INSIGHTS

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IN SEARCH OF A CHAIN REACTION

VALUE CHAINS AND THE POOR

INSIGHTS

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Our work at IFPRI is increasingly collaborative, and one area of teamwork is our research on pro-poor value chains, featured in this issue of *Insights.* Value chains are garnering attention as a way of achieving broad development outcomes such as food security, poverty reduction, and sustainable use of natural resources. A number of centers in the Consultative Group on International Agricultural Research (CGIAR) have been working for years on ways to strengthen value chains for the poor. Now much of this research is being brought into two major research programs that are pooling resources and expertise across the CGIAR. Among other things, these research programs will study how to help smallholder farmers break into food value chains, raise their incomes, and produce safe, healthy, and nutritious food for consumers.

I hope this story, as well as the other exciting on-the-ground research highlighted in this issue, inspires a new way of thinking about agricultural development as a hub of innovation and synergy. As always, we welcome your thoughts and comments.

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The International Food Policy Research Institute (IFPRI) was established in 1975 to identify and analyze national and international strategies and policies for meeting the food needs of the developing world on a sustainable basis, with particular emphasis on low-income countries and on the poorer groups in those countries. IFPRI is one of 15 CGIAR consortium agricultural research centers.

PHOTO: Transporting bananas to market in Burundi. © 2010 D. Telemans/Panos

COVER PHOTO: Women at an Ethiopian food-processing center that produces the nutritional supplement Plumpy'nut. © 2008 A. Caliz/Panos

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DEMOCRATIC REPUBLIC OF CONGO

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Improving ports along the Democratic Republic of Congo's dense river network would boost agricultural production.

Rebuilding Agriculture in the DRC

The Democratic Republic of Congo (DRC) is one of the richest—and poorest—places on earth. The country abounds in mineral and natural resources such as copper, diamonds, gold, and wood, but after decades of conflict, it is economically destitute. Between 1960 and 2001, the country's economy shrank by about 3 percent per year—the largest economic decline in the world. An estimated 70 percent of the population is facing food insecurity of some sort, and an estimated 37 million Congolese suffer from undernutrition. Many families can afford to feed their children only every other day.

The country may, however, be turning a corner: in November 2011 the DRC held its second democratic election in 40 years, although post-election political unrest threatens this positive trend. Nevertheless, there is new recognition that agriculture, on which the vast majority of people depend, holds the key to the country's development. The government is working to develop strategies for economic growth and poverty reduction, and IFPRI's Country Strategy Support Program in the DRC aims to contribute to these efforts.

Through an intensive and sustained program of research, capacity building, and policy communications, IFPRI researchers based in Kinshasa and Washington, DC, are working with government officials, policy research and agricultural institutions, and others to provide policy-relevant research results and promote evidence-based decisionmaking in areas that affect agricultural development.

To begin with, the research team focused on one of the country's most important development bottlenecks: crumbling and nonexistent transportation infrastructure. Using geographic, crop, and demographic data, researchers simulated what would happen if transport networks were improved and extended. Their findings strongly suggested that increasing investment in ports—and the roads that lead to them—would allow the country to take advantage of its dense river network, boost agricultural production by giving farmers access to markets where they can sell their goods, and ultimately reduce food insecurity. "Even a 10 percent reduction in travel time to a river port can increase production by 3.7 percent, whereas a 10 percent reduction in travel time to a 50,000-person town would increase production by only 1.6 percent," explained acting program leader John Ulimwengu.

The program also focuses on institutionalizing capacity building through training, collaborative research, and policy communication. "We have a long-term commitment," Ulimwengu said. "We want to leave behind a legacy of policymaking that improves the lives of the poor through agriculture."

– Marcia MacNeil

MOZAMBIQUE

A Potato of a Different Color

You never know how people will react when you suddenly change the color of their food. But a recent HarvestPlus project managed to rapidly integrate orange sweet potatoes into the diets of rural households accustomed to eating white and yellow varieties—and in the process delivered substantial nutritional benefits.

Researchers have bred new varieties of orange sweet potato rich in vitamin A to help combat vitamin A deficiency, a serious problem in many resource-poor areas of the world. Lack of vitamin A weakens immune systems, claims the eyesight of 250,000–500,000 preschool-aged children each year, and in many of these cases results in death. If people in Mozambique switched from growing and eating white or yellow sweet potatoes to the new orange varieties, they should be able to boost their vitamin A consumption and achieve better nutrition, researchers believed.

But would farmers grow—and would parents feed their children—a sweet potato that looks different from what they're used to? And how long would a project need to last to get them to make the switch?

In 2007 HarvestPlus initiated a two-year project to distribute vitamin A–rich orange sweet potato vines for planting to approximately 10,000 households in the Zambezia Province of central Mozambique, along with agricultural, marketing, and nutritional information. At the end of the project, which was extended another year, IFPRI senior research fellow Alan de Brauw said that about 77 percent of the participating rural households had adopted orange sweet potato and were feeding it to their families. "The rates of adoption were much higher than in lots of other agricultural interventions in Africa," he says.

Women and children, who are most vulnerable to vitamin A deficiency, nearly doubled their intake of vitamin A during the orange sweet potato harvest period.

Why did people take to the orange sweet potatoes so readily? Was it the high yields? The health messages about vitamin A? The orange color itself? De Brauw and other IFPRI researchers are now turning to these questions: "Analyzing what worked is very important, but we're also interested in what didn't work and why. These insights could benefit future efforts to scale up orange sweet potato and other nutrition-based interventions throughout the world."

– Josh Heard

Mozambican households adopted orange sweet potatoes in great numbers even though they were used to white and yellow varieties.

PAKISTAN

Gathering Evidence for Policy Reforms in Pakistan

Pakistan faces persistent challenges of poverty, food insecurity, and weak economic growth: nearly 48 million people survive on $2 or less a day, more than one-third of children under age five are underweight, and the country ranks 52nd out of 84 countries in IFPRI's Global Hunger Index. Evidence-based policy reforms targeted to poor and food-insecure people in rural and urban areas could help improve well-being in Pakistan, but achieving them requires marshaling evidence on current conditions and policy options and using it effectively.

In July 2011, at the request of the Government of Pakistan, IFPRI launched the Pakistan Strategy Support Program (PSSP) in Islamabad to contribute to pro-poor economic growth and enhanced food security in Pakistan. Funded by the US Agency for International Development, the PSSP is working in partnership with a Pakistani research institution, Innovative Development Strategies, under the guidance of a national advisory committee.

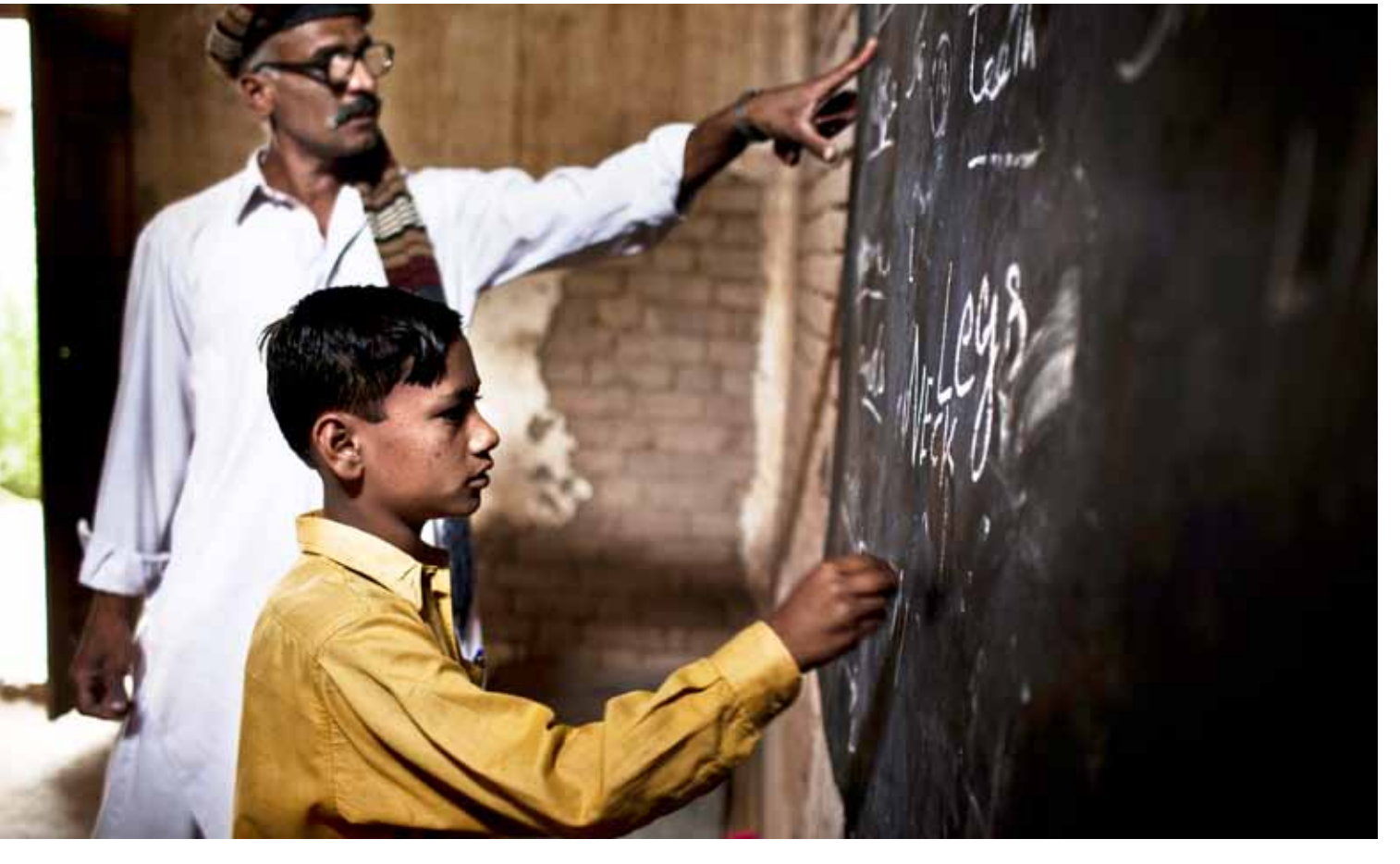
The idea behind the PSSP is to improve the Pakistani researchers' capacity to generate results that contribute to the country's development strategy, to improve policymakers' capacity to demand and absorb this policy research, and to foster a broader and more integrated knowledge community—including researchers, policymakers, civil society, and the private sector—to support pro-poor policies and strategies.

