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INTERVIEW INSIDE
Ellen Johnson Sirleaf
President of Liberia

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Davos Report: Modest Progress Made on MDGs

Although the world made some progress in 2005 in its efforts to meet the UN Millennium Development Goals (MDGs), it is still investing less than half the effort needed, according to a report from the Global Governance Initiative of the World Economic Forum (WEF). The report, prepared for the WEF annual meeting in Davos, Switzerland, scores the efforts of the world's governments, nongovernmental organizations, and corporations toward achieving the MDGs, as well as progress (or the lack thereof) on peace and security and on human rights. Although this year's score is the best result yet, the highest score achieved in any category was 5 out of a possible 10.

IFPRI Director General Joachim von Braun co-chaired the Expert Group on Poverty and Hunger, together with Sartaj Aziz, former finance and foreign minister of Pakistan, for the second year in a row. The group gave the world a score of 5 for poverty reduction and 4 for hunger reduction in 2005. Contributing factors in the scoring include the heightened attention given to poverty reduction on the global

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Healthy Agriculture for Healthy People

The development community increasingly recognizes the many links between human health and the practice and products of agriculture. Some policymakers and practitioners are now pursuing opportunities for using these links to achieve both more productive agriculture and better health.

The global health community is bracing for the possibility of a pandemic of avian influenza, or bird flu—a disease that has to date been transmitted to humans through contact with infected poultry. The anxiety over bird flu highlights the previously often-overlooked link between agriculture and human health.

In fact, agriculture is tied to human health at the most basic level. Agriculture produces food, fiber, and medicine and provides livelihoods to millions of farmers so that they can purchase other necessities of life that contribute to their good health.

Moreover, the chain of cause and effect goes both ways. Good health affects agriculture by boosting people's

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2020 VISION
FOR FOOD, AGRICULTURE, AND THE ENVIRONMENT

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Panacea or Not, ICTs Can Play a Significant Role for the Rural Poor

The proliferation of information and communication technologies (ICTs), like cell phones and Internet access, has the potential to influence all aspects of development through their effects on governance, markets, media, and public services. Despite this great potential, however, the opportunities of the digital age are not equally accessible, and poor people have been left behind. This is not to say that poor constituents are passively forgoing ICTs, however. The demand—and at times the struggle—for access by poor people is accelerating in many countries.

A new book, *Information and Communication Technologies for Development and Poverty Reduction: The Potential of Telecommunications*, edited by Maximo Torero and Joachim von Braun and published by the Johns Hopkins University Press for IFPRI, addresses the implications of ICTs for poor people. In a collection of case studies, the book explores the relationship between ICTs and development in Bangladesh, China, India, Ghana, Laos, Peru, and East Africa.

The case studies show that reducing the information gap at lower cost is crucial for the poor. Despite restricted rural access, ICTs have an important positive impact on rural households. The welfare effect of rural telephone use is verified by rural users' perceptions of its benefits, the high demand for service, the substantial consumer surplus associated with telephone use, and rural households' willingness to pay for service. These positive effects can be expanded by increasing rural service access, adapting new technologies to rural settings, and using existing technologies—such as telephones—more innovatively.

Yet ICTs are not a panacea. For the potential benefits of ICTs to be realized in developing countries, many prerequisites need to be put in place: prompt deregulation; effective competition among service providers; free movement and adoption of technologies; targeted and competitive subsidies to reach areas and population groups that will not be served under market conditions; and institutional arrangements to increase the use of ICTs in providing public goods to poor people. Successfully harnessing the power of ICTs could make a substantial contribution to achieving the Millennium Development Goals (MDGs), both directly, through the delivery of public services, and indirectly, through the creation of new economic opportunities for the rural poor via better links to markets.

The book argues that although *connectivity* has been a priority and is the first step in advancing access to ICTs, it is also crucial to ensure that users have the *capability* to use the new tools and that relevant *content* is provided in accessible and useful forms. All three "Cs" must progress together. (For more information: **www.ifpri.org/pubs/jhu/icttelecom.asp**) ■

Davos Report: Modest Progress Made on MDGs *(continued from page 1)*

agenda, the UN Millennium Project's delivery of crucial roadmaps for how to halve poverty and hunger by 2015, the G8's cancellation of 100 percent of multilateral debt for poor countries in Sub-Saharan Africa, and China's elimination of taxes on farming and pledge to close the economic gap between cities and countryside.

The full report, *Global Governance Initiative Annual Report 2006*, can be found at **www.weforum.org/globalgovernance**. ■

Touring IFPRI's Country and Regional Support Programs

To have a direct impact on poverty and food security in selected countries, IFPRI has launched several country and regional support programs (CRSPs) since 2004. CRSPs are intensive and sustained programs of research and capacity building undertaken within an individual country or region in close collaboration with local researchers and policymakers. Through CRSPs, IFPRI can have a direct impact on poverty reduction and food security in some countries while also generating broader lessons from the case study results. CRSPs are currently underway in Central America, China, Ethiopia, Ghana, Uganda, and Eastern and Central Africa, with an additional program in Nigeria to be launched this year.

