The Farmer and the Dell

Technology is cropping up in fields, forests, and farmers markets.

BY STACEY SHACKFORD

Illustration by Evan Clayburg

In May, the "Girls of Summer" will turn up on Fay Benson's 140-acre farm with their pedometers, ready for a workout and a few moments in the spotlight.

The lovely 500-pound ladies will likely gain a little weight as they indulge in some serious dietary splurges, but that's okay. In fact, it's encouraged, as they are heifers on holiday, freed from the confinement of their home dairies and sent to the green pastures of Groton to bulk up and tone down.

As they frolic and feed in the fields, the bovine beauties could become social media starlets as their daily exploits and activities will be broadcast on Facebook, where they have a small but dedicated fan base.

It's one example of how farmers are using modern media to promote their industry and reconnect people with a food chain that has become increasingly globalized and impersonal.

By posting photos and activity updates about the 100 heifers, Benson, an organic dairy specialist with Cornell Cooperative Extension, aims to showcase their quality of life and how it is improved through grazing.

"One of the challenges that dairies face is people's perceptions," Benson says. "We are using Facebook as a way to dispel some myths about large farming operations."

It also helps Benson reach out to other farmers who may be curious about the effectiveness of grazing compared to confinement or who, like him, may be looking to transform their farms into profitable part-time businesses.

After 20 years as a dairy farmer, Benson sold his organic cows in 2003 and began boarding heifers during the summer. Large commercial dairies pay Benson to board their cows because it frees up space and reduces their feed costs.

Benson is not alone in his innovation, or use of new-age technology. Gone is the image of the hayseed farmer plowing his fields while perched atop his tractor with a straw hat. Today's farmer is more likely to be controlling the tractor by GPS while simultaneously using his smartphone to check weather reports, email a buyer, or snap a photo of an ailing plant to submit online to a crop specialist.

For Benson that means using pedometers to track the amount of steps his heifers take every day, which can help him formulate nutrient plans. Fewer steps could be an early indication of sickness, while a spur in activity could mean the cow is ready to make some calves.

Other dairies have implemented entire robotic milking systems or other handy techie tools (see sidebar).

Marketing with new media

For farmers who are loath to leave their fields and cooks who are cleaved to their kitchens, mobile technology and Internet-based social networking can be a godsend.

Todd Schmit, MS '94, PhD '03, the Ruth and William Morgan Assistant Professor in Applied Economics and

Management and director of the Cornell Program on Agribusiness and Economic Development, says it's also great for market research and networking. He hosted a conference on social media marketing for agribusiness professionals last November, which attracted about 60 farmers, business owners, and educators.

Keynote speaker Kerry Trueman, the author of popular blog Eating Liberally, told participants that social media is a priceless — and often price free—promotional tool.

"It's like word of mouth on steroids," Trueman said. "It doesn't replace one-on-one interactions with customers, but it should definitely supplement it." Schmidt quoted a study by social media management firm Syncapse that valued each Facebook fan at $136.38, based on their potential product spending, brand loyalty and affinity, earned media value, and propensity to recommend.

Many farmers and foodies have successfully jumped on the social media bandwagon. At the Piggery, a popular Ithaca area sustainable agriculture pig farm, former molecular biologist Brad Marshall '97 and his agricultural engineer wife, Heather Sandford '97 use their @thepiggery Twitter account to inform customers about the latest deli offerings, CSA deliveries and farm activities.

Video sites like YouTube—with an astounding 1 billion views per day and now the second largest search engine in the world—present new opportunities for grassroots marketing and education. Alabama dairy producer Will Gilmer is an Internet sensation after posting quirky videos about farm life, including "Water 'n Poo—a song about nutrient management."

Farmers markets are getting in on the social media act, too. One success story is www.cnybounty.com. Headquartered in Morrisville, N.Y., and developed with help from Cornell Cooperative Extension and the New York Farm Viability Institute, CNY Bounty is a year-round online farmers market that supports more than 110 local small and mid-sized producers, with free membership and free delivery to customers in Chenango, Madison, Broome, and Onondaga counties.

