Agricultural Extension Service
The University of Tennessee

A "Statewide Journey" of Sustainable Success:

Hands-on Training

A Tour Guide and Training Manual for Agricultural Leaders in Tennessee

February 2003

Center for Profitable Agriculture
A Partnership of The University of Tennessee Institute of Agriculture and the Tennessee Farm Bureau Federation

Foreword

Welcome to the "Statewide Journey of Sustainable Success." This educational program has been developed to provide training for agricultural leaders. Specifically, the training is intended to enhance the understanding and applicability of a variety of marketing, production and management concepts and practices that have been studied and implemented on various demonstration and case-study farms – concepts and practices that enhance the sustainability of Tennessee agriculture.

While Tennessee agricultural production alone generates more than $2.5 billion annually in farm cash receipts, farmers have not been especially well paid for their efforts recently. In 2001, on average, Tennessee farmers returned a net income of $4,500 per farm. One reason for this low net return is that the farmer's share of each dollar the consumer spends on food has been steadily decreasing. In 2000, only 19 cents of every dollar spent by the consumer on food items made it back to the farm level. For food items purchased at restaurants and fast-food facilities, the farmer's portion slips much lower, to less than 12 cents. An underlying principle of the farm share for food items is that the more processing performed on a product beyond the farm but before it reaches the retail level, the smaller the farm share. For example, fresh eggs require little processing and have a higher farm share than bakery products that require a great deal of processing. Opportunities to add value to agricultural commodities, tap niche markets and sustain the environment are timely topics in need of continued, perpetual enhancement through competitive educational programs.

This "Statewide Journey" manual represents a unique guide to sustainable agriculture in Tennessee that will not only be used as the curriculum handbook for the hands-on training tour, but also as an off-the-shelf resource for years to come. This manual showcases examples of sustainable success across Tennessee. These successes appropriately present value-added activities, niche marketing ventures, sustainable and organic production practices and results of previous projects funded by the Sustainable Agriculture Research and Education (SARE) program.

The entire "Statewide Journey" has been developed through the efforts of many. Primary funding support was made possible by a professional development grant from the USDA Sustainable Agriculture Research and Education program, the Tennessee Department of Agriculture ag development funds and The University of Tennessee Institute of Agriculture.

Rob Holland
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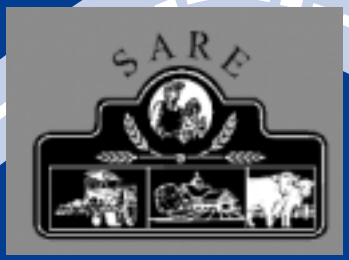

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Written by: Alex McGregor

"Sustainable agriculture" is a term that has been used by many different people. The term has as many different definitions and interpretations as there are people who use it. One simple thought often comes to mind when sustainable agriculture is used: **the ability to produce high-nutritional-value crops without depleting our resource base**. Sustainable agriculture is a way of thinking, not a specific system of farming practices.

To study sustainable agriculture, it is helpful to consider its three different parts:

1) sustainability of the soil
2) sustainability of the farm as a business
3) sustainability of the community in which the farm operates

It is also helpful to consider how these three parts are related and interconnected:

Soil

- Soil fertility must be maintained or increased, using sustainable resources (i.e., compost, green manure crops and others).
- Soil minerals must be replaced.
- Erosion must be eliminated.

Soil Quality

(a good source for information on soil quality is the USDA/NRCS publication, **Soil Biology Primer**)

- Soil quality is best defined by its ability to support a soil ecology that is highly diversified.
- Soil functions:
  - suppresses disease
  - improves nitrogen and other nutrient retention in the soil
  - mineralizes nutrients
  - improves soil structure
  - allows decomposition of toxins in soil
  - produces plant growth promotion hormones
  - improves crop quality

Economics

- The farm operation needs to produce a living wage for the operators.
- Crops should be diversified.
- Marketing should be diversified into retail, wholesale and value-added.

Community

- The farm operation must have connections with the community in which it operates. These connections are economic and social.
- High-nutritional-value crops sustain the community, which in turn sustains the businesses of those who make up the community, farms included.
- Social connections with the community provide resources and support for the farmers.

R-GROW Organic Soil Conditioner

Rollins Family Farm – Pulaski, Tennessee
Written by: Trish Milburn

Overview

R-GROW Organic Soil Conditioner is a success story for Ed Rollins, his wife, Teresa, and their adult children, Robert and Debra, who collectively run Rollins Family Farm near Pulaski, Tenn. Being in the contract chicken business, they had to dispose a lot of poultry waste. A process that had been costing them money became a money-making venture after the family decided to start a composting business.

Background

Though his wife is a second-generation farmer, Ed Rollins is the first in his family to farm. And until 1996, he didn't farm full-time. Though the family raised beef cattle, his main occupation was as an electrician for the automotive industry, including General Motors and Saturn. He'd also kept bees and produced honey since the early 1970s as a hobby, a hobby that is now another part of his multi-faceted farm operation.

When the family decided to go into the contract chicken business in addition to their beef operation, Rollins says they looked at about 20 different companies' operations. Rollins decided to build their contract layer houses to the strictest standards so they could contract with any company. For the past nine years, they've been contracted to produce hatching eggs for Aviagen. Their roughly 18,500 chickens produce 60,000-70,000 eggs twice a week. With that many chickens, plus 2,000 roosters, eating three tons of feed a day, there is obviously a lot of waste, not to mention several chicken mortalities a week, all of which have to be discarded.

Originally, Rollins incinerated the dead chickens and spread the waste on his fields. However, two concerns led to the creation of the R-GROW Organic Soil Conditioner. First, the price of propane, which fueled the incinerator, jumped from 60-some cents a gallon to more than a dollar per gallon. Rollins was spending between $300 and $400 a month just to run the incinerator. Second, the Rollinses became concerned that they were putting too much waste on their fields.

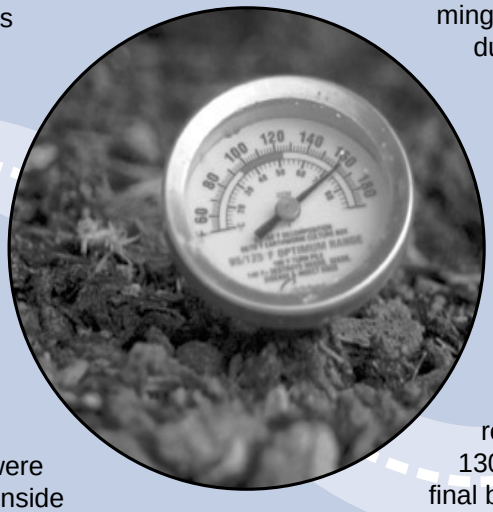
At this point, they began looking at composting as an option for disposal of the waste. First, they consulted a pamphlet produced by the University of Tennessee Agricultural Extension Service about composting chickens, but it didn't work correctly because the pamphlet was targeted for chickens weighing four pounds, not the 10-pound layers with which the Rollins farm dealt.

In 1995, the Rollines began the three-phase construction of a 40-foot by 120-foot dry-stack shed about a mile and a half (a minimum distance required by Aviagen) away from the layer houses to compost the waste and chicken mortalities. They partnered with their county Natural Resources and Conservation Service (NRCS) to build the facility in an effort to protect the environment. NRCS sent in an engineer to compile plans for the project, did a cost estimate and shared in the cost of the construction by contributing 75 percent of the construction cost, about $40,000. Construction included three phases: the initial shed, an addition with improvements and finally the storage and bagging area, the latter made necessary when they decided to commercially market their soil conditioner.

The Birth of a New Product

To get rid of some of the extra waste, Rollins started selling some to other people to put on their fields and flower beds. At this point, the sales were in bulk for about $20 per ton. When Rollins began getting requests for smaller quantities, he began bagging the product in 50-pound clear plastic bags with a simple stick-on label. The product didn't even have a name, simply stated on the label that it was an

organic plant food compost. He hand marketed and delivered the product to area lawn and garden businesses, some buying it outright at a wholesale rate and some on a consignment basis if they were hesitant to try carrying a new product. Out of the approximately 30 stores Rollins visited, eight agreed to carry the product.



Like most new-product ventures, it was a process of trial and error. At the end of the first season, Rollins visited all the stores that had carried his product to get their input regarding customer response to the compost and suggestions for improvement. Problems they cited were: the labels peeled off fairly quickly, the 50-pound bags were too heavy, moisture accumulated inside the bag and due to the 75 percent composting level, odor was a problem, even though the way they water their chickens and run their facility results in a much drier waste product than is typical.

To improve his product and make it more attractive, Rollins consulted the University of Tennessee *Agricultural Development Center* (ADC). ADC canvassed Master Gardeners across the state to compile a good knowledge base concerning what consumers wanted from a composted soil fertility product. Rollins says he and his family pretty much went by the letter of ADC's recommendations, such as using a more attractive and informative 22-pound white bag and changing the composting procedure to help alleviate the unpleasant odor and moisture problems.

Today, the waste is mixed with wood shavings Rollins acquires from right-of-way trimming crews who need somewhere to dump their byproduct. It is moved through a series of wooden bins, each of four batches being moved three times when the temperature falls below 165 degrees. Each time a batch is moved to a new bin, the temperature goes up and the decomposition process begins in earnest again. Unneeded microorganisms are eliminated by exceeding normal recommended temperatures of 130 degrees. After removal from the final bin, the mixture is run through a homemade screening machine and redesigned silage chopper to make its texture finer and easier to spread. Once the final mixture falls below 90 degrees, it is ready to bag.

Though automated baggers are available, the Rollinses still bag R-GROW by hand, a process that has two family members bagging for nine hours a day during the peak spring season. During those nine hours, they can fill 400 bags for delivery. Automated baggers cost between $10,000 and $40,000. When you take into consideration that R-GROW will bring in $30,000-$40,000 gross sales in 2002, Rollins doesn't believe the automated system

is feasible yet, although he believes they'll purchase one sometime in the future when the business grows to a point where it makes sense.

And grow the business has. Sales increased more than 10 times in the second year. The first quarter of the third year brought more sales than the entire previous year. In addition to the local businesses that took a chance on the Rollinses' new product, R-GROW can now be found in Tennessee Farmers Co-ops across the state and Lowe's® locations in Tennessee, north Alabama and part of Georgia. They also have a tentative contract with Wal-Mart® and will likely soon start contacting individual Wal-Mart® stores to see if they are interested in carrying R-GROW.

Marketing

Even though he's been pleased with the results, Rollins says, "I didn't realize marketing was a seven-day-a-week job."

The marketing began as soon as he made those first personal contacts with area store owners. He continues to attend 10-12 trade shows a year where he markets not only the R-GROW but also the honey and beef operations. He typically sells enough honey to cover the trade show expenses, so the sales of R-GROW, which he delivers at a later date, is profit. "At the bigger shows, we sell about 30 pallets, which is about 1,200 bags," he says.

Other means of marketing are direct mail brochures, participation in the Pick Tennessee Products program, which allows R-GROW to be listed on the program's Website, seminars at Lowe's® and other locations and a television commercial in the Chattanooga area. Unlike farmers of the past, Rollins says the marketing of the product has required that he learn to work on the computer and spend a lot of time e-mailing and talking on the phone, much of which he does during his lunch "break" when he has the phone in one hand and a sandwich in the other.

Rollins says much of the work with the R-GROW product comes between the end of February and mid-May, when people are planting their gardens and flowerbeds. A fall season runs from mid-September to mid-November, when they do about 30 percent of the business they do in the spring. Rollins maintains a personal touch by doing all the deliveries himself, a part of the job that keeps him on the road four days of the week during the peak season.

Financials

Rollins guesses the startup costs for the R-GROW business to be around $100,000 including expenditures for a new tractor, bags, 25 percent of the dry-stack shed construction, and research and development. They also spend between $60 and $400 every six months to get their product tested for composition at either a private or university laboratory. "We know of no other soil conditioner on the market with a guaranteed analysis," Rollins says.

R-GROW sells for $5.33 retail, $4 wholesale delivered and $3.50 wholesale if the buyer picks up the product at the Rollins farm. Rollins says they make about $1.25 profit per bag retail, especially good since the process of getting rid of chicken waste used to cost him money. In 2002, he expects to sell 300-400 tons in bags plus perhaps 100 tons in bulk sales. Rollins estimates that 25 percent of the farm's gross income now comes from R-GROW.

He credits the value-added product for saving the Rollins family farm. He says it kept them from going under when they got a bad batch of chickens in 2001, the only year they didn't make a profit on the hatching egg business. "We wouldn't be surviving if we didn't diversify," he says.

Reasons for Success

The reasons why R-GROW has been a successful product actually began before the idea for the product occurred to the Rollins family. Their decision to water their chickens only at certain times prevented the chicken waste from

being excessively liquid. This was part of a comprehensive plan including insect and pest control and running a clean, nonoffensive operation. “We made a commitment to our neighbors not to be a nuisance, and we’ve had no complaints,” Rollins says.

Because the waste was drier, it was a good starting point for the compost product. By working with helpful agencies such as the UT *Agricultural Development Center* and listening to customer feedback, the Rollinses were able to improve the product. R-GROW was marketed as a soil conditioner because it differs from many fertilizers currently on the market and to comply with labeling regulations.