The Central American Free Trade Agreement (CAFTA) is a major policy initiative affecting Central America, a region that faces worsening rural income distribution trends and growing environmental degradation. In 2006, IFPRI's regional program in Central America will facilitate a series of events related to identifying policy options for helping poor and small-scale farmers benefit from CAFTA. Activities will include topical virtual meetings through the Global Development Learning Network.

The China program seeks to provide support in the design and implementation of the country's recently adopted rural development strategy. In 2006, it will host two important events: an international conference on poverty alleviation in May and the third conference of "The Dragon and the Elephant," a comparative study of China and India, in July. The program's current portfolio includes two projects in western China dealing with development strategy, resource conservation, macroeconomic policies, income inequality, and famine and malnutrition.

The Ethiopia Strategy Support Program, now in its second year, will launch major research projects in four areas in 2006: the role of information and communications technologies, safety nets and food security, innovation systems, and the development of the Ethiopian commodity exchange. It will also hold several policy-focused events in late April to disseminate research findings. Its Rural Economy Knowledge Support System, which contains the largest database on rural economy parameters in the country, will continue to be built up.

The Eastern and Central Africa Programme for Agricultural Policy Analysis (ECAPAPA) and IFPRI are responding to the development challenge in Eastern and Central Africa with a regional research program. In 2006, it will focus on policy communication and preliminary analysis of the impact of WTO negotiations on regional trade and income.

The Ghana and Uganda Strategy Support Programs, both launched in 2005, will carry out their consultations with their national advisory committees to identify priority research areas. Two new program coordinators, to be based in Accra and Kampala, respectively, will join the teams.

Finally, the Agriculture Policy Support Facility is IFPRI's country program in Nigeria. It will be launched this year to support Nigeria's capacity for policymaking in agriculture and rural development in the context of the country's implementation of its National Economic Empowerment and Development Strategy and the UN Millennium Development Goals.

For more information, contact Shenggen Fan, Director, Development, Strategy, and Governance Division (**s.fan@cgiar.org**). ■

Remembering Hans Singer

Sir Hans Singer—disciple of Keynesian ideas, champion of the poor, and pioneer of economic research on developing countries—died last month at age 95.

Singer's illustrious career spanned roughly seven decades. It included groundbreaking research on poverty and development and senior postings at the United Nations. There, his work helped lead to the programmatic development of such UN institutions as the World Food Programme and the UN Economic Commission for Africa. His work had a strong impact on IFPRI's research agenda.

In 1969, Singer joined Britain's Institute for Development Studies at the University of Sussex. He helped shape its transformation into an international development leader.

Singer made the welfare of poorer nations the centerpiece of his career. He traveled widely, advising many developing-country governments. And he called for increased foreign aid to offset disproportionate trade windfalls benefiting richer nations.

His landmark theory—that the price of primary commodities declines relative to that of manufactured goods—highlighted a critical handicap facing many poorer economies producing primary goods. The idea was echoed in the Prebisch-Singer hypothesis, a staple of development theory. ■

"First, there is the problem of achieving peace and security, which we must tackle through the principles of inclusion and participation. . . Second, there is a problem of development that we must tackle—balanced development through social and economic policies, decentralization, infrastructure rehabilitation, and the promotion of an environment to attract private capital and investment for sustainable growth and job creation."

Photo by Cachelleink.com

Ellen Johnson Sirleaf, President of Liberia

Ellen Johnson Sirleaf was elected president of Liberia in late 2005—the first woman to be elected president in Africa. President Sirleaf is a Harvard-educated economist who served as Liberia's minister of finance from 1980 to 1985. During years spent in exile, she worked for Citibank, the World Bank, and the United Nations Development Programme. Often called the "Iron Lady," she was inaugurated as president on January 16, 2006.

FORUM: **Your election as a female president is unprecedented in Africa and much of the rest of the world. What difference do you think being the first female president will make to Liberia and to Africa?**

Sirleaf: I have often said that our elections by the people of Liberia, most especially the women, have been a truly humbling experience for me. At the same time it has awakened and challenged my resolve that I must rise to the task of rebuilding a broken and shattered nation. As a female with the requisite competence and credibility, I will work to ensure that social equity, equal opportunity, and fundamental human rights protection are extended to all our people. I must also ensure that women are particularly targeted in this regard and that the quality of life of all Liberians is improved during my tenure. I believe that with God as my guide and the source of my strength, I will be able to lead a team that will meet these challenges.

FORUM: **Does being a female president bring different perspectives for accomplishing economic and political goals? If so, how would you characterize these differences?**

Sirleaf: I have often prided myself on being a technocrat and professional who happens to be a woman. That said, as a woman president, I certainly believe that I can bring a motherly sensitivity to the office, thereby ensuring that there is a human face in all that we do. I can be a true African woman—resourceful as always.

