Planning For Whole Farm Management:

Lessons From Midwest Farmers

A Publication of
The Minnesota Project
and
The Great Lakes Whole Farm
Planning Network

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The Minnesota Project connects people and policy, nurturing collaborations that build strong local economies, vibrant communities, and a healthy environment.

The Great Lakes Whole Farm Planning Network is comprised of the following organizations:

Innovative Farmers of Ohio
The Michigan Agriculture Stewardship Association
The Minnesota Project
Sustainable Earth (Indiana)
University of Wisconsin, Center for Integrated Agricultural Systems

The Great Lakes Whole Farm Planning Network works toward profitable farms that protect the Great Lakes water system using successful Whole Farm Planning and decision making.

Planning For Whole Farm Management highlights the research projects of North Central Region SARE that best demonstrate Whole Farm Planning principles.

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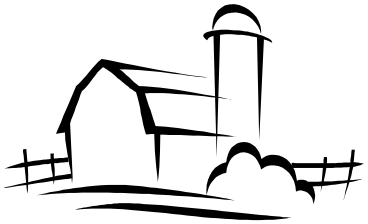
Planning for Whole Farm Management:
Lessons from Midwest Farmers

Introduction

Managing the farm as a whole is not something one can simply learn at a university or a weekend workshop. It requires learning by doing. Farm management is complex, requires intimacy with the environment supporting the farm and must meet the specific needs of the farm family it supports in the community where they live.

Practical agricultural research for solving problems and testing ideas is not new. Farmers have been conducting experiments on their farms for centuries, formally and informally. Most of their experimenting is uniquely suited to the farming system upon which it is applied, and are likely to go unnoticed.



Because excellent farm management is an art, templates for farm management won't do. But we can learn a lot from the experience of other farmers – our parents and grandparents, neighbors, or farmers who have tried similar experiments in other parts, near and far.

In this spirit, the Great Lakes Whole Farm Planning Network has teamed up with the North Central Region Sustainable Agriculture Research and Education Program to introduce you to the stories of farmers in this 12-state region. These farmers who are purposefully experimenting with new management approaches that integrate the opportunities on their farm with the needs of their families and communities. Many of these stories are supported by the technical work of researchers at universities around the region, who listen to farmers and work with them to address specific questions that impact farming in our region.

NORTH CENTRAL REGION

SUSTAINBLE AGRICULTURE RESEARCH AND EDUCATION

SARE is a program of the United States Department of Agriculture

NCR-SARE Goals: Foster site-specific, integrated farming systems; satisfy human food and fiber needs; enhance environmental quality, natural resource conservation, and the integration of on-farm and biological resources; enhance the quality of rural life and support owner-operated farms; protect human health and safety; and promote crop, livestock, and enterprise diversity and the well-being of animals.

The 12 NCR states — Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin — have a rich agricultural history. The NCR's challenge has been to hold fast to historical roots in a contemporary manner, preserving its place in the front lines of food production, and promoting healthy food systems.

SARE strives to sustain agriculture by encouraging research and education on profitable and environmentally sound systems that strengthen communities.

The North Central Region funds 50 to 75 cutting-edge research and education projects every year in four grant programs:

Research and Education Grants
Producer Grants
Professional Development Grants
Graduate Student Grants

WWW.SARE.ORG

How To Use This Book

The first section discusses the big picture – why farm planning is important for improving your farm management ability. The book then flows into **five sections** that reflect various aspects of planning for whole farm management: the planning process, systems evaluation of natural and biological components, systems evaluation for human and social components, daily decision making and monitoring.

Each section presents an overview of the concepts presented, and provides some examples of specific SARE projects that speak to that issue. SARE provides project summaries online at **http://www.sare.org/ncrsare,** or you can call the office for copies of project reports and data at 402-472-7081.

The sections can be read in any order that sparks your curiosity, or you may choose to skim parts and read other parts in depth. The book is fully indexed, so if you have a specific need, check the index. Each section covers on-farm experimentation that has been funded by the NCR-SARE program since 1988. Many farmers' stories cover more than one of the four aspects of whole farm management. These stories are covered in depth in one section and then simply referenced in the others.

