, and they provide significant support to the country support programs. For instance, in Ethiopia model simulations show that increasing national food availability by 50 percent by 2015 will significantly help reduce poverty. In Zambia accelerating staples production is likely to reduce poverty more than traditional and nontraditional export crops. In Ghana exploiting intraregional trade opportunities for staple foods will be important. In addition, in 2004 IFPRI released social accounting matrices (SAMs) on its web site for public access.

Strategic Analysis and Knowledge Support Systems

In 2004 IFPRI took the lead in launching the Strategic Analysis and Knowledge Support Systems (SAKSS)—originally developed for the Initiative to End Hunger in Africa (IEHA)—for Africa. SAKSS is intended to build up an information platform for decisionmakers to help them design and implement more effective rural planning strategies. Working in collaboration with other Future Harvest centers in Africa (the International Livestock Research Institute [ILRI], CIAT, the International Crops Research Institute for the Semi-Arid Tropics [ICRISAT], and IWMI), IFPRI is contributing to SAKSS at the country

and subregional levels in western, eastern, and southern Africa. In 2004 the G8 and NEPAD endorsed SAKSS, and a number of workshops in Ghana, South Africa, and Uganda brought together representatives of international research centers, universities, and donors. The results from SAKSS analyses at the country level in Ethiopia, Ghana, and Uganda and at the regional level have helped to highlight the importance of revisiting the fundamentals for realizing economic growth in the mostly rural and agricultural-based economies of Africa. The studies have found that a smallholder-led rural development strategy, focused on raising the productivity and commercialization of food staples, is a win-win approach to reducing poverty and stimulating economic takeoff in these countries. In 2005 consultative workshops have taken place in all three subregions, and SAKSS analysis has helped inform strategic plans in eastern and central Africa with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and in West Africa with the West and Central African Council for Agricultural Research and Development (CORAF/WECARD).

IFPRI launched country and regional programs in Central America, China, and Ethiopia in 2004 and plans programs in Ghana, Nigeria, and Uganda in 2005 as part of its research strategies.

Central America

Central America is characterized by ethnic, ecological, and economic diversity, yet countries in the region share problems of uneven economic growth, unacceptably high poverty rates, and among the highest hunger and malnutrition rates in the world. IFPRI has set up a regional food policy network in Central America to promote research and policy dialogue within the region on key agricultural and food policy issues. An IFPRI research fellow is based in San José, Costa Rica, and works in close collaboration with the Regional Unit for Technical Assistance (RUTA), an interagency project with more than two decades of experience in rural development in Central America. The program is currently undertaking two case studies in Honduras: one on the drivers of rural growth, and the other on sustainable development strategies for hillside areas. At the end of 2004, the program launched an important study on the impact of the Central American Free Trade



Agreement (CAFTA) on agriculture and the rural sector in five Central American countries. This CAFTA study has strong outreach and dissemination components, including five collaborating country teams and a number of regional consultation workshops and policy dialogues. In 2005 the country case studies were launched.

China

After 25 years of economic reforms, China has achieved great success in economic growth. This success has been accompanied, however, by rising regional income inequalities, environmental degradation, diet changes, and nutrition-related diseases. The China program was launched in early 2004 to provide science-based solutions and advice for reducing poverty and tackling China's emerging problems. In 2004 the program developed its priority themes after consultations with Chinese policymakers and researchers. An IFPRI research fellow is based in Beijing and works in close collaboration with the Chinese Academy of Agricultural Sciences (CAAS) and the International Center for Agriculture and Rural Development (ICARD), a joint initiative of IFPRI and CAAS created in 2003. In 2004 ICARD undertook research on China's western development strategy and conducted capacity strengthening under China's agricultural policy analysis support system. It organized policy dialogues, workshops, and conferences in Nanjing in November 2004 and in Guizhou in early 2005.



Ethiopia Strategy Support Program

Ethiopia faces daunting poverty and food security challenges that are worsening over time. An estimated 30 million Ethiopians are now food insecure, and food crises persist. IFPRI launched the Ethiopia Support Strategy Program (ESSP) in 2004 to improve the data and knowledge base available for applied policy analysis in Ethiopia, address specific knowledge gaps concerning food and agricultural policy through rigorous research, and strengthen the national capacity for practical applied policy research that directly informs rural development strategy. This program will also generate valuable lessons and add to knowledge on development strategy and the policy process. An IFPRI research fellow, based in Addis Ababa, leads the program. The Ethiopian Development Research Institute (EDRI) acts as IFPRI's main partner in Ethiopia. In 2004 the program work plan was developed for the three pillars of the program: Rural Economy Knowledge Support Systems (REKSS), research, and capacity-strengthening. In addition, the program has launched a policy seminar series, organized a number of workshops and conferences, and held ongoing dialogues with stakeholders. Finally, an Ethiopian delegation was invited to visit China in 2005.

For IFPRI, this program represents a new direction in that it is country-driven and impact-oriented, with a direct link to policymaking at the highest level—the prime minister's office. As such, the program will be quite visible, both outside and inside Ethiopia, and presents a significant opportunity to have impact.



Strategic Criteria for Rural Investments in Productivity and Uganda Strategy Support Program

Strategic Criteria for Rural Investments in Productivity (SCRIP) provides analytical and research support to inform the design and implementation of strategies by the Government of Uganda or donors. In 2004, SCRIP researchers undertook a number of studies in conjunction with other projects (such as SAKSS). They produced one report on oil palm and oilseed production and another report on a baseline survey of community and household-level income and asset status. At the program's annual workshop in October 2004, participants noted the relevance of the research results for Uganda's development process and urged SCRIP to broaden its policy outreach and communication. Results of key analyses in Uganda suggest that the country's agricultural economy offers a variety of growth opportunities, especially in the processing sectors. Significant investments will be needed, however, in research and extension, rural roads, and education, along with sector-specific, targeted policy interventions. These results have been disseminated widely through the publication of briefs and through the program's website. To respond to broader needs for research in Uganda, IFPRI will develop a Uganda Strategy Support Program from SCRIP. To be launched in 2005, the

program is expected to work closely with the Program for Modernization of Agriculture (PMA) Secretariat.

SUCCESSES IN AFRICAN AGRICULTURE

Sub-Saharan Africa is the only region in the developing world where per capita food consumption has declined in the past 40 years. The stagnation in Africa's food and agriculture sector stands in sharp contrast to the successes achieved in much of the rest of the developing world. Success in agriculture is crucial to poverty reduction in Africa, given the sector's central role in the continent's economies. About 80 percent of poor Africans live in rural areas, and over 70 percent work in agriculture. Only agriculture offers the potential to lift rural incomes and employment, while at the same time reducing urban food prices.

In response to the region's lack of progress, in 2000 IFPRI established its Successes in African Agriculture program, which highlights successful initiatives and helps focus future research at IFPRI and the other CGIAR centers that work on Africa. In 2004, the program moved forward with several projects that emerged from the conference, "Successes in African Agriculture: Building for the Future," held in Pretoria the

previous year. IFPRI published a collection of 10 briefs describing case studies and conclusions from the Pretoria conference. Among the subjects were recent growth in African cassava production, maize breeding in southern and East Africa, smallholder cotton production in Mali, and horticultural exports in Kenya. Broader questions, such as natural resource management and the overall policy environment for agriculture, were also covered. Full versions of all the Pretoria case studies will be included in an upcoming IFPRI book.

The Pretoria conference has also led to several new partnerships. Under the sponsorship of NEPAD, a number of Pretoria participants developed the Pan-African Cassava Initiative. Recognizing the key role of the crop in African diets, and especially those of the poor, the initiative aims to improve markets, organize producers for collective action, and push for sustained funding of cassava development programs. Another group of Pretoria participants has facilitated regional exchanges to help spread natural resource management technologies, and a private-sector-led initiative has paired agribusiness firms with regional researchers and government decisionmakers to review regional trade policies for key commodities.

At the request of NEPAD, IFPRI is helping organize a series of three regional conferences on agricultural successes. The first, "Agricultural Successes in the Greater Horn of Africa," took place in Nairobi in November 2004.

Over 70 experts with extensive practical experience in African agriculture discussed key opportunities and challenges for accelerating agricultural growth and improving food security in the region. Participants included high-level policymakers, senior researchers, farmers, and representatives from the private sector and donor agencies. Success stories discussed at the conference included:

- maize in southern and East Africa,
- cassava in southern, eastern, and western Africa,
- tissue culture bananas,
- horticulture exports from Côte d'Ivoire and Kenya,
- domestic Kenyan horticulture markets,
- smallholder dairy in Ethiopia, Kenya, and Uganda, and
- fodder shrubs in Kenya.

Several community-driven successes were also presented, including water harvesting in West Africa, adoption of small-scale irrigation systems in Kenya, empowering farmer communities in Somalia, and farmer field schools in East Africa. The conference was co-organized by the Kenyan Ministry of Agriculture, NEPAD, the Intergovernmental Authority on Development (IGAD), Germany's Capacity Building International (InWent), IFPRI, the IWMI, the Technical Center for Agricultural and Rural Cooperation (CTA), and IFAD. Follow-up conferences in southern and West Africa are planned for 2006.