FORUM: **What do you see as the most pressing problems confronting Liberia, and how will you be addressing those problems?**

Sirleaf: First, there is the problem of achieving peace and security, which we must tackle through the principles of inclusion and participation. There is a need to reduce the vulnerability of our war-affected youths through education and job creation. There is a need to promote reconciliation and justice through the processes established by the Truth and Reconciliation Commission. Second, there is a problem of development that we must tackle—balanced development through social and economic policies, decentralization,

infrastructure rehabilitation, and the promotion of an environment to attract private capital and investment for sustainable growth and job creation.

FORUM: What is your vision of the role government should play in reducing poverty and hunger?

Sirleaf: The Government of Liberia must take a lead role in reducing poverty and hunger through agricultural policies that are aimed at food sufficiency and security and through empowerment programs aimed at enhancing the quality of life of a great number of the population. This requires access to education for skills training and literacy. As an agricultural nation, Liberia has an urgent need to support the repatriation of refugees and internally displaced persons to their communities and rural areas to enable them to produce food for self-sufficiency.

FORUM: The NEPAD initiative and the developed countries have focused a great deal of attention on Africa in the past year. In your view, how have Africans benefited from these activities? What are the next steps for maintaining beneficial attention and action?

Sirleaf: The NEPAD initiative, which involves a compact between governments and their people on the one hand and between governments and their external partners on the other hand, is a sound development initiative that has yet to reach its full realization. Those African countries that have endorsed the initiative and its innovative Peer Review System have benefited from more transparency and accountability in matters relating to governance. If NEPAD is to reach its potential, much more needs to be done by governments, and even more by their external partners, who are called upon to provide a significant increase in resources to countries prepared to promote the processes that will lead to significant progress in political, economic, and corporate governance. ■

"The Government of Liberia must take a lead role in reducing poverty and hunger through agricultural policies that are aimed at food sufficiency and security and through empowerment programs aimed at enhancing the quality of life of a great number of the population."

Securing Land Rights for the Poor in Africa

What kinds of land tenure reforms are needed to secure land rights for the poor in Africa? How can the rights of multiple users, including women, pastoralists, and other marginalized groups be recognized and reflected in land tenure reforms? What are the essential elements for such tenure reforms, and how can reforms be implemented to ensure effectiveness and sustainability? These questions were addressed in a workshop hosted by the United Nations Development Programme's (UNDP's) Drylands Development Center and the International Land Coalition (ILC) in November 2005. They also form the basis of a dozen briefs recently published by the Collective Action and Property Rights Initiative (CAPRi), a CGIAR-wide research program convened by IFPRI.

The briefs address a broad range of land rights issues, from problems of reconciling the needs of farmers, herders, and other stakeholders using common lands, to the importance of finding innovative solutions to property rights issues. Several briefs address lessons from ongoing land tenure reform processes in Burkina Faso, Uganda, and Zambia.

Because of the prevalence of customary rights, workshop participants largely agreed that reform must reflect customary tenure, rather than seek to replace it, while also taking the necessary steps to safeguard women's rights. Participants also proposed that common property arrangements and group rights not be uniformly replaced with individual, titled rights—at least not

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Securing Land Rights for the Poor in Africa *(continued from page 5)*

in all settings. In situations of multiple, overlapping resource use, strengthening negotiation and conflict resolution processes can help permanent and transitory resource users secure access. Participants recognized that broad-based involvement by stakeholders at grassroots and national levels is necessary for successful tenure reforms.

New approaches, such as creating legal advice centers, may serve to inform the poor of their rights and of opportunities for claiming rights or contesting potential violations. Similarly, banks and financial institutions may alter lending rules to accommodate group rights, or conventional land administration systems may be restructured to support group-based rights structures.

IFPRI and CAPRi presented a special session on these issues at the Food and Agriculture Organization of the United Nations conference on Agrarian Reform and Rural Development in Porto Alegre, Brazil, in March 2006.

To download the briefs, go to **www.capri.cgiar.org/wp/brief_land.asp**. ■

Strengthening Capacity through E-Learning in Africa

After IFPRI's International Service for National Agricultural Research (ISNAR) Division was established in Addis Ababa, Ethiopia, two years ago, it did not take long to learn that the demand for training for agricultural professionals in Africa far outstrips IFPRI's capacity to meet the need through face-to-face workshops. ISNAR's Learning and Capacity Strengthening Program has implemented five workshops—each with a capacity of 25 participants—on various aspects of managing agricultural research for development and received more than 300 applications for each workshop. To make it possible to reach many more individuals, the Institute has developed two innovative courses that have been offered over the Internet. This e-learning approach makes it possible to strengthen the capacities of a virtually unlimited number of individuals, regardless of their physical location.