Many farmers and researchers wondering how to make farms and farming systems more sustainable come to North Central Region SARE seeking seed money to make their ideas blossom. Part of the U.S. Department of Agriculture, North Central Region SARE supports farmers and researchers in their efforts to explore such projects on a voluntary basis. NCR-SARE itself is supported by Congressionally appropriated funds.

Since SARE's humble beginnings in 1988, farmers and researchers working with SARE have accumulated a considerable body of research results. What is special about SARE research is that it takes place on individual farms, and farmers keep a record of their experiences so that others can review and learn from their accumulated understanding.

This reference book collects management ideas and experience gleaned from SARE on-farm research and presents the information in a format that makes it easier to consider and select from a range of alternative practices and approaches.

Some examples may be more suitable to your land, system of farming, family, and community needs than others, but all of them may prove useful as you plan to manage your whole farm.

We describe the SARE research examples and show how they fit in a farming system that sees the farm as multi-dimensional – interconnected ecological, social. and economic systems in context.

We hope that through other farmers' experiences you will better understand the processes, patterns, and structures that make up a successful whole farm.

The Big Picture

Planning

Do you live to work or work to live? How do you envision your life on the farm? Planning can help you articulate your goals so your goals can easily guide your daily efforts.

Planning can help you work smarter to free up your time and other precious resources, which will improve your quality of life. Planning can allow you the flexibility to change the crops or animals you raise so you can better meet your overall life goals. Planning may give you the time to think creatively about how crops and animals interact on your farm and how you can improve these interactions through minimal, targeted management.

How does you set aside the time to plan? Where does you start? Finding a mentor or a group of farmers interested in improving farm management can help — and it's a way to get support for your planning efforts.

Involving your entire family in the planning process is another way to build up steam to keep the planning process moving forward, even when daily chores and unforeseen complications seem overwhelming.

Evaluating Systems

What is blocking your success in managing the farm? What sub-systems are being managed? What is the weakest link within and between the sub-systems you manage?

Farm sub-systems can be grouped into four areas – natural, biological, human, and social . Together, these components make up the whole farming system and are unique to each farm.

It is critical to understand how water flows into and out of the farm, how minerals cycle (fertilizer, animal and green manure, soil minerals), how energy (solar, petroleum) flows through the farm system.

Plant and animal interactions also tell a story about soil health, crop and livestock health, and ultimately human health.

The level of family satisfaction with farming indicates the level of management success. The farm business may be overshadowing or under-supporting family needs. Similarly, the farming business may be overshadowing or under-supporting community needs: as civic-minded citizens, farmers often play a key role in local politics and civic engagement. Is there adequate community support for farm families? Can young farmers enter the occupation? Is there appropriate continuing education for farmers of all ages? Are urbanites and suburbanites creating markets for local products?

Farm sub-systems can be grouped into four areas – natural, biological, human and social components. Together, these components make up the whole farming system and are unique to each farm under management.

Monitoring

On any given day, a farmer makes hundreds of decisions that influence the course of events on the farm. Measuring these decisions – both large and small – against the overall goals may help the farm stay on the course you set. At least, it will ensure that if you are changing course you know it and you know why.

Monitoring the direction of change on the farm will also help you discover if what you are doing is helping you reach your intended goals. Are you trying to improve herd nutrition? Then you need to develop key indicators to measure pasture improvement. Is trout in your stream important to you? Then you need to develop key indicators for water quality and trout habitat.

Monitoring requires systematic measurements so it is possible to chart change over time. Finally, analyzing the data and integrating the information into your planning process is key to successful management.

The Planning Process

Planning for Quality of Life

For some, simply taking time to plan ANYTHING takes a back seat to "fighting fires," those daily and seasonal emergencies that fill our days. Yet it is precisely these on-going emergencies that indicate the need to step back and take time to plan ahead. How can emergencies be avoided? How can we save time, avoid injuries, make more money, work less, involve our children? How can we set up the time we have available to do the things we care most about or enjoy thoroughly? Planning gives us a chance to ask these questions and adjust our farming operation to improve our quality of life. Envisioning the future we want and then setting goals to attain that future is key to planning.