“After 60-90 days, all the nutrients are gone with an average fertilizer,” Rollins says. “R-GROW is slow release over a six-month period.” R-GROW also provides all the micronutrients such as potassium, sulfur, magnesium, calcium, sodium, iron, aluminum, manganese, copper and zinc. And 20 percent organic matter is left in the soil.

“A soil conditioner is used primarily for improving soil physical properties such as soil structure and tilth over time,” says Hugh Savoy, an associate professor of biosystems engineering and environmental science at the University of Tennessee. “This results in a more productive soil because permeability of the soil to water and air is improved, water-and air-holding capacity of the soil is improved, beneficial microorganisms flourish, nutrient cycling and availability are enhanced through the interaction of several processes. A soil conditioner may or may not have some fertilizer value. A fertilizer is added to the soil primarily to amend the deficiency of elements that are essential for plant growth. Physical properties of the soil may or may not be affected.”

R-GROW customers have been happy to provide positive comments for the Rollinses’ marketing brochures. “I’ve used R-GROW in our flower gardens and vegetable garden,” says a customer from Lewisburg, Tenn. “The results were impressive. Our tomato plants in particular yielded more tomatoes after using this product than ever before. My wife’s rose garden was absolutely beautiful all summer long.”

Rollins also feels that their decision to diversify and hold off on the automated bagging equipment has helped their bottom line. They run a $1.2 million operation with only $170,000 debt as of August 2002. Rollins says they should be completely out of debt by the middle of 2004, something many farmers can’t claim.

“We didn’t bet the farm that this operation would work,” he says. “Lots of these composting businesses have gone bust. We think our composting facility has succeeded because we did our homework up front, we kept our capital investment to a minimum and we really worked hard with our retail partners.”

The Future

Rollins says he hopes to grow the R-GROW business until it has nationwide distribution. But he doesn’t plan to add any more chicken layer houses in an effort to keep up with the demand for the value-added product they help produce. “We’ll eventually buy the end product, waste composted to the same strict standards, from other farmers,” he says.

Even though the Rollins Family Farm currently has a four-pronged business, Rollins hopes to add yet another value-added aspect sometime in the future. Agritourism, where people come out to spend a day on a working farm, is increasing in popularity, and he hopes to capitalize on that popularity. One thing he hopes to offer that perhaps other day-on-the-farm experiences can’t is a train ride through the old train tunnel on his land.

It only takes a few minutes of talking to Ed Rollins to realize he’s a firm proponent of diversification and value-added farming. “This is just my opinion, but I believe that anyone who doesn’t diversify isn’t going to be here in the future,” he says.

Precision Farming Project

J. Tucker Farm – Prospect, Tennessee
Written by: Trish Milburn

Overview

Giles County, located in southern Middle Tennessee close to the Alabama border, is like many of the rural counties across the state in that many of its residents depend on agriculture to make their living. The county has about 250,000 acres in farm land, of which about 30,000 are row crops such as corn and soybeans with a bit of cotton and wheat. Like much of Middle Tennessee, Giles County's soil varies widely in its ability to produce a good crop. Fertile bottom land may lie close to strips of farm land that doesn't meet the cost of production. To help determine the quality of the soil, its ability to produce and its profitability, some local farmers began to use Global Positioning System (GPS) units to sample their soil.

The University of Tennessee Agricultural Extension Service in Giles County saw a need to explore this technology more fully to see how it could help local farmers, whose annual yield brings approximately $5 million into the county. Extension agent Kevin Rose contacted some area farmers to see if they would be interested in working on a precision farming demonstration with the Extension office. A couple were interested in the results it would generate but didn't want to be the "guinea pigs," Rose says. Rose did find a willing partner in J. Tucker, a young farmer from Prospect who had been farming alongside his father, Lamar, for as long as he could remember and who has an agriculture degree from the University of Tennessee at Martin.

Giles County Extension Agent, Kevin Rose, at the demonstration site.

Background

Once a $7,800 Sustainable Agriculture Research and Education (SARE) grant was funded by the cooperative project between the U.S. Department of Agriculture and the Environmental Protection Agency, Rose and Tucker began work on the precision farming demonstration. The demonstration would not only help Tucker map out his fields based on criteria such as bushels per acre of yield and pH levels of the soil, but would also help educate area farmers who might choose to adopt similar methods based on the study's findings.

In 1999, two demonstration plots were selected, and soil sampling and mapping data were collected to use as a baseline against which the 2000, 2001 and 2002 data could be compared. In the following years of the study, they evaluated soil test results, generated fertilizer application recommendations, applied fertilizer using variable rate and uniform rate swaths, conducted scouting, recorded management practices and weather information during the growing seasons, collected data from the yield monitor mounted inside Tucker's combine and conducted economic evaluations based on the data available after each growing season.

Educational Objectives

According to one of Rose's project reports, the primary educational objectives were to study variable rate fertilizer and lime applications; determine if they were more economically feasible than traditional, uniform applications; and determine if local agribusinesses could provide precision farming services that could be economical. Other aspects of precision farming practices such as grid or smart soil sampling and the use of yield maps were also objectives of the project.

Many farmers are realizing that agriculture is changing with the times, becoming more dependent on technology to make a profit. A sustainable family farm must be able to adapt to the changing agricultural economy through the adoption of the most cost-efficient uses of all resources such as land, labor, machinery, fertilizers, pesticides and information.

This is even more important considering the ever-increasing costs of production, including those listed above plus property taxes and crop protection chemicals and the fact that commodity prices have not kept pace with farmers' costs of doing business.

By late summer 2002, Tucker had already made some changes in his operation based on the project results. The yield maps showed him which sections of his fields were not meeting the cost of production. Many of these were in shady areas near stream banks. Fortunately, being able to identify these areas coincided with such areas being placed in the Conservation Reserve Program, a Natural Resources Conservation Service (NRCS) program that pays farmers to keep certain buffer zones in riparian areas out of cultivation to prevent agricultural runoff into streams and erosion of streambanks. It has the added benefit of providing additional wildlife habitat.

Tucker was also able to look at the maps showing the pH levels in his fields and adjust his application of lime. In the areas where the pH was within the acceptable range, no lime was applied, while areas with a too-low pH got additional lime. Tucker says that even though the fields might get, on average, the same total amount of lime, it was being applied at rates that would bring all areas of the field up to the proper pH level, increasing productivity. With uniform application across fields, some lime was being wasted, while other areas that were pH-starved continually under-produced.

Educational opportunities extended beyond Tucker himself. Several field days were held at one of the demonstration fields. The first introduced area farmers to the GPS unit and the yield monitor, detailing the types of information each could provide.

Soils were sampled that fall using the GPS. With the help of the Tennessee Farmers Co-op and the Giles Farmers Co-op, more than 300 soil samples were pulled in the two project areas. The following spring, variable rate lime and potash were applied to the project areas — one 11-acre plot and one 206-acre plot. More soil samples were pulled to determine the effect of the fertilizer.

In November 2001, a Soil Quality and Yield Mapping Field Day was held at one of the project fields. The program included a summary of the project up to

that point, with a discussion on yield mapping and issues in precision soil mapping. NRCS personnel discussed soil quality, buffer strips and the Conservation Reserve Program.

In addition to the two field days, one producer meeting and five cooperator meetings have been held to discuss the project's progress. Six radio tapes have been produced to promote the program, and several articles have run in local newspapers and *The Agronomy Page*, the newsletter for Extension agents.

Results of the Project

The three-year project was designed to last through the 2002 fall harvest, and over the span of the demonstration a number of people have viewed it in various stages. Those exposed to the precision farming concept have been other farmers, agribusiness owners and employees, and 30 county Future Farmers of America students.

Tucker has bought a yield monitor he will continue to use after the demonstration is complete, and he may buy his own GPS unit to replace the UT-owned GPS used on the project. In 2000, he found a corn variety in one of the project fields that did not pollinate as other varieties in the same field. As a result of having yield maps that showed this difference, Tucker was able to obtain a $36,000 compensation from the seed company for estimated yield losses.

The Giles Farmers Co-op successfully used their truck to apply variable rate lime and potash. Soil tests taken one year after the variable rate applications indicated that the field was much more uniform in pH and available potassium. Because this truck was not variable rate-ready and had to be set up each time it went to a field needing variable-rate application, the Co-op decided to purchase another

truck that is variable rate-ready. Because of the Co-op's investment in the new truck, they obtained the business of a farmer who raises 3,500 acres of corn and soybeans. That farmer indicated that the information obtained from the precision farming demonstration on Tucker's farm helped him make his decision.

Of the 64 participants attending the Soil Quality and Yield Mapping Field Day in November 2001, two indicated they planned to adopt the use of a yield monitor, five stated they planned to adopt intensive soil sampling and two intended to adopt variable rate fertilizer and lime applications.

Financial Implications

Rose stated in his grant application: "Farmers and suppliers in this area are willing to invest in precision farming technologies and practices if there is evidence they can reasonably expect increased profits....Farmers in this area need firsthand information on the precision farming practices and the economic consequences of adopting some or all of the practices. They also need opportunities to experience these practices in a production setting, to better understand the rationale for adopting practices in a certain order or priority and the ways they can maximize their economic returns. In addition, small farmers need to understand that some of the precision farming practices can be adopted without personally investing in all the hardware and software."

Though the final results of the three-year demonstration have not yet been compiled, results revealed along the way have answered some of the above questions as evidenced by the local Farmers Co-op buying a variable rate-application truck and other farmers beginning to invest in at least the beginnings of precision farming techniques. The Co-op's investment will allow many farmers who cannot justify the cost of purchasing precision farming equipment to continue row crop production while taking advantage of the new technology.

Tim Prather, an assistant Extension specialist with UT's Department of Biosystems Engineering and Environmental Science, has been the technical adviser for the demonstration project and has worked closely with Rose and Tucker on the collection of data. In late summer 2002, Prather said that the data could not be fully interpreted until the months after the final harvest in the fall of 2002. He hoped to produce profit maps with the help of agricultural economists at UT after the demonstration was completed.

Even though the results of the study were inconclusive in August 2002, Prather did say that one thing became very clear. "What had the most effect (on yield) was what we had the least control over — soil moisture," he said. "But one of the biggest payoffs of the demonstration was finding areas that were chronically low-producing."

Integrated Systems That Utilize Biofumigation, Solarization and Composts for Commercial Vegetable Production

Written by: Martin Lyons and Carl Sams
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Background

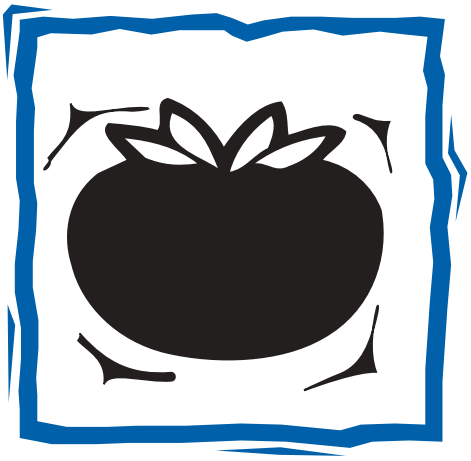
The adoption of integrated production systems is advantageous to both the agricultural community and society as a whole. Consumers are increasingly demanding produce that has no pesticide residues and that fulfills nutritional requirements. Farmers also have concerns about worker safety, as well as potentially negative environmental impacts and long-term sustainability of intensive synthetic chemical-based pest control practices.

Vegetable producers face a substantial challenge when attempting to produce an economically viable crop under the constant pressure of disease-causing, soil-borne pests. Aggressive pathogens can significantly reduce total yields and reduce the quality of marketable product.

Research

The viability of biofumigation to control pathogens has been investigated for many years. Two projects recently funded through the Southern SARE graduate research program have successfully developed an integrated production system that combines an enhanced form of biofumigation with the many benefits of composts. The studies conducted at The University of Tennessee have shown that certain *Brassica* cover crops, as well as mustard seed meal, contain high concentrations of isothiocyanates (ITCs). The seed meal is also a significant source of nitrogen and other nutrients. When incorporated into the soil, ITCs act as an effective biofumigant, reducing populations of pathogenic fungal species (*Sclerotium, Rhizoctonia* and *Phytium*), nematodes, weeds and certain insect species.

Solarization is a technique that elevates soil temperatures beneath a clear plastic layer to reduce soil-borne pests. The sub-lethal temperatures



generated in regions of the southeast United States may actually lead to an improvement in the mode of action of biofumigation, making this treatment combination an effective one for sustainable agriculture.

Research has also indicated that a pre-plant combination of biofumigation with composted organic amendments increases the efficacy of both treatments. Composts improve plant health and productivity due to enhanced soil nutrient levels and improved physiochemical properties (increased bulk density, porosity, aeration) and increased water-holding capacity. Disease suppression due to advantageous changes to the soil microbial composition, including increases in the populations of known biological control agents (*Trichoderma, Bacillus* and *Pseudomonas* spp.), has been noted by many researchers.

Composting is an ecologically sound way to recycle organic farm wastes, such as animal manures and plant debris. It avoids the environmental hazards associated with burning, burying or spreading these agricultural by-products on fields. These methods can lead to problems such as increased particulate

matter in the air, leaching and ground water pollution, and toxic excesses of phosphorous and nitrogenous compounds in the soil.