IFPRI's first e-learning program, chosen in response to an assessment of needs in Africa, dealt with aspects of proposal writing. The program was designed to be implemented in five phases. First, participants engage in a phase of individual learning online or, if Internet access is problematic, through materials on a CD-ROM. Next, they apply their knowledge through a practical exercise and then receive feedback from a subject matter specialist. They then evaluate the e-learning program and create a Participant Action Plan Approach (PAPA) to help with follow-up of their future performance. Finally, participants who complete all phases successfully receive a certificate. The positive response to this course led IFPRI to design and offer a second e-learning program on how to present and write scientific research.

The two e-learning programs offer useful lessons for future such efforts. Particularly helpful were the clear methodology with interdependent phases and time limits, the subject matter specialist who served as the online coach, and the technical support from an information technology specialist. Problems included lack of good Internet access for some participants and late responses to exercises from some students. It was difficult to assess the level of effort and interest of a few participants.

Positive feedback on the first two e-learning programs has prompted the ISNAR Division to invite donors to collaborate in expanding this activity globally. ■

Governance that Matters for the Rural Poor

by Regina Birner

"Good governance is perhaps the single most important factor in eradicating poverty and promoting development," Kofi Annan said in 1998. In recent years governance has taken center stage in the international development arena. Donor organizations increasingly make their funding dependent on governance performance. Developing countries, too, have placed good governance prominently on their own agenda. NEPAD, the New Partnership for Africa's Development, for example, highlights "good governance as a basic requirement for peace, security, and sustainable political and socio-economic development" as its first principle. Yet making governance "good" in ways that increase the well-being of the majority of the world's poor people, who live in rural areas and depend on agriculture for their livelihoods, can be particularly challenging.

Of course, some of the challenges related to understanding and improving governance apply to both rural and urban areas. To begin with, defining good governance involves value judgments and thus is not subject to universal agreement. A widely used data set compiled by the World Bank measures six dimensions of good governance: (1) voice and accountability, (2) government effectiveness, (3) regulatory quality, (4) control of corruption, (5) rule of law, and (6) political stability. Yet are not social protection, gender equity, and environmental protection also elements of good governance? Moreover, the links between governance and economic development are complicated and far from clear. Bangladesh, for example, shows extraordinary progress in social indicators—such as eliminating gender bias in education and reducing infant and maternal mortality at historic rates—yet Transparency International lists Bangladesh, together with Chad, as one of the most corrupt countries in the world.

Achieving good governance in rural areas has its own difficulties. Providing public goods and services in an efficient and equitable way to rural areas can be tricky. Efforts to improve governance are subject to the same urban bias inherent in other development activities, and the political incentives to improve governance in rural areas are often low, even in well-functioning democracies like India, where the rural poor do vote.

In addition, there has been little research on the aspects of governance that matter for the rural poor. Many of the data used to construct governance indicators are based on surveys of entrepreneurs in the formal industrial sector. How effective a government is in, say, creating a conducive business environment for a foreign investor is not necessarily related to its effectiveness in addressing the needs of poor farmers and in improving the living conditions in rural areas.

Another governance challenge for agricultural and rural development is the fact that agriculture is subject to a variety of market failures. In remote areas and in early phases of agricultural development, farmers cannot easily get access to inputs, technologies, credit, and output markets. While the public sector can help overcome these market failures, its involvement is often associated with government failure, as experiences with subsidized agricultural credit and parastatal marketing institutions have shown.

In recent decades, civil society movements, governments, and donor organizations have promoted three major types of strategies to improve governance in rural areas in view of both market and government failure. First, there have been strategies to improve the ability of the rural poor to exercise their voice, demand public services, and hold service providers accountable, through, for example, political decentralization, local leadership training, transparency movements, participatory development methods, and use of vouchers. The state of Karnataka in India has, for example, introduced a social audit, which empowers local communities to judge the quality of development projects in relation to the expenditure incurred. Second, there have been strategies to improve the supply of public services, through, for instance, public sector management reforms, public-private partnerships, contracting out of services, pluralistic forms of service delivery, and service provision by nongovernmental organizations (NGOs). Third, strategies have promoted self-help and collective action, through community-based organizations, resource user groups, agricultural producer organizations, and cooperatives, among others. In Uganda, for example, the public sector is now contracting out agricultural advisory services to private providers and NGOs, and the representatives of farmers' groups have a say in the choice of the service provider. In spite of this wide range of efforts to improve governance for agricultural and rural development, the empirical evidence on their results is mixed, and there are major knowledge gaps regarding the most promising strategies in a given situation.