"Existing distribution systems generally cater to larger farms that can supply a steady, high-volume stream of goods," says organizer Sue Parker, a farm assistant with the Madison
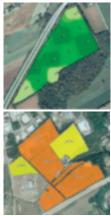
Tech Tools for Farmers

GPS

- Advances in GPS (global positioning systems) allow farmers to map three-dimensional views of farm acreage to see details such as rises and dips, terraces and slopes, and terrain types, which could help them improve yields. It has proven a worthwhile investment at CALS' own research farms operated by the Cornell University Agricultural Experiment Station, where farm managers report that increased efficiency in seed, fertilizer, and pesticide application has already paid for the $2,000 cost of the system in as little as a year.

Software

- At CALS' Dilmun Hill student farm, the young farmers teamed up with their peers in the Center for Applied Mathematics to develop their own crop management software. The program not only helps them keep track of the amount of produce planted, harvested, donated, and sold, it allows farm managers to plot their plantings on a gridded field map. It then lets them know which crops should be planted next based on the farm's long-term crop rotation plan.

- Cornell alumni Jeff Froikin Gordon, PhD '09, and Giulia M. Stellari, PhD '09, have developed free AgSquared software that enables small farmers to create a farm plan, manage tasks, organize employees, and keep accurate records.

- AgFleet, whose development was led by CALS alumnus Joe Russo, PhD '78, has been used on more than 15 million acres of agricultural land in North America. The company behind it, ZedX, Inc., has developed additional modular, web-based applications, including an irrigation scheduler and early warning systems for crop diseases and invasive pests. ZedX, Inc. maintains a research collaboration office at the Cornell Agriculture and Food Technology Park in Geneva.
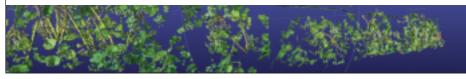
Gadgets

- There are handheld devices that resemble small, sturdy computer notebooks, packed with features. They bundle recordkeeping, mapping, and soil sampling, and feature WiFi or Bluetooth technology so that data can be shared with colleagues and experts. They allow farmers to track data over time, develop charts of past performance, and plan for future plantings.

  - Some devices have built-in cameras to take pictures of weeds or insects, which are then linked to a map for future reference, or chlorophyll meters, which measure the transmittance of a leaf at two different wavelengths and can help determine if the soil needs nitrogen.

  - Drought and water stress are important issues for grape growers. Horticulture professor Alan Lakso and graduate student Vinay Pagay, MS '08, are working with Chemical Engineering professor Abraham Stroock '95 to develop tiny microsensors, which can be imbedded inside plants to monitor real-time water stress and help growers strike the precise balance between drought and overwatering. "It will also offer advanced capabilities such as continuous, real-time measurements, autonomous operation, wireless data logging, and at a significantly lower cost compared to existing methods," Pagay says.

- Viticulture researchers are deploying low-cost sensors and using off-the-shelf cameras to build computer models that can distinguish grapes hidden among leaves and shadows. In field tests at the Lake Erie Research and Extension Laboratory in Portland, N.Y., Carnegie Mellon University PhD student Debadeepta Dey tried out his new technique to non-destructively estimate crop load and canopy throughout the growing season by triangulating images and creating three-dimensional reconstructions of scenes below the foliage.

Tech Tools for Farmers
continued

Online tools

- The departments of Crop and Soil Sciences and Earth and Atmospheric Sciences have developed a free "Adapt-N" web-based tool that draws on local soil, crop, and weather data to provide better estimates of nitrogen fertilizer needs for corn—helping farmers improve the environment and their bottom line, as nitrogen fertilizer is typically the most expensive part of grain corn production. Professor Harold van Es said the tool is being tested in New York and Iowa, and has already generated a lot of interest.