The program's first major research project is a wide-ranging, multiyear survey of rural households in the provinces of Sindh, Punjab, and Khyber Pakhtunkhwa. PSSP researchers will work with local researchers to collect, compare, and analyze data from household surveys covering a whole host of topics: agricultural practices, income, assets, consumption, education, employment, health, nutrition, economic shocks and safety nets, migration, and aspirations of household members.

"This dataset will provide credible and timely information that permits us to establish a baseline, benchmark progress over time, and understand the dynamics of income and employment. It's central to determining how best to kickstart growth and promote employment and poverty reduction in Pakistan," explained Sohail Jehangir Malik, senior policy adviser to the PSSP. "Credible real-time data are not currently available in Pakistan. Policymakers are operating largely in the dark. So this survey will be extremely useful in allowing them to evaluate the effects of various policies on the poor in real time."

—Marcia MacNeil

Education is among the sectors to be surveyed in the Pakistan Strategy Support Program.



AFRICA

China Comes Calling

Mines in Zambia. Tanneries in Ethiopia. Construction projects in South Africa. This decade, the world's fastest-growing economy has made a controversial mark on the world's least-developed continent. Currently Africa's largest trading partner and an increasingly significant donor, China has quickly established a major presence across the continent. But misunderstanding abounds about why, exactly, the dragon has set its sights on Africa.

According to Deborah Brautigam, senior research fellow at IFPRI and professor at American University's School of International Service, the answer is more complex than portrayed in most Western media reports—many of which speak of China's merciless drive for resources. Her book *The Dragon's Gift: The Real Story of China in Africa* works to dispel misconceptions that the country's motives in Africa are strictly short-term and crassly economic.

"I wanted to challenge the conventional wisdom on this issue," says Brautigam, who has studied China's presence in Africa since 1983. "And I was curious myself to find out what was going on with this growing relationship between China and Africa—and analyze what was truth and what was fiction in what I was reading."

Based on interviews in Beijing and extensive field work in Africa, *The Dragon's Gift* argues that there are diverse reasons why Chinese nongovernmental organizations, volunteers, and private and state-owned companies have flocked to Africa.

"There are those who really want to work for development; they are excited about doing something to help Africa. And there are those who are trying to make money and looking for opportunities," Brautigam says.

She argues that the presence of China—one of the world's most populous countries—in Africa is just one aspect of its increasing role as a global actor.

Outside a Chinese-built clinic in Freetown, Siera Leone. © 2007 D. Brautigam

"For the first time, China is becoming a donor to multilateral organizations, instead of just being a recipient. They're in transition. In terms of business going out, investors going out, immigrants going out—all of this is accelerating."

Most recently, Brautigam used interviews, focus groups, and field visits to survey China's agricultural engagement in Ethiopia and Tanzania. She found that Tanzania's risky agricultural investment climate makes the country less attractive to Chinese investors than Ethiopia, where China sponsors several agricultural aid programs. At least one Chinese firm is currently scoping out large-scale investment opportunities in the sector.

"China is a moving target," she said. "Not just economic growth, but institutional changes, value changes, new understandings of things—it's changing all the time."

– Susan Buzzelli and Ashley St. Thomas

COLOMBIA

A Colombian woman picking cotton

Do Women Think Differently about GM Crops?

Evidence tells us that women farm differently from men. Researchers have long known that women and men often prefer to grow different conventional crops. Now a new discussion paper from IFPRI suggests that women farmers' attitudes toward genetically modified (GM) crops also differ from men's.

Smallholder farmers in developing countries grow genetically modified crops for a variety of reasons, ranging from higher yields to decreased labor costs. A growing body of research is assessing the impacts of GM crops on these farmers, but Patricia Zambrano, an IFPRI senior research analyst, noticed that this research was consistently overlooking one issue.

"With only a few exceptions, studies that evaluate the impact of transgenic crops have hardly touched on gender considerations in their work," she says.

To lay the groundwork for an investigation of the role that gender plays in the adoption of GM crops, Zambrano and colleagues at Universidad de Los Andes and the Colombian Cotton Confederation conducted an exploratory survey of Colombian farmers—both men and women—who have adopted GM cotton.

"It appears that GM cotton is seen as advantageous by women for reasons that differ from those cited by men," Zambrano says. "It seems to save women farmers money in some critical activities that would otherwise require them to hire and supervise men—for example, in the application of insecticides and other chemicals."

The adoption of these crops also appears to free women farmers from laborious chores such as manual weeding. "It can free up their time so they can devote their energy to other productive tasks," Zambrano says.

Because of their limited free time, women farmers reported that they have less opportunity than men to obtain information about GM crops despite the fact that they are more willing than men to adjust their farming practices to best take advantage of this technology.

Zambrano and other IFPRI colleagues are already working on further research that will provide more quantifiable findings. In addition to looking at Colombia, they will conduct studies in Burkina Faso, the Philippines, and South Africa, among other countries. "We need to identify and qualify gender differences in the adoption and use of GM crops," she says. "Tailoring products and programs that take into account these differences will increase the benefits that these technologies have for all household members and the overall economy."

– Susan Buzzelli

AFRICA

Beyond "Slash and Burn"

Slash and burn. Most of us know this practice is bad news for the environment. Farmers clear land by cutting down all the vegetation (slashing) and then burning away what's left, releasing carbon dioxide into the air. After a few years, when the soil nutrients are depleted, farmers move on to a new plot of land and leave the old plot to fallow and eventually replenish itself. In Sub-Saharan Africa, slashing and burning and poor soil quality feed into each other, creating an endless loop of land degradation and inefficiency. But what if there were a way to keep farmers from burning up all the biomass left behind by slashing while also enhancing the soil's retention of nutrients and water?

Biochar—biomass burned without oxygen to form charcoal—has the potential to end the slash-and-burn cycle. Studies have shown that biochar added to soil increases the soil's ability to retain water and nutrients. But for people to use it, the technology needs to be both effective and affordable. That's where IFPRI research fellow Alex De Pinto saw an opportunity.