About 80 percent of poor Africans live in rural areas, and over 70 percent work in agriculture. Only agriculture offers the potential to lift rural incomes and employment, while at the same time reducing urban food prices.



Research and Outreach

FOOD SYSTEM INNOVATIONS

Food- and Nutrition-Related Science and Technology Policy Serving Poor People

GENETIC RESOURCES: GENES IN BANKS AND FIELDS

Economics has contributed relatively little to debates about the value of crop genetic resources because most of these resources are not traded on markets. Measuring the value of nonmarket goods presents substantial challenges, and price data are sparse for crop genetic resources, partly because crop genetic resources have multiple traits or attributes that are not all equally apparent to all of the people who manage and exchange the resources.

IFPRI researchers and other CGIAR scientists have undertaken interdisciplinary research on the costs and benefits of conserving the diversity of crop genetic resources, a component of the biodiversity found in domesticated landscapes. Their findings appear in two new books. The premise of both books is that, compared with an endangered wild plant or animal species, crop biodiversity holds proportionately more of its economic value in its practical value in use. The global spectrum of genetic variation in crops has expanded and contracted over the centuries as a direct consequence of human interest, which has arisen because crop varieties are functional units of food production. In harsh environments lacking well-functioning markets, farmers depend on a range of crops and varieties for their survival.

The first book, *Saving Seeds: The Economics of Conserving Crop Genetic Resources Ex Situ in the Future Harvest Centres of the CGIAR*, published in 2004, assesses the cost of saving seeds in genebank collections. It provides a means for estimating the cost of an endowment fund to conserve the current CGIAR

holdings in perpetuity. Based on this information, the Global Crop Diversity Trust has set a target of US\$260 million. This level of investment would generate annual revenue sufficient to underwrite the costs of conserving and distributing the current in-trust holdings of the CGIAR genebanks and other important collections of crop diversity in perpetuity.

The second book, *Valuing Crop Biodiversity: On-Farm Genetic Resources and Economic Change*, to be co-published with the International Plant Genetic Resources Institute (IPGRI) and FAO in 2005, explores the determinants of the diversity of crop genetic resources on farms and the value of diversity to farmers during processes of social and economic change. The book's



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.

findings confirm that farmers themselves value various dimensions of crop biodiversity across a range of crops, national incomes, and agroecological environments where case studies were undertaken. Two of the overriding determinants of crop biodiversity levels on farms are geographical location and environmental heterogeneity. Within these locations, however, the prospects that farmers will sustain crop biodiversity are determined by human capital and assets, sources of off-farm income and migration, farm physical factors, and seed and labor markets. Often, in less-favored environments, factors such as assets and education are associated with more numerous crop varieties grown more evenly across the landscape. In some cases, remittances from off-farm employment enhance access to different seed types; in others, competing activities draw labor out of farm production, reducing dependence on the diversity of staple food crops.

Both books provide a set of tools and methods that can be applied by national researchers in designing genetic resource conservation programs in banks and farm fields. Through the CGIAR Systemwide Genetic Resources Program, in collaboration with ILRI, IFPRI also developed an annotated bibliography and paper assessing the current state of economics knowledge about the value of crop and livestock biodiversity, soon to be posted on multiple websites.

PROGRAM FOR BIOSAFETY SYSTEMS

Decisions about how to use and regulate products from modern biotechnology are the sovereign choice of each country. Biotechnology is producing tools that can help developing countries increase agricultural production and improve food security, and as each country decides how to regulate these new products, it must consider their benefits in relation to potential harmful effects on the environment and human health. The Program for Biosafety Systems (PBS), which IFPRI coordinates, helps partner countries develop the policies and systems necessary to manage and regulate biotechnology and its products, such as genetically modified plants. The program addresses biosafety in the context of sustainable development by providing science-based information and research to improve national biosafety decisionmaking. PBS works with each partner country and region to develop a program of activities tailored to its own needs, as identified by local collaborators. Assistance is available for policy and regulatory development, technical training in risk assessment, strategic planning for communications and outreach, grants for scientific research, and regulatory documentation for proposed field testing.

PBS is working initially with Indonesia, the Philippines, and countries in East, West, and southern Africa. Bangladesh and India were originally included, but IFPRI now is leading a separate program on biosafety issues in those countries. PBS is funded by USAID and implemented by a consortium of expert organizations, including the Donald Danforth Plant Sciences Center, International Life Sciences Institute, Michigan State University, Western Michigan University, national and regional partner organizations, and CGIAR centers.

In 2004 PBS held several technical programs, workshops, and training courses. These included a technical training program for the genetically modified organism regulatory committee, held in Malawi; a food safety short course in New Delhi; a training course on evaluation of biosafety applications for contained use and confined field trials in Uganda; and a workshop on reviewing applications for confined testing of genetically modified plants in Kenya.

The program also held its second annual meeting at IFPRI headquarters in September 2004.

AGRICULTURAL SCIENCE AND TECHNOLOGY INDICATORS

Agricultural R&D is taking place in an investment and institutional environment that is undergoing rapid, and in many instances unprecedented, changes. Public spending on agricultural R&D has slowed in some countries, stalled in others, and actually declined in some. Public agencies are being pushed to pursue new sources of funding and develop new organizational structures to manage and allocate public research funds. In addition, the distinction between public and private research is increasingly blurred. Yet there is a shortage of information and policy analysis to inform and guide the institutional and policy changes that are underway or being contemplated in many countries.

The Agricultural Science and Technology Indicators (ASTI) initiative provides internationally comparable information on agricultural research investments and institutional changes to policymakers and donors. Managed by IFPRI and made up of a network of national, regional, and international agricultural R&D agencies, the ASTI initiative compiles, processes, and makes available data on institutional developments and investments in agricultural R&D worldwide, and it analyzes and reports on these trends. Tracking these developments in ways that allow meaningful comparisons among different countries, different types of agencies, and different points in time is critical for keeping policymakers abreast of science policy issues pertaining to agriculture. The ultimate goal of the initiative is to help policymakers and donors make better-informed decisions about the funding and operation of public and private agricultural science and technology agencies. Better-informed decisions will improve the efficiency and impact of the agricultural R&D systems and ultimately enhance the productivity growth of the agriculture sector.

During 2004 the ASTI initiative finalized its study of recent agricultural R&D investment trends in Sub-Saharan Africa through a survey round in 27 countries. The survey results showed that growth in agricultural R&D investments stalled for the region as a whole during the 1980s and 1990s. Indeed, many individual countries

actually experienced a decline in agricultural R&D expenditures during the 1990s, when funding became increasingly scarce, irregular, and donor-dependent. So far, private sector research has not stepped in to fill in the gap. Given the continued withdrawal of donor funding, Sub-Saharan African countries will need to consolidate and further develop other sources in order to prevent a quick erosion of agricultural R&D capacity. The study recommended that countries combine this action with institutional reforms and sound science and technology policies, both of which are prerequisites for improving the efficiency and effectiveness of the region's agricultural research. The ASTI results for Sub-Saharan Africa contributed significantly to the 2004 InterAcademy Council report *Realizing the Promise and Potential of African Agriculture* and have been cited in other influential studies.

Also in 2004 the ASTI initiative initiated similar survey rounds in various Asian, North African, and Middle Eastern regions. Country briefs and regional assessments, and the underlying datasets, will be made available during 2005–06.

The Future of Smallholder Farming in Efficient and Equitable Food Systems

PARTICIPATION IN HIGH-VALUE AGRICULTURAL MARKETS

Rapidly growing global markets for high-value agricultural products, such as meat, milk, eggs, fish, fruits, and vegetables, present a major opportunity for smallholders in the developing world. Expanding the role of small-scale and poor producers, especially vulnerable groups, in markets for high-value commodities would help boost rural incomes and reduce poverty. Small producers have traditionally dominated markets for such products in developing countries; however, an increasing number of barriers—such as private quality standards and food safety regulations—make it difficult for smallholders to compete in export markets. Some of the same barriers arise in domestic markets, as supermarkets and processor-owned stores command an increasing share of urban demand. These firms often prefer to deal with larger producers.



They also increasingly demand assurances of quality and delivery reliability. These forces tend to drive up the capital intensity of production for high-value products, displacing small farmers.

IFPRI's programs on high-value agriculture markets look for ways that small producers can surmount such obstacles and compete in growing and changing markets. One of the strongest growth sectors is the world market for poultry. Between 1965 and 2002, world poultry production rose 6-fold to over 70 million tons, per capita supplies of poultry meat tripled, and exports of poultry meat grew 17-fold, to more than 6.5 million tons in 2002. International trade accounted for about 10 percent of world consumption in 2002. Poultry trade can spread both animal and human disease domestically and across borders; this is addressed by health regulations in exporting and importing countries. Together with tariffs, related quotas, and a variety of bilateral restrictions, these regulations create a complex mix of trade barriers that poultry producers must navigate.