Result Data

Figure 1 depicts the visible differences between plants infected with Southern Blight in a control bed compared with healthier plants growing in the treated beds. Figures 2 and 3 summarize data collected from field studies at the Knoxville Experiment Station during 2001 and 2002. In both years tomato yields were significantly enhanced by the incorporation of composted amendments used as a pre-plant soil treatment for plasticulture production. The occurrence of Southern Blight was also reduced in both years when compared to controls.

Figure 1. Comparison of control (foreground) versus treated beds.

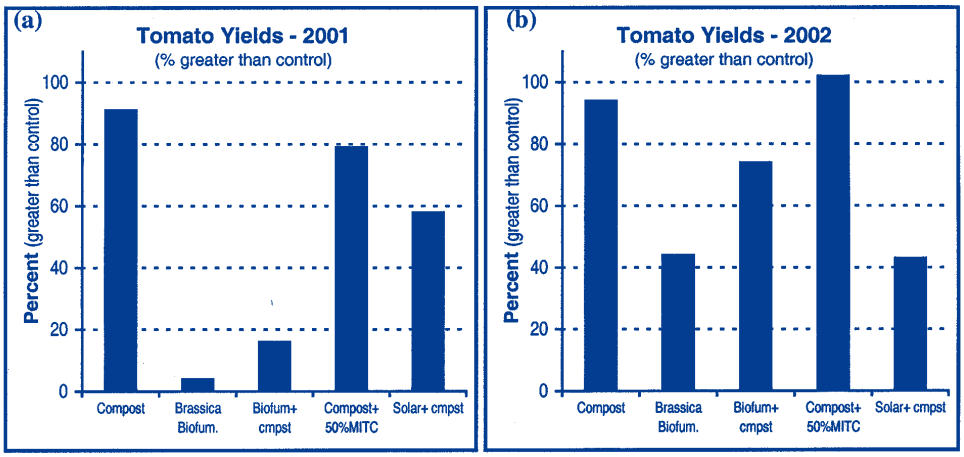


Figure 2. Tomato yields per treatment for (a) 2001 and (b) 2002

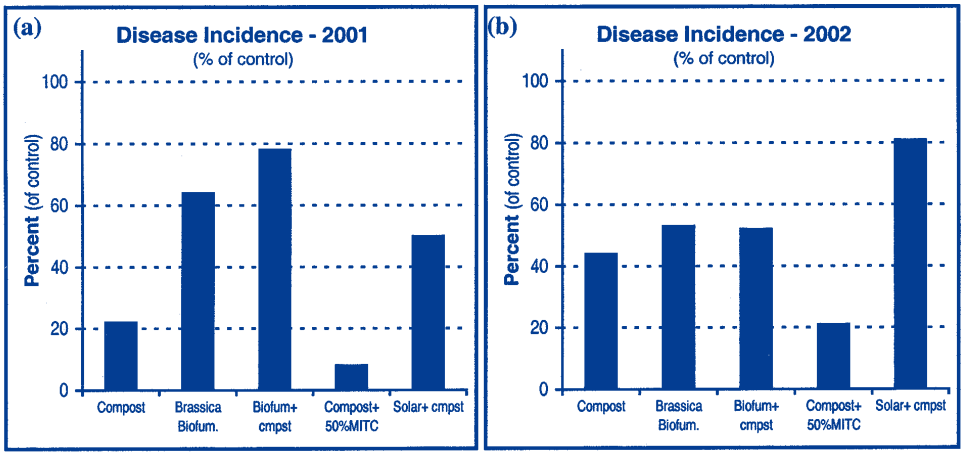


Figure 3. Incidence of Southern Blight per treatment in (a) 2001 and (b) 2002

Direct Farm Marketing and Agritainment

Valley Home Farm – Wartrace, Tennessee
Written by: Rob Holland

Overview

It might be easier to write about the activities which Nancy Edwards does NOT provide at Valley Home Farms rather than the numerous enterprises that she and the rest of the Potts family have already undertaken. In just two years, this truly family farm operation has assembled distinctive spring and fall on-farm marketing and agritainment activities with a retail shed, petting zoo, pavilion, wagon rides, nature

path, pumpkin patch, corn maze, restaurant, grain bin converted to a cooling house for miniature pumpkins, commercial kitchen for food processing and manufacturing and a straw pit. This is an amazing family operation. The family has identified that in direct farm marketing and agritainment enterprises, any one ingredient that is not perfectly executed can kill the business. The entire Valley Home Farm operation has numerous ingredients. Understandably, production of the crops has its own set of unique success factors and ingredients, but beyond production – processing, packaging, advertising, marketing, labor, safety and customer relations – are additional ingredients.

Background

The 350-acre farm, which is now home to the numerous direct farm marketing and agritainment enterprises, was purchased in 1958 by Nancy's grandparents, R.K. and Nellie Potts. On this farm her grandfather made his living growing corn, soybeans, beef cattle, hogs, poultry and hay. Granny Potts raised matted-row strawberries for extra income in the same field where strawberries are grown today. In 1960, Nancy's parents, Lowell and Martha Potts, moved their family (four children – Linda, Vickie, Nancy and Bobby) not only to the farm but into the same house with Lowell's parents. Lowell and Martha still live on the farm and are very involved with the diversified farming operation. The main farm house, where three generations of Potts lived, was built in 1835 and is now on the National Register of Historic Places for its architectural significance. This house is now Nancy's home.

When Nancy's husband died in 1998 at age 47, Nancy decided that she did not want to stay in the corporate world but that she would rather return to the farm full-time. She studied many alternative farm enterprises but struggled to find anything with the potential revenue to provide a full-time living. Nancy actually considered a bed & breakfast business in the historical house, but found that such an enterprise just would not provide the amount of net return that she desired.

Nancy needed something small enough that she could manage, but with an adequate profit potential. Because strawberries had been grown well by her grandmother and her brother, Nancy heavily considered this crop as a nucleus for her return to the farm. In searching for specific production information about strawberries, Nancy met some poignant discouragement from some of the experts. This may have been just the motivation Nancy needed. After attending a short-course on plasticulture strawberry production in North Carolina, she realized why she had been discouraged by others. Nancy realized that a profitable commercial strawberry enterprise would be much more than she could manage alone. Frustrated, Nancy shared her findings with her brother Bob, and he simply said "I didn't think you knew how much was involved." So, Nancy reluctantly returned to work until Bob dropped by and said that if she really wanted to stay on the farm and give the strawberries a try, he would do it with her . . . so they were partners.

UT Extension specialists John Buchanan and Allen Straw met with Nancy and Bob on the farm and got them started in the right direction. Both specialists have made several return visits to the farm over the years and have consulted numerous times over the telephone. Bob and Nancy also continue to attend short courses in North Carolina.

Labor is an essential ingredient to the success at Valley Home Farm. Nancy admits that they probably would not be able to pull off the operation if they did not have such dedicated family labor. Family labor offers three helpful elements at Valley Home Farm: "they work cheap, they are committed to success and they are always available." Nancy and Bob do rely on hired labor to pick strawberries for a flat rate per gallon picked.

Family Labor, Management and Investors

Nancy is very familiar with the importance of people skills at the farm, and all the folks at Valley Home Farm have learned this very well from Nancy. Nancy reminds them that if they slack on their people skills, all the other ingredients in the business will not offset it.

- Linda Potts Williams is Nancy's oldest sibling. Linda is a middle school principal and science teacher and is in charge of the farm's restaurant. She is also a partner in the jam-making business with Vickie.

- Vickie Potts Pyrdum is the director of the Bedford County Medical Center's cardiac testing. She is a partner in the farm's jam business. Vickie's husband Billy Pyrdum operates the farm's spring and fall markets.

- Nancy Potts Edwards is a former business manager with experience in retail, mail-order, manufacturing and publications/advertising. She is a partner with her brother Bobby in the farm's specialty crop production.

- Bobby Potts and his wife Janet are the actual landowners of the farm. Bob has farmed on his grandfather's place full-time since age 14. He owns and operates the farm's 100,000-head broiler enterprise and a diversified livestock and hay operation. Bobby has dabbled in various crop and farm enterprises over the years and even operated a local retail grocery store business before partnering with Nancy in the specialty crops.

In the Spring

The spring market, where the harvests from the farm's three acres of plasticulture strawberries are sold, is generally open for six weeks – mid-April through May. Bob and Nancy began with two acres of strawberries but increased to three acres after they gained confidence in their production capabilities and found that the third acre greatly enhanced the overall profit potential. Nancy estimates that 98 percent of their strawberry crop is sold directly from the farm. The remaining 2 percent of the crop is taken to nearby towns and sold from the pick-up truck. A majority of the strawberries sold at the farm (about 80 percent) are pre-picked and priced at $9.50 per gallon, and about 20 percent are sold at $8.00 per gallon for the "U-Pick" customers. Strawberries at the farm are priced relatively close to berries in grocery stores, although as the grocery store prices fluctuate, the prices at the farm are sometimes a bit higher. Nancy has found that customers coming to the farm are primarily interested in the superior quality and the opportunity to interact with the grower.

Strawberries provided the primary raw ingredient for the Valley Home Farm commercial kitchen, where sisters Linda and Vickie develop a variety of specialty jams, jellies, sauces and vegetables flavored with local blackberries, peaches, strawberries, peppers and mixed vegetables. The commercial kitchen area also serves as host to the spring strawberry sales. All products from the commercial kitchen are available by mail order.

In the Fall

The fall market is generally open for six weeks from mid-September to Halloween. The fall retail market

offers mums, pumpkins, gourds, winter squash, straw bales, corn-stalk shocks, jams and jellies, honey and a complete line of agritainment activities including a five-acre corn maze, hayrides, animal barn, restaurant, pavilion and a walking nature trail.

Nancy and Bob have decided not to contract with a national corn maze company instead opting to design and cut it out themselves. The first attempt with a corn maze in 2001 featured the design of two horses running with “Valley Home Farm” spelled out at the top. Unfortunately, on the third day of the 2001 maze season, a wind storm destroyed the maze and essentially snipped the maze income stream. Once again determined, Valley Home Farm’s 2002 corn maze featured a complicated design of circles and geometric patterns which they “guaranteed to confuse and challenge the best mazers.” Even with many years of corn-growing experience, Bob and Nancy have learned a great deal more about growing corn when the objective is a maze. Bob says “I don’t think we could grow corn for a suitable maze without irrigation.” The maze is open daily from mid-September through Halloween. The operating schedule is Mondays - Thursdays from 8 a.m. until 7 p.m.; 8 a.m. until 10 p.m. Fridays, Saturdays and Sundays. The admission is $6 per person. Children under 3 are admitted free. While the maze has become a great attraction and money maker for the overall fall operation, Nancy does not think that the maze alone could sustain their fall income needs. Schools and other group tours are booked Tuesdays through Fridays from September 16 - October 31. These tours include a hay ride to the crop fields and the beeyard, a visit to the corn maze and animal barn and a free pumpkin to take home.

Unlike other agritainment enterprises, Nancy does not unload visitors from the hay ride at the pumpkin patch. Pumpkins are made available to both tour groups and individual customers exclusively at the fall market location or near the animal barn. Nancy has found that she maintains much more control of the tour groups when they do not load and unload from the wagon. Speaking of wagons, the Valley Home Farm wagons are converted from old cotton wagons and can hold close to 75 people at a time.

Location

Valley Home Farm is located in the Wartrace community about 12 miles east of Shelbyville in Bedford County. The Farm is located abut 3 miles east of Wartrace on Potts Road just off Highway 64. The farm is also located about 10 minutes west of exit #97 on Interstate 24 and about 50 miles southeast of Nashville. Most of the Valley Home Farm customers come from within 40 miles, which includes the larger-populated towns of Manchester, Tullahoma, Shelbyville, Murfreesboro and Smyrna. Nancy was initially concerned about their rural location, but after studying traffic counts on nearby roads and studying the population and demographic statistics of the nearby towns, she realized that their location was actually a positive aspect of the operation.

Other Issues, Observations and Philosophies

Although a necessity, liability insurance for the operation did not come easy. After realizing the amount of liability they were undertaking with the on-farm retail and agritainment activities, Bob and Nancy first tried to get adequate liability coverage from their existing farm insurance provider. They were first informed that the liability coverage needed would not be possible. Determined, Bob and Nancy kept pushing the issue, and after some fighting, they finally did get good coverage at an acceptable rate from their existing insurance provider.

In the spring of 2002, Nancy hosted a “strawberry bake-off,” which garnered outstanding newspaper coverage with several full-page and full-color feature stories. However, despite such great publicity, Nancy has not been able to find that the coverage actually converted into any additional sales.

After returning to the farm from her corporate experience, Nancy realized that she had to learn again that on the farm, most success factors are secondary to the weather. This was especially true in the management area, production and market management, where many times she has realized that no amount of management will offset the weather.

Nancy credits much of their short-term success to the fact that each family member has invested in the operation and keeps investing. After the third marketing year they have, however, decided to wait one year before adding any more. Another year should give them some additional income that is not re-invested in the operation.

Small Farm Sustainability and Value-Added Food Processing/Products

Appalachian Spring Cooperative
Written by: Paul Miller

The Problem of Small Farm Sustainability

Small farms in America, and indeed throughout the world, face a crisis of unprecedented proportions arising out of intense social, political and economic pressures that are largely beyond the control of the agricultural producers who are most affected by them. These pressures include a relentless upward spiral in the cost of inputs, equipment, labor and marketing; stagnation in the rate of increase in farm-gate prices for agricultural products; and marginalization of small producers with respect to a mainstream food distribution system dominated by mass-merchandisers and supplied by mega-farms located both on- and off-shore.