Evaluation of Pasture Farrowing Concept Non-Chemical Suppression of Perennial Weeds

FNC93031, FNC94084, FNC96137
Tom Frantzen Family
New Hampton, IA

The Frantzen family began applying holistic management to their operation in 1992, after implementing ridge till, narrow strip inter-cropping, management-intensive grazing, and deep-bedded swine production. They farm 320 acres in Northern Iowa, raising corn, soybeans, small grains, forage, amaranth, and they maintain 6,000 trees and nut-bearing bushes for wind shelter and the nut crop. They also pasture stocker cattle and pigs. The family provides nearly all the labor on the farm.

As part of their family planning process, they realized that a weak link in their system was a lack of economic data to assess and compare the success of various enterprises on the farm. The family purchased a platform scale in 1993, collected data, and used the data to compare the enterprises.

They realized that a weak link… was a lack of economic data to assess and compare the success of various enterprises on the farm.

In 1994-95, the Franztens turned their attention to assessing the economic viability of pasture farrowing hogs. The family kept extensive records of stock weight, farrowing, feed, and labor hours over two years. The result was that the family planned to triple the size of this alternative farrowing system, while keeping in mind that the weak link in the system was market access for the product.

In 1996, the Frantzens considered entering the organic marketplace as a way of boosting income, but were not certain this was the way for them to go. To qualify for organic certification, they needed to suppress problem perennial weeds without chemicals.

There was little information to draw on, so they developed an experiment to assess various approaches to quackgrass control in corn and soybeans. Despite rigorous use of both chemicals and cultivation to control quackgrass, weed pressure was significant in the corn and soybean fields. Extreme wet weather delayed planting in 1996 — it reduced yields but also helped to control weeds.

Their first thing they learned was that chemical control and early planting would be more profitable than organic unless beans planted later with no chemical weed control could be marketed as organic. The Frantzens successfully grew three crops in three different growing years using organically-acceptable practices. Co-operating with Iowa State University, the Frantzens evaluated the quackgrass stands and then planted various plots that included full year fallow, oats/red clover, Japanese millet, and sorghum sudangrass. Livestock were incorporated into the system, which grazed stubble, consumed low value forage, and provided manure for a composted soil amendment. Soil tilth was noticeably best in the oats / red clover treatment, while the full-year fallow soil tilth was poorest.

The second thing they learned was that quackgrass pressure came and went, regardless of chemical, mechanical, or fallow treatments. Pressure was largely dependent on weather conditions and the timing of crop planting — and they learned to take advantage of periods when the quackgrass was stressed. The upshot of the project was that the Frantzens had adequate information to assess the viability of switching the entire farm to organic production.

Over the period of these three projects, the Frantzens, as a family, planned to run the farm and to methodically investigate ways to farm in a manner that allowed them to attain their family and business goals. They made major changes in the farming operation with little disruption to their family life.

Through one-on-one contact and field days, they worked with the university, a network of farmers, and with others in the community to consider various strategies and systems.

Benefits of Whole Farm Management

FNC 98221, FNC1995-97
Dennis Rabe
Lake City, MN

The Rabe family's three-year SARE project took the family through a whole farm planning process. In 1996-97, they evaluated the farm in four ways – financial, family living, environmental benefits, and cost reduction. They kept tract of income and expenses to determine net income per acre as a way to measure their success.

The business fared well as a result, with net returns up, and input and overhead costs down. They put their cattle and hogs on pasture, which reduced erosion by replacing row crops with pasture and hay and provided habitat for birds. Sow production increased on pasture, and both cows and sows were healthier. They didn't require antibiotics and had healthier feet and legs. Because the animals were raised as "natural," there were opportunities for direct marketing, which increased profit per animal. For beef, this meant as much as an added $350 per animal.

Perhaps most importantly, the family was in a position to take family vacations for the first time. They enjoy their work with animals on pasture and chores take less time. The family has more time to enjoy the pleasures of rural living, such as horseback riding, cross-country skiing, and walks along quiet country roads.

Policy and Whole Farm Planning

SARE focuses its research and education funds on helping farmers manage the farm as a whole, taking into account economics, the environment, family, and community implications. But planning for the farm means taking a look at farm policy — which is changing. Sustainable farming advocates supported the creation of the Sustainable Agriculture Research and Education program in the 1985 Farm Bill, and have been changing U.S. farm policy ever since.