To better understand the effects of sanitary requirements in this rapidly growing market, IFPRI researchers developed an economic model to simulate international poultry trade. The model distinguishes between high-value (mostly white meat) and low-value

(mostly dark meat) poultry products, and simulates flows between eight exporting and importing countries and regions. The simulation results suggest that nontechnical barriers to trade among the eight countries and regions have significant effects on world markets. The study concluded that potential existed to expand global poultry trade by more than 25 percent if major importers removed nontechnical trade barriers such as tariffs and quotas. Removal of sanitary barriers alone appeared to open few trade opportunities, but removing sanitary and other technical trade restrictions in the simulations created substantial additional trade compared with removing nontechnical barriers only.

Another important high-value sector is fruits and vegetables. A 2004 IFPRI report compared fruit and vegetable exports from Côte d'Ivoire and Kenya. Kenyan horticultural exports are often cited as an African agricultural success story. Fruit and vegetable exports from Côte d'Ivoire have received less attention, but the export value is similar to that of Kenya. Researchers sought to determine whether the two cases constituted valid success stories, what factors contributed to their success (or lack thereof), and to what degree they might be replicated in other African countries. They concluded that Kenyan horticultural exports were a genuine national achievement: horticulture has become the third-largest

earner of foreign exchange, more than half the exports are produced by smallholders, and smallholders gain from producing for the export market. The study concluded that the situation in Côte d'Ivoire was less clearly successful, because most exports are produced on large industrial estates, and growth has been uneven. Ivorian exports also rely on preferential access to European markets relative to Latin American exporters, raising doubts about whether they can be sustained. Researchers found that a realistic exchange rate, stable policies, a good investment climate, competitive international transport connections, institutional and social links with markets in Europe, and continual experimentation with the market institutions to link farmers and exporters were key factors in the growth and success of horticultural exports. The study also found that many of the lessons of Kenyan horticulture can be applied elsewhere in Africa. Not surprisingly, Kenya is already facing increasing competition from neighboring countries, though demand constraints and the slow pace of institutional development will probably prevent other African countries from achieving the same level of success.

INSTITUTIONS AND INFRASTRUCTURE FOR MARKET DEVELOPMENT

IFPRI research has found that many liberalization programs in developing countries have failed to develop efficient and competitive agricultural markets because they have neglected the development of institutions and infrastructure. This has serious consequences for (very often poor) rural smallholders, who practice either subsistence farming or operate in local markets because of lack of connectivity to more lucrative markets at provincial, national, or global levels. Agricultural markets need more than price signals to ensure they function well. Institutions and infrastructure are critical in providing transportation, storage, credit, forums for transactions, price information, and much more to farmers and purchasers of agricultural products.

Important institutions in the agricultural sector include those involved with marketing, such as cooperatives, farmers' and traders' associations, credit clubs, commodity exchanges, and contract farming; those that maintain or operate infrastructure, such as roads, communication networks, extension services, storage facilities, and market information services; and legal and regulatory institutions,



which enforce rules for market conduct, contracts, ownership and property rights, and commodity grades and standards. Without effective institutions and infrastructure, markets function inefficiently, transaction costs and risks remain high, and policies designed to improve incentives for agricultural production may have little impact on small farmers and the rural poor. IFPRI works to identify public policies that foster the development of the institutions and infrastructure needed to make agricultural markets efficient and competitive and to improve the access of small farmers and traders to these markets. To accomplish this, IFPRI includes three dimensions in its analysis of how to link smallholders with markets: (1) the heterogeneity of smallholders and hence the specific bottlenecks they experience in connecting to markets; (2) the complementarities that investments in rural institutions and infrastructure (that is, capital intensive and postharvest technologies) may have in market development and poverty reduction; and (3) the level of market accessibility.

Electric power and irrigation are two important elements of agricultural infrastructure. IFPRI researchers have been studying the provision of electric power for irrigation in the Indian states of Andhra Pradesh and Punjab. They have found that the current system—charging a fixed rate per month rather than an accurate, localized measurement according to use—is highly inefficient. The



Changes in infrastructure and investments affect rural livelihoods and poverty, particularly through income diversification and better links to urban areas and markets.

system is regressive, effectively subsidizing the largest users, who are also the richest. It has driven up agriculture's share of electricity use and has brought about a huge revenue deficit for the electrical system. Lack of accurate use measurement has bred inefficiency and corruption; the quality of electricity supply has deteriorated; and transmission and distribution losses have increased. By making pumping artificially cheap, it has also increased use of tube wells, leading to a fall in the water table in large parts of the two states. This threatens future water supplies and has led to increased spending on drilling deeper wells. To address these problems in the short term, IFPRI has proposed a two-tiered pricing system under which larger users would be charged more per unit of electricity. This would make the system more progressive and increase use efficiency. Over the long run, researchers propose the gradual elimination of subsidies, combined with the development of accurate metering of electricity use, which will allow any remaining support for poor farmers to be carefully targeted.

Changes in infrastructure and investments affect rural livelihoods and poverty, particularly through income diversification and better links to urban areas and markets. IFPRI researchers have been looking at the poorest area of Bangladesh—the northwest region—to determine how both *rural* and *urban* flows of goods, services, and investment affect the food and agricultural supply chain and rural livelihoods more generally, particularly those of poor people and women. The results clearly show that access to infrastructure increases household welfare. This essentially stems from higher

farm prices and increased nonfarm activities, especially for women. In addition, contract farming, which is welfare improving, is more prevalent in areas with better access to infrastructure. Research results also showed the importance of coordination in the provision of infrastructure because of the significant positive complementarities among all forms of infrastructure.

Trade agreements are another very important type of institution affecting agricultural markets. CAFTA was signed by trade representatives from El Salvador, Guatemala, Honduras, Nicaragua, and the United States at the end of 2003 and by those from Costa Rica in January 2004. As of April 2005, CAFTA had been approved by the parliaments of El Salvador, Guatemala, and Honduras, and the treaty will go into effect as soon as the U.S. Congress approves it. The agreement is currently the most hotly debated political issue in participating Central American countries. The debate, however, is mostly fueled by the perceived impacts of the treaty rather than by solid analysis. In response to a request from the Central American Council of Agriculture Ministers (CAC), IFPRI and RUTA have jointly launched a project on the impact of CAFTA on agriculture and the rural sector in Central American countries. Using IFPRI's economic models, detailed household data, market chain and public investment analyses, simulations, and other tools, researchers will examine the economic and social costs of the agreement and explore how to minimize its negative impacts on Central America's already-fragile societies.

Unlike their rural counterparts, who frequently buy less than half their food, residents of large cities generally have to purchase more than 80 percent of their food.



Urban–Rural Linkages in Efficient and Equitable Food Systems

URBAN CHALLENGES TO FOOD AND NUTRITION SECURITY

Cities are growing rapidly across the developing world. Rural residents who leave the countryside behind can bring the problems of poverty, malnutrition, and food insecurity with them. The urban poor already suffer from social exclusion, low incomes, lack of access to education, health services, and safe water, as well as poor environmental conditions. Poverty in the developing world is becoming just as much an urban problem as a rural one. Even in regions with relatively low levels of urbanization, including Africa and parts of Asia, millions of the poor already live in cities. Malnutrition in the poorest areas of cities often rivals that of rural areas. By 2025, more poor and undernourished people in developing countries will live in cities than in the countryside. For a decade, IFPRI has focused a research program on key aspects of urban food and nutrition security and on urban livelihoods often overlooked by policymakers.

Employment is critical to nutrition and food security for urban dwellers in the developing world. Unlike their rural counterparts, who frequently buy less than half

their food, residents of large cities generally have to purchase more than 80 percent of their food. A 2004

IFPRI report used survey data from Bangladesh, Egypt, Ghana, Malawi, and Peru, along with information from other studies, to shed light on overlooked aspects of urban employment. It highlighted three: the importance of agriculture, the importance of formal-sector jobs—even to the poor—and seasonal variations in income. Agriculture, forestry, and fishing are still surprisingly important to the lives of many urban dwellers, especially in smaller cities. Even 2–3 percent of those living in large cities earn a living from agriculture. Many more work in businesses based on or providing inputs to agriculture, such as food transport, processing, and sales. Also counter to common perceptions, the formal sector still dominates urban employment: most city dwellers work for wages or salaries, many of them in the public sector. Another surprising finding is that seasonal variations in income are not limited to those working in agriculture. The poor who work as day laborers may suffer the most from seasonal variations in employment, as monsoon rains can interfere with the businesses that hire them. Rural dwellers may also migrate to the city during slow seasons for agriculture, competing for scarce jobs.