This is especially true in our region of the country (the southern Appalachian highlands of East Tennessee), an area where, for generations, tobacco, beef cattle and hay have been the principal cash crops. The past several years have seen rapid and substantial changes in the ways in which tobacco is produced and marketed; changes that include cuts in quotas, sell-offs of small quotas to larger growers, competition from tobacco producers overseas and moves toward direct contractual relationships between (larger) American producers and the tobacco companies. Moreover, the profitability of small beef cattle and hay operations in recent years has been less than impressive and there is little reason to believe that substantial positive changes are likely to occur in the near future. Absent the underpinning of tobacco production in the local agricultural economy, many, if not most, of the small farm enterprises in our region face the prospect of failure and demise in the next decade unless real alternatives can be identified and profitably implemented by our agricultural producers.

The Value-Added Solution

For more than a decade now, USDA, through its Extension and Ag Development programs, has been promoting to small farmers the benefits of diversification, value-added production and niche marketing of farm products as a means to increase the income, profitability and sustainability of small-farm enterprises. Indeed, it would not be difficult to show that those small farm enterprises that are currently most viable and with the best prospects for long-term sustainability are those that have taken active measures to diversify their operations, develop value-added components and access niche markets for their products.

For some of these producers, “value-added” begins in the field with the production of specialty crops for niche markets in place of conventional or commodity crops. Examples of this would include production of organically grown crops that have historically brought a price premium in the marketplace; brand- or region-identified crops (such as Grainger County tomatoes, Vidalia onions, etc.); or production of specialty, gourmet and ethnic crops for niche markets.

For others, “value-added” has meant the addition of a processing component to their operations, turning self-produced or contracted-for raw inputs into finished products for sale to retailers, distributors or direct-to-consumer as a means to maximize the percentage of the consumer dollar that goes to the primary producer. Examples of this would include products such as artisan cheeses; specialty processed foods for gourmet, ethnic and health food markets; and, for some, the conversion of seconds, cull, and over-production of raw crops into locally-marketable processed foods (often of a sort with local, regional or traditional appeal to local or regional consumers).

Key to the development of a value-added processing component for many of these producers has been the appearance nationwide in the last decade of approximately a dozen licensed, shared-use food

processing/business incubator facilities such as the Clinch-Powell Community Kitchens in Hancock County, Tennessee. Small-scale producers who could not achieve the economies of scale necessary to contract with large, commercial food processing facilities are finding in these shared-use kitchens comprehensive services and facilities to enable and support not only the production of their value-added processed foods, but also the development of business plans, access to start-up financing, compliance with legal requirements for food products and effective marketing strategies. In the case of the Clinch-Powell Community Kitchens, the creation and development of an affiliated value-added producers marketing cooperative (Appalachian Spring Cooperative) has added an additional level of support for producers, assisting them with access to most-lucrative markets for their products.

And, not content to wait for potential producers to show up at the kitchen door, idea in hand, the staff and members of Clinch-Powell Community Kitchens and Appalachian Spring Cooperative have embarked on the development of a model program to develop strategic, productive alliances between primary producers seeking value-added alternative crops and secondary producers requiring specialty crops or varieties for processing into finished food products for targeted markets.

We believe that efforts such as these to develop coordinated, value-added components in the field, in the kitchen and in the marketplace will prove to be essential to the sustainability of small-farm enterprises in our region and a ray of hope to those face-to-face with the prospect of demise for their traditional farming operations.

Evaluating the Feasibility of a Dairy Processing Facility

Agricultural Development Center
Written by: Shasta Leinart Hubbs

Through the centuries, farmers have been processing and packaging dairy products on the farm for personal consumption. Oftentimes, they consider doing this on a larger scale to service their local community or region and provide extra farm income. However, before capital is invested in such an endeavor, it is important that the economic feasibility of such an undertaking be analyzed.

Several general business management areas should be addressed in the beginning stages of business planning. These include:

- Legal business formation – sole proprietorship, corporation, LLC, etc.
- Zoning and other local regulations
- Food regulations, inspections and permits
- Food-labeling regulations
- County business license
- Insurance – property, production liability, general liability

Next, it is important to study some of the limiting factors that may be encountered along the way. These may include such things as:

- Federal marketing orders
- Production parameters
- Technical expertise
- Costs
- Dairy products industry trends
- Targeted marketing area demographics and consumption data
- Image
- Product packaging
- Pricing

Federal Milk Marketing Orders

The Federal Milk Marketing Orders system was developed to pool the proceeds of all milk sales to ensure that all producers in an area receive the same uniform price for their milk regardless of how their milk is used. Dairies that process and package less than 150,000 pounds (17,442 gallons) of their own fluid milk per month are denoted as a "producer/processor exempt plant." These dairies are allowed to sell any remaining raw milk, above 150,000 pounds, the same way that they have in the past. However, if the dairy processes above the 150,000 pound mark, any excess milk must be sold on the market at other than class 1 utilization rates.

Production Parameters

The maximum level of farm production will largely depend on the size of the dairy herd and the level of milk production per cow. Once the maximum level of production is determined, it must be adjusted for the Federal Milk Marketing Orders and the percentage of milk a farmer wants to devote to the new enterprise. In addition, the capacity and size of the equipment purchased will limit the amount of products that can be produced at any given period of time.

Technical Expertise

While dairy farmers may have previously processed and packaged dairy products for personal consumption, it is important that products for retail sale be processed using accepted industry practices and following all regulations. This may entail attending classes or workshops to learn and understand processes and regulations, etc. The product produced should be high quality and acceptable to the public.

Costs

All costs associated with a dairy processing facility should be analyzed, including start-up costs, annual operating costs and variable costs. Start-up costs are the initial investment that must be made to get an enterprise running. Start-up costs may include the costs associated with building a facility, purchasing equipment, initial marketing, setting up utilities, etc. Annual operating costs are those associated with running the business on a yearly basis and may include repayment of borrowed funds, labor, utilities, repairs and maintenance, supplies, marketing, etc. Variable costs are the production costs per product, which may include the costs associated with processing, ingredients, losses, packaging, etc. on a per-unit basis.

Dairy Products Industry Trends

Looking at the current trends in the dairy products industry as well as trends for the specific products that will be produced is important. Trends provide indications as to the general mood of the consuming public. Is the public becoming more or less health conscious? Is flavor more important than fat content? Are new products being accepted or are products that are currently on the market satisfying the consumers? How much is currently being spent on specific products? Is more or less being purchased than was purchased five years ago? All of these questions give insight into the industry in which the new dairy processing facility will be competing.

Target Market Demographics and Consumption Data

While it is easy to believe that the entire world is the market, it is a naïve belief. Only consumers who have a need or want for a specific product or those who stand to reap benefits from it are likely consumers. These individuals are called the target market. Gather as much information as possible regarding individuals in this group – annual income, age, marital status, hobbies, where they live, what they buy, how much of specific products they consume, etc. The information will provide the processor the opportunity to tailor a product attributes and marketing efforts to best reach those individuals.

Product Image

An image is the set of beliefs, ideas and impressions a person holds regarding a product or service. People's attitudes and actions toward a product or service are highly conditioned by an object's image. The image should reflect the wants and needs of the target market. The image should be reinforced in all marketing strategies, product packaging and pricing, etc. If an image is not created by the processor, a product may go unnoticed or the public may create an image different from that intended by the processor.

Product Packaging

A product's packaging is more than just a shipping container or a place to provide mandated information. Packaging is another opportunity to market a product to the public. Packaging can be used to catch the consumers' attention through the effective use of color, graphics, shape, etc. The packaging should support the intended product image. The first product that a consumer picks up off a retail shelf is more likely to be purchased than any of its competitors.

Product Pricing

A product should be priced so that all costs associated with its production are covered plus a specified profit for the processor. However, product pricing has additional implications. A product's price must be reflective of the product's image – gourmet, high-quality, discount, average. The price should also be in line with competing products to ensure trial by consumers.

At first glance, beginning to process and package dairy products on the farm seems like a simple task. After all, haven't farmers been doing it for centuries? But, it is actually a much more complicated process. All areas of such an endeavor should be analyzed to ensure that everything is being done in the most efficient and legal way possible. In addition, marketing, an often overlooked area, should be considered and used to the benefit the enterprise.

Greenhouse Production and Retail Garden Center Marketing

PWP Greenhouses and Retail Garden Centers
Pall Mall, Lenoir City and Lascassas, Tennessee
Written by: Melissa Carro

Background

Although the 300-acre family farm in Pall Mall, Tennessee, had been a dairy farm for 20 years, most members of the family had pursued non-farming

paths in life. Bob Washburn and his brother-in-law, Bob Pile, had careers as a lawyer for TVA in Knoxville and an engineer with TVA in Muscle Shoals, AL, respectively. Both decided in the mid-1980s that they wanted to raise their children in the country, away from the hustle and bustle of city life. They wanted to return to the family farm.

They didn't, however, want to be dairy farmers. So they considered their options for alternative agriculture. One of Pile's most recent projects with TVA was to design a greenhouse that could be heated with the hot water discharged from TVA's Browns Ferry Nuclear Plant. From this expertise was born the idea for a series of greenhouses. Their first greenhouse, opened in 1982, was small – 30x90. As the greenhouse was located next to her property, Washburn and Pile's sister-in-law Connie Pile ran this first greenhouse until Washburn and Pile sold their homes and moved onto the Pile family farm in 1985 and 1986. They set an initial goal of one acre of products in five years. PWP Greenhouses, Inc. was officially underway.

Slow, Careful Growth

Because they had left lucrative jobs, sold houses and transitioned their families to a new region, finances were a chief concern, and prudence prevailed when it came to economic investments. Both Washburn and Pile wanted to manage PWP's growth carefully. They added a few greenhouses each year, always putting any profits back into PWP to facilitate future growth. Always, they kept their eyes on the five-year mark.

Signs of frugality were evident in PWP's early days, and remain today. Bedding plant flats are grown on top of a black plastic weed barrier. Doors, vents and some of the greenhouse structures are homemade. Old, one-ton farm trucks are used to transport plants from the potting building to the greenhouses.

Where it was important, however, significant capital investments were made. PWP did its homework and determined that an automated transplanting line could cut transplanting costs in half over transplanting and filling flats by hand. For this reason, PWP built a custom-designed steel building that contains a Bouldin & Lawson flat filler, transplant line and mist chamber. This high-tech equipment meets the objective of producing high-quality, uniform trays of bedding plants. With such substantial reduction in transplanting costs, PWP is able to pass the savings along to customers by keeping prices lower than those of other growers.

By 2001, PWP had expanded to 48 greenhouses, and exceeded its five-year goal by 50 percent.

Finding the Customer

PWP developed a solid customer base, ranging from large garden centers to small “mom-and-pop” greenhouses that fill their pick-up trucks with PWP products. One of PWP’s largest customers continues to be Tennessee’s Wal-Mart® stores. Fifty percent of PWP’s products go to Wal-Mart®. Maintaining this customer relationship is a dynamic situation, because people in Wal-Mart® change all the time. There is also always the concern that Wal-Mart® could choose to buy elsewhere.

There is an inherent challenge for mid-sized growers like PWP. As large growers benefit from economies of scale and bargaining power with their suppliers, they can afford to reinvest significantly and enhance their productivity. On the opposite end of the spectrum, small growers can carve out new niches for themselves by specializing in more unusual plants. The mid-sized grower, like PWP, however, must carefully determine which plugs are not cost-efficient to grow themselves. For instance, PWP identified vinca and begonia plugs as being too expensive to grow, so they purchase those plugs and concentrate on growing only plugs that germinate well in their soil – like marigolds, petunias, tomatoes and salvia.

Although pleased with their initial productivity and customer base, PWP needed to plan more aggressively for the future in an uncertain economy. They had found a customer base within their rural community. They had established a wholesale market with Wal-Mart®. What was lacking was a retail strategy to offset any economic downturns that their position as a mid-sized grower could bring.

Building Retail Outlets

Increasing profitability would come only through increasing retail business. Toward this end, PWP set out to build its own retail outlets, with the long-term objective of PWP’s largest customer to shift from Wal-Mart® to PWP’s own retail outlets.

In pursuing a retail strategy, PWP encountered two major stumbling blocks. The first was its name, which was not retail-friendly. The retail business was set up, then, under the name Wolf River Valley Growers, indicative of the lush valley in which the family business is set.

Three retail outlets were established over the period of four years. First, retail customers were already visiting the original greenhouse in Pall Mall to buy the products. The second outlet, opened in 1997, was a full-service garden center, Meadow View Greenhouse and Garden Center, built in Lenoir City, about 20 miles west of Knoxville, TN. The garden center was opened in Lenoir City solely to have an outlet for the product grown in Pall Mall. In this way, PWP created its own customer.

Retail progress continued. In 2000, PWP opened its latest venture – Valley Growers in Murfreesboro, TN, a location chosen because of the tremendous growth in the area, as well as because family members were available in the area to staff the operation.

Currently PWP is its own retail customer for approximately 20 percent of its total volume. PWP plans to open two or three more retail locations to increase that percentage.