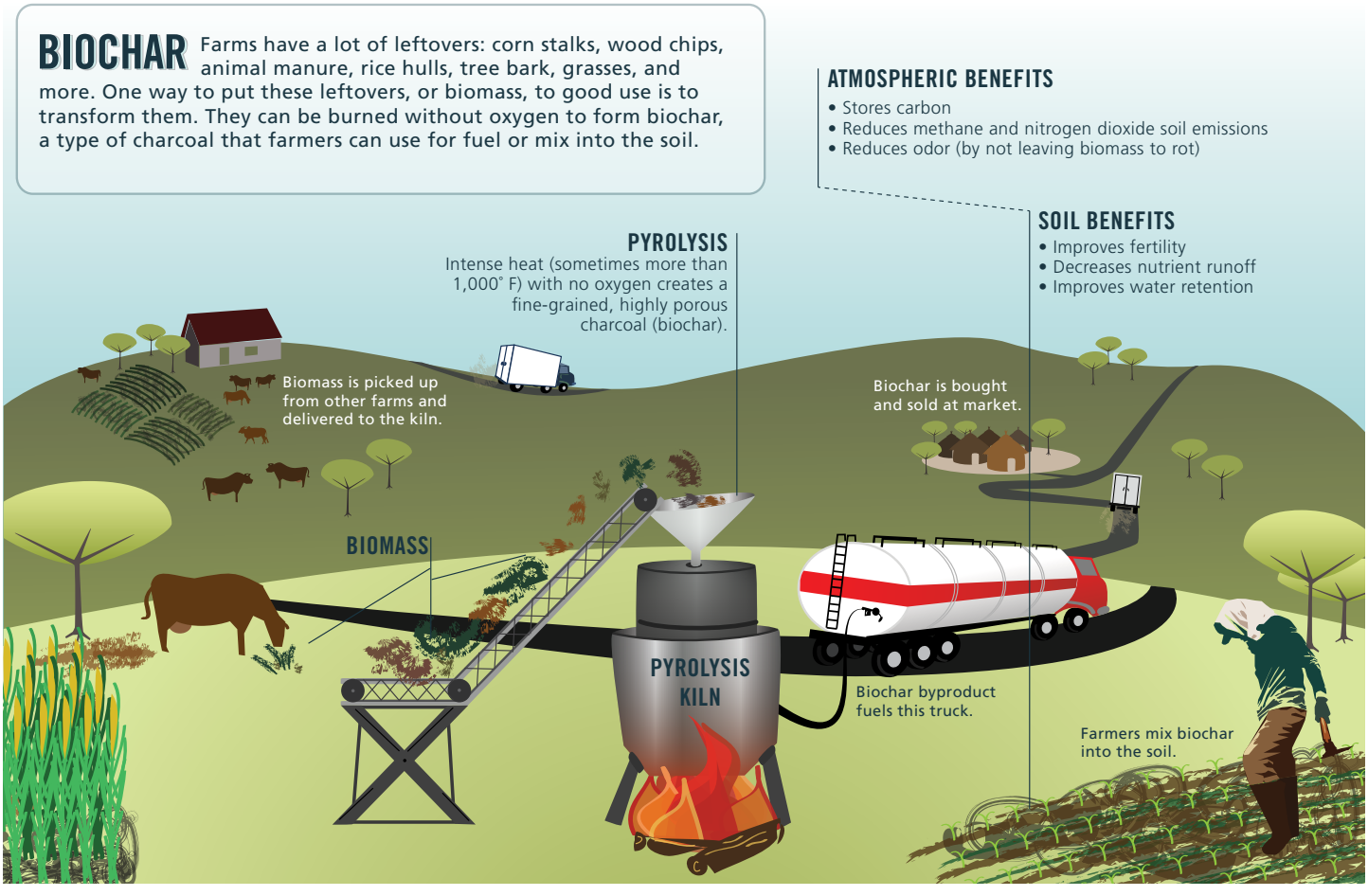
"The biophysical side of this has been explored," De Pinto said. "Now we need to work out the economic side."

De Pinto is launching a study of the economic viability of "slash and char" as an alternative to slash and burn, working with partners at Ghana's Soil Research Institute and Kwame Nkrumah University of Science and Technology, who are running trials on how biochar affects the soil. De Pinto's research will focus on the costs: clearing the land, transporting the biomass, turning that biomass into biochar, and distributing the biochar to farmers.

Depending on his results, De Pinto sees many possibilities for biochar to improve agriculture in developing countries. Using biochar should lead to richer soil and increased productivity, reducing farmers' need to clear new land. It could also be linked to cap-and-trade or carbon-payment schemes, giving farmers not only richer soils and increased yields but also a monetary incentive to capture and use carbon rather than releasing it into the air by simply burning a field.

Could biochar help spell the end of slash and burn? De Pinto is working on the answer.

– Adrienne Chu



WORLD

Talking with Michael Hailu

Michael Hailu is director of the Technical Centre for Agricultural and Rural Cooperation (CTA), based in Wageningen, the Netherlands. CTA works to improve the flow of information on agricultural and rural development in African, Caribbean, and Pacific countries. In 2011 IFPRI and CTA launched collaborative activities in several areas, including the CTA's Brussels Development Briefings, which are bimonthly policy dialogues for policymakers, development practitioners, researchers, and others. We asked Hailu about current development issues and his own path to international development work—and we threw in one extra question just for fun.

What's the biggest development issue you see?

Of course, the big issues are poverty and hunger. There are policy and institutional constraints in addressing these issues, but I would say one really important thing is capacity. This means having well-trained and appropriately remunerated nationals at different levels—technicians, researchers, policy people—with adequate skills and resources so they can make a difference on the ground. We talk about so many new technologies and approaches, but there aren't enough people to actually make them happen.

How can we address it?

Governments cannot do it alone. Private-sector engagement and linking farmers to markets can make a significant difference. If agriculture continues as a subsistence activity, then we won't really get away from where we are. But if people see it as a viable business that can improve their livelihoods, young people will be interested in staying on the farm and doing more. It's critical to look at the value chain and find where more of the benefits can go to the smallholder farmers. With higher incomes, they can invest more in their farms and also become consumers contributing to the rural economy. The whole lifestyle in the rural areas can be improved—infrastructure, health, education, services—so that the rural space becomes much more livable.

CTA works to improve information for developing countries. Why is this so important?

Timely and up-to-date information is critical in learning about new techniques or accessing markets for smallholder farmers. CTA facilitates access to information and exchange of knowledge at various levels—from farmers' groups to extension workers, researchers, trainers, educators, and policymakers. Lessons from policy and practice from one country may be useful to another country. And in many instances—for example, in the remote villages of Gabon's tropical forest—CTA's *Spore* magazine is the only source of up-to-date written material available to extension workers and villagers.

What excites you most about the work CTA is doing?

We recently launched a new strategy identifying three key priorities for CTA until 2015—strengthening regional agricultural policy processes, supporting priority value chains, and strengthening the information, communication, and knowledge management capacities of institutions and networks in the countries where we work. We are one of the few international organizations devoted to facilitating information and knowledge exchange—using modern information and communication technologies as well as more traditional means—to support agricultural development, particularly smallholder agriculture. From bringing together farmers' organizations, policymakers, and researchers to debate important policy issues to helping rural youth exploit the potential of information and communication technologies,

Michael Hailu, director of the Technical Centre for Agricultural and Rural Cooperation (CTA).

CTA does work that benefits a wide range of stakeholders in the agriculture and rural development sector.

How did you get into international development?

To be honest, it was kind of accidental. I was in the university in Ethiopia during turbulent political times in the country, which brought a lot of uncertainty and an insecure situation. An ad was posted for a job at ILCA [International Livestock Center for Africa, now the International Livestock Research Institute]. There were about a thousand young university students interested in the job, and they picked 10. I was one. Although initially it was accidental, I've always been interested in development and in working for the betterment of people's lives. So it's very much in line with my own philosophy and values.

You grew up in Ethiopia—what meal do you remember most clearly from your childhood?

My favorite dish is *doro wat*, which is chicken in a spicy sauce. I think my mom makes the best *doro wat* ever. If you are a reasonably well-to-do family, it's a typical meal you might have once a week or a couple of times a month. In a rural household, you might have it once or twice a year, during holidays like Easter or New Year. Some people like *kitfo*—raw meat. Many Ethiopians say that's what they love, but I still like my mom's chicken.

– Heidi Fritschel

WORLD

Penny Wise and Pound Foolish?

The world's farm land is under siege. Desertification, deforestation, overgrazing, salinization, and soil erosion—from both natural and human causes—are eating away at the quality of the land on which humans depend for food, according to a new IFPRI brief called *Economics of Land Degradation: The Costs of Action versus Inaction*, and a book of the same name. Forty-two percent of the world's poor now depend on degraded lands for food and income, yet little serious effort has been made to reverse land degradation.

Why isn't more being done? It's tempting to assume that solutions cost too much. But IFPRI Senior Research Fellow Ephraim Nkonya and his coauthors point out that if all the costs of action (taking steps to prevent or reverse land degradation) and inaction (letting degradation continue) are accounted for, it is nearly always cheaper to take action.

In Niger, for example, doing nothing is already imposing a heavy cost. Overgrazing, soil salinity in rice fields, and lack of soil nutrients in sorghum and millet fields reduce gross domestic product (GDP) by about 8 percent. Prevention would be cheaper. The authors calculated the cost of preventing salinization at only about 10 percent of the cost of not preventing it and the cost of preventing overgrazing at only 20 percent of the cost of allowing it to continue.

The challenge is getting land users to change the behaviors that lead to land degradation. When land users themselves receive the benefits from mitigating or preventing land degradation and when those benefits outweigh the value of current practices, they are more likely to do the right thing. A bottom-up approach helps because it gives land users a mandate to determine land improvement. Evidence shows that linking national institutions with local ones, such as local councils, improves farmers' and pastoralists' compliance with regulations designed to improve land quality.

Improving infrastructure and access to services reduces farmers' transaction costs and gives them better prices for the items they produce from the land, in turn giving them incentives to invest in land management. Serviceable rural roads, reliable communications, and access to markets have led communities to invest more in, for example, preventing soil erosion.

Finally, Nkonya and his coauthors noticed that the more effective a government was, the more land improvement took place. "Surprisingly," Nkonya said, "this relationship was consistent across all regions of the world, including areas with high population densities like China and India." In other words, even in areas with heavy pressure on land, good governance can create the conditions for sound land management.

– Heidi Fritschel

A sand dune stablization project in Niger.