IFPRI's urban research has succeeded to the point that such issues have become integrated into many other parts of the institute's work. IFPRI is now shifting the focus of its urban research toward the linkages between



cities and rural areas. In 2004, researchers went to Bangladesh to conduct interviews and collect other information as part of a comprehensive review of rural–urban linkages in Bangladesh. While much other work in this area has taken a “rural-to-urban” perspective, primarily on issues such as migration or agriculture, this study took a more comprehensive look at the ties between urban and rural areas. One key set of findings is that migrants tend to fall into two categories. The first group is “pulled” to cities by existing connections. Given their education and contacts, they can often make a successful transition to the city. Others are pushed; they have few resources in rural areas and take few skills or resources with them. They are more likely to join and not escape from the ranks of the urban poor. The study found that, with recent reform and structural change in agriculture and the rural economy in Bangladesh, rural areas are increasingly integrated with urban areas—through physical infrastructure, markets, institutions, and communications. These connections are promoting rural and urban growth in the food and agriculture sector. Nevertheless, the national government in Bangladesh continues to be highly centralized, missing many opportunities that could come with regional planning.

Knowledge Systems and Innovation

INSTITUTIONAL CHANGE IN AGRICULTURAL INNOVATION SYSTEMS

In spite of new economic opportunities created by expanding markets and technical and social innovations, rural poverty is still prevalent in most developing countries. The reasons that prevent the rural poor from benefiting from these opportunities are many, but one of the most important is the limited (human, social, and financial) resources they command to search for useful information—information on how to enhance production, how to better access input markets, how to market their output—and to use that information profitably. The ability to search for useful information and to use that information is known as the absorptive capability and is a key factor in the ability to innovate. Based on extensive research at the former ISNAR center, IFPRI’s program, Institutional Change in Agricultural Innovation Systems, launched in 2005, relies on two key assumptions: (1) smallholder farmers and other groups’ absorptive capabilities are weak owing to limited human and social capital and institutional constraints, and (2) farmers and other agents do not innovate alone, but by interacting with other agents. In other words, collective action is necessary to innovate. Thus, enhancing the individual and collective absorptive capabilities can be a major instrument in the fight against poverty. The program will concentrate its efforts on understanding how individual and collective absorptive capabilities can be strengthened and their importance in strategies to reduce rural poverty.

Food Policy Communications

COMMUNICATIONS DIVISION

The Communications Division carries out the work of communicating with IFPRI’s audiences in close cooperation with the research and outreach divisions and the 2020 Vision Initiative. It serves the entire institute by communicating research results to those who need them. It does this by disseminating IFPRI’s research findings through publications, the media, a website and other electronic/digital means, conferences and other meetings,



and by listening in workshops, dialogues, and stakeholder meetings to the needs of the Institute's various stakeholders. The Communications Division also works with IFPRI's Publications Review Committee to ensure the academic quality of IFPRI's publications and it promotes and safeguards IFPRI's brand and visual image through consistency in design.

A key communications activity the Division undertook in 2004 focused on the 2020 Africa Conference. In cooperation with the 2020 Vision Initiative, the Communications Division carried out state-of-the-art communication activities for this three-day conference. Communication activities and tools included developing a brand image for the conference, a pre-conference interview with President Museveni published in the IFPRI newsletter, a conference website featuring daily summaries of all the sessions and French translations of key materials, simultaneous English-French translations of most sessions at the conference, an instantaneous audience polling system that allowed audience members to express their opinion on key issues, a pre-conference media tour in Uganda, press briefings with President Museveni and others, and numerous publications developed for the conference. Thirty leading African and European journalists were recruited to participate in the conference. (For more information on the conference itself, see the 2003-2004 annual report.) After the conference, the Communications Division worked with the Government of Uganda to develop Ugandan stamps to commemorate the conference. The government issued these stamps in two denominations.

In addition to this major conference, the Division helped promote dialogue among policymakers, researchers, and other stakeholders through 13 policy seminars and 8 workshops and conferences in 2004.

The Communications Division brings research findings to stakeholders through media outreach as well. Media activities have extensively publicized IFPRI's research in major newspaper, magazine, internet, and radio/television outlets worldwide. In 2004, the Communications Division organized approximately 25 press events on four continents to promote IFPRI's research. The number of journalists that subscribed to the media listserv reached 550 in late 2004, representing 65 countries.

The Division continued to take advantage of new technologies to enhance electronic access to IFPRI's research via the web. It has helped to market IFPRI's research output by making it "harvestable" from a variety of databases/search engines, including CiteSeer, Scirus, Google Scholar, OCLC WorldCat, and Google Print. These popular and widely-used databases enable users to search specifically for scholarly literature, including theses, books, abstracts, working papers, and journal articles from a great variety of academic publishers, professional societies, universities, and other repositories. Through these digital libraries IFPRI can share its publications and information resources with a much larger audience. These innovations are useful resources for visitors and IFPRI researchers, and enhance the visibility of IFPRI's website by increasing the external links. The number of visitors to IFPRI's website increased by about 180,000 in 2004,



compared to 2003. With new features such as an RSS feed and a blog in 2005, the number of website visitors is expected to continue to grow substantially.

The Division also worked with ISNAR to manage the transition of communication activities, including the website, library, and publications pipeline, to IFPRI. And it worked with the new ISNAR Division on branding, peer review, and general publication procedures, as well as on developing information-related materials. The two divisions increased their collaborative activities in early 2005, with the posting of a senior communications specialist to the ISNAR Division in Addis Ababa. This person reported to the directors of both divisions.

IFPRI, through its Communications and ISNAR Divisions, continues to study the role of public-private partnerships for food and agriculture in developing countries. The research agenda has covered many policy aspects of the sector, including conventional crop breeding, agricultural biotechnology, processing and value addition, and small-scale agro-industry. Key elements of this research agenda were highlighted at a seminar on "Cooperation in Agricultural Research: A Review of Research on Public-Private Partnerships" held in Frankfurt, Germany in February 2004. Building on the successes of this event, the Communications and ISNAR Divisions jointly convened an international dialogue on "Pro-Poor Public-Private Partnerships in Food and Agriculture" in Washington, DC in 2005. The goal of this event was to identify opportunities for more effective pro-poor partnerships, covering the full range of on-farm production, off-farm agroindustry, distribution, and marketing.

2004 also brought recognition of efforts to combine high-quality research and communication on the publishing front. *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. The American Agricultural Economics Association honored this effort to appeal to a relatively broad audience with sound research with its 2004 Quality of Communication Award. The Division published more than a dozen books and monograph-length studies in 2004, along with a wide range of materials for non-academic stakeholders.

In designing appealing communication products, the Division also makes sure that they can be clearly identified as IFPRI's. The Division maintained a visual "brand" that cut across its publications and other communication materials. It also provided support to IFPRI's field offices on branding guidelines for signage, letterheads, web pages, and publications, as well as guidance on lobby and office design. The Division also began work on a new communications toolkit on a CD-ROM that staff can take with them when they travel.

To be able to communicate and share research results with an even broader audience, whenever feasible the Division translated IFPRI publications. In 2004, publications were translated into Arabic, Chinese, French, German, Japanese, and Spanish.

A 2020 VISION FOR FOOD, AGRICULTURE, AND THE ENVIRONMENT

Understanding and responding to the challenges of poverty and food insecurity require vigilance on emerging developments, new realities, and advances in knowledge. The 2020 Vision Initiative is IFPRI's home for forward-looking and innovative analysis and communications. The Initiative is continually on the lookout for issues that are likely to influence food and nutrition security and responds with tools and projects designed to share knowledge and inform the debate over key issues. The ultimate goal is to contribute to more informed and effective decisions and policies for fighting hunger and poverty in developing countries.

Small farms provide the largest source of employment among the world's poor, but small farmers are now facing the challenge of being competitive in a more integrated, globalized, and consumer-driven environment.



Over the past year the Initiative has devoted much attention and energy to improving understanding of the problems facing Africa and to identifying solutions. The groundbreaking 2004 conference "Assuring Food and Nutrition Security in Africa by 2020," facilitated by the initiative and held in Uganda, helped to put food and nutrition issues on the agenda in Africa, and work has continued on ensuring the long-lasting impact of this conference.

Follow-up comments by a number of conference participants showed that they were eager to move ahead on the actions highlighted at the conference. "The African Business Roundtable and NEPAD Business Group stand ready to partner with IFPRI and all stakeholders in implementing the actionable strategies put forward to ensure the realization of the conference objectives," said Alhaji Bamanga Tukur, executive president of the African Business Roundtable and Chairman of the NEPAD Business Group. Jacques Murinda Muzirakugomwa, a delegate of the Forum for African Civil Society (FACS) from South Africa, said, "We young people from Africa and the Forum for African Civil Society, of which I was one of the representatives, benefited significantly, and we are looking forward on the ways to implement the outcomes and resolutions of the conference and are resolved to get ourselves involved actively as partners in ensuring food security in Africa."

To help build on the commitment and enthusiasm expressed by conference participants, the Initiative and the Conference Advisory Committee have taken steps to feed the outcomes from the conference into various forums in Africa and around the world. One such forum

was Dakar Agricole, a meeting convened by President Wade of Senegal in February 2005 to address ways to bridge the world agricultural divide. At the request of President Wade, who was one of three heads of state to attend the 2020 Africa Conference, the Initiative offered guidance and technical assistance to the Dakar meeting. Now the Initiative is supporting an African effort to establish an Africa Food and Nutrition Day designed to focus attention on food and nutrition issues.