Different Sets of Challenges

Marketing remains the greatest challenge for PWP, but the wholesale and retail operations have had to employ totally different marketing strategies. Although both sides of the operation need to find the customer, the *type* of customer they need is totally different.

The wholesale marketing strategy is relationship-driven. The wholesale side of PWP – Wolf River Valley Growers – must forge new relationships with large customers such as Wal-Mart®, or identify potential new customers, like Home Depot® or Lowe's®. With 50 percent of their product going to Wal-Mart®, PWP sells 30 percent to other garden centers, with the remaining 20 percent stocking PWP's retail centers.

PWP's retail outlets must employ a completely different marketing approach. The garden centers in Lenoir City and Murfreesboro do weekly radio spots and newspaper inserts. In addition, in Lenoir City, the garden center does a direct mail piece targeting 1,300-1,400 individuals five or six times per year. Effectiveness of these direct mailings are quite high, with an approximate 20 percent rate of return.

Related to marketing, retail has other inherent challenges that don't exist in wholesale. Because aesthetics carry an importance that is irrelevant in the wholesale environment, for instance, retail carries a higher overhead. While the production greenhouse tries to maximize space, the garden centers must have convenient, paved parking; wide aisles; and an enticing environment.

Both wholesale and retail operations have benefitted from a well-organized Website. Although flower production does not innately seem to be a high-tech operation, contemporary society – and marketing techniques – dictate that a business be searchable through the Internet.

The greenhouses in Pall Mall, on the other hand, have more labor and transportation costs. Finding drivers – especially in the Cumberland Mountains region of East Tennessee – is difficult. The operation's full-time labor base is good, but it's difficult to secure temporary truck loading labor to meet seasonal need. Although PWP rented trucks during the spring rush every year, a cost/benefit analysis shows it made more sense for PWP to own its own trucks. For this reason, PWP finally invested, in 1997, in its own fleet of delivery trucks.

The retail outlets have a completely different type of labor issue. More employees are needed spring through summer, and the garden center managers have to contend with a part-time workforce.

Achieving an Effective Balance

Usually agriculturists either grow the product or sell it; it is rare to do both. PWP achieved a healthy balance between their wholesale and retail business lines. Not only is the product shared in the sense that it's grown in one place to be distributed in another, but the workloads in the two types of operation complement each other.

PWP may be viewed as three business lines, representing distinct workloads, in one umbrella company. The different business lines' busiest times of year complement each other. The wholesale operation is busiest in January and February, in making the product – sowing seeds and doing cuttings. At that time the retail outlets are slower and use that time to do facility modifications and concentrate on selling gift items. Then, in early spring, the wholesale operations are slower, while retail outlets see as many as 1,000 customers on any given weekend. In July and August, while the growing side of the business is slower, the wholesale business is at its peak, transporting mums and other fall products. Meanwhile the retail outlets are gearing up for fall sales.

Like any successful business, PWP has managers – specialists in their distinctive areas. Unlike many businesses, however, the titles are much more agricultural and descriptive of an actual task done – such as watering specialist, transportation specialist and potting specialist.

Looking at PWP's revenues for the past few years, one can see an enviable balance between retail and wholesale dollars. While the Pall Mall farm does approximately $1 million in wholesale business but only $200,000 in retail, the Lenoir City garden center showed retail sales of $500,000 and the Murfreesboro center sales of $220,000. Achieving this balance between wholesale and retail enables PWP to absorb the impact of any potential customer losses or reductions.

The Key to Success

PWP realized early on that the flower business is a low-margin enterprise. It is critical to watch what is

being bought and *when* it's being bought. Careful analyses of buying and sales trends help PWP plan its seed ordering for the next season. Excess product goes to customers who are stocking flea markets. This process somewhat buffers the cost of excess product, but PWP tries to minimize the overage.

Washburn and Pile have seen many growers and garden centers go under – especially in these tough economic times. They have witnessed horticulturists focusing too much time on each plant and not recognizing agriculture as the business that it is. In their own words, their retail operations are no different from Sears'® operations, except that PWP has a living product to water.

Driving PWP's operations are some facts they've learned about their business and their customer:

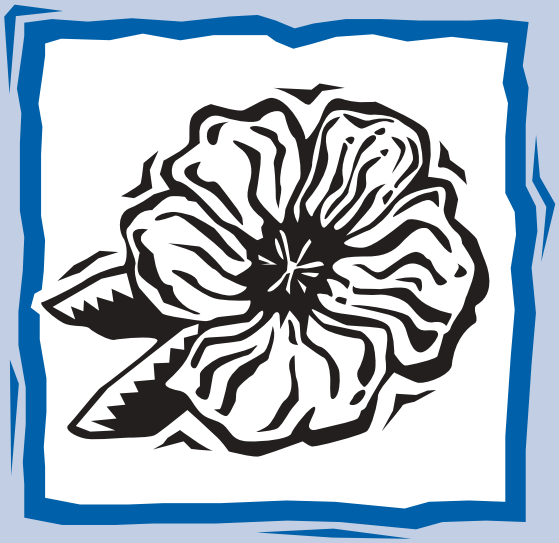
Customers need greater convenience. With contemporary society's hectic lifestyles, customers have increasingly less time for gardening. Retail outlets need to maximize the customers' convenience by offering ready-to-grow plants in large pots and access to concise information.

Environmental concerns. There are increasingly stricter environmental controls and a growing need to continually conserve water. As water shortages continue, the demand will increase for drought-resistant/low-maintenance plants.

Rising fuel prices. It seems that fuel prices will continue to rise, so PWP is investigating alternative heat sources and considering growing plants that don't require as much heat.

Labor shortages. Increasing wages are a given in today's economy. Although it's important to automate as much as possible, PWP advocates paying current employees as much as possible, because retention is much more cost-efficient than recruiting and training new employees.

Combination of high tech with personal service. Today's society demands a high level of service that includes both Internet information and face-to-face interaction. Neither aspect of a retail business, even one that's agricultural in nature, can be ignored.



Although PWP is a *family* business, that nomenclature does not reveal the incredible volume that the growers have achieved in the past 15-odd years. Each year, PWP and its retail outlets produce more than 30,000 flats of annuals, 5,000 units of perennials and herbs, 20,000 hanging baskets, 11,000 pots of mums and 12,000 pots of poinsettias.

Red Barn Winery

Lafayette, Tennessee
Written by: Melissa Carro

Background

Planting their tobacco crop in 1999 was bittersweet for Judy and Glen Clements. Tobacco had been their livelihood on their family farm. They had been growing tobacco on 100 acres in Macon County, Tennessee, for almost 30 years. However, as the federal government began slashing tobacco bases in Tennessee in 1996, the Clements saw the writing on the wall. Between 1996 and 1998, the Clements' tobacco base had been reduced from 8,000 to 2,100 pounds, and their family income reduced by more than $30,000 a year.

The Clements' chief objective was to maintain their way of life, which included living and working on the family farm. Starting in 1996, they began to plan for a future without a tobacco product. To survive, they had to begin a new product. The choice was straightforward, as they had already established a secondary product a few years earlier. A winery had approached the Clements about planting grapes. They had done so – with two acres of blackberries in 1990 and seven acres of grapes in 1994. With some initial success, they decided to enter the state's 75/25 program, in which Tennessee mandates that wineries in the state obtain a minimum of 75 percent of the fruit for their wine from Tennessee growers. This plan gave the Clements a fresh produce market.

After eight years in grape production, they decided to process wine. In 1999, the Clements received their license and the regulatory approval necessary to operate a winery. The full transition from tobacco to wine had begun.

Learning the Product

Having farmed for so many years, the Clements had a thorough knowledge of the soil and an understanding of what the leaf structure for grapes should look like. They also knew the challenges of the climate. Although the soil was good, there was high humidity with which to contend in the Highland Rim of Macon County. They also had to identify the grapes that are most successful – French hybrid or North American. These grapes will grow well in Tennessee's climate and are most comparable in sweetness to the Vinifra grape from California. Pinpointing the right type of grape was important, because the Clements had to market their product to the taste buds of the region, and East Tennesseans prefer fruitier, sweeter wine.

Starting wine production meant refresher courses in chemistry. The University of Tennessee *Agricultural Development Center* was instrumental in getting the Clements the resources they needed to begin production. The greatest learning curve, according to the Clements, was related to the cleanliness process. Experts from UT and University of California-Davis helped the Clements understand the nature of air-borne bacteria and how to prevent it. In addition, the Clements attended seminars offered by Purdue University.

The Clements set up the Red Barn Winery as a Limited Liability Company (LLC) and do their own

bookkeeping with off-the-shelf software. They pursued many avenues for grant money, but the Small Business Association and their county executive said there were no grants available for agricultural businesses of that type. They finally went to a local banker who asked them to submit a financial plan for their projected business plan. It was advantageous that the Clements knew the local bankers from previous business ventures, but the bankers still asked tough questions about how a winery could make money in a dry county. It was a question that the Clements had to think through themselves and strategize.

Overcoming Regulatory Hurdles

Becoming licensed to produce and sell wine required that the Clements jump through a number of regulatory hoops. The first step was to inform local county officials about the plans for the winery. Since Red Barn Winery is located in a dry county, the Clements were concerned that they might meet up with philosophical or moral opposition. Surprisingly, they received support for the venture from county officials. Next, the local health department had to visit the Clements' farm and check the water. Then, the Clements had to go in front of the Tennessee Department of Agriculture Regulatory Department. There were strict requirements on how the winery could be built. They found out that the concrete on the floors had to be 1/8 inch to the drain, and that the walls could not be absorbent. The final step with this state agency was to send the winery's floor plan to the Tennessee Department of Agriculture.

The next step was to complete the lengthy paperwork necessary to obtain a permit from the Alcohol Beverage Commission. Then the Clements had to pursue the same process with the Bureau of Alcohol, Tobacco and Firearms. The most time-consuming paperwork, however, was associated with the Washington D.C. Labeling Department, which demanded that the package carry very specific warnings about the product and its alcohol content.

In general, the Clements found the federal demands and paperwork much simpler than the state's. The whole regulatory process – both federal and state – took 14 months.

It Takes a Market

By 2000 the Clements had three varieties of grapes and blackberry wine, and they opened the farm winery to the public.

The first hurdle the Clements had to face: how to find the customer. The Clements were primarily dependent on local trade, since Tennessee laws prohibit them from selling off-site, except through a distributor. To market their products through a distributor meant giving up 40 percent of the gross sales, so on-site sales had to be the Clements' emphasis, at least in the beginning.

It became clear to the Clements that they needed to establish a clientele and depend on repeat business. Another marketing challenge, though, was their location off a well-traveled highway. The winery was difficult to find. Signage would be an advantage, but there again, the Clements' efforts were thwarted. There were stringent regulations about placement and types of signs, and highway directional billboards were almost prohibitively expensive.

The Clements had to think creatively and make the winery a destination in itself. To accomplish this, the Clements had to focus not only on marketing the product but the environs as well. Toward this end, they began an extensive remodeling of the tobacco barn. The single, double and triple tiers of the tobacco farm became different venues for the winery. The main part of the barn was renovated to be the sampling room. The side parts of the barn were renovated to become party rooms, and a large

covered patio was added. One focus of Red Barn Winery became special events and jamborees, which brought visitors on-site to become familiar with – and purchase – the products. One annual event, which became very popular, is the Grape Stompin Jamboree, held on Labor Day weekend every year. As many as 3,000 visitors have attended this event.

Requiring Retail Savvy

Becoming a destination and hosting special events required retail savvy, a skill unnecessary for tobacco farming. The Clements' winery meant much more public contact than tobacco farming. As many as 200-300 visitors per week visit the winery, and the special events bring in even more people. In addition to the Jamboree, the Clements book their party rooms for weddings and other celebrations. The party rooms are booked solid in weekends from March through December. Red Barn Winery is also the site of a Murder Mystery Weekend in October.

Several factors have enhanced the winery's traffic. The proximity of two bed and breakfast inns provides a target market for visitors to the winery. In addition, the Clements joined the Tennessee Farm Wineries Association (TFWA). Through this affiliation, the Red Barn Winery was included in a brochure that spotlights Tennessee wineries and benefitted from attractive Tennessee Wine Country signs positioned throughout the rural back roads. The Clements also worked diligently to be good neighbors to the community, hosting church and other local groups. Red Barn Winery worked hand-in-hand with the tourism industry in the eastern part of Tennessee. It was a mutually beneficial relationship.

Being a retail outlet necessitated a significant capital investment. Red Barn Winery had to have a full-service kitchen from which caterers could work. Also, beyond the $800,000 investment in pumps and storage tanks necessary to produce the product, the Clements invested $80,000 in refurbishing the barn.

An Award-Winning Winery

In the end, the Clements not only successfully transitioned to a different type of agriculture, but also made a product that has won several awards at the Indy Indiana International Wine Competition, including second-place silver medals for the blackberry, muscadine and Tennessee Red Neck wines, as well as six third-place bronze medals for various other sweet wines. Through creative marketing and strategic community networking, the Red Barn Winery has become a popular visitors' destination and has cultivated an enviable level of local trade.

The Clements now have three diverse product lines: five varieties of dry, three of medium and six of sweet wines. Knowing their market, they know how to tailor the products to the taste buds of the local trade. In 2001, Red Barn Winery sold 2,000 gallons. There is room to grow and expand, as the limit set by the Tennessee Alcohol Beverage Commission is 20,000 gallons. Certainly, it seems, the Clements have both the wherewithal and the capability to grow as much as they want.