BOTTOM UP

Local initiative creates a thriving cluster of potato producers in China

Adrienne Chu

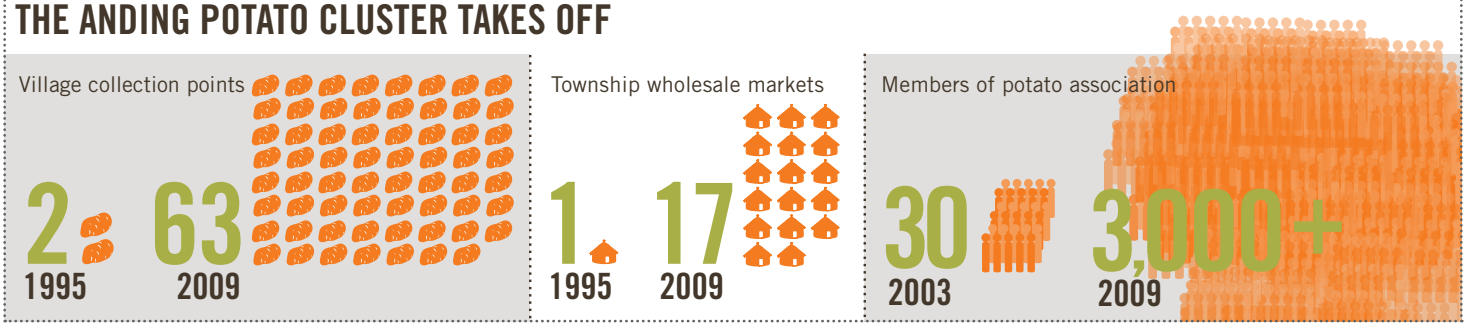
Anding County was once one of the poorest, hungriest areas in China. Limited rainfall and infertile soil led to extremely low and volatile yields of wheat, the main crop. Seventy-eight percent of farmers lived in poverty.

But now Anding has become China's "potato capital." This improbable transformation led IFPRI Senior Research Fellow Xiaobo Zhang, along with Dinghuan Hu from the China Academy of Agricultural Science, to explore just how it happened and record the findings in an IFPRI discussion paper, *Overcoming Successive Bottlenecks: The Evolution of a Potato Cluster in China*.

What Zhang saw was a well-functioning "potato cluster" that employs about 30 percent of the population. To understand what a cluster is, think of Silicon Valley, California, or Bangalore, India—a geographic area where related businesses are concentrated. This concentration makes it easy to achieve a division of labor. In Anding different people are responsible for each small step in production—everything from growing the potatoes to producing French fries to making the bike deliveries that move supplies from one step to the next.

Starting in the 1950s, the Anding County government undertook a massive effort to improve agricultural land by building terraces. But better land only went so far. Yields were still lackluster, and people were still poor. The county government realized that wheat, which farmers had grown there for many years, was not well suited to Anding. Potatoes were a better fit for the local climate and soil, but farmers did not take them seriously as a cash crop. Recognizing this, the local government convinced a core group of farmers

THE ANDING POTATO CLUSTER TAKES OFF



Source: Based on X. Zhang, "Local Industrial Policy and Cluster Development in China: The Evolution of Anding Potato Cluster," slide presentation (International Food Policy Research Institute, Washington, DC, 2011).

to plant potatoes in the 1980s and early 1990s. Their success led other farmers to forget their prejudices and start growing potatoes as well.

This success, of course, was not the end. The local people and their government used their knowledge of the area to overcome new challenges. When the market demanded higher-quality potatoes, the local government focused on developing new and better varieties. When farmers needed a place to store their potatoes while they waited for better prices, the county government implemented a new policy to encourage farmers to build more storage facilities.

Zhang and Hu identified several reasons that clusters work in China, and specifically in Anding County. First, the concentration of production attracts wholesalers to Anding, saving farmers travel time and money. This concentration also gives the farmers political power. When Anding producers wanted to expand the potato trade to large cities on the coast, transporting the potatoes was a problem—the Ministry of Railway had allocated only a small number of freight railcars to Anding. The potato producers had enough clout, however, to get the quota of freight cars more than doubled from 2003 to 2004.

In addition, clusters can make it easier for entrepreneurs to get started, according to a related study by Zhang and his colleagues. Access to credit in developing countries is limited, especially for the poorest citizens. Clusters can overcome the credit bottleneck by both reducing the amount of money needed to start a business and creating partnerships through which bigger players can lend money to smaller ones.

Fresh from the potato capital.

Finally, while avoiding the credit problem is a significant advantage, Zhang points to the reliance on the knowledge of local people and governments, rather than regional or national decisionmakers, as the Chinese clusters' greatest reason for success. "You need to trust people on the ground," Zhang said. "The local people know best what their issues are."

Anding's potato cluster is just one example of a growing trend in China—a nearby county specializes in medicinal herbs, while another focuses on the Chinese art of paper cutting. The success of clusters in China leads one to wonder why this system is not flourishing in other developing countries. According to Zhang, these countries often do not share two of China's main advantages: infrastructure and empowerment of local governments.

In Ethiopia, for instance, handloom clusters exist, but they have failed to thrive because the country lacks electricity and other basic infrastructure.

But the bigger problem, as Zhang sees it, is that nongovernmental organizations and other development partners are not making use of the clusters' greatest strength: local knowledge and initiative. The key difference between China and other developing countries, according to Zhang, is that "local governments in China are very involved."

The development community usually talks with national leaders to come up with prescriptions that are duplicated around a country. But the agenda imposed on a community may not fit that place at that time. Clusters are effective because they are location and population specific.

"The development community wants one-size-fits-all, simple solutions," Zhang said, "but development is a continual process. Local governments know best how to adapt when needs evolve."

Farmers in Anding County, China, now earn 60 percent of their income from potatoes.

CHANGING THEIR WAYS

IFPRI researcher Purnima Menon is studying how to change the behavior of families and policymakers so they'll do the right thing for children's nutrition.

Keith Chu & Ashley St. Thomas

Researchers know the first two years of life represent a critical time in child development, a time when an undernourished child can suffer setbacks in mental and physical development from which she may never recover.

What's less clear is how to communicate with families so they can ensure their children get good nutrition—and with policymakers so they will set up systems to make it easier for families to do so.

That's what IFPRI's Purnima Menon is working to change. Menon, a research fellow at IFPRI since 2007, studies issues related to families' behavior and nutrition interventions. She is co-leading the project Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN), as well as leading the evaluation of Alive & Thrive, an initiative of the Bill & Melinda Gates Foundation that aims to improve infant and child nutrition in Bangladesh, Ethiopia, and Vietnam. Posted in India, which accounts for more than 40 percent of the world's stunted children, she sees the ravages of undernutrition every day.

"What does it take to enable families to do the right thing?" Menon asked, in an interview from her New Delhi office. "It's fascinating from a behavior change perspective."

Understanding the details of women's lives is a vital piece of Menon's work. To know how to persuade women and families to change their behavior, Menon first needs to know how they live and why they make the choices they do. Menon is particularly interested in the roles of women in households, not only as mothers, but also as wives, daughters-in-law, income earners, and farmers—all of which may make it easier or harder for them to follow recommendations about feeding and caring for children.

"What do their daily lives look like? What do their routines look like? What enables or prevents them from doing a certain thing?" Menon said. "When we go out and gather data in our studies, we talk to women about what they're feeding the babies and why they're doing things a certain way. We also talk to health workers to understand their work environments and the things that enable them to deliver services in poor communities."

Still, as she spent her childhood moving around India (her father was in the Indian Air Force), Menon never envisioned herself delving into the thorny problems

of international food policy. She was a self-described "foodie" who imagined someday running a restaurant or hotel.

This was the future she was pursuing when she took up the study of nutrition at the University of Madras. But as she worked with women and young children in the field as part of her master's degree program at the University of Delhi, Menon was struck by the importance of engaging communities with nutrition first-hand. She was hooked. "I just started to feel like the community side of it was much more exciting and much more relevant," Menon said. "That's where I wanted to go."

Two decades later, after earning a doctorate at Cornell University and working to improve nutrition programs in Haiti and elsewhere, Menon is helping draw attention to the severity of India's nutrition problem. A 2009 *New York Times* article quoted her on the challenges facing India's efforts to improve infant undernutrition, and in 2010 she wrote a *Foreign Policy* op-ed calling for smarter nutrition interventions by India's national and local governments.

As part of both POSHAN and Alive & Thrive, Menon and her staff collect voluminous amounts of data about the lives of women and children, and the systems surrounding them, through surveys and anthropological research. They then use that information to tell policymakers and program implementers how they can support women's adoption of nutrition-promoting recommendations.

One example is the effort to persuade women to exclusively breastfeed for the first six months of a baby's life, which has been a focus of Alive & Thrive. Breastfeeding is natural, Menon said, but exclusive breastfeeding for a full six months is often challenging for women.

"Maybe they're not getting enough help with breastfeeding when they have problems. Or maybe other people in the house decide the child can have something other than breast milk because the dad brings home, say, a tin of formula milk," she said.

So Alive & Thrive doesn't just target mothers—it also uses mass media to reach fathers and engages with older women who may play a part in child rearing. And it makes use of advocacy and engagement with policymakers to support the efforts of governments and other partners to improve child feeding in the three countries. Part of the goal of the program is to learn what works. "Our team is bringing innovation and rigor to the evaluation of these interventions," said Menon.

POSHAN aims to address a critical gap in India: less than 55 percent of mothers and children receive essential health and nutrition interventions. This gap occurs in part because it can be difficult to scale up the delivery of high-quality health and nutrition services. In addition, policymakers lack consensus on how to address undernutrition and so adopt ineffective policy solutions.