Through publications associated with the 2020 Africa conference, the Initiative has also contributed to the knowledge base in Africa. IFPRI published a complete proceedings of the conference as well as three 2020 Vision Discussion Papers and dozens of other publications and materials covering a wide range of issues affecting food and nutrition security in Africa.

While follow-up to the conference continued through the year, the Initiative also turned its attention to other emerging issues. One such issue concerns the future of small farms in developing countries. Small farms provide the largest source of employment among the world's poor, but small farmers are now facing the challenge of being competitive in a more integrated, globalized, and consumer-driven environment. In June 2005, the 2020 Vision Initiative and IFPRI's Development Strategy and Governance Division organized a research workshop in collaboration with the Overseas Development Institute and Imperial College London. Leading experts gathered to address the key questions: Is agriculture the engine of growth? If so, should a pro-poor agricultural growth strategy rely on small farms? How can small farm development contribute to growth and poverty reduction in many of the poorest



developing countries? Discussion of these questions was informed by a commissioned 2020 Vision Discussion Paper entitled *The Family Farm in a Globalizing World*, by Michael Lipton. The Initiative will continue its work on the future of small farms in the coming year.

In addition to the work on small farms, the Initiative has continued to commission new research and analysis on other emerging issues, such as the links between agriculture and health.

Besides furthering research and information exchange on emerging issues, the Initiative also engages in pilot activities that offer potential for advancing the effort to achieve food and nutrition security. In this regard, the Initiative served as the lead facilitating agency for the establishment of the Collaborative M.Sc. Program in Agricultural and Applied Economics for Eastern, Central, and Southern Africa. After three years of planning, consultation, and implementation by IFPRI and other partner institutions, the program was transferred to a permanent home in Africa in 2005, generating a great deal of pride and enthusiasm among all the partners. Harris Mule, chair of the program's Steering Committee, said, "Generation of knowledge and building of analytical skills for enhancing agricultural productivity is central to meeting food security concerns in Africa. By promoting world-class training in agricultural economics, the Collaborative M.Sc.

Program in Agricultural and Applied Economics in Eastern, Central, and Southern Africa will go a long way toward meeting this need. IFPRI has played a critical role in initiating and steering this program to fruition."

POLICY AND RESEARCH NETWORKS

IFPRI East Africa Food Policy Network

The IFPRI East Africa Food Policy Network contributes to efforts to reduce poverty and malnutrition, increase agricultural productivity, and promote sustainable use of natural resources in East Africa by facilitating collaborative research, improving the dissemination and use of research results, and strengthening the capacity for policy research and analysis in the region. The network is built on 6- to 10-member country teams in six countries—Ethiopia, Kenya, Malawi, Mozambique, Tanzania, and Uganda—with a regional advisory committee drawn from these teams. An IFPRI research fellow acts as network coordinator. The network collaborates closely with the Uganda-based Eastern and Central Africa Program for Agricultural Policy Analysis (ECAPAPA) and with policy research organizations in each member country.

The network administers two grants programs: the Competitive Grant Program and the M.Sc. Grant Program. The Competitive Grant Program promotes research on country and regional priorities. Since 2000,



the network has supported 31 projects across all six network countries. Twenty-five projects have been completed, yielding results of great policy relevance for the region. Results from 14 projects have been published as IFPRI East Africa Food Policy Network Reports. In 2005 the network published a volume titled "The Future of Smallholder Farming in Eastern Africa: The Roles of States, Markets, and Civil Society" based on 11 of the best reports. The comprehensive volume was launched during a three-day conference on smallholder farming in East Africa attended by more than 80 participants. The network's M.Sc. Grant Program has awarded 16 grants to M.Sc. students from Ethiopia, Kenya, Malawi, Tanzania, and Uganda, and 13 of these projects have been completed.

In addition, the network continues to expand its dissemination of research results, with a growing mailing list of more than 880 individuals and institutions. In early 2005, after consultations with the network's regional advisory committee and stakeholder groups, IFPRI and ECAPAPA launched a new entity called the ECAPAPA-IFPRI Food Policy Research Program to undertake long-term regional food and agricultural policy research, capacity strengthening, and outreach in Burundi, the Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Sudan, Tanzania, and Uganda. The partnership is designed to pursue collaborative projects that explore high-priority research topics. In a year-long priority-

setting process, six country teams, ECAPAPA, and IFPRI identified five research themes of highest priority for the region and for which ECAPAPA and IFPRI have expertise. These themes are (1) facilitating agricultural trade, (2) commercializing smallholder agriculture, (3) strengthening food and agricultural policies and institutions, (4) developing options for improved agricultural science and technology policies, and (5) strengthening institutions for using and managing natural resources. Most collaborative research projects in the program will fall under these high-priority themes.

South Asia Initiative

IFPRI has been working in South Asia for a long time, but early in 2002 it launched the South Asia Initiative (SAI) with aims of improving the understanding and analysis of the emerging challenges to agriculture in the region and their implications for food security and poverty alleviation. To advance its long-term commitment to South Asia, IFPRI opened a new office in New Delhi—inaugurated by the Prime Minister of India, Dr. Manmohan Singh on March 7, 2005—to significantly scale up its research, policy analysis, and capacity strengthening activities.

SAI has three components. The first is the Policy Analysis and Advisory Network for South Asia (PAANSA), a network of agricultural policymakers, advisors, and analysts to identify high priority research issues and research opportunities in South Asia. During 2004, PAANSA meetings were organized in Bangladesh, Bhutan, Nepal, and Sri Lanka. Two policy communication programs were also organized, one in September 2004, "Food Security in Asian Countries in the Context of the Millennium Development Goals," jointly organized with the Asian Development Research Foundation, and another in December 2004, "Re-energizing Agriculture in India," jointly organized with the Rajiv Gandhi Foundation and the World Bank.

SAI's second component is applied research, addressing the issues of smallholders—given their prevalence in South Asia—with a number of research partners. Of 125 million farm holdings in South Asia, more than 80 percent have an average size of 0.6 hectares. Hence a key SAI objective is to explore opportunities for integrating smallholders into the supply chains of

emerging and profitable agribusiness ventures. Studies assessed the emerging patterns of agricultural diversification toward high-value agriculture in South Asia, the role of the private sector in strengthening vertical coordination, and the institutional and policy impediments to accelerating diversification. Findings showed that South Asian agriculture is gradually diversifying in favor of high-value food commodities, and that urban and periurban areas are diversifying faster than the hinterlands. A silent revolution of innovative institutions is emerging, reducing transaction costs, improving marketing efficiency, and minimizing production and marketing risks. The results of studies show that output prices and agricultural diversification were important sources of growth in India during the reform period, and this is true on small farms as well.



The third component of SAI involves developing policy research capacity in national agricultural research systems. Two training workshops, "Agricultural Diversification and Vertical Coordination" and "Policy Analysis on Reforming Agricultural Markets," were organized in Dhaka, Bangladesh, and Islamabad, Pakistan. In addition, several collaborators from South Asia visited Washington, D.C., to work more closely with IFPRI colleagues and share results.

IMPACT ASSESSMENT

Documentation of the influence of IFPRI—impact assessment for short—is an important aspect of policy communications. IFPRI's impact assessment work is carried out primarily by a long-term part-time collaborator, who serves as coordinator, along with IFPRI researchers and independent assessors. The objectives of IFPRI's impact assessment activities are to

- achieve improved accountability and credibility,
- improve research quality and effectiveness,
- ensure continuing relevance, and
- promote strategic thinking in a learning organization.

In 2004 a new case study was published as part of IFPRI's impact assessment working paper series. Coauthored by an independent assessor, the paper evaluated the effects of the Bangladesh food-for-

education program on school enrolment, duration of schooling, and lifetime earnings, and the influence of IFPRI research on policy. The Johns Hopkins University Press published *What's Economics Worth? Valuing Policy Research* for IFPRI in 2004. Several of the chapters in the book were based on papers presented at IFPRI impact assessment workshops in 1996 and 2001, as well as on past impact assessment discussion papers.

The impact assessment team began a second round of focus group interviews with senior research staff in 2004. These interviews elicit narratives that describe outcomes, influences, policy responses, and impacts from research and related activities. The second round has been completed in terms of initial discussions, and confirmation and updating of the draft findings will be finalized in 2005. The results of these interviews will inform future outreach activities.

Along with the Economic Research Service (ERS) of the U.S. Department of Agriculture and the Farm Foundation, IFPRI cosponsored a workshop aimed at taking stock of lessons learned from food policy research impact assessment in 2004. Several IFPRI staff made presentations, along with researchers from ERS, the World Bank, the Global Environmental Facility, the University of Maryland, and Harvard University. A workshop report will be issued as an IFPRI impact assessment discussion paper in 2005.