Their priority, however, is to preserve the integrity of the product and to continue to produce on a family farm. Therefore, future growth will be carefully planned and managed.

Organic Grain Production

Windy Acres Farm – Orlinda, Tennessee
Written by: Trish Milburn

Overview

Former cattle farmer Alfred Farris got into the organic grain business partially as a result of a challenge by his children to farm in a more environmentally friendly manner. The decision to switch to organic grain farming was partially a spiritual decision, but it appears to have been a smart business decision as well. Even though it is hard work and nothing in farming is guaranteed, Farris and his business partner, Sam Justice, are happy with their decision to leave conventional farming methods behind.

Background

In the 1970s, Alfred Farris raised Charolais cattle on a farm west of Nashville. During this time, he talked with a number of young people, including his children, who were a part of the growing environmental movement. From those conversations, and his own firm belief as a Christian that we should be good stewards of the land, he began to rethink his priorities. He asked himself questions such as: Are we simply miners of the soil, taking all we can get, or are we caretakers so that future generations also will receive the blessing and benefit of the good land? Should we engage in farming practices that are detrimental to the life in the soil, to the plants and animals that soil produces and to the health of the people who consume that food?

As the early 1980s dawned, Farris and his wife, Carney, also began traveling to Uganda to aid the people of that country to work toward sustainable agriculture. Being away from home several months at a time wasn't compatible with cattle farming, so the Farrises made the decision to switch to field crops. The farm where they'd lived was sold by the family, and the Farrises took their share of the profit and bought their current 460-acre farm in Robertson County near Orlinda.

Meanwhile, Robertson County native Sam Justice also was becoming interested in the organic farming business. He'd been a conventional farmer but sold his farm and went to work in a factory. He wasn't happy in his position, however, and began to explore the possibility of returning to farming, even in a limited capacity. In 1984, he started growing organic blueberries, one of the easiest crops to grow organically, he says. When Carney Farris visited him to buy some blueberries, they began talking about organic farming. It was a fateful meeting, since the Farrises and Justice held many of the same farming philosophies, ones that weren't widely held at the time.

"We were convinced the continual use of chemicals was killing the land," Alfred Farris says.

A New Direction

Today, the Farrises and Justice work side by side on Windy Acres Farm, growing organic soybeans, wheat and corn. The Farrises own the land, but Justice shares the work and the profit from the crops the land produces.

They weren't fully organic from the beginning, but they did start out by using one-third less chemicals than neighboring farms growing the same crops. They had to gradually wean the land off the chemicals that had been put in the soil for years.

"The land has to be chemical-free for three years to be certified organic," Justice says.

The term "organic farming" was coined by J.I. Rodale, the publisher of *Organic Farming and Gardening Magazine*, in 1940. It means "good farming practice without using synthetic chemicals"

and is characterized by the following practices: crop rotation, cover cropping, composting, elimination of synthetic pesticides and herbicides, enhancement of the soil's aerobic biological life, reduction of compaction and increasing water retention qualities of the soil and prohibition of the use of genetically modified seed.

Organic farming got a boost in 1962 when Rachel Carson published *Silent Spring*, which documented the harmful effects of pesticide use. Still, it was a fringe movement and was often the object of derision by farmers using the full complement of pesticides, herbicides and fertilizers. Today, however, it is becoming more mainstream, and Farris sees a change in attitudes.

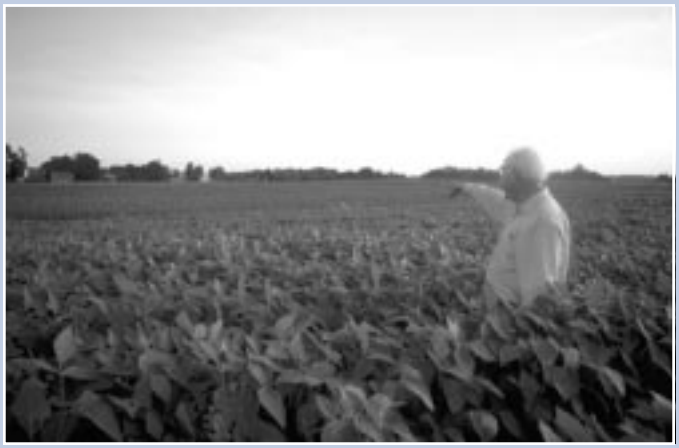
"The market is driving the change," he says. "The organic market is growing by possibly 20 percent a year, the only sector of U.S. agriculture that's healthy and growing. Educated people want food free of chemicals."

As evidence of its increasing popularity, the organic market's 2000 sales figures reached $7.8 billion, according to www.marketresearch.com.

Even though organic farming presents several challenges, such as dealing with weeds, Farris and Justice adhere to the strict standards imposed by the U.S. Department of Agriculture in order to be certified organic. They use no toxic materials; plant cover crops such as hairy vetch to put nitrogen back into the soil – especially in the fields where they raise corn, a heavy nitrogen user; spread a compost made of a mixture of sawdust and chicken manure; don't use genetically-modified seed; and perform deep tillage, which gives their fields an aerobic zone 11 inches deep and makes it very workable and able to retain lots of water. This keeps the water from running off into creeks, taking valuable topsoil with it.

Farris and Justice also had to take precautions to protect their organic certification since their neighbors are conventional farmers who use chemicals. "We maintain 25- to 40-foot buffers – grassways and water buffers," he says. If chemicals from adjacent fields do manage to reach some of their crops, they simply harvest them and take them to a conventional grain elevator. Fortunately, this usually involves only those crops on the edges of his fields and isn't a common concern.

Of more concern is the possibility of genetically modified seed cross-pollinating with their crops, especially the corn. To avoid that potential problem, Farris communicated with his neighbors, providing them with maps of their land and asking that they mark what they were using on their crops in certain fields. The majority of his neighbors responded to his queries.



Farris says they've fortunately not had any trouble with pests but have fought a battle with pigweed. They hired a few summer laborers to help remove the pigweed by hand and also constructed what amounts to a four-headed weedeater that they can pull behind a tractor to cut off the tall stems of the pigweed.

One of the other challenges of organic farming actually takes place inside Farris's home office. The new USDA National Organic Program, effective Oct. 21, 2002, requires lots of record keeping so that an organic operation can be audited easily. Farris's office contains several thick manuals about what is and isn't acceptable in his organic business.

"The organic farming community pushed for this," Justice says. "We needed the uniformity between states and the strict standards." He notes the strict standards because earlier versions of the program didn't differ significantly from conventional farming, still allowing harmful chemicals, and would have put organic growers out of business.

Marketing

Today, marketing organic farm products is easier than 20 years ago because of the niche's growing portion of the total agriculture market, but it still has its challenges. Since there aren't any organic grain elevators or storage facilities as there are for conventionally-grown crops, organic farmers must have their own storage. But this also allows them to sell to many different customers and in varying amounts. Even though Windy Acres Farm's biggest customer is Clarkson Grain Company in Illinois, they also sell to small food processors such as Joy Soy in Clifton, organic grain brokers and even locals who might only want 500 pounds of feed-grade grain to feed their farm animals.

"We're very interested in smaller customers," Farris says. They've also just joined the Midwest Organic Farmers Co-op, which they hope will open up new markets to them.

Most of their crops are not grown on contract, but they will grow certain amounts and varieties for established customers such as Joyce Swiatek, owner of Joy Soy, who wanted a specific type of soybean for her line of soy-based food products.

To add more value to their product, Justice says they've constructed a seed-cleaning apparatus. "It's not a necessity, but a convenience," he says. "We can sell the grain at a higher price (when it's cleaned)."

Networking and word of mouth is important in the organic industry. Belonging to groups such as the Midwest Organic Farmers Co-op, the Southern Sustainable Agriculture Working Group and Quality Certification Services, the organization that handles Windy Acres' annual organic certification, aids in this effort.

Financials

Farris says the capital outlay to get into organic production was gradual, and many of the items he needed, such as a tractor and combine, were no different than those conventional farmers must purchase. Storage, as mentioned above, is a necessity. Farris has storage facilities on his farm that will hold 52,000-53,000 bushels of grain, which must be aerated regularly so the grain doesn't deteriorate.

One of the areas where the cost to organic farmers is higher than his conventional neighbors is in cultivation. "In fighting weeds, we go over the fields a lot more," Farris says.

But the extra work pays off in the end. Farris and Justice get premium prices for their crops, roughly twice what farmers using chemicals receive. For instance, they received $3.50-$4 a bushel for yellow corn, $5.40 a bushel for white corn and more than $10 a bushel for their soybeans on their last crop. Of their 460 acres, they usually plant crops on 390-400 acres, typically 130 acres each of wheat, corn and soybeans. With no inputs, the yield is typically 116 bushels of corn per acre, 45 bushels of wheat per acre and 40-50 bushels of soybeans per acre.

With the standardization of the organic market, pricing will also be easier. In the beginning, Farris had to set his own prices since there was no standard for organic crops like the standards set by the Chicago Board of Trade for conventionally-raised grains.

Farris says they aren't getting rich, but they are pleased with the overall results. "Exciting things are happening, but we have a long way to go," Justice says.

Reasons for Success

Farris believes the organic market will continue to grow because of the increasing belief that chemicals sprayed on food crops are harmful. And because they give back to the soil by using nitrogen-rich

cover crops and rotating crops to best advantage, he believes his land won't play out.

Their approximately 400 acres of crops is small compared to many conventional farmers who plant thousands of acres each year. Farris says with such large acreages under cultivation, those farmers plant, spray and harvest. By being organic, he has to be out in his fields every day, and so he knows his land intimately, which wouldn't be feasible for a farmer with 10,000 acres.

"Growing organic allows us to get by financially on a smaller acreage," Justice says.

The Future

Farris's belief that farming isn't solely for the purpose of making money is a message he shares when he speaks to groups about organic farming. It's about giving back to the land that gives to us, about leaving the land better than he found it, about growing a product he can be proud of and that is good for people. He enjoys the organic business enough that he'd like to diversify further and perhaps grow organic vegetables and heirloom plants. Justice wants to get back into growing organic blueberries as well as strawberries.

Though he is no longer in the cattle business, Farris, as well as Justice, would like to see the organic industry grow to the point where there were options for cattle farmers. Right now, there aren't any slaughterhouses in Tennessee that are certified organic, so growing organic beef isn't really an option. They've seen an increasing interest in free-range chickens, too, another indicator that people want healthier food free of harmful chemicals. And both men firmly believe there are other niches available in the organic farming field for those wanting to explore them.

The partners also would like to take on a third, younger partner who could continue the business for years to come.

When asked what they would have done differently if they had it to do over again, Farris and Justice agree that they would have gotten into organic farming sooner.

Joy Soy – Clifton, Tennessee
Written by: Trish Milburn

Joyce Swiatek's road to becoming a successful soy food products manufacturer and retailer began when she was a child. In those early years, her parents became vegetarians because, Swiatek says, "We found we were healthier with a vegetarian diet."

"I learned then, when I started to cook at an early age, that it's essential in a vegetarian diet to use soy along with other plant-based foods," Swiatek says.

When her family dropped meat from their diets, her father's recently healed hemorrhaging ulcers didn't return, her mother's hay fever eased and the family tended not to get colds. She also notes that they didn't have tooth decay problems because they didn't eat sugars.

"Through the years, I have cooked for schools, groups and restaurants. Finally, people said, 'These foods are good. You ought to market them.' So, for the last eight years, this has been my goal. We've been manufacturing for four years now."

Swiatek's business, Joy Soy, is based in a former garment factory in the small Tennessee River town of Clifton. Even with her familiarity with soy products, the business evolved gradually.

"We started out with a soy milk we call Joy Soy, and then we added a vanilla-flavored milk. After that, we made a butter spread we call Instead O'Butter, then more Instead O' spreads. Next we made some Joy O's cereal and some Soy Snax. Everywhere I went, I took along products for people to taste, and I kept and improved what people liked and changed what they didn't like. An amazing number of people seemed to enjoy our Joy Soy products. In fact, just recently we won an Award of Excellence from Quality Institute International for our powdered soymilks."

That award, an Award of the Americas, is bestowed after a group of chefs select winners based on taste tests.

Swiatek, who had previous business experience as the owner of a health food store, restaurant and art gallery in downtown Clifton, had about $300,000 in startup costs, including machinery, labor and rent on the building. Part of the funding came from a Small Business Association loan and family financing.

"It cost more than I expected," she says. "The initial labeling cost $12,000-$15,000." And Swiatek spent at least that much more when she had to redesign the labels only two years in because buyers weren't responding well to the original design.

Each new product she introduces costs Joy Soy approximately $100,000 considering the label, trademark, development and marketing process. Each new product takes about two years to turn a profit.

From that initial staple of products, Joy Soy now sells more than 20 different items, and the product line continues to grow. New products include: Kruncha'lot Soy Power Snacks in butterscotch and berry flavors plus a full line of Instead O' spreads that replace butter, mayonnaise, ranch dressing and cheese; cereals; milk; and cream. The very popular Tennessee River Mud Balls are described on the Joy Soy Website as a "yummy, melt-in-your-mouth carob-confection."

Swiatek says each product evolved from the products she'd already developed, and she constantly has more ideas that may see store shelves in the future. Sometimes she'll get an idea and stay late at work to run experiments to check for flavor, nutritional value and consistency.