How can research contribute to more effective governance in rural areas? Although sovereign citizens, and not researchers, are responsible for identifying and promoting the aspects of governance that are of value in their own right, research can play an important role in identifying the dimensions of governance that are instrumental for reaching goals that societies have agreed to pursue, such as the Millennium Development Goals. Research is also important to analyze what governments, civil society, and the private sector can actually do to improve governance. Finally, given the diverse conditions that characterize agriculture and rural areas, generalized models of improving governance have not worked, and "best fit" has proved to be more important than "best practice." In view of this experience, research can make an important contribution to improving governance that matters for the rural poor by enhancing our understanding of what works where and why. ■

***Regina Birner** is a research fellow in the Development Strategy and Governance Division of IFPRI.*

Agriculture Cannot Be Bypassed for Africa's Development

Three-quarters of Africans live in rural areas where agriculture is the single most important source of employment. Yet Africa's agriculture is the least productive in the world, leading to some of the highest levels of rural poverty and recurring food crises. Is agriculture still the way forward for Africa's development? Can it be the much-needed engine for pro-poor growth? A new IFPRI paper—*The Role of Agriculture in Development: Implications for Sub-Saharan Africa*, by Xinshen Diao, Peter Hazell, Danielle Resnick, and James Thurlow—tries to answer these questions.

For more than 50 years, development economists have argued over the role of agriculture in economic development. Whereas some economists believe agricultural growth can be bypassed on the road to industrialization, others have identified it as a precondition for overall growth. Today the debate centers broadly on two issues: whether agriculture can be the driver of economic growth and poverty reduction and, within agriculture, whether higher-value export crops should be the main recipient of targeted investments.

"Some of the recent literature is skeptical of the role of African agriculture, emphasizing its poor past performance, low commodity prices and productivity, small farm sizes, and increased competition in the more integrated global markets," explains Hazell, previous director of IFPRI's Development Strategy and Governance Division. Research described in the report suggests, however, that blanket skepticism is unfounded. "Even after accounting for different stages of development, agricultural conditions, natural resources, and geographic location, agricultural growth remains vitally important for most low-income African countries, especially for poverty reduction," says Thurlow, an IFPRI postdoctoral fellow. Moreover, the research finds that growth and poverty reduction can result not only from growth in higher-value export crops, but also from growth in a wider range of agricultural products, including many staple crops and livestock products. Only broad-based agricultural growth can benefit the large population of smallholder farmers. Xinshen Diao, a senior research fellow at IFPRI, concludes, "While African agriculture today faces many new challenges, targeting investments to improve agricultural competitiveness should be a crucial part of the development strategies of most African countries."

The paper offers support for the recent endorsement of the Comprehensive Africa Agriculture Development Programme (CAADP) by the New Partnership for Africa's Development (NEPAD), which clearly affirmed its commitment to agriculture as the engine for Africa's growth. (For more information: **www.ifpri.org/DIVS/DSGD/dp/dsgdp29.asp**) ■

Healthy Agriculture for Healthy People *(continued from page 1)*

capacity for work and thus increasing how much they can produce. It enhances their ability to take risks with new crops or farming methods—risks that might pay off with better production and income. On the down side, when unhealthy farmers are unable to produce enough agricultural goods to earn a decent livelihood, their poverty and consequent malnutrition further worsen their health.

"The fact that there are two-way linkages between agriculture and health poses an opportunity for the two sectors to work together to help solve each other's problems," says Corinna Hawkes, an IFPRI research fellow. "Agricultural systems can be developed to benefit health, and the health sector can take steps to help overcome agricultural problems. Although this approach will involve some trade-offs, greater coordination could ultimately benefit both sectors."

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Healthy Agriculture for Healthy People *(continued from page 8)*

The connections between agriculture and health have been recognized for years, but health and agriculture professionals still tend to continue working within the limits of their own sectors. In 1988 Michael Lipton, research professor of economics at the University of Sussex, and Emanuel de Kadt wrote a book for the World Health Organization called *Agriculture-Health Linkages*, but today Lipton says, "I have seen little sign of improved coordination between health-directed and agriculture-directed agencies."

Some researchers and development practitioners are now working to direct more attention to these links between agriculture and health and to stimulate more joint action to address them. The Consultative Group on International Agricultural Research (CGIAR), for example, is undertaking an initiative, coordinated by IFPRI, to explore these links. "The CGIAR is well positioned to foster the synergies between health and agriculture. Tapping these synergies, however, requires connecting strong research in both agriculture and the health community. With this new initiative we aim to strengthen that especially neglected connection," says Joachim von Braun, director general of IFPRI.

Animal Health and Human Health

Farmers, pastoralists, and other agricultural workers are constantly and directly exposed to health risks posed by agriculture, and one of these risks originates from contact with farm animals. Seventy-five percent of the emerging infectious diseases affecting humans are zoonotic, meaning they jump from other animal species to humans. Agriculture, which brings humans and animals together in close contact, is an ideal environment for this species jumping to occur.

Bird flu is one in a long list of zoonotic diseases, including bovine tuberculosis, brucellosis, anthrax, and rabies. Currently, though, the spread of a highly pathogenic form of bird flu, its actual impacts on agriculture, and its potential impacts on human health put this disease at the forefront of global human health and development policy. Many resources and specialists in animal and public health have been mobilized as the international community prepares for a possible global pandemic of a human form of bird flu. The Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE) have issued a global strategy for controlling the spread of the disease, in collaboration with the World Health Organization (WHO). In recent months the disease has reached Africa and Europe, and authorities still have much to learn about how it spreads.