Capacity Strengthening

LEARNING AND CAPACITY STRENGTHENING

Lack of capacity and skills has often been identified as a key impediment to progress in the world's poorest countries. Accordingly, IFPRI has made capacity strengthening one of the three pillars of its new strategy. In 2004 IFPRI decided to move its Capacity Strengthening Program from the Communications Division to the ISNAR Division and change the program's name to the Learning and Capacity-Strengthening (L&CS) Program effective January 1, 2005. The program will contain a large outreach component and will focus its research on evaluating capacity-strengthening programs.

In 2004 the L&CS Program increased and diversified its capacity-strengthening resources and made preparations for offering distance education. The program also expanded the channels and venues for capacity strengthening by planning new training workshops and further developing its database of institutions that have used, or could use, IFPRI publications and training material in their own instructional programs.

In 2004 IFPRI conducted 31 training courses; trained more than 430 policymakers, policy researchers and analysts, and university professors; guided 39 M.Sc. and Ph.D. thesis projects; developed 5 curricula related to food policy courses; and made several IFPRI datasets available to the public. Upon request, IFPRI sent 187 sets of its materials to trainers and professors in more than 30 organizations.

The L&CS Program held two methods-oriented training workshops in South Asia: one on methods for analyzing high-value agriculture and the other on quantitative methods for analyzing domestic market reforms. In Sub-Saharan Africa the program continued providing technical assistance to researchers funded by the East African Policy Analysis Network. The program also collaborated with Sokoine University, Makerere University, Egerton College, FOODNET of the International Institute of Tropical Agriculture (IITA), and the CIAT to organize a short course called "East Africa Marketing Policy and Agribusiness," designed to enhance and upgrade the skills of junior personnel.



The program expanded its role in Sub-Saharan Africa to address capacity needs in the areas of privatization, liberalization, and diversification in agriculture. IFPRI has set up a formal relationship with Alemaya University, Ethiopia, to support the creation of a Center for Agricultural Research Management and Policy Learning in East Africa (CARMPoLEA) and to evaluate short-term learning programs on agricultural research management and policy. IFPRI is also partnering with Makerere University, Uganda, to strengthen capacity for designing an M.Sc./M.A. degree program in agricultural management and policy to respond to the needs of eastern and central Africa. To help create the knowledge and skills needed for food policy analysis and rural development strategy formulation, IFPRI developed three learning modules on spatial analysis for rural economic policy for Ethiopian policy analysts and implementers.

IFPRI also continued to coordinate the development of the CGIAR program Global Open Food and Agriculture University (GO-FAU) in 2004. In collaboration with partners, GO-FAU will develop course modules in distance education that will strengthen existing M.Sc. programs, short-term M.Sc.-level training programs, and new M.Sc. programs in agriculture. GO-FAU will strengthen the capacity of collaborating faculty and will facilitate student thesis research for those enrolled in these M.Sc. programs. GO-FAU partner universities will take the lead in delivering the courses, providing accreditation, and



awarding degrees. IFPRI will take the lead in developing the program in agriculture economics and agribusiness, ICRISAT will take the lead in agroecology, and ICARDA has agreed to help lead the agroecology program for North Africa and the Middle East.

In 2004 GO-FAU was approved by the CGIAR Center Directors Committee and endorsed by the Science Council. During the year, IFPRI consulted partners through formal and informal meetings and undertook three preliminary technical needs assessments in South Asia, eastern and southern Africa, and Southeast Asia. In 2005 the program established a program advisory committee and content peer review committees for GO-FAU, developed formal relationships with key partners, and gathered existing CGIAR and non-CGIAR course modules in agricultural economics/agribusiness and agroecology.

In an effort to provide accessible and inexpensive learning and capacity strengthening, IFPRI launched an e-learning program in mid-2005 through its website and on CD-ROM. The first e-learning modules are "How to Write a Convincing Concept Note," "How to Write a Convincing Proposal," and "How to Prepare a Logical Framework Matrix."

ORGANIZATION AND MANAGEMENT FOR STRENGTHENING AGRICULTURAL RESEARCH

IFPRI's work on organization and management centers on developing effective and efficient approaches and tools to enhance the productivity and efficiency of key agents in research for development systems. This work acknowledges the need for a fundamental shift away from a linear innovation model to one that is iterative and participatory, and thus far more complex. The underlying assumption is that enhanced interaction among key stakeholders will create the necessary collaborative synergy to achieve badly needed impact at the grassroots level. Key challenges will involve catalyzing collective action through the development and testing of innovative approaches and methodologies to rationalize the research agenda, rationalize the division of labor, diversify funding sources, pool resources for shared goals and objectives, and promote impact-oriented accountability.

Collaboration 2004



COLLABORATING INSTITUTIONS IN DEVELOPING COUNTRIES

AFRICA

BOTSWANA

Botswana College of Agriculture
Department of Agricultural Research

BURKINA FASO

Association pour la Gestion de l'Environnement et le
Developpment
Institut de l'Environnement et de Recherches Agricoles
University of Ouagadougou

CÔTE D'IVOIRE

Ivorian Center for Economic and Social Research

DEMOCRATIC REPUBLIC OF CONGO

Institut National pour l'Étude et la Recherche
Agronomiques

ETHIOPIA

Addis Ababa University
Alemaya University
Amhara Regional Agricultural Research Institute
Central Statistical Authority
Ethiopian Agricultural Research Organization
Ethiopian Civil Service College

Ethiopian Development Research Institute
Ethiopian Economics Association
Ethiopian Grain Trade Enterprise
Ministry of Agriculture and Rural Development
Ministry of Finance and Economic Development

GABON

Institut de Recherches Agronomiques et Forestières

GAMBIA

National Agricultural Research Institute

GHANA

Ghana Health Service, Nutrition Unit
Institute for Statistical, Social, and Economic
Research, University of Ghana-Legon
Nutrition Security Unit, University for Development
Studies-Tamale
Science and Technology Policy Research Institute,
Council for Scientific and Industrial Research
UNICEF-Ghana
Water Resource Institute

KENYA

Catholic Relief Services
Egerton University

Institute for Policy Analysis and Research
Institute of Development Studies, University of Nairobi
Jomo Kenyatta University of Agriculture and
Technology

Kenya Agricultural Research Institute
Kenya Trypanosomiasis Research Institute
Maseno University
Ministry of Agriculture and Rural Development
Ministry of Finance and Planning
Moi University
TechnoServe
Top Investment Management Services, Ltd.
University of Nairobi

LESOTHO

Ministry of Tourism, Environment, and Culture

MALAWI

Bunda College of Agriculture, University of Malawi
Center for Social Research, University of Malawi
Malawi Agriculture Sector Investment Program
Malawi Polytechnic
Ministry of Agriculture and Irrigation, Department of
Agricultural Research and Technical Services
National Statistics Office

MALI

Association des Organisations Professionnelles
Paysannes
Institut d'Économie Rurale

MAURITANIA

Centre National d'Élevage et de Recherches Vétérinaires

MAURITIUS

Attorney General's Office

MOZAMBIQUE

Eduardo Mondlane University
Ministry of Agriculture and Rural Development
Ministry of Education
Ministry of Planning and Finance
National Institute of Statistics

NAMIBIA

University of Namibia

NIGER

Institut National de Recherches Agronomiques du Niger

REPUBLIC OF THE CONGO

Délégation Générale à la Recherche Scientifique et
Technologique

RWANDA

Institut des Sciences Agronomiques du Rwanda
Université Nationale du Rwanda

SENEGAL

Institut Sénégalais de Recherche Agricole

SOUTH AFRICA

Agricultural Research Council
Department of Social Development
Department of Land Affairs
Department of the Treasury
Human Sciences Research Council of South Africa
Ministry of Agriculture
South Africa Human Rights Commission
University of KwaZulu Natal
University of Pretoria
University of Stellenbosch
University of the Western Cape

SUDAN

Agricultural Research Corporation
Ministry of Finance and National Economy

SWAZILAND

Swaziland Environment Authority
University of Swaziland

TANZANIA

Economic and Social Research Foundation
Institute of Development Management
Institute of Development Studies
Ministry of Cooperatives and Marketing
Ministry of Water and Livestock Development
National Bureau of Statistics
Research on Poverty Alleviation
Sokoine University of Agriculture
Tanzania Commission for Science and Technology
University of Dar es Salaam

UGANDA

Action Aid-Uganda
Agricultural Council of Uganda
Allied Business Consultants and Management Services
Ltd.