The increasing popularity of natural foods is generating new markets that bode well for Joy Soy and other manufacturers of organic, soy-based products. Swiatek has worked hard to ensure her product is as tasty as it is healthy.

"Our process gives the soy a nutty taste which most people like," she says. "Many of our products would be acceptable to the general public."

Swiatek says that sometimes it can be difficult to get a person who has never eaten soy products to do so, but most of the time if it's a one-on-one contact, they're more receptive. She says it's not difficult to learn to cook or adjust one's diet to soy with a little education.

In the increasingly competitive field of organic foods, it is important to differentiate one's products, and Swiatek has endeavored to do exactly that.

"We deliver what we call a 'Deep Nutrition'," she says. "It is common practice in our industry to first remove or isolate difficult-to-handle elements of soybeans and grains. But our unique process takes nothing out, so you get all the proteins, isoflavones and fiber locked up in the mighty little soybean," she says. "Our products are made from organic grains and soybeans, and are not genetically modified. Being all dry mixes, they are shelf-stable."

The fact that her products, even her soy beverage, Soy Melk, is packaged as a dry mix saves on production costs. To manufacture and sell the milk as a liquid would have been cost-prohibitive for her small company.

Using only certified "organic" is integral to most natural foods producers, including Swiatek. She uses only certified organic soybeans and grains, purchasing them from Windy Acres Farm in Orlinda, Tennessee.

Joy Soy has grown to where the operation now has five employees in production and that many more in the office and retail store, up from three total when she began the business. When Swiatek started marketing her products, much of her business was conducted by mail order. Now, less than half of the business is generated that way. "We are now getting into distributors and health food stores," she says. "Our next goal is to get into grocery and convenience stores as well as food service."

If some of the possible outlets for her products come to fruition, Swiatek may need to increase the size of her manufacturing facility and has already found a piece of land outside Clifton on which she'd like to build a new plant.

Even though the retail store serves a small rural community, Swiatek says that it has been well-received and holds its own. And the business Website, www.joysoy.com, generates direct sales.

Soy products no longer just appeal to vegetarians. Swiatek says her customers are people who are interested in improving their health. And many of them give Joy Soy glowing reviews, as evidenced by the testimonials on the company's Website. For example, this comment from a small health food store owner in northern Idaho: "A customer came in and bought an Instead O'Butter and Instead O'Cheese. Within two days, they came back and ordered seven cases of each. Wow! I can hardly believe it, and now that I hear Instead O'Mayo and Instead O'Ranch are available, I can't wait to start stocking them also."

Another benefit of soy Swiatek touts is its ability to help lower cholesterol by replacing animal proteins. Some health professionals look to soy as a possible aid in helping reduce the chances of heart disease and cancer. Swiatek notes that there is a wide variety of opinions about what is healthy. Her best advice is to read the label on food products and ask questions.

Ken Burress, Wayne County's Extension agent and county director, says Swiatek's efforts have not only helped her business but also the community. "The business adds to the employment base, has taken up an empty building and brought a new business to a small town," he says.

Burress says that when Swiatek was beginning to do preliminary work for Joy Soy, his office didn't have the expertise she needed since the *Agricultural Development Center* at UT hadn't opened yet, but he did help her locate sources of organic grains and research the organic standards and regulations that would affect her business.

"He is a good cheerleader and encourager," Swiatek says of Burress.

When asked, "What types of things do people need to consider before going into business in a niche market," Swiatek responded with several questions: How good is your endurance and determination? How deep are your pockets, or how persuasive are you? Do you know that God wants you to do this, and if so, how much faith do you have that He will see you through?

"It's a struggle," she says. "You have to really want it, and want to do it for the rest of your life."

Jones Orchard and Value-Added Bakery Products

Jones Orchard – Millington, Tennessee
Written by: Rob Holland

Jones Orchard is owned and operated by Lee Wood and Juanita Jones. The family orchard began in 1940 by Lee Wood's father, H.L. "Peaches" Jones. The farm is located in Millington, Tennessee, about 15 miles north of Memphis, in Shelby County. Lee Wood has managed the farm operation since his father's death. Lee's wife, Juanita, is a retired Shelby County court reporter and now works primarily with the value-added, fruit-product enterprises.

Business Idea Discovery Process

In the early 1990s, Juanita found a recipe for peach preserves that did not include pectin. Because of her strong interest in jams and jellies, she decided to try the recipe using fresh peaches from the orchard. She then took the pectin-free preserves to farm-market stands and discovered they were selling quite well. Thinking that their children would some day return to the farm, they decided to build a modern facility for preparation of fruit products for commercial sales. The facility included a certified commercial kitchen, walk-in cooler, environmental-control storage area and large retail shed with pull-down overhead doors. The retail market was designed to display fresh fruit, local vegetables and a variety of fruit products made in the kitchen (jams, jellies, preserves, cakes, cookies, breads, salsa and chow-chow relish).

Market Discovery Process

Initially, very little market research was done. The Joneses visited some similar operations and attended educational programs by the Agricultural Extension Service and the Tennessee Fruit and Vegetable Growers Association. Existing customers who frequented the pick-your-own and roadside stands were the targeted customers for the value-added products. The Joneses maintain four separate farm markets, and value-added products from the commercial kitchen were placed at each of them. Most products moved very well through the on-farm stands; however, the costs of the inspected kitchen required more sales than occurred from just setting out the value-added products. So, in recent years, a very aggressive marketing campaign has been in the works. Working very closely with specialists from the county Extension office and the UT *Agricultural Development Center*, Juanita has developed a brochure, direct mail communications and other sales literature, a logo that has been used extensively on printed materials, custom-printed shipping boxes, gift packages (containing jams, jellies and relishes) that can be prepared and shipped, a toll-free telephone number and a Website.

The sale of value-added products is not up to the desired level, so marketing strategies are ever-changing. One of the biggest obstacles has been trying to locate reasonably priced sources for jars, labels, lids and other materials. Among the most successful marketing tactics at Jones Orchard is their diverse product line. To spread the cost of the fixed facilities over as many unit sales as possible, the Jones' extended their product line to more than 20 different varieties of jams, jellies and preserve products, several relishes, salsa and lots of fresh baked goods, including cookies, cakes and breads.

Capitalization Process

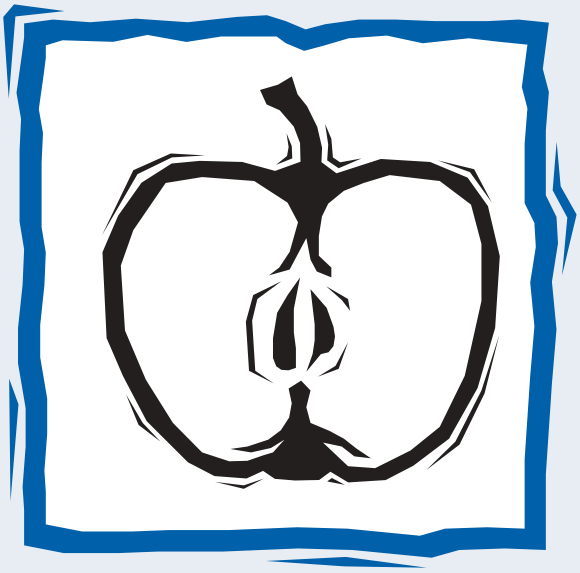
A substantial investment was required to finance the four farm markets, an inspected commercial kitchen and a large cooler for fresh fruit. A loan for the facility was obtained from the family's longtime local farm lender. Obtaining the loan required very little information about the value-added enterprise and was arranged similar to a farm loan. Construction of the facility and acquisition of the commercial kitchen equipment approached $100,000; however, Juanita notes that "the cost of building the facility is small compared to the cost of operating it."

Regulatory Process

All of the value-added products made at Jones Orchard must be made under Good Manufacturing Practices (GMPs) in the inspected kitchen facility. Some products must be made under the direction of someone who has been trained in a Better Processing School and/or in low-acid or acidified food processing; Mrs. Jones has successfully completed both trainings and the kitchen meets all GMPs. The kitchen is inspected periodically and has consistently received a high score.

Business Growth Process

Short-term plans include pursuing mail-order and gift-package sales, evaluation of Internet sales potential and working to get more publicity through brochures. Production of sugar-free products will also be evaluated in the short term. Use of printed promotion materials will continue and serious consideration will be given to targeting specialty/ gourmet food stores.



The Effect of Municipal Compost on Christmas Trees

A Project Funded in Part by SARE
Jonesborough, Tennessee
Written by: Curtis Buchanan

Background

An individual/producer SARE grant was awarded and used to test the effects of municipal compost on Fraser Fir Christmas trees. Municipal compost is made from sewer sludge and yard waste. The use of municipal compost carries some legitimate concerns (i.e., e-coli and heavy metals) but also has many benefits. Municipal compost recycles local waste materials and can provide a reasonably priced source of nitrogen, phosphorus and beneficial micro-organisms.

Experiment

The experiment lasted three years and involved 1700 trees. The trees varied in age and were divided into two groups. One group received commercially available organic fertilizers. The other group received only municipal compost. Records were kept and comparisons made using both objective and subjective criteria.

Results

Results were mixed. Municipal compost cost less, but the labor was more. The labor was more intense with the municipal compost, because one truck load of the compost covered about a hundred trees. Thus, 20 trips were needed to pick up the compost, while only one trip was required to obtain the amount of commercially available fertilizers needed for the same number of trees, and it took less than a day to apply the fertilizer. Growth and color were equal in both test plots, but bud set was 15 percent greater on those trees that received purchased fertilizers. There are two areas, though, where municipal compost does have a significant advantage. First, the municipal compost is longer-lasting than other forms of fertilizer, so it does not need to be applied each year. The second, and directly related to the first, is that it provides beneficial micro-organisms for the soil.

Pathways to Success: Opportunities for Communities and Farm Families

A Project Funded in Part by SARE
Submitted by: Rob Holland

The "Pathways to Success" project was a SARE-funded project in the 1990's that developed a series of video case studies to show practices family farmers are adopting to confront challenges in agriculture today and steps communities can take to support local farmers.

The purpose of these case studies is to extend a greater understanding and support of sustainable agriculture and encourage increased adoption rates of sustainable technologies on the farm.

In this series, sustainable agriculture is considered to be an approach that allows farmers and farm families to farm more profitably, environmentally friendly, efficiently, competitively, and in a manner that maintains the social fabric of rural communities.

Although the five case studies in these materials highlight farms located in the Southern region, the general concepts of sustainable agriculture discussed are applicable to many farm types throughout the country. While the specific activities discussed may only be ideal for the case study farms, the emphasis of the Pathways video series is on teaching the general concepts of sustainable agriculture, extending the experiences of farmers in applying these concepts, and encouraging participants to think about how the general concepts of sustainable agriculture could be applied to other farms. The information in these written materials and the accompanying videos is not to be considered a complete treatment of any given topic, but rather a stimulus for future discussion and/or investigation.

The five case studies are independent of one another and vary in farm type and topic. Each case study highlights one farm family that applied concepts of sustainable agriculture to their farm to bring about positive changes. Although each of these farms has adopted many sustainable farming practices, the case studies highlight two major topics per farm.

The purpose of the Pathways video series is to introduce or reinforce sustainable solutions to issues in agriculture. These case studies are depictions of issues that were actually faced by farmers and their families, the courses of action taken and the outcomes. The case studies are faithful renderings of the facts, opinions and prejudices upon which decisions were made, and the results of those decisions.

Following are descriptions of the topics for each case.

Coggin Farm

- ***Improved Management Information Systems***
  The Coggins, a beef cattle and row crop farm family in Mississippi, explain how the addition of a satellite information system and personal computer to their farm management information system has improved marketing decisions and management of farm records.
- ***Chemical Management***
  The Coggins discuss how they have improved their approach to weed management by cutting herbicide application rates and building an enclosed storage shed for safer storage of chemicals. They share how this approach has helped them cut costs and preserve the environment.

Hill Farm

- ***Estate Planning***
  The Hill farm in West Tennessee is a row-crop operation owned and operated by three Hill families. The Hills discuss how their estate plan provides security for a retiring family, while continuing to support the two families who will take over the operation.
- ***Integrated Pest Management***
  The Hills discuss how their approach to integrated pest management (IPM) helps them manage costs and preserve the environment.

Mercer Farm

- ***Strategic Planning***
  Dane Mercer, a dairy farmer in East Tennessee, implemented a strategic plan that called for an increase in herd size (from 80 to around 280 cows) and construction of a new loafing barn and waste management facility.
- ***Quality of Life***
  The Mercer family discusses the difficulties they had finding quality family time prior to the implementation of their strategic plan. Implementing a strategic plan in support of their family values ultimately created more opportunities for the Mercer family to pursue family activities and personal interests.

Roberts Farm

- ***Conservation***
  The Roberts discuss their response to water quality and erosion issues on their row-crop and beef cattle farm in Western Kentucky. By building earthen dams and a rock structure and reducing cattle access to ponds and creeks, the Roberts improved water quality on- and off-site and reduced erosion.
- ***Community Service***
  The Roberts discuss the benefits of their participation and leadership in various agriculture-related and nonagriculture-related community activities.