Although bird flu poses a serious threat of becoming a global pandemic, it is not yet easily transmissible between humans. According to guidelines from the WHO, the best hope for avoiding a pandemic lies in limiting the number of cases in birds, and thereby reducing the number of human cases in which the virus can mutate into a strain capable of human-to-human transmission.

The changes in agricultural practices needed to reduce the risk of bird flu will be just as useful in fighting off other zoonotic diseases that have emerged in the past and that are sure to emerge again in the future. According to Juan Lubroth of the FAO's Animal Health Section, "The principles for dealing with bird flu are the same as those for dealing with other animal epidemics. You need early detection and warning, early preparedness, better veterinary inspection, and better hygiene at the abattoir and in the marketplace." Poor countries are far behind on meeting these goals, but bird flu may provide some additional impetus to raise standards.

IFPRI and the International Livestock Research Institute (ILRI) are now undertaking joint research "to help governments make more informed decisions on how to control the spread of a transboundary animal disease such as highly pathogenic avian influenza while minimizing the negative impacts on different socioeconomic groups, particularly the poor," says IFPRI research fellow Clare Narrod.

More broadly, the challenge of managing both animal and human health has led to some innovative approaches. In some remote, pastoral areas of Africa, veterinarians have a much greater presence than medical personnel, with the result that livestock, which are critical to pastoralists' livelihoods, have better access to health care than humans. In 2000, the Swiss Tropical Institute set up a pilot program that established simultaneous vaccination for nomadic women and children and for the nomads' livestock in certain areas of Chad, where children had never received vaccinations of any kind. In addition to vaccinating 136,000 livestock, the pilot program fully vaccinated 4,700 children against polio, diphtheria, tetanus, and whooping cough and fully vaccinated 7,400 women against tetanus. A significant additional number of children received vaccinations against measles and yellow fever. The program is now being integrated into existing agencies and infrastructure in Chad.

"Initiatives to join veterinary and public health services seem to be most effective in remote zones," says Esther Schelling, a veterinary epidemiologist at the Swiss Tropical Institute. "Costs of vehicles for transportation are very high, especially in the Sahelian countries. In Chad, for example, it is estimated that only about one-fourth to one-half of the rural population lives near enough to a health center to get access to, for example, vaccinations or tuberculosis treatment. And livestock keepers greatly appreciate that the team considers the health of both their animals and their family."

Creating a Healthier Agricultural Environment

Not only pastoralists, but also farmers find that their health is tied to agricultural practices. Agrochemicals can lead to sizable gains in production, but can also pose serious risks to users. Overuse of fertilizers causes nitrates and nitrites to run off of farmers' fields and contaminate drinking water supplies. Evidence has shown that in China only 30 percent of fertilizer applications actually reach crops, a situation that not only threatens health, but also needlessly raises farmers' production costs. The other 70 percent ends up in downstream water bodies or percolates into groundwater.

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Healthy Agriculture for Healthy People *(continued from page 9)*

Pesticides are also used much more than necessary, poisoning thousands of agricultural workers each year. Pesticides and their residues also pollute water resources, and long-term exposure through drinking water is linked to a range of noncommunicable diseases. Researchers from the International Potato Center (CIP) found that pesticide poisonings among potato farmers in the Ecuadorian highlands were 20 times higher than expected. Researchers used computer software that integrates models from different disciplines—agriculture, health, and environment. "The question we've tried to answer with the new model is: Which policies can be put into place that will provide adequate levels of protection for the farmers' potato crop and, at the same time, reduce pollution and improve human health?" says Charles Crissman, an economist at CIP.

The most effective solution, researchers found, was a combination of integrated pest management (IPM) and education about the dangers of pesticide use. A survey had revealed that less than 15 percent of workers who applied pesticides knew, for example, that a skull and crossbones label on a container indicates danger. By using IPM, which relies more on biological control of pests and less on pesticides, farmers were able to maintain their potato yields while reducing their production costs. At the same time, they escaped many of the neurological effects of the pesticides.

This effort to reduce pesticide use among potato farmers in the Andes is part of a broader approach to agriculture and health called "ecohealth," which tries to create a "virtuous circle" of adequate agricultural production, improved human health, and sustainable agricultural ecosystems. "Instead of targeting the small fraction of the population that is severely affected by a given illness," says Jean Lebel, director of the Environment and Natural Resource Management Program at the International Development Research Centre (IDRC), "and achieving a very relative success rate, the aim is to attack the root cause of health problems and protect a larger number of people from illness. It is not always easy to convince the communities in difficulty that the proposed solution to their health problems is not large-scale vaccination or some other modern medical program, but simply better management of their natural resources."