Appropriate Technology-Uganda
Economic Policy Research Centre
Government of Uganda: Plan for Modernization of
Agriculture

Makerere University
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
National Council for Science and Technology
Office of the President
Uganda Bureau of Statistics
Uganda National Agricultural Advisory Services
Uganda National Farmers Association

ZAMBIA

Ministry of Agriculture
Pelum Association
University of Zambia
Zambia National Farmers Union

ZIMBABWE

Biosafety Board of Zimbabwe
Biotechnology Trust of Zimbabwe
Department of Veterinary Public Health
Ministry of Science and Technology
Troparg Consultancy Services
University of Zimbabwe

ASIA/PACIFIC**BANGLADESH**

Bangabandhu Sheik Mujibur Rahman Agricultural
University
Bangladesh Agricultural Research Council
Bangladesh Rice Research Institute
CARE-Bangladesh
Centre for Social Studies, Dhaka University
Data Analysis and Technical Assistance Limited
Jahangirnagar University
Sawkat and Associates
University of Dhaka

BHUTAN

Ministry of Agriculture

CAMBODIA

Cambodian Agricultural Research and Development
Institute

CHINA

Center for Chinese Agricultural Policy
Chinese Academy of Agricultural Sciences
Gansu Agricultural University
Guizhou University
Nanjing Agricultural University
Zhejiang University

INDIA

Agricultural University
BAIF Research and Development Foundation
Centre for Development and Human Rights
Centre for Economic and Social Studies
Indian Council of Agricultural Research
Indian Development Foundation
Indian Institute of Management-Ahmedabad
Indira Gandhi Institute of Development Research
Institute for Social and Economic Change
Jawaharlal Nehru University

M.S. Swaminathan Research Foundation
National Centre for Agricultural Economics and Policy
Research

National Council of Applied Economic Research
Punjab Agricultural University
Research and Information System for Non-Aligned and
Other Developing Countries

Sardar Patel Institute for Economic and Social Research
Society for Research and Initiatives for Sustainable
Technologies and Institutions

Tamil Nadu Agricultural University Aracharya N.G.
Ranga

Tribhuvan University
University of Agricultural Sciences
University of Delhi

INDONESIA

Center for Agro-Socioeconomic Research
Center for Regional Resource Development and
Community Empowerment
Directory of Development Planning Board
(BAPPEDA-Bungo and Tajung Jabung Barat
Districts)
Indonesian Agency for Agricultural Research and
Development
Institute of Economic and Social Research, University of
Indonesia

LAOS

National Agricultural and Forestry Research Institute

MALAYSIA

Malaysian Agricultural Research Development Institute

MYANMAR

Department of Agricultural Research

NEPAL

Business Information Services
Institute for Social and Ecological Transition
National Agricultural Research Council
Nepal Agricultural Research Council, In Situ
Agro-biodiversity Conservation Project
Tribhubhan University

PAKISTAN

Agricultural Prices Commission
Innovative Development Strategies
National Agricultural Research Centre
Pakistan Agricultural Research Council
Pakistan Institute of Development Economics
University of Agriculture

PAPUA NEW GUINEA

National Agricultural Research Institute

THE PHILIPPINES

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

SAMOA

Institute for Research Extension and Training

SRI LANKA

Council for Agricultural Research Policy
University of Peradeniya

Collaboration 2004

COLLABORATING INSTITUTIONS IN DEVELOPING COUNTRIES

THAILAND

Thailand Development Research Institute

VIETNAM

Central Institute for Economic Management
General Statistical Office
Ministry of Agriculture and Rural Development
Ministry of Labor, Invalids, and Social Affairs
Ministry of Planning and Investment

LATIN AMERICA/CARIBBEAN

ARGENTINA

Instituto Nacional de Tecnología Agropecuaria

BARBADOS

University of West Indies

BOLIVIA

Unidad de Análisis de Políticas Económicas

BRAZIL

Empresa Brasileira de Pesquisa Agropecuária
University of São Paulo

CHILE

Instituto de Investigaciones Agropecuarias
Universidad de Talca

COLOMBIA

Universidad de los Andes

COSTA RICA

Centro Internacional de Política Económica para el
Desarrollo Sostenible
Instituto Nacional de Innovación y Transferencia en
Tecnología Agropecuario
Instituto Nacional de Tecnología Agropecuaria
Ministerio de Agricultura
Universidad de Costa Rica

CUBA

Ministerio de Agricultura y Ganadería

DOMINICAN REPUBLIC

Centro de Desarrollo Agropecuario y Forestal
Instituto Dominicano de Investigaciones Agropecuarias
y Forestales

ECUADOR

Corporación de Promoción de Exportaciones e
Inversión

Instituto Nacional de Investigaciones Agropecuarias
Pontificia Universidad Católica de Ecuador
Universidad Central del Ecuador

EL SALVADOR

Fundación Salvadoreña para el Desarrollo Económico y
Social

GUATEMALA

University of Landivar

HAITI

World Vision-Haiti

HONDURAS

Fundacion Hondurena de Investigacion Agrícola
Zamorano Panamerican School of Agriculture

MEXICO

Coordinadora Nacional de las Fundaciones Produce
Instituto Nacional de Investigaciones Forestales,
Agrícolas y Pecuarias
Instituto Nacional de Salud Publica

NICARAGUA

Agencia Suiza para la Cooperación y el Desarrollo
Asociacion Gremial Fundacion PROVIA
Red de Protección Social, Ministry of the Family
Sistema de Integracion Centroamerica de Tecnologia
Agricola
University of Central America

PANAMA

Instituto de Investigación Agraria
Instituto de Investigación Agropecuario de Panama

PARAGUAY

Dirección de Investigación Agrícola
Instituto Desarrollo de Capacitación y Estudios

PERU

Grupo de Estudios de Desarrollo Economico

URUGUAY

Centro de Investigaciones Económicas
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

JORDAN

University of Jordan

KUWAIT

Arab Planning Institute

MOROCCO

Casablanca Hassan II University
Centre Régional de la Recherche Agronomique de
Oujda
Centre Régional de Recherche Agricole de Settat,
Institut National de la Recherche Agronomique
Directions Provinciales de l'Agriculture
Institut National de la Recherche Agronomique
Institut National de Statistique et d'Economie
Appliquée

SUDAN

Agricultural Research Corporation
Ministry of Agriculture
Ministry of Finance and National Economy
University of Gezira

SYRIA

Directorate of Agricultural and Scientific Research

TUNISIA

Centre Interuniversitaire sur le Risque
Direction Générale des Eaux et Forêts
École Nationale d'Agriculture de Mograne
Institut National de la Recherche Agronomique de
Tunisie
Institution de la Recherche et de l'Enseignement
Supérieur Agricoles
Tunis Al Manar University

COLLABORATING INSTITUTIONS IN DEVELOPED COUNTRIES

ASIA/PACIFIC

AUSTRALIA

University of Adelaide

JAPAN

Foundation for Advanced Studies on International Development

National Graduate Institute for Policy Studies

EUROPE

DENMARK

Institute of Economics, University of Copenhagen

Royal Veterinary and Agricultural University

FRANCE

Centre de Coopération Internationale en Recherche Agronomique pour le Développement

Institut Agronomique Méditerranéen de Montpellier
University of Paris 1-La Sorbonne

GERMANY

Center for Development Research, University of Bonn

Centre for Environmental Research, Leipzig-Halle

Humboldt University-Berlin

Marburg University

University of Kiel

University of Stuttgart-Hohenheim

HUNGARY

Institute for Agrobotany

Institute of Environmental and Landscape

Management, Szent István University

THE NETHERLANDS

Free University

Institute of Social Studies

Lingua Nostra Translations

Wageningen University and Research Centre

UNITED KINGDOM

Action Aid

Centre for Population Studies, London School of Hygiene and Tropical Medicine

Centre for the Study of African Economies, University of Oxford

Department for International Development

Economic and Social Research Council Research

Programme on Well-Being in Developing

Countries, University of Bath

Imperial College

London School of Economics

University of Cambridge

University of East Anglia

University of Sheffield

University of Sussex

NORTH AMERICA

UNITED STATES

Abt Associates, Inc.

Auburn University

Berkeley Economic and Advisory Committee

Christian Medical and Dental Associations

Cornell University

Economic Research Service, United States

Department of Agriculture

Ecotrust

Emory University, Rollins School of Public Health

George Washington University

Global Development Learning Network

Global Development Network

Harvard University

Massachusetts Institute of Technology

Michigan State University

New York University

Population Council

Purdue University

Rockefeller Foundation

Rutgers University

Swarthmore College

University of California-Berkeley

University of California-Davis

University of Maryland

University of Minnesota

University of Pennsylvania

University of Wisconsin-Madison

U.S. Agency for International Development

Virginia Polytechnic Institute

Wellesley College

COLLABORATING INTERNATIONAL AND REGIONAL ORGANIZATIONS

Advocates Coalition for Development and Environment

African Capacity Building Foundation

African Economic Research Consortium

Africare

Asian Development Bank

Association for Strengthening Agricultural Research in Eastern and Central Africa

Center for International Forestry Research

Central American Academy

Central American Council of Ministers of Agriculture

Centro Internacional de Agricultura Tropical

Centro Internacional de la Papa

Centro Internacional de Mejoramiento de Maíz y Trigo

Consumer International

East Africa Market Information and Postharvest Network (Foodnet)

Eastern and Central Africa Programme for Agriculture Policy Analysis

Food, Agriculture, and Natural Resources Policy Analysis Network

Food and Agriculture Organization of the United Nations

Food Security Network for West Africa

Forum for Agricultural Research in Africa

Horticultural Promotion Council

Institute of Nutrition in Central America and Panama

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 Federation of Organic Agriculture

Movements

International Fertilizer Development Center

International Foundation for Global Economic

Challenges

International Fund for Agricultural Development

International Land Coalition

International Livestock Research Institute

International Plant Genetics Resources Institute

International Rice Research Institute

International Water Management Institute

New Partnership for Africa's Development

Programa Cooperativo de Investigación y Transferencia de Tecnología Agropecuaria para la Subregión Andina

Programa Cooperativo para el Desarrollo Tecnológico Agroalimentario y Agroindustrial del Cono Sur

Regional Unit for Technical Assistance

Southeast Asian Ministers of Education Organization's Regional Centre for Graduate Study and Research in Agriculture

Southern African Development Community

Technical Cooperation Agency, Inter-American

Institute for Cooperation on Agriculture

United Nations Development Programme

United Nations Environmental Programme

West Africa Rice Development Association

West and Central African Council for Agricultural Research and Development

World Agroforestry Centre

World Bank

World Food Programme

WorldFish Center

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Number 137

Evaluating Targeted Cash Transfer Programs: A General Equilibrium Framework with an Application to Mexico, by David P. Coady and Rebecca Lee Harris.