The Environmental Quality Incentives Program, ntroduced in the 1996 Farm Bill, promoted efforts to integrate farm planning centered on bringing diverse conservation cost-sharing programs together. While a whole farm conservation plan was not required, many farmers took advantage of the opportunity to address multiple resource issues on their working farmlands. Limited funding kept the incentives from most farmers until the 2002 Farm Bill expanded funding.

The 1996 Conservation Farm Option was designed to reward whole farm planning by integrating incentives for management practices and land retirement. The USDA failed to implement the program.

Sustainable agriculture supporters then spent years trying to shape the Conservation Security Program (CSP), passed in the 2002 Farm Bill. This program is the first nationwide open-enrollment program designed to encourage a whole farm approach to conservation. All farmers will be eligible to earn financial incentives for implementing a conservation security plan, with the highest rewards of up to $45,000 a year going to those who solve all identified resource problems on their whole farm. The CSP is slated to be launched in late 2003.

Many view the CSP as more than a conservation program, citing its potential to become a way for the public to support and reward farmers for the environmental and other benefits they provide. This is a vast shift away from policies that focus resources on rewarding monoculture commodity production.

Policies to advance sustainable agriculture have grown over the years, with momentum building for ever bigger reforms of policies to promote sustainable farming systems.

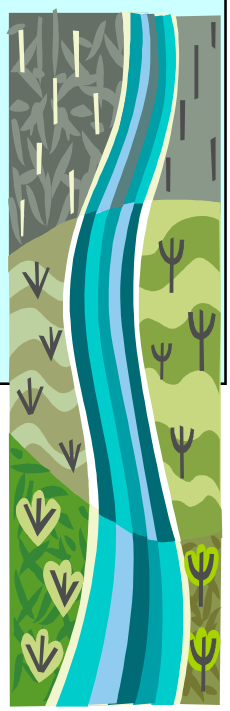
- Loni Kemp, Minnesota Project

The Planning Process

Planning for Complex Farming Systems and Unusual Crops

Business gurus recommend that serious businessmen and women take at least a month every year to think critically about their work in the past year and set a course for the coming year. Depending on the kind of farm you run, there may be only a few weeks that you can commit to planning your farm operation for the next year or next five years.

This kind of commitment to planning can allow you time to organize and manage complex systems to support your goals and lead to careful and large-scale changes in your farming operation.



Riparian/Range Plant Restoration and Demonstration

FNC94070
Jeff Mortenson
Pierre, SD

The Mortenson ranch raised about 1,500 head of beef cattle, with management intensive grazing over about 18,000 acres. They developed a master plan, using Holistic Management, which is the style of whole farm planning, to set attainable goals and then began to work methodically toward reaching individual goals over the course of a number of decades. This required the simultaneous management of cattle, vegetation, water resources, and wildlife.

The goal of this SARE project was to quickly restore and improve the quality of the rangeland, particularly along the creek that runs through their property. The Mortensons wanted to address massive stream bank and channel erosion, loss of biodiversity in riparian plants, loss of wildlife habitat, loss of groundwater storage capacity, and loss of forage potential. They proposed to harvest native seed and plant it along the creek banks using cattle hoof action to plant.

The Mortensons spent considerable time locating the seed they wished to replant, but were successful. They seeded in the spring and in the fall of the same year, when the seed was available. The reseeding will continue for years to come. The project was a success, and is being duplicated.

The Mortensons developed a side business by selling seeds collected from the ranch to greenhouses and other distributors in Minnesota, Wyoming, Colorado and South Dakota.

Hazelnut Hedgerow

FNC93042
Michael Natvig
Cresco, IA

Michael Natvig is a fourth-generation farmer on his Iowa family farm. His complex management system includes 240 acres of field crops and pasture, hard wood trees, native prairie pasture, hogs and beef cattle. He wished to add a hazelnut hedgerow to his operation because it is a native nut-bearing shrub that could further diversify his farming portfolio and provide a windbreak and wildlife habitat.

