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In China, Farming Advances Lie Fallow

No Clear Path for New Science or Policy Changes to Reach Rural Fields

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Washington Post Foreign Service
Monday, August 6, 2007; A01

ZENGCHENG, China -- [China](#)'s vast network of food research centers and laboratories churns out mountains of papers on the latest farming techniques and technology. Their work on chemical use, pollution risks and genetically engineered crops is considered to be among the most advanced in the world. The Ministry of Agriculture keeps close tabs on the developments, constantly issuing new advice and new regulations based on the research.

None of that information reaches Li Xiujuan.

With her husband and two children, Li tends to a 2 1/2 -acre farm in [Guangdong province](#), on the southern coast, where many of the fruits and vegetables sent to the United States are grown. In recent months, Guangdong has been the source of pesticide- or additive-laced shipments of plums, lemons, star fruit, kumquats, scallions and ginseng blocked by the [U.S. Food and Drug Administration](#).

The answer to why even the most well-intentioned and smartest policies of China's leaders have been so difficult to implement in a country so vast lies in small farmers like Li. With 200 million farming households and 500,000 food-producing companies, information about new science often doesn't trickle out to remote areas for months or years -- if ever.

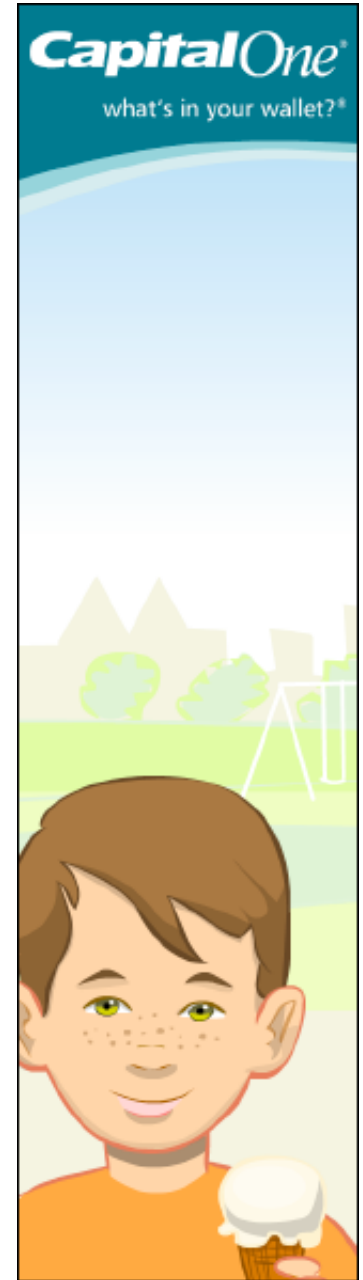
The way Li farms is mostly passed down from her parents and grandparents, she says. Her only other source of information is the pesticide salesmen. In the eight years she has been here, they are the only ones who have come to teach her anything new.

So whenever insects descend on the melon fields and cornfields, Li stirs up some pesticide cocktails and sprays. The label says to use it every 15 days. But if the pests are especially resilient, she doesn't hesitate to reapply it in a week. Doing otherwise would endanger the roughly \$1,300 that she is struggling to earn this year. Li, 32, said she doesn't understand much about the chemicals except that "they are very strong. They kill everything."

As in the rest of the country, Guangdong's countryside is carved into farms as small as a fifth of an acre, the legacy of [Deng Xiaoping](#)'s reforms in the late 1970s that aimed to get rid of communal farms and redistribute land equally among families.

With concern mounting over the safety of its exports, [Beijing](#) in recent weeks has promised to reform its farming, processing and monitoring systems. But many of the workers like Li who handle food remain unaware that a problem exists.

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As the country has grown, the government is losing control over how the latest scientific ideas are communicated and applied in the countryside. There poverty is still widespread in contrast with the growing wealth of urban China, and there have been tens of thousands of violent protests in recent years.

Zhao Zhijun, a researcher with the Chinese Academy of Agricultural Sciences, said there is a gap between the government's push to develop the science and technology of agriculture and how farmers practice it.

