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An Extension Service Enters the Information Age

Conjuring up images of that famous first telephone call in which Alexander Graham Bell spoke into a receiver to ask his assistant, "Please come here," Mike Miller, a research extension scientist in Minot, North Dakota, recently placed a sick-looking canola leaf on a microscopic slide viewer attached to a video camera. Instantly, the magnified image appeared on monitors at North Dakota State University (NDSU) in Fargo, 300 miles away. After tinkering a while, Miller was able to transmit a picture clear enough to tell quite a story. "You could see constriction in the leaf stem, indicating disease," he says. "And you could see the bite marks of a flea beetle."

For farmers in sparsely populated North Dakota, the ability to send such images could mean the difference between saving and losing entire crops. Like farmers across the country, many of North Dakota's 30,500 farmers live and work hundreds of miles away from the small handful of experts who can help them diagnose crops struck by unfamiliar maladies. Traditionally, the only practical way to identify the source of a problem—and determine how to address it — was to ship samples of afflicted plants to a diagnostic laboratory in Fargo, on the state's eastern border. The answer typically would come back a week or two later, but by then, it might be too late. Farmers hit by the orange blossom wheat midge, for instance, have as little as two days to identify and exterminate the pest if they hope to

save their crops. With videoconferencing, the answers could come back in a matter of hours rather than days or weeks, greatly increasing farmers' chances of bringing more crops to a successful harvest.

Miller's exercise in what Jay Fisher, director of NDSU's Minot Research Extension Center, calls "tele-plant medicine" is just one of many new opportunities officials at NDSU see in store as videoconferencing links the university's main campus in Fargo with its 52 county extension offices and eight research extension centers (including Minot) scattered across the state. Launched in October 2000 when the Technology Opportunities Program provided funds to link four regional extension offices to the university's main campus in Fargo, the system already has grown to include several branches. One of these offices alone has used it to provide training for pesticide applicators, to instruct a group of people how to assess the credibility of Internet sources, and to demonstrate digital photography to a group from South Dakota. Under the TOP grant, NDSU is developing a curriculum to train farmers at remote sites on how to manage risk in everything from production and marketing to financial and legal aspects of managing their farms.

As in many other institutions, officials at the North Dakota extension service are using new communications tools to offer a richer array of services to the public. But to take full advantage of that opportunity, service officials say, they must reorganize their own staff, and that requires giving employees new incentives and new training. This, then, is a story about how information technology could help strengthen the farm economy, and how the extension service is working to change itself so that it can realize its full potential.

A Pivotal Time

The TOP grant comes at a time when the extension service's job is getting harder than ever. Agriculture, which accounts for 38 percent of North Dakota's economy, has become a far more diverse and complex business than it was 20 or 30 years ago. Farmers who once raised mostly wheat and barley now produce sugar beets, soybeans, rye, flaxseed, navy beans, sunflowers, and honey as well. Whole new crops like canola have sprung up in response to consumer demand for healthier foods. Thanks to advances in technology, North Dakota farmers now produce a substantial amount of corn despite the state's relatively short growing season. They also are actively developing niche markets — raising bison used in upscale restaurants on the east and west coasts, for instance. And they are seeking to increase their earnings by processing, rather than merely raising, some of their crops. One farm cooperative, the Dakota Growers Pasta Co., is now the third largest pasta maker in the United States. "Agriculture isn't dying, it's changing," says David Saxowsky, an associate professor in the NDSU Department of Agricultural Economics and manager of the TOP grant.

At the same time, farmers face new risks. Not only do they have to learn new ways to protect themselves against price fluctuations, they also have to keep closer watch on changing market conditions in the U.S. and around the world. "The educational demands being placed on us are growing exponentially," says Cole Gustafson, director of the North Dakota Agricultural Experiment Station.

New demands on the farming sector mean new pressures on the extension service. Now, more than ever, it is difficult to provide all the expert assistance farmers need. Traditionally, most extension service agents have been generalists, a fact that is not surprising since they have to field requests for help or advice on everything from pest control to business management, from youth problems to local economic development. The need to be all things to all people is especially true in the most rural counties, which frequently have only one extension agent.