The ecohealth approach has also been tested in the Mwea region of Kenya, a rice-growing region where malaria has persisted in spite of the use of insecticides and antimalarial drugs. Through a project supported by IDRC, a team of specialists from various disciplines worked with villager-researchers to determine the factors behind the high rates of malaria. They found that local farmers, frustrated with government control over irrigation of their rice fields, had recently taken over this responsibility themselves. The result was that farmers then planted when and where they liked, creating many more breeding grounds for mosquitoes. Researchers also found that villages with the highest concentrations of mosquitoes had the lowest rates of malaria—and the largest number of cattle, which the mosquitoes apparently prefer to humans.

The findings suggested several solutions. One is to reduce rice-paddy flooding time and alternate rice with soybean crops, grown on dry land, thereby cutting back on the mosquitoes' habitat and improving people's diets at the same time. Others are to maintain the cattle population by using rice husks as animal feed and to place into water sources bacterial preparations that kill mosquito larvae but are harmless to humans. Insecticide-treated mosquito nets would help protect the most vulnerable groups—women and children—from the disease. The Mwea example also illustrates the importance of understanding local ecosystems and social structures before designing interventions.

Agriculture and HIV/AIDS

Because so many people affected by HIV and AIDS depend on agriculture for food and income, especially in Sub-Saharan Africa, agricultural policies and practices loom large in determining how well households cope with the disease. People living with HIV have heightened nutritional needs and less labor capacity, while others in their households require significant amounts of time for care giving. If agricultural policies and programs fail to account for these realities, they are unlikely to meet their objectives and they can worsen the spread and impacts of HIV and AIDS. "Policymakers need to rethink agriculture in the face of AIDS," says Stuart Gillespie, an IFPRI senior research fellow. "The art is to think across sectoral lines."

A good example of this kind of cross-sectoral thinking occurred recently when CARE and the Ministry

of Agriculture in Lesotho made major changes in a program of agricultural assistance. Beginning in 1995, CARE offered agricultural extension services and participatory planning and learning to help rural households better manage agriculture and natural resources. At the same time the HIV/AIDS crisis was mushrooming. Lesotho is now believed to have one of the highest HIV prevalences in the world: an estimated 29 percent of people aged 15 to 49 were HIV positive in 2003. To respond to the crisis, CARE added messages about HIV and safe sex to its extension activities and began to distribute condoms, with little result.

CARE staff decided to look for a new approach that would do more to support the food security of AIDS-affected households. What could they do that would work for households that lacked easy access to fields, that had limited capacity for labor and often heavy care-giving responsibilities, and that had special nutritional needs related to HIV infection?

They settled on an approach of promoting and supporting homestead gardens. These small plots of land are adjacent to family homes and can be used for growing vegetables. Because they are within sight and earshot of the house, they make it easier to care for ill family members. To contribute to improved nutrition, at least 75 percent of participating households are required to grow at least five different vegetable crops. This program is a small start in the direction of a more holistic response to HIV and AIDS—a response that CARE is now working to promote more broadly in Lesotho.

Agriculture and Obesity and Other Chronic Diseases

Besides the practice of agriculture, the products of agriculture also play an important role in human health. Agriculture is a contributor, for instance, to the world's current epidemic of chronic, noncommunicable diseases like obesity, diabetes, cardiovascular diseases, and some forms of cancer. Chronic diseases contributed 60 percent of the 58 million deaths worldwide in 2005, according to the World Health Organization, and 80 percent of these deaths occurred in low- and middle-income countries.

One key factor in chronic diseases is diet, and the world's diet has undergone major, rapid changes in the past half century. As countries, both developed and developing, have become more urban and industrial, people have replaced traditional plant-based diets with high-fat, energy-dense diets that are often poor in essential micronutrients like vitamin A, iron, and zinc. At the same time, people have become more sedentary, exacerbating the health risks of changing diets.

In some cases agricultural policy has exacerbated chronic health problems. In the early 1970s the Brazilian government adopted a range of policies designed to increase production, export, and consumption of soybean oil. The aim was partly to stimulate the soybean industry and generate foreign exchange and partly to provide a cheap source of energy to lower-income families. From a health perspective, the approach succeeded too well. Consumption of vegetable oils soared and today contributes to excessive fat intake in Brazil. "If agriculture is going to contribute to improved nutrition," says Hawkes of IFPRI, "it faces a real challenge in ensuring a sufficient supply of staples and micronutrient-rich foods without encouraging excessive consumption of energy-dense, nutrient-poor foods."

The problem, says Tim Lang, professor of food policy at City University, London, is that the agricultural paradigm based on maximizing production to the exclusion of other concerns has outlived its usefulness.

"In the 20th century the basis of agriculture was to produce food to meet need," he says. "The food industry has brilliantly unleashed capacity to produce food, but now we are overproducing meats and fats and exporting them to developing countries. There are 650 million hungry people in the world, while there are 1.5 billion people who are overweight and obese. We are selling Western diseases to developing countries, and these are expensive diseases."