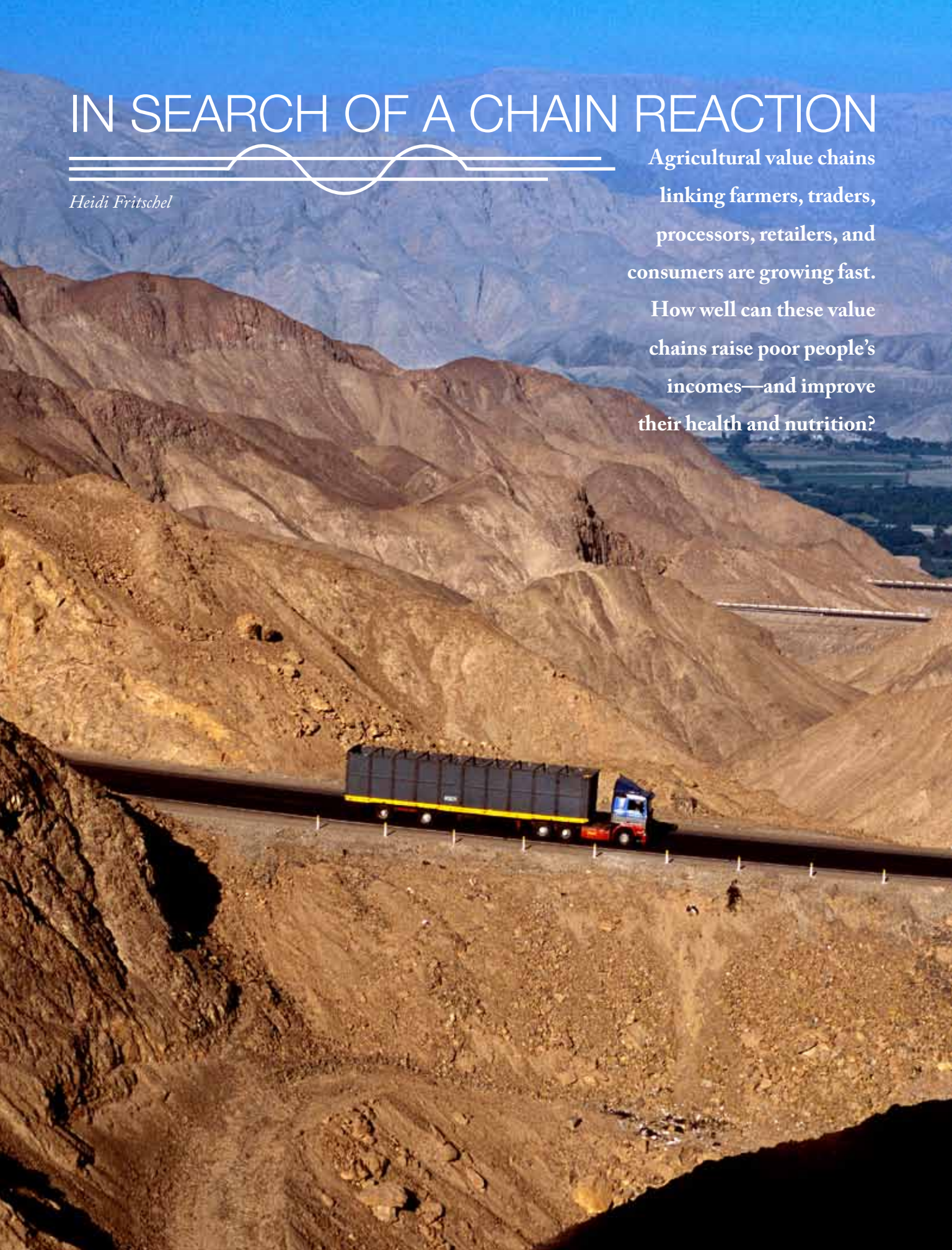
Menon and her colleagues are starting their research by gathering evidence on health and nutrition programs in India, focusing on three or four states. Next they will turn to finding the most effective ways of communicating with program implementers and policymakers.

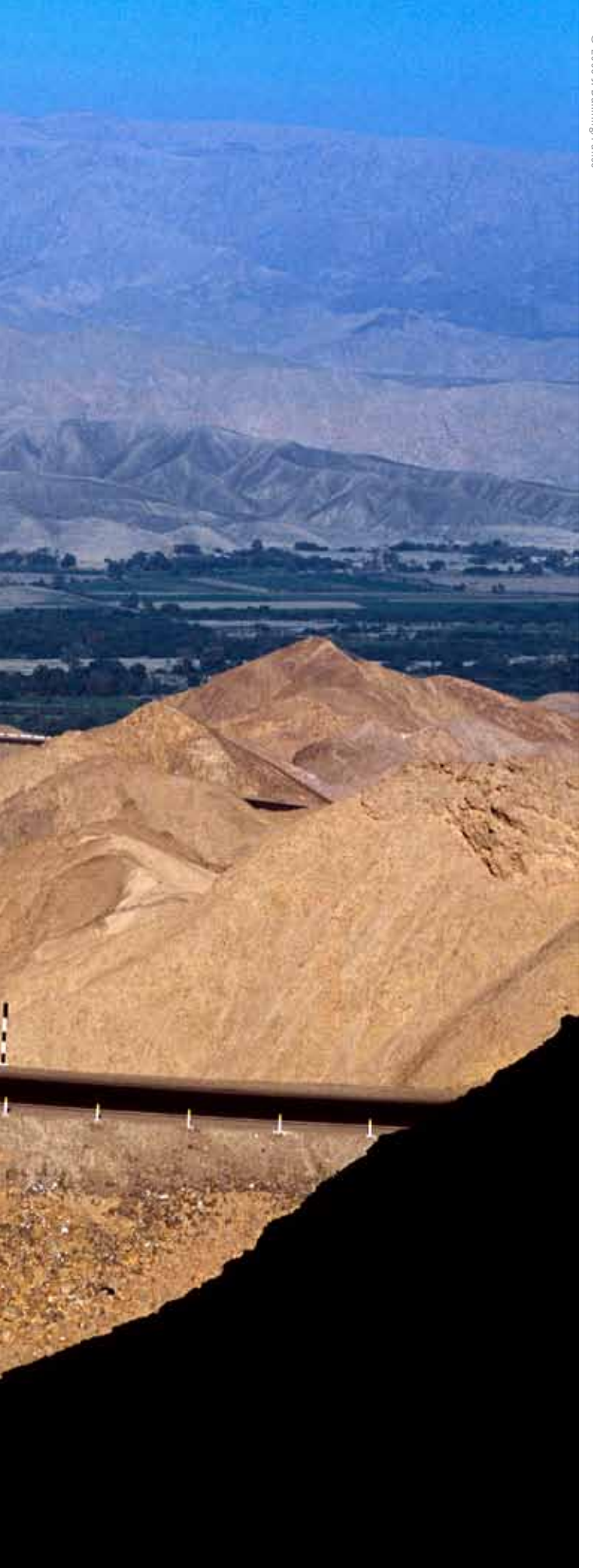
"We are trying to understand what the evidence base looks like," Menon said, "but also what people are looking for when they're making those decisions, what's really going to work to enable the system to deliver that behavior."

IN SEARCH OF A CHAIN REACTION

Heidi Fritschel

Agricultural value chains linking farmers, traders, processors, retailers, and consumers are growing fast. How well can these value chains raise poor people's incomes—and improve their health and nutrition?





In the late 1990s, a vast gulf separated poor farmers in the northern Nicaragua province of Jinotega from the potential market represented by the country's leading national supermarket chain, La Colonia. The farmers grew meager quantities of cabbage, lettuce, and tomatoes that brought them hardly any income. More than three-quarters of the province's population was living on less than a dollar a day. What they really needed were good seeds, better irrigation, and a reliable market for their goods.

Meanwhile, La Colonia was having its own problems. It imported fresh produce from neighboring countries, but this arrangement was expensive and slow. When it arrived at La Colonia, the produce was often wilted, bruised, or rotting. What the supermarket chain needed was a good local supplier of fruits and vegetables.

Enter TechnoServe, a nongovernmental organization (NGO) with lots of experience connecting farmers to markets. TechnoServe helped the farmers start a cooperative and obtain financing so they could buy better-quality seeds. Advisers helped the farmers carry out safety and quality-control measures that would meet the supermarket chain's stringent standards. The farmers started planting high-quality seeds, improved their irrigation system, and staggered their plantings to increase harvests. Soon they were selling lettuce and other produce to La Colonia, and other buyers as well, including a distributor for Walmart. In 2008, the cooperative's revenues were US$300,000, and the farmers, whose incomes have risen significantly, can now afford to send their children to school, an expense that was previously out of reach for them.

This is an agricultural value chain in action. It is simply a supply chain that has been designed to add and retain value at each step along the way, from production to final sale, with the ultimate goal of meeting consumers' demand.

"Population is increasing, incomes are increasing, demand is booming," says John McDermott of IFPRI. "There are lots of opportunities, and someone is going to meet this demand. We want to ensure that poor people will benefit, whether they are

Hauling goods to market in Peru.

Instead of surviving on a monotonous diet of rice, maize, or cassava, people are now buying meat, milk, cheese, bread, tortillas, crackers, canned fruits, frozen vegetables, fruit juices, and soft drinks.

farmers or input suppliers, service providers, or market agents." So IFPRI, along with a large number of partner institutions in the Consultative Group on International Agricultural Research (CGIAR), is launching two new research projects that will examine, among other things, how value chains can be designed to improve not only poor people's incomes, but also their health and nutrition.