Teamer Farm

- ***Whole-Farm Planning***
  The Teamers, owners and operators of a small row-crop and farrow-to-finish hog farm in West Tennessee, discuss how they created a whole-farm plan for their unique set of resources.
- ***Conservation Tillage***
  Erosion had carved large trenches in the fields of the Teamer farm before the Teamers adopted conservation tillage.

Sustainable Dairy Systems

A Project Funded in Part by SARE (1994-1998)
Contact Person: Clark Garland

Dairy farming is a significant and dramatically changing part of agriculture. These changes are occurring in production systems, investment requirements, environmental concerns and the need for enhanced overall business management.

Over a four-year period, 1994-1998, a 24-member team of engineers, economists, agronomists, Extension agents and dairy specialists, along with farmer advisors from Tennessee and Kentucky, completed a dairy systems manual and user-friendly computer program. The manual has been used in educational programs with more than 500 Tennessee and Kentucky dairy farmers. The manual and software were designed to provide refined investment requirements and cost estimates for use in comprehensive farm and financial planning with farm families.

The project included chapters on forage systems, feeding systems, manure-management systems, milking center facilities, management information and decision support, dairy farmstead planning, dry cow housing, feeding and management, replacement heifer housing, feeding and management, milking herd feeding and housing facilities and additional inputs. Systems were developed for herd sizes ranging from 50-to 800-cow operations.

Dairy systems training for Extension personnel in all the southern states was held in August and September 1998. Sixty specialists and agents from the 13 southern states, Puerto Rico and the Virgin Islands participated in the training program. The training was conducted in Florida and North Carolina. A $90,000 Southern Region SARE grant provided additional resources to develop and use the manual and software in Tennessee and Kentucky. Another $48,500 grant was received from SARE to conduct the southern region training program.

Nationally, exceptionally high interest has been expressed in the dairy systems subject matter and process. Cooperative State Research, Education and Extension Service recognized the dairy systems project in a national publication entitled *Innovation in Extension Programs: Examples Related to Agricultural Economics*. Presentations and/or papers have been given in four international, nine national and seven regional meetings, for a total of 20 meetings. Initial work on the project was primarily for the benefit of Tennessee and Kentucky farmers. As the project developed, the program was expanded to the southern region. The last step was to make the program available world-wide – distributing software to five additional countries.

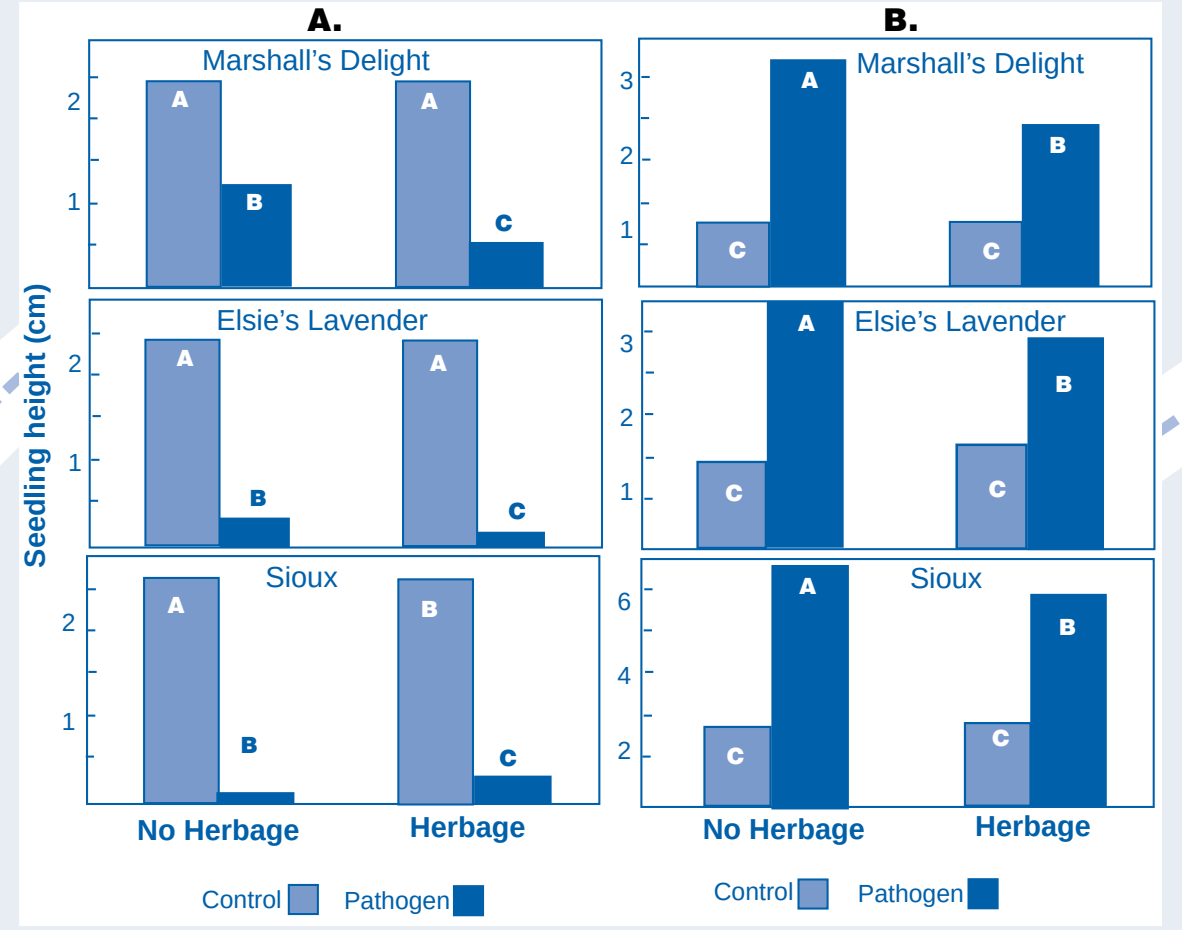
Educational materials developed in this project are a critical component in an overall farm and financial management educational program. The dairy systems program has demonstrated to others the importance of a systems approach to management. This has encouraged leaders in other commodity areas to consider using this approach. Lessons learned and portions of the teaching material developed in the dairy systems manual have been useful in additional work directed to other types of farms. A major benefit of this program is the professional growth experienced by the 24 member team. Working together as a team in putting together a total interactive system has improved the ability of each “specialist” to look at the often-complex total picture instead of focusing only on a small part of the issue.

Control of Soil-borne Diseases with Bioactive Herbage Alone or in Combination with Biocontrol Agents

UT Bioactive Natural Products Center, Knoxville, Tennessee
Written by: S.E. Greene, K. D. Gwinn, B. H. Ownley and S. L. Hamilton

The threat of large crop losses due to soil-borne pathogens in greenhouse production systems can lead to overuse, and illegal use, of pesticides. Furthermore, situations exist where disease control with synthetic pesticides is either unavailable or ineffective (e.g., no registered pesticides or pesticide-resistant pathogens). Many bioactive control agents have been proposed as natural alternatives to combat soil-borne plant pathogens, but only marginal success has been achieved. Dried ground plant material high in antifungal essential oils (bioactive herbage) is an additional disease control option for pathogens.

A rapid growth chamber test was developed to screen *Monarda* herbage for activity against seedling disease caused by *Rhizoctonia*. We chose the cultivar 'Marshall's Delight' because it showed fungicidal activity in a bioassay and had no impact on tomato germination in greenhouse tests. 'Elsie's Lavender' was selected for study because of its high concentrations of several key compounds (e.g., thymoquinone, carvacrol). 'Sioux' was chosen because it contains high concentrations of cymene and thymol.



Charts A and B show the effect of *Monarda* herbage on plant height and Rhizoctonia disease of tomato. Tomato seeds were planted in germination medium or medium amended with herbage from a *Monarda* cultivar. Treatments were control or amended with *Rhizoctonia* inoculum. Chart A shows the seedling height at seven days after planting. Chart B shows the disease data. The disease index was determined on a scale of 1 to 4 where 1 = no disease, 2 = seedling living but lesions present, 3 = seedling dead due to post-emergence damping-off, and 4 = seedling dead due to pre-emergence damping-off. Bars with the same letter are not different according to a Fisher's-protected least significant difference test at P=0.05.

Additional Reading

Publications and resources addressing sustainable agriculture are available from USDA's Sustainable Agriculture Research and Education (SARE) program. A complete listing of these resources; a description of each including number of pages, publication date and cost; online status; and instruction for ordering by Web, FAX, or mail can be obtained at <http://www.sare.org> and by clicking on "Publications and Other Resources." Publications and resources available include the following:

Building Soils for Better Crops – How ecological soil management can raise fertility and yields while reducing environmental impacts.

Managing Cover Crops Profitably – Comprehensive look at the use of cover crops to improve soil, deter weeds, slow erosion and capture excess nutrients.

Steel in the Field – Farmer experience, commercial agricultural engineering expertise and university research combine to tackle the hard questions of how to reduce weed control costs and herbicide use.

'Naturalize' Your Farming System: A Whole-Farm Approach to Managing Pests – By laying out ecological principles for managing pests and suggesting how to do so in real farm situations, this bulletin helps producers design farm-wide approaches to control pests.

The Real Dirt: Farmers Tell about Organic and Low-Input Practices in the Northeast – Based on interviews with more than 60 farmers in eight Northeast states, this publication summarizes practical methods for ecological soil, pest, disease, crop, greenhouse and livestock management.

Profitable Pork: Strategies for Hog Producers – Showcases examples of alternatives ways to raise pork profitably – in deep-straw bedding, in hoop structures and on pasture – to save on fixed costs, find greater flexibility and identify new marketing channels.

The Small Dairy Resource Book – Evaluates books, periodicals, videos and other materials on farmstead dairy processing in a thorough, annotated bibliography.

Profitable Poultry: Raising Birds on Pasture – Farmer experiences plus the latest research create this "how-to" guide to raising chickens and turkeys sustainably, using pens, movable fencing and pastures, with original ideas for marketing strategies.

The New Farmers' Market: Farm-Fresh Ideas for Producers, Managers & Communities – Covers the latest tips and trends from leading sellers, managers and market planners to best display and sell products.

Reap New Profits: Marketing Strategies for Farmers and Ranchers – Offers creative alternatives to marketing farm products through conventional channels.

The New American Farmer: Profiles of Agricultural Innovation – This collection of in-depth interviews with producers describes diverse operations around the country and details of the effects of those systems on farm profitability, quality of life, rural communities and the environment.

SARE Annual Reports, 1994-2001 – Each year, SARE staff choose 12 research and education projects from across the country exemplifying farming systems that improve profits, benefit the environment and are good for communities.

How to Manage the Blue Orchard Bee as an Orchard Pollinator – Using this guide from the USDA-ARS Bee Biology and Systematics Laboratory, learn how to improve orchard pollination by rearing the blue orchard bee.

Put Your Ideas to the Test: How to Conduct Research on Your Farm or Ranch – Outlines how to conduct research at the farm level, offering practical tips for both crop and livestock producers.

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The Effects of Municipal Compost on Christmas Trees

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Control of Soil-borne Diseases with Boactive Herbage Alone or in Combination with Biocontrol Agents

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Tennessee's Sustainable Successes

Small Farm Sustainability and Value-Added Food Processing Products

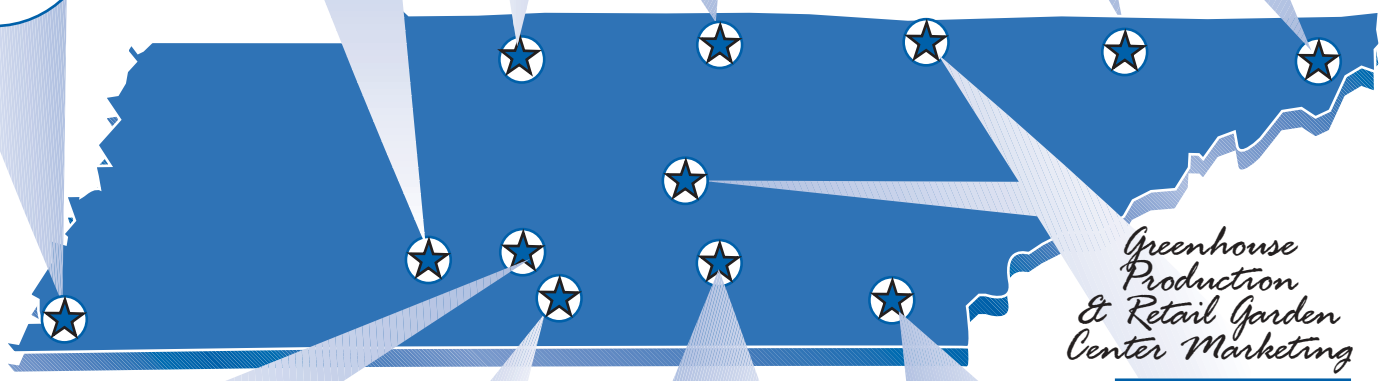
Organic Grain Production

Red Barn Winery

Jones Orchard & Value-Added Bakery Products

Organic Food Processing

The Effect of Municipal Compost on Christmas Trees



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Visit the Agricultural Extension Service Web site at:
cpa.utk.edu/default.htm
and
http://www.utextension.utk.edu/

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COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
The University of Tennessee Institute of Agriculture, U. S. Department of Agriculture, and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914.
Agricultural Extension Service
Charles L. Norman, Dean.