Lang sees the world on the brink of choosing between two new paradigms for agriculture. One is what he calls the "life sciences integrated paradigm," which links genetics, biology, engineering, and nutrition in a science-led integration of the food chain dominated by large life sciences companies. The other he calls the "ecologically integrated paradigm," driven by environmental concerns and focusing on local, sustainable agriculture. Although most money has gone to promote the life sciences paradigm in the past couple of decades, says Lang, recent awareness of the complexity of managing food and agriculture to meet the needs of all people and of the threat of global climate change have given increased impetus to the ecological paradigm.

Growing—and Eating—Healthier Food

Part of a new paradigm for agriculture may be simply growing healthier foods. For millions of poor people, their daily diet consists of little more than three meals of rice. They may be ingesting calories, but they are not getting the nutrients they need for good health. Lack of micronutrients like iron, zinc, and vitamin A are responsible for poor mental and physical development, disability, disease, and death in hundreds of thousands of poor people worldwide. Yet little research has been conducted on the effectiveness of one of the most obvious approaches: encouraging poor farmers to grow more nutritious foods and educating poor people on why they should eat these foods.

Food-based strategies consist of efforts to increase both the production and consumption of nutritious foods and, when possible, to make the nutrients in foods more easily absorbable by the body.

According to Marie Ruel, director of IFPRI's Food Consumption and Nutrition Division, a program in Vietnam that included home gardens, fish ponds, and small-animal husbandry, combined with effective nutrition education, increased the iron intake of young children. "Research shows that farmers are likely to experience trade-offs between the income they would gain from selling their

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Healthy Agriculture for Healthy People *(continued from page 11)*

home-produced, nutrient-rich foods and the health benefits they would gain from consuming them," says Ruel, "so strong communication about the benefits of consumption is critical for production-focused agricultural interventions to improve nutrition."

Another food-based approach is biofortification—creating staple food crops that are more nutritious. The HarvestPlus program, co-convened by IFPRI and the International Center for Tropical Agriculture (CIAT), is working to add micronutrients to rice, wheat, maize, beans, cassava, and sweet potato—crops widely consumed in the developing world—using both conventional plant breeding and modern biotechnology.

"Those most affected by malnutrition, the rural poor, are also the most difficult to reach with traditional nutrition programs," says Howarth Bouis, director of HarvestPlus. "Biofortified crops have the potential to transform the health of these communities by allowing them to grow crops that are naturally fortified with essential micronutrients." In addition, biofortification should cost less than vitamin supplements because once seeds are developed, they would cost farmers no more than regular seed.

"Agriculture can be a tool for public health, but developing new technology is only half of the solution," says Bouis. "The other half lies in effectively getting biofortified foods to the undernourished." HarvestPlus is now working to reach malnourished people with its first biofortified crop—an orange-fleshed sweet potato high in vitamin A, developed by CIP.

Integrating Health and Agriculture: Can It Be Done?

On a national scale, getting policymakers in the health and agriculture sectors to work together is still an uphill battle. Todd Benson, an IFPRI research fellow, explains that government ministries and agencies are organized strictly along sectoral lines and are normally self-contained. "Instead of collaborating, they may often find themselves competing over budgetary resources," he says. "In addition, agriculture and health professionals have different objectives—maximizing agricultural production versus providing health services and preventing ill health—and they have entirely different standards for judging their own success."

It can be easier to tackle joint problems at the community level, says Benson. At that level, development problems are often perceived holistically rather than neatly categorized as "health problems" or "agricultural problems." These community-level interactions may offer lessons to higher-level professionals from the two sectors. Policymakers should also increase incentives for health and agriculture professionals to work together, says Benson.

One idea for integrating health concerns into agricultural policies and projects is "health impact assessment (HIA)"—an informal process in which experts and affected communities weigh in on the health effects of policy changes. Michael Joffe, an epidemiologist with Wellbeing, Health, and Economic Policy Services in London, gives the example of London's recent development of a food strategy. "London's public sector has enormous food-buying power if you consider the hospitals, schools, and so forth," says Joffe, "and through the HIA we argued that you can use that buying power to discriminate in favor of healthier foods and sustainable agriculture."

Although they are gaining popularity in the industrialized world, HIAs are still little used in developing countries, where capacities are limited. "It would help if donors would require HIAs in the planning of development projects they support," says Robert Bos, scientist in the Water, Sanitation, and Health Program of the WHO. "And it is not just about preventing adverse impacts. In irrigation and dams projects, for example, the opportunities for health promotion are not recognized. When they fail to include access to safe water for drinking or to put in proper drainage that will help control mosquito populations, they are actually transferring hidden costs to the health sector." Often, the already thin economic benefits of such projects do not allow for investments in designs and measures that promote health. Bilateral donors, says Bos, should offer grants specifically for these health aspects of development projects.

Despite agriculture's great potential for improving human health, existing ways of managing agricultural policies and projects will leave much of that potential untapped, according to Benson. Exploiting agriculture's benefits for health will require changing both mindsets and policy processes. Yet growing evidence suggests that the payoffs could be worth the effort. After all, in the end both agriculture and health seek to improve human well-being. ■

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