In the past there has been a heavy emphasis on increasing production as part of agricultural development. But there is a problem with that approach, and value chains may provide an answer. "If farmers produce twice the potatoes, the price may fall in their local market," says Maximo Torero, director of IFPRI's Markets, Trade, and Institutions Division. "So how can they add value in a way that links them to markets and helps them make more money?"

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VALUE CHAINS ON THE RISE

Agricultural supply chains are nothing new, but in the 1980s the concept of a value chain arose as people started to pay more attention to the value added at each stage of the supply chain, from the input suppliers and farmers to the traders, processors, retailers, and consumers. And the concept has attracted increasing attention as a way of thinking about, and implementing, agricultural development.

"It's a holistic way of analyzing problems," says Andrew Shepherd of the Technical Centre for Agricultural and Rural Cooperation (CTA). "In the past donors would go into a developing country with a production person, or a postharvest person, or a marketing person. The value chain approach gets people thinking about the whole chain and emphasizes the need for production to be related to what consumers want to buy."

Modern value chains are becoming more common in developing countries, especially in Asia and Latin America. IFPRI's Bart Minten attributes this growth to two factors. First, the growth of cities means more people now buy their food instead of growing it themselves. Second, rapid economic growth has put more money in people's pockets, increasing their demand for more diverse, convenient, high-quality foods. Instead of growing just a few staples and surviving on a monotonous diet of rice, maize, or cassava, they are now buying meat, milk, cheese, bread, tortillas, crackers, canned fruits, frozen vegetables, fruit juices, and soft drinks.

To meet this demand, modern retail has swept into the cities of many developing countries. In India, for example, the sales revenues of modern private retail stores—such as supermarkets—grew by 49 percent a year from 2002 to 2009—five times faster than gross domestic product (GDP). The supermarket revolution is also occurring in other countries in Asia, Latin America, and, to some extent, Africa.

These retailers need to procure large quantities of consistently safe, high-quality food from somewhere, and to get it they are imposing standards that have implications all along the value chain. "This has led to rapidly increasing flows of marketed, higher-value agricultural products," says Minten. "More producers and more consumers now depend on the functioning of these value chains."

A MONEY-MAKING PROPOSITION

For farmers, getting in on a value chain can reduce much of the uncertainty and frustration of farming. Large buyers like supermarkets and wholesalers can offer a reliable market for output and secure access to inputs like seeds, fertilizers, and pesticides. They also often provide credit and farming advice that can help farmers produce more valuable crops.

And the bottom line? "Most research seems to indicate that farmers who supply these modern value chains indeed have higher or more stable incomes," says Minten.

PepsiCo has set up contracting arrangements with small farmers in Mexico to produce maize for the company's snack products; in the first three years of the project, yields and farmer incomes have increased significantly. PepsiCo is also

Washing lettuce destined for a Nicaragua supermarket.

"We want to explore whether it's possible to add nutrition to the value chain without affecting economic value for the different participants in the chain."

— Marie Ruel, IFPRI

working with hundreds of Mexican smallholder farmers who grow sunflowers for sunflower oil. "We've committed to buy 100 percent of their crops for the next seven years," says Beth Sauerhaft, PepsiCo's director of global environmental sustainability. "We have a partnership with lenders to provide financing to these farmers, and the Inter-American Development Bank is guaranteeing a certain amount of these loans. And we're also committed to technical training."

Other major multinational corporations are also taking steps to incorporate small farmers into their value chains as a way of helping to meet demand in developing countries. In 2010 Unilever announced it would buy 20 percent of selected dehydrated vegetables from small farmers and incorporate 500,000 small farmers into its supply chain by 2020. Walmart has announced that it wants to reach 1 million small farmers in China, training them to farm sustainably and increasing their incomes by 10 to 15 percent. It plans to sell US$1 billion worth of food from small and mid-sized farms in emerging markets like China.

Despite the attention garnered by these global corporations, they won't be able to absorb the millions and millions of small farmers and traders in developing countries any time soon. In fact, most of the value chains that involve small farmers are relatively small-scale, local efforts—for example, a small dairy farmer transports his milk to a nearby cooperative that processes it and sends it on to be sold at a local milk bar. "While it is true that the biggest monetary value addition will come from higher-value foods sold in supermarkets," says IFPRI's McDermott, "the vast majority of poor people will need to start by getting involved in informal markets and over time graduate up as these markets evolve and get more sophisticated."

The income and employment benefits can spread farther along the supply chain, going beyond the farm. Modern value chains can provide jobs in food packaging and processing in rural areas. Beans can be made into bean flour, potatoes into potato chips, maize into tortillas; fruits and vegetables can be differentiated into different qualities at different prices. "Even simple sorting and packing can provide employment," says Mark Lundy of the International Center for Tropical Agriculture (CIAT).

GETTING A FOOT IN THE DOOR

It's a great opportunity for small farmers—*if* they can break into the value chain.

Because supermarkets and wholesalers need large quantities of high-quality products, delivered when promised, they tend to seek relationships with farmers who are already well endowed with land, education, and assets, like irrigation. In many ways, this preference is understandable. Small farmers produce small quantities, and it's expensive to arrange individual transactions with them.

In addition, small farmers are generally not accustomed to meeting stringent quality and safety standards, and they may find the technologies needed to meet these standards—such as equipment for drying crops or refrigerating livestock products—unaffordable. "For individual farmers, it's very difficult," says Andrew Shepherd of CTA.

Pippa Chenevix Trench, who worked on these issues as an IFPRI research fellow, points to the way around this small-farm problem: "You need collective action to bring together small farmers who produce for these markets," she says. In other words, you need to organize small farmers in such a way that they act as one large entity—just as the produce farmers in Nicaragua did.

"Institutional arrangements become important," says John McDermott. "You need service hubs—they might be cooperatives or some other institution. They can provide loans, inputs, information, and market opportunities. They can lower costs and improve services to the poor. These institutions help link millions of small farmers and other poor people to functioning value chains. In Kenya it

TALLYING UP THE SCORECARD

A new tool from IFPRI helps prioritize value-chain projects

To help aid donors direct funding to the most poverty-reducing and economically sustainable projects, IFPRI has developed a "scorecard" system that is currently being applied to agricultural value-chain projects in a pilot program in Central America. Here, Manuel Hernandez, an IFPRI researcher, and Maximo Torero, director of IFPRI's Markets, Trade, and Institutions Division, describe how it works.

Donors typically want their projects to be both effective (in this case, to reduce poverty) and economically sustainable (so the project won't collapse when donor funding ends), but they often rely on qualitative or subjective criteria to decide whether potential projects will meet these goals. Our scorecard applies a more objective, quantitative approach to both goals. First, we evaluate the project's sustainability using the latest developments in statistical modeling. Our data-driven method can more accurately model the risk of whether the project will succeed or not based on specific project characteristics and external factors, such as the education and experience of beneficiaries and the probability of crop failure. Then, the projects that meet the sustainability threshold are ranked in terms of their potential to reduce poverty based on how well the projects reach geographic areas with high poverty and low market access and how many direct and indirect beneficiaries they serve.

With the help of two sponsors of the pilot program—the Office of the Multilateral Investment Fund of the Inter-American Development Bank and the Austrian Development Agency—we have so far assessed more than 50 projects using the scorecard, and 9 have been selected for funding. The projects, located in El Salvador, Guatemala, Honduras, and Nicaragua, represent a total investment of about US$1.7 million and will have nearly 6,000 beneficiaries—half of whom are women—who live in high-poverty areas. The projects support a wide range of agricultural products and markets, including coffee, chocolate, tropical fruits, and vegetables.

Our task now is to evaluate the projects and assess how well the scorecard has identified activities that are likely to be poverty-reducing and sustainable. Looking ahead, we hope to extend the scorecard approach to other types of projects and other regions around the world to help donors ensure the effectiveness and sustainability of their investments.

has been estimated that there is one job along the dairy value chain for each of the 3 million improved cows."

TechnoServe and similar NGOs can help get the process started by showing what kinds of farmer arrangements have worked elsewhere and identifying other problems that keep small farmers from participating in value chains. It could be, for example, that farmers have poor seeds or breeds of livestock, lack farming or storage equipment, use too little or too much fertilizer, or follow less than optimal farming practices.

Cooperatives are not the only solution, however, says Derek Baker of the International Livestock Research Institute. "With a cooperative, you need a lot of formal organizational structures. They commit people to various courses of action and ways of dividing benefits. There are other less formal approaches," he says. For instance, informal groups of farmers may share a truck or funnel their products to a large local farmer who can get them to market.

The International Potato Center (CIP) is working to help small-scale Andean farmers enter value chains for new potato products. Because not all value chains work to the benefit of small farmers, CIP is developing a "poverty filter" to determine which types of potatoes—such as small varieties that require harvesting by hand—will give small farmers a long-term competitive advantage.