"Research projects are set up by the state or by the scientists without effective communications with the farmers," Zhao said. Furthermore, because scientists aren't judged on real-world results, "they are more interested in the foresightedness and theoretical creativeness of a project and ignore practicality."

In the 1980s, the government pushed the use of chemicals to increase food output. Now, in light of research on the dangers of pesticides, the state has been trying to break farmers of their dependence on them, but banned pesticides still regularly show up in rivers and lakes. China's statistics show that more than 10 percent of cropland may have been polluted because of improper use of pesticides and fertilizers. And while the situation is improving, each year there are still thousands victims of pesticide-laden food, such as a couple in a small village in [Shandong province](#) who died after eating leeks with heavy doses of a pesticide.

In recent years, the Ministry of Agriculture has sent thousands of staffers to rural areas to explain the newest pesticide product or technique to farmers. According to Zhang Yanqiu, vice director of the ministry's department of market and economic information, there are 3,500 "demonstration zones," which were set up to standardize production at the provincial level.

But experts estimate that those efforts are able to reach only 20 to 30 percent of farmers.

China's scientists also have been tinkering with the genetic makeup of crops, creating new forms of bioengineered rice and sorghum. Designed as a solution to the overuse of pesticides, biotech crops have their own possible safety risks. Genetically engineered rice is not approved for commercial production or human consumption in China, but it has been found planted thousands of miles from where it was supposedly being tested on experimental farms.

In 2005, an investigation by [Greenpeace](#) found that rice genetically modified to be pest-resistant was being sold in wholesale markets in [Guangzhou](#), the capital of Guangdong. In late June, food-safety authorities in [the Netherlands](#) found genetically modified rice protein, which is banned in the [European Union](#), in a shipment from China.

The Chinese government has also published numerous research articles to help farmers and food producers maximize profit, including pieces about various kinds of cheap additives that can boost the protein content of animal feed. Some of this research may have been misinterpreted, leading to incidents such as the poisoning of pet food that was recalled in the United States in March.

U.S. investigators think that companies added melamine -- a byproduct of coal burning that artificially inflates protein levels in feed-- to deceive buyers seeking higher-quality feed. The Chinese government portrayed the practice as the scheme of two rogue companies. But the idea actually may have been sparked by state-sponsored research.

In 2003, the Chinese academic journal *Feed Review* published an article with information on how to boost the protein content of animal feed by mixing in unconventional industrial ingredients such as melamine.

The recommendations by authors Zhang Li and Zheng Zhongzhao were for animals with more than one stomach, such as cows, that can convert such substances into protein. But chemical dealers may have promoted the practice for pet food, even though cats and dogs do not have that ability.

"Those people may have copied the practice. . . . I don't believe the producers of animal feed could do this or know this. I think those who made the ingredients put melamine in and sold them to the feed producers," said Chen Baojiang, a professor of animal nutrition at the Agricultural University of Hebei.

There is such confusion often in Zengcheng, too, although as a place that grows mostly litchis and other fruits and vegetables, it is mostly concerned about information on pesticides.

In the rural areas surrounding the city, pesticide vendors are like old-time village apothecaries. People often walk into their stores and put all their hopes on them to fix their crops' ailments.

Fan Guorong, 32, a graduate of Guangdong's agricultural university, is one of them. He is one of the rare migrants who came from the city back to the country, and he spends much of his time teaching farmers about pesticide safety. He thinks that many are catching on.


"Chinese farmers aren't as low as people think. They can also learn how to use pesticides safely," Fan said.

But not all the vendors are as qualified or equipped to give good advice. One owner said all the information she gets is from the pesticide vendors. Another said the government stops by only once or twice a year, so sometimes he's as badly informed as the rest of the farmers.

That leaves people like Zhu Songjun, who farms a little less than an acre of peanuts and wheat in land adjacent to Li's, in a difficult position. He said he hadn't heard of President Hu Jintao's 2006 "new socialist countryside" campaign to increase the living standards in rural areas, much less the food-safety tensions between China and the United States.

He said that if he could ask the government for one thing, it would be for more technical assistance. "All I learn, I learn myself. No one comes to help. It's very hard to make money these days," Zhu said.

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