Of course, local extensions agents can refer questions to outside experts, but that is not always an effective alternative. "We are thin in the ranks of experts," explains Morris Davidson, director of the extension service's northeast district. The service has just two PhD-level agronomists and two PhD-level

plant pathologists to serve the whole state, he notes. It has just one field specialist in pest control. This expert and Stevan Sagaser, a horticulturist based in Grand Forks County in the northeastern corner of the state, receive far more requests for help than they can handle. To manage their time, they perform a crude sort of triage: requests for assistance that require too much "windshield time" — that is, hours spent driving to distant locations — tend to get turned down.

Demands on Institutions

Once fully developed, the videoconferencing system could reduce windshield time and mileage costs to zero, enabling specialists to extend their reach without leaving their offices. In addition, it should enable them to provide much more intensive services than ever before. That is a matter of simple arithmetic. In the past, an expert in Fargo would have to drive five hours each way to meet with a group of farmers in Minot for perhaps just one hour. But using video network, the same expert can hold eleven one-hour meetings with that group in the same amount of time. "This will enable us to take our programming to the next level," notes Gustafson.

North Dakota farmers clearly are hungry for the greater learning opportunities such a system will make possible. All across the state, groups of farmers have come together in "risk management groups" or "marketing clubs" dedicated to increasing their knowledge about the many complex issues farmers must face today. There currently are about 50 such groups, each with 10 to 20 members. And, they are serious about learning. Well into this spring's busy planting season, many were meeting twice a week, exploring topics as varied as the use of options trading to hedge against risks associated with fluctuating commodity prices, strategies for doing business with grain marketing companies, opportunities presented by overseas markets and more.

These groups represent just one set of claims on the extension service's resources. As North Dakota's economy grows more diverse, the service increasingly is being called on to make other aspects of the university's diverse programs — including business, pharmacy, engineering and architecture — more accessible to communities. It also faces rising demand for services to youth and families as the farm population drops and the number of people living in cities like Fargo and Grand Forks increases.

All this suggests that reducing windshield time won't be enough. The only way to meet the rising demand for educational services will be to increase the supply of experts available throughout the system. And the only way to do that, given constraints on staffing, will be for more extension agents to specialize and then use electronic communications to share what they know. The university's ability to achieve the full potential of the new videoconferencing network, in short, will depend on how effectively it can reorganize and retrain extension service staff.

Preparing People

Of course, changing people can be more difficult than installing new technology. The university is tackling the manpower challenge on several fronts. First, it offers each employee $1,000 a year to enhance his or her professional skills through training. "This is one area where you don't want to cut corners," says Pat Jensen, vice president and dean for agricultural affairs. Second, the extension service has decided to require each extension service employee to choose an area of spe-

cialization, which will be included among certain "core competencies" he or she is expected to achieve.

Finally, because some employees might feel threatened by such a requirement, officials stress that it be seen more as an opportunity than a source of pressure at performance-review time. "We need to describe this in a positive way to staff," says Morris Davidson, the extension service's northeast district director. "Right now, they feel inadequate. They are besieged. We have to show them that we can enhance their efficiency and lighten their load by letting them focus."

Already, extension service employees are rising to the university's challenge. An agent in Burke County, whose population dropped 25 percent in the 1990s, now works with the U.S. Soil and Conservation Service to improve its technology capabilities. Another agent, in Walsh County, has built himself a statewide reputation by becoming an expert in organic farming. In Langdon, a group of research extension economists are working with economic development groups and some farmers to explore the possibilities of creating an environmental tourism industry. Technology will enable these officials to share the fruits of their labors throughout the state, not just in the particular regions where they work.

This is just the beginning. "This is going to turn the way we deliver information upside down," predicts Sharon Anderson, director of the NDSU Extension Service. "It's what's going to allow 52 [extension] offices to assist the citizens of North Dakota and beyond."

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