Even poor, illiterate farmers are able to participate, with the right support. For example, IFPRI researchers are working

Loading locally produced oranges and lettuce in Ethiopia.

on a project with CARE to strengthen dairy value chains in Bangladesh. The project helps small dairy producers afford to buy high-yielding breeds of cattle that can produce much more milk than traditional breeds. It helps the producers organize themselves into groups, and it trains them in how best to feed and care for the cows. "It has taught the farmers how to grow fodder, when to feed the cows, and when to go to the vet," says IFPRI Senior Research Fellow Agnes Quisumbing. "It teaches them how to function in a very complicated production system and ensure the quality of milk production, even if they are illiterate." Then the project helps build ties between small producers, small dairy collectors, and small processing plants.

IFPRI researchers are also evaluating how well the project meets the needs of women, who traditionally do most of the work associated with dairy production. When women do the work but don't reap the benefits of value chains, they may participate only half-heartedly. "We know from other value chain projects that when they don't address the issue of gender," says Quisumbing, "it can jeopardize the project's success."

FOOD THAT'S SAFER...?

Besides raising farmers' incomes, building agricultural value chains can make it easier to produce safer food.

Although hunger in developing countries gets the headlines, unsafe food kills more people. In 2008, according to the World Health Organization, more than 1.6 million people worldwide died of diarrheal diseases—in many cases resulting from unclean food and water.

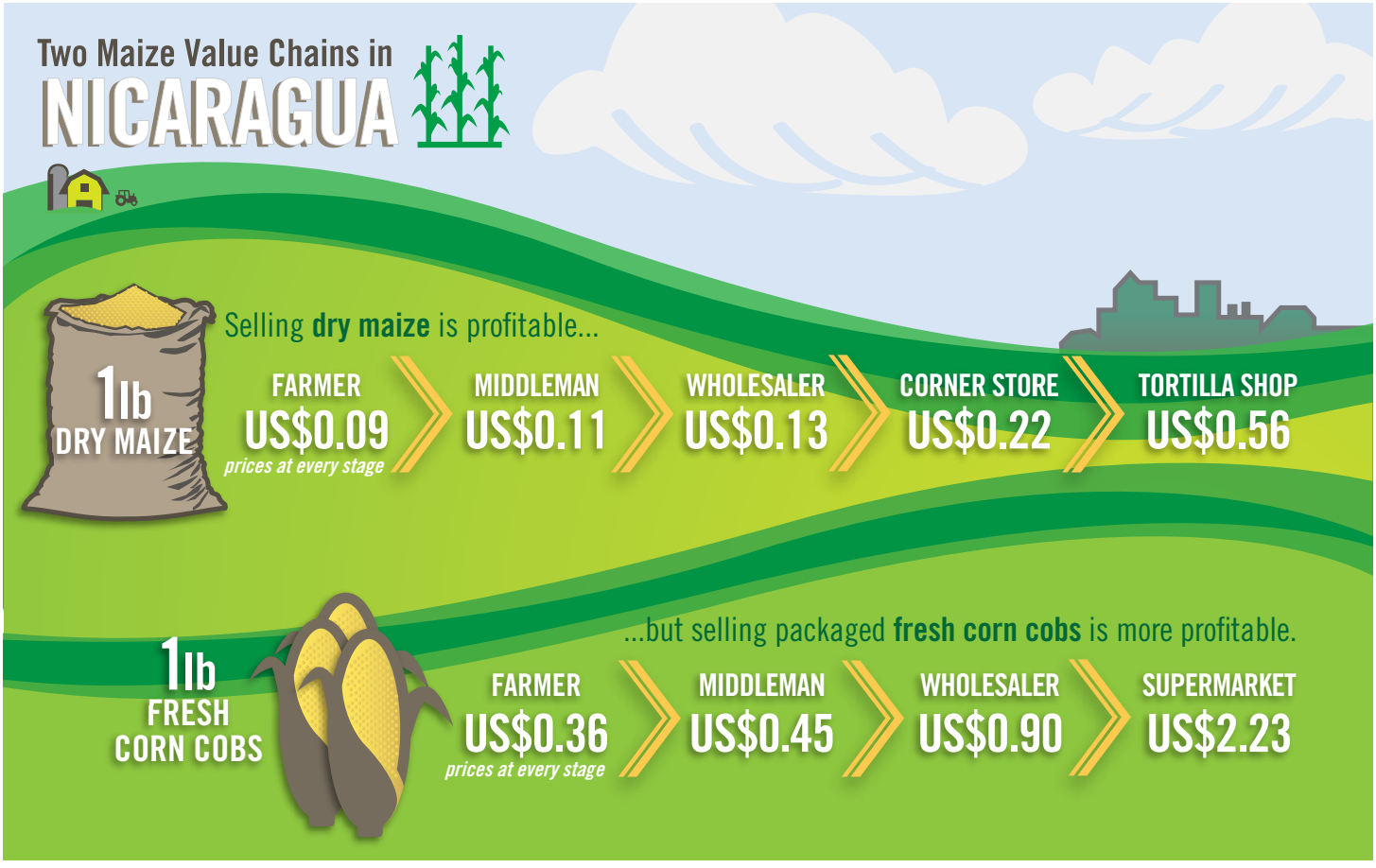
Demand for safe, high-quality foods is on the rise in developing countries, so large buyers like supermarkets and agrifood businesses have set food safety standards that farmers and other actors along the value chain must meet. In fact, improving food safety requires working along the whole value chain—farmers can't improve food safety by themselves.

To better understand the value-chain approach to food safety, IFPRI is starting a program to study how best to control aflatoxin, a fungus byproduct that appears in some food crops, especially maize and peanuts, and can cause serious liver diseases, including cancer. "A producer in Kenya can do everything to reduce aflatoxin in maize, but if the trader leaves the maize on the back of his truck in the rain, all that effort is lost," says Trench. "Any action taken has to be supported all the way through." This means training people all along the chain, from the farmers to the retailers, in how to keep food safe.

In Kenya and elsewhere, milk marketing agents have formed associations to collect milk from small farmers, process it, and sell it to distributors or supermarkets. ILRI and partners have looked along the dairy value chain to identify the points where food safety risks are greatest and then worked to fix these, says John McDermott. The fixes can be quite simple: washing hands, wearing clean clothing, cleaning the milking area, straining the milk to remove contamination, and using easy-to-clean metal containers instead of plastic ones.

...OR MORE NUTRITIOUS?

Just as food safety can be one of the "values" produced by a value chain, so can nutrition—but if adding nutritional value costs producers money, there may be trade-offs between economic value and nutrition. "We want to explore



Source: IFPRI elaboration based on data from S. Flores Cruz, "Oportunidades para el exito de los modelos de retencion de granos de Nicaragua," *Revista Encuentro* No. 72 (Managua: Universidad Centroamericana, 2005).

whether it's possible to add nutrition to the value chain without affecting economic value for the different participants in the chain," says Marie Ruel, director of IFPRI's Poverty, Health, and Nutrition Division.

How important is including nutrition in value chains? Won't people in developing countries automatically improve their nutrition as they make more money? "Although increasing incomes usually do lead to improvements in nutrition," says Ruel, "it takes too long to improve nutrition that way. We need to do more to ensure that additional income translates into nutrition benefits." One way to do that, she says, is not only to educate people about the value of nutritious foods, but also to improve their access to such foods. That's where the value chain can help.

By studying the value chain, it's possible to determine where to add nutritional value or avoid nutritional losses. Then, says Maximo Torero, "nutrition becomes an attribute that farmers can charge for. This requires both improving the nutritional content along the value chain and creating consumer demand by providing information on the benefits of this new attribute."

Small farmers have an important competitive resource at their disposal: their own labor and that of their families.

But will poor people pay a higher price for more nutritious food? Although researchers are still studying this question, it appears that in some cases people will pay more. For example, HarvestPlus, a program that breeds vitamins and minerals into staple food crops, has developed a biofortified orange-fleshed sweet potato that has more vitamin A than the white and yellow sweet potatoes typically eaten in many African countries. The program distributed sweet potato vines to 10,000 households in Mozambique and Uganda and at the same time worked to raise awareness among farmers, traders, and consumers of the nutritional benefits of the orange sweet potatoes.

The market for orange sweet potatoes had to be created from scratch, using road signs, murals, promotion days, and radio programs and advertisements. When the orange sweet potatoes reached the market, the light orange variety earned a 17 percent price premium and the deep orange a 54 percent price premium over white or yellow sweet potatoes (for more on the spread of orange sweet potatoes, see the story on page 3).

Women entrepreneurs cleaning out cattle pens at a dairy facility in India.

The inclusion of nutrition in value chains is still at an early stage and may offer significant potential for growth. CIAT's Mark Lundy says, "If biofortified varieties are of interest to farmers and show nutritional benefits, can't we get a major food processor to use these crops in processed and fresh food products targeted to low-income consumers?"

THE PRIVATE SECTOR CAN'T GO IT ALONE

The rising consumer demand for higher-value and processed-food products in developing countries has opened up a sizable new opportunity for private-sector companies. But private companies and small farmers often can't meet this need and build thriving value chains without input from other actors, such as NGOs and governments.

NGOs with experience in setting up value chains can provide the sort of guarantees of quality and reliability that buyers like wholesalers or supermarkets rely on. Julio C. Montealegre, TechnoServe's country director in Nicaragua, says, "We help reduce the perceived risk. Before we started, supermarkets were comfortable buying produce from Costa Rica. Changing suppliers is a big commitment—not a one-time thing. We help ensure quality and consistency of delivery."