Number 136

Assessing and Attributing the Benefits from Varietal Improvement Research in Brazil, by Philip G. Pardey, Julian M. Alston, Connie Chan-Kang, Eduardo C. Magalhães, and Stephen A. Vosti.

Number 135

Managing Resources in Erratic Environments: An Analysis of Pastoralist Systems in Ethiopia, Niger, and Burkina Faso, by Nancy McCarthy, with Celine Dutilly-Diane, Boureima Drabo, Abdul Kamara, and Jean-Paul Vanderlinden.

Number 134

Human Capital, Household Welfare, and Children's Schooling in Mozambique, by Sudhanshu Handa and Kenneth R. Simler, with Sarah Harrower.

Number 133

Strategies for Sustainable Land Management and Poverty Reduction in Uganda, by Ephraim Nkonya, John Pender, Pamela Jagger, Dick Sserunkuuma, Crammer Kaizzi, and Henry Ssali.

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

IFPRI/JOHNS HOPKINS UNIVERSITY PRESS BOOKS

What's Economics Worth? Valuing Policy Research, edited by Philip G. Pardey and Vincent H. Smith.

Land and Schooling: Transferring Wealth across Generations, by Agnes R. Quisumbing, Jonna P. Estudillo, and Keijiro Otsuka.

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The 1998 Floods and Beyond: Towards Comprehensive Food Security in Bangladesh, edited by Paul Dorosh, Carlo del Ninno, and Quazi Shahabuddin. Published by University Press Limited, Bangladesh, for IFPRI.

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A 2020 VISION FOR FOOD, AGRICULTURE, AND THE ENVIRONMENT

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Number 37

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FOCUS BRIEFS

Number 12

Building on Successes in African Agriculture, edited by Steven Haggblade.

Number 11

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ISSUE BRIEFS

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Assessing Development Strategies and Africa's Food and Nutrition Security (2020 Africa Conference Brief 14), by Franz Heidhues, Achi Atsain, Hezron Nyangito, Martine Padilla, Gérard Gherzi, and Jean-Charles Le Vallée

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FOOD POLICY REPORT

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Ending Hunger in Africa: Prospects for the Small Farmer

IFPRI FORUM (IFPRI/2020 Vision newsletter)

December 2004
Is There a Way Out of the Debt Trap?

October 2004
The Changing Face of Malnutrition

July 2004
The Promise of School Feeding

May 2004 (special issue)
Ready for Action in Africa?

March 2004
Funding Africa's Farmers

GENERAL INFORMATION

IFPRI At a Glance, revised version.

Annual Report 2003–2004

DIVISION INFORMATION SHEETS

Food Consumption and Nutrition, revised version.

Development Strategy and Governance

2004 TRANSLATIONS

GENERAL INFORMATION

Chinese

国际食物政策研究所简介

(Translation of *IFPRI at A Glance* brochure, revised version)

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

(Translation of *IFPRI at A Glance* brochure, revised version)

Spanish

En Breve: Instituto Internacional de Investigación Sobre Políticas Alimentarias

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Spanish

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French

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Importancia de la situación de la mujer para la nutrición infantil en los países en desarrollo. (Translation of Research Report Abstract 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)

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Financial Statements 2003-2004

Presented here is a summary of financial information for the years ended December 31, 2004 and 2003.
The full financial statements and the independent auditors' report are available from IFPRI on request.

Balance Sheets

December 31, 2004 and 2003 (US\$ thousands)

Assets		2004	2003
Current Assets	Cash and cash equivalents	\$ 1,968	\$ 2,667
	Investments	8,188	4,344
	CGIAR grants receivable	1,437	1,591
	Restricted projects receivable (net)	5,231	4,966
	Other receivables	1,443	462
	Other current assets	488	267
	Total Current Assets	18,755	14,297
Other assets	Investments—long term	9,325	10,509
	Property and equipment, net	849	442
	Total assets	\$ 28,929	\$ 25,248
Liabilities and net assets			
Current liabilities	Accounts payable and accrued expenses	\$ 1,748	\$ 1,296
	Accrued vacation	1,073	944
	Advance payment of CGIAR grant funds	1,057	1,531
	Unexpended restricted project funds	9,027	6,754
	Amount held for Challenge Program	3,210	4,044
	Total current liabilities	16,115	14,569
Noncurrent liabilities	Deferred rent	530	709
	Accrued post-retirement benefits	926	795
	Total noncurrent liabilities	1,456	1,504
	Total liabilities	17,571	16,073
Net assets—unrestricted	Operating reserves	9,370	6,172
	Reserves allocated for subsequent year expenditure	1,139	2,560
	Net investment in property and equipment	849	443
	Total net assets	11,358	9,175
	Total liabilities and net assets	\$ 28,929	\$ 25,248

Statements of Revenue, Expenses, and Changes in Operating Reserves

For the Years Ended December 31, 2004 and 2003 (US\$ thousands)

Revenue		2004	2003
Grant and contract income			
	Unrestricted	\$ 13,007	\$ 8,148
	Restricted	20,280	17,085
Investment income		195	280
Foreign exchange gain		608	405
	Total revenue	34,090	25,918
Expenses			
Program services	Direct research and outreach	27,820	21,727
Management and general		4,087	3,443
	Total expenses	31,907	25,170
	Excess of revenue over expenses	2,183	748
Transfer from reserves allocated for subsequent year expenditure		609	72
Transfer to net investment in property and equipment		406	(38)
	Increase in working capital fund	3,198	782
Operating reserves, beginning of year		6,172	5,390
Operating reserves, end of year		\$ 9,370	\$ 6,172

Schedule of Expenses by Type

(US\$ thousands)

Expenses	2004	2003
Personnel	\$ 14,007	\$ 12,065
Collaboration/field expenses	7,035	4,280
Travel	3,383	2,226
Trustees' expenses (nontravel)	113	65
Operations, supplies, and services	7,059	6,248
Depreciation/amortization	310	286
Total	\$ 31,907	\$ 25,170

Personnel 2004

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

DIRECTOR GENERAL'S OFFICE

Director General

Joachim von Braun, Germany

Special Assistant to the Director General

Marc Cohen, U.S.A.
(Joint appointee with FCND)

Head of Donor Relations

Stacy Roberts, U.S.A.

Program Analyst

Louise Heegaard, Denmark

Executive Secretary to the Director General

Edith Yalong, Philippines

Graphics Specialist

Vickie A. Lee, Philippines

Senior Administrative Coordinator

Christine Vafior, U.S.A.

Senior Research Assistants

Maria Soledad Bos, Argentina
Mary Ashby Brown, U.S.A.*
Tewodaj Mengistu, Ethiopia**

Program Assistant

Ann Gloria, Philippines***
(Moved from EPTD)

HARVESTPLUS

Director

Howarth Bouis, U.S.A.

Senior Communications Specialist

Bonnie McClafferty, U.S.A.

Research Analyst

Oscar Neidecker-Gonzales, Honduras

Senior Administrative Coordinator

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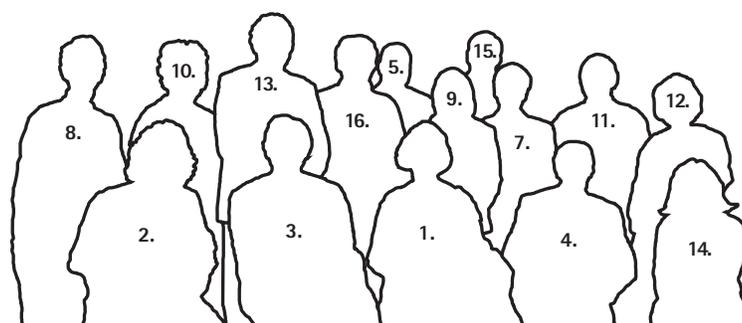
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