- The Decision Support System tool developed by plant pathologist Bill Fry, PhD '70, helps manage potato blight, which can wipe out entire crops, and reduces the expense of fungicides. The program not only tracks incidences of potato blight on a map, but takes into account geographically precise historical and future weather data to produce farm-specific disease forecasts. By adding further details about the exact strain of pathogen found on a farm—or within a 50 mile radius—the system will also be able to rate risks and tailor remedies.

- The Cornell Net Carbohydrate and Protein System helps farmers maximize the use of homegrown and purchased feeds, bringing down annual feed costs as much as $13,000 per 100 lactating dairy cows and reducing nitrogen and phosphorus excreted in manure by about one-third.

- Cornell Cropware plans manure and fertilizer utilization of a farm's cropping operation, reducing reliance on commercial fertilizers by up to 40 percent. The software has helped around 2,000 users in 42 countries meet environmental standards for soil erosion reduction, nutrient management, and water quality protection.

- Horticulture professor Alan Lakso and viticulture extension leader Tim Martinson, MS '88, PhD '91, working with the Institute for the Application of Geospatial Technologies in Auburn, N.Y., have created the Vineyard Site Evaluation website, where prospective vineyard owners can rapidly access information and maps with data overlays of soil characteristics, topography, and key climate data—all in one place.

County Cooperative Extension. "Getting their products to consumers is one of the biggest hurdles faced by Central New York's small and mid-scale agricultural producers."

Each week, CNY Bounty staff members coordinate product availability and pricing with producers. Product descriptions, prices, and photos are uploaded on the website, and customers place their orders. The organization handles about 150 orders per week for its selection of about 1,400 products, including meat, organic dairy, and farm-fresh produce.

Initially, it was a tough sell, as many considered it unusual to buy food online, Parker says. But in two years, the group has made more than 10,000 deliveries and $500,000 in gross sales, about $350,000 of which has gone directly to local farmers, while a 23 percent margin covers CNY Bounty's cost.

Parker says customers have embraced the opportunity to connect with farmers and contribute to the health of the local agricultural community. Something as simple as enclosing a brief biography of a farmer in a paper bag containing his produce can triple subsequent sales, she added.

MarketMaker, hosted by a national partnership of land grant institutions and state departments of agriculture, was adopted by CCE in New York City to build an electronic infrastructure connecting food-producing farmers with economically viable new markets. Today the site has more than 100,000 hits a month, connecting upstate farmers with New York City's retailers.

Online outreach

Extension specialists are incorporating social media and emerging technologies into their outreach efforts. Cornell Cooperative Extension offices deliver their own online programming to address local issues, such as early-morning webinars about gas drilling for business owners in Chemung County. CCE is also part of the national Extension.org network, which hosts a series of educational webcasts and online courses.

With more than 60 percent of New York's forests in the hands of private citizens, connecting with the state's nearly 600,000 woodlot owners is essential for Arnot Forest director Peter Smallidge, a senior extension associate in the CALS Department of Natural Resources.

He established a monthly webinar series in May 2007, with topics ranging from woodlot management to invasive species.

"I was attracted to the technology. I thought it was cool," Smallidge says. "I also thought it was a way to have regular, cost-efficient contact with a large number of people, some of whom are hard to reach by conventional means."

The forestry webinar has been successful, beyond even Smallidge's expectations. In just three years of existence, more than 2,000 people from 44 states, responsible for managing more than 10 million acres of woodland, have registered, with an average of 107 participating each month, some who had never previously attended a traditional workshop.

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>
> *—Peter Smallidge*

Smallidge estimates that conducting the presentations online saves around 7,000 miles per month of vehicular travel. And in a survey, participants estimated they would either earn or save more than $90,000 based on the content of the webinars in 2010.

Smallidge has dabbled in other social media, including Facebook and Twitter, but has found them less effective for his audience. He says new media can be great tools to supplement traditional outreach, like printed publication and seminars, but shouldn't replace them.

"I pick my educational tools based on their effectiveness, efficiency, and impact, not just because they are the latest thing," Smallidge says. ∎