Beth Sauerhaft of PepsiCo says, "Partnering with NGOs that are known to growers and consumers may add a certain degree of trust from these groups. And they can help ensure that different players or impact points in the value chain are accounted for—whether the small-scale farmers, rural communities, or the environment."

Governments also play a critical role in setting appropriate policies, making contracts enforceable, and building infrastructure such as roads. "No exporter is going to buy from farmers who are down at the end of a dirt road," says CTA's Andrew Shepherd. In some countries, such as Colombia, governments themselves have taken the initiative to promote value chains in certain products.

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ALIGNING THE INCENTIVES

Value chains are no panacea for the problems of small farmers. Worldwide there are about 500 million small farms, which are home to about 2 billion people. Only a small fraction of them are involved in modern value chains. CIAT's Lundy points out that to be suited for value chains, farmers must be able to grow commercial crops, and CTA's Shepherd is doubtful whether the poorest people have what it takes to participate. "The very poorest people have no assets or financing and limited education. They are not an attractive proposition for companies to work with," he says.

Nonetheless, ILRI's Derek Baker points out that small farmers have an important competitive resource at their disposal: their own labor and that of their families. "There are conditions under which smallholders can be competitive," he says. "It comes down to, 'Can cheap labor be used well?'"

There is still much to learn about how to engage poor farmers and rural people in value chains, and it can be difficult to translate lessons learned from one value chain to another. Products and local conditions vary widely, so it often seems as though each value chain must reinvent the wheel. To help find broad lessons for developing value chains, IFPRI researchers and their partners across the CGIAR will look at the big picture, bringing to bear their experience in studying specific commodities and in conducting large-scale surveys at different points along the value chain and across different types of producers. "This will give us a quantitative assessment that is representative of what is happening in different value chains on farms of different sizes in a certain country," says Maximo Torero. The findings should help set priorities in promoting value chains, especially those targeting small farmers.

"The most important thing any project can do," says Montealegre, "is to align the incentives of the various actors: the farmers, the supermarkets, the processors."

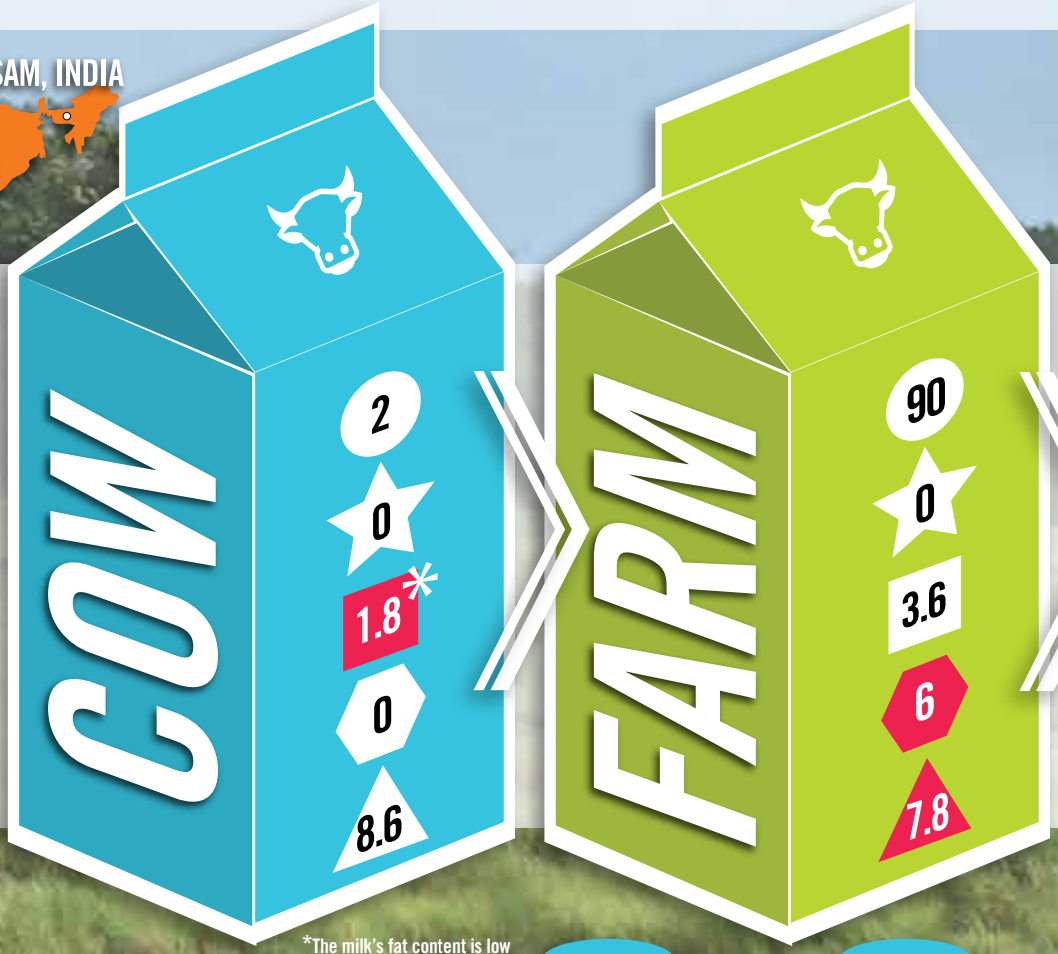
MILK IT FOR ALL IT'S WORTH

There are a number of points along the value chain where the quality and safety of milk may be compromised. This figure shows how the quality of milk from one cow in Assam, India, changes as it moves along the value chain to consumers. Along the way, it may be contaminated by bacteria, which can pose a

MILK QUALITY
ALONG THE VALUE CHAIN

- **Bacteria**
  Should be < 5,000 bacteria per microliter
- **Coliform** (evidence of contamination by feces)
  Should be < 1 bacteria per 100 milliliters
- **Fat**
  Should be at least 3.5%
- **Added water**
  Should be 0%
- **Milk solids**
  Should be at least 8.5%

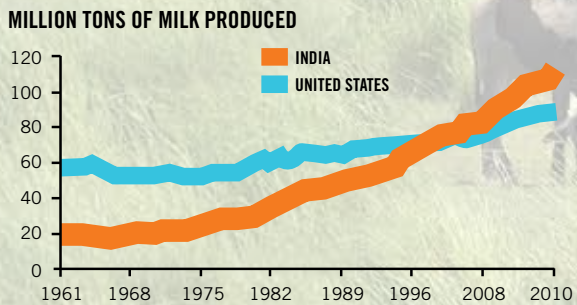
Acceptable levels
Unacceptable levels

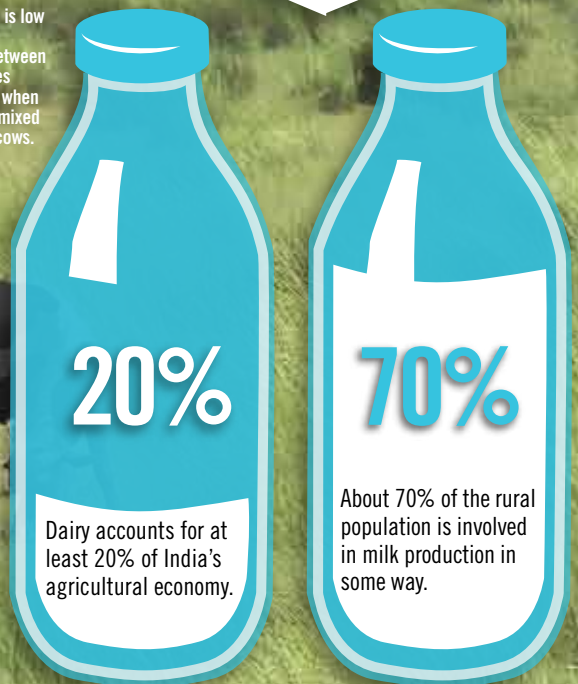


*The milk's fat content is low because of natural biological variation between cows. Fat content rises along the value chain when milk from this cow is mixed with milk from other cows.

DAIRY SUPERPOWER

India,the world's largest milk producer and consumer, is self-sufficient in milk.





threat to human health, or it may be adulterated with added water, which reduces its nutritional value. This kind of analysis shows exactly where the greatest risk to milk quality is generated, and therefore where along the value chain scarce resources for improving milk quality should be concentrated.

CRYING OVER SPOILED MILK

In January 2012, a government study of milk safety found that almost 70 percent of samples taken nationwide in India were either watered down or contaminated with potentially toxic ingredients such as detergent and other chemicals.

SOURCES: Milk quality along the value chain: D. Grace, D. Baker, and T. Randolph, "Innovative and Participatory Risk-Based Approaches to Assess Milk Safety in Developing Countries: A Case Study in Northeast India," paper presented at the International Association of Agricultural Economists conference, Beijing, August 17–22, 2009. **Dairy superpower:** Food and Agriculture Organization of the United Nations (FAO), FAOSTAT database. **Crying over spoiled milk:** Food Safety and Standards Authority of India, Press note, January 11, 2012, and news reports.

INTERNATIONAL FOOD POLICY
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PHOTO: Empty vegetable crates at a wholesale market, Dira Dawa, Ethiopia. © 2011 A. Johnstone/Panos