His project allowed him to experiment with ways to move small hazelnuts from greenhouse propagation to the field. He focused specifically on weed control, predators, wind and moisture conservation. First, he sheltered the plants with biodegradable tree shelters staked over the bushes. He then mulched each bush with wood chips for weed control and moisture conservation. He experimented with bare ground weed control through tillage, but found that the mulched plants fared better.

Growing Sweet Sorghum in a Short Growing Season

FNC93046
Richard A. Wittgreve
Elkhart Lake, WI

The Wittgreves' goal has been to downsize their operation to reduce risk to investments while providing products and services that allowed them to control their final price. This has meant exploring unusual crops, such broom corn and sweet sorghum, and engaging in on-farm processing. It has always been difficult to produce sorghum for syrup in Wisconsin because as much as one-third of the crop does not reach maturity before the first killing frost.

The Wittgreve project identified varieties of sweet sorghum suitable for the short growing season in the upper Midwest, and evaluated various non-chemical weed control practices. Their first step was researching other sorghum growers' activities and getting advice from interested consultants, researchers from the University of Kentucky and Texas A&M, and other growers who worked with different crops that faced similar constraints.

Over the course of the project, Wittgreve realized that the problem may not the early frost killing the sorghum, but poor germination in the spring. A vegetable grower suggested that raising sorghum as a specialty vegetable crop rather than as a traditional grain crop may give sorghum a better start in the spring.

By responding to issues of planter depth control, soil fertility, starter fertilizer, crust control, soil temperature, and seed coating, direct seeded sorghum dramatically improved germination. Wittgreve also experimented with transplanting sorghum grown in a greenhouse. He found that transplanting on a limited scale allows for August harvest. Cultivating only days after transplanting gives an advantage on mechanical weed control.

Weed control research is key in sorghum production. Pressure from foxtail had stunted sorghum growth to the point that it slowed maturity and resulted in stunted and immature crops that could not be harvested before the first frost. Mechanical control did not sufficiently disadvantage the foxtail. However, Wittgreve found that foxtail could be controlled by improving soil tilth through rotation and adding calcium to the soil.

Finally, the project tested 31 syrup-producing varieties of sorghum from Wisconsin, Texas, Kansas and Kentucky. Using standard test plots in multiple locations, he found that some varieties of sorghum are better able to compete with foxtail than other varieties. The test plots also raised questions about disease and lodging for different varieties, all questions that needed to be investigated with further research.

"I know for a fact that I was able to do more about improving growth and production in this one year than I have been able to do in any other one year . . . I was able to open doors and get assistance when I told people I had a grant to do a research project," Wittgreve said.

"I know for a fact that I was able to do more about improving growth and production in this one year than I have been able to do in any other one year…

Ornamental Bittersweet Production for Small Woodland Farms

FNC97195
John Klueh
Mt. Pleasant, IN

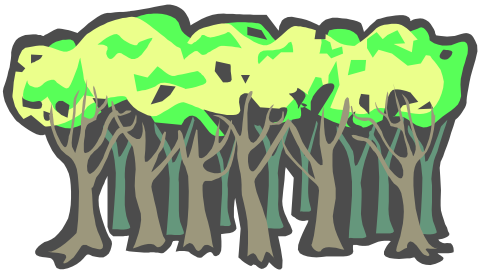
John Klueh supplies annual and perennial cut flowers to regional florists and a farmers market. He wanted to experiment with ornamental bittersweet to market this high-value cut stem to his florist customers or potentially new wholesale markets.

Since flowering and fruiting occur on second-year wood, female plants only, this one-year project soon became a two-year project. He purchased plant material from various nurseries, only to find that few nurseries sexed the plants. As a result, Klueh would not know the ratio of male to female plants until the second year of the project when the plants fruit. The nurseries routinely interchange one species of bittersweet for another, further complicating Klueh's research. He could not know for certain which species he planted until fruiting.

Klueh planted bittersweet into well-prepared plots that had been fertilized with a green manure and a winter cover crop. Additional fertilizer was added in the spring before planting and composted sawdust was

added. He constructed trellises of bamboo and wire a few months after planting. Plant survival was high. Only after they were well-rooted, one or two months after planting, did the plants start to vine.

Some individual plants vined more than others, with an average vine length from 8-12 feet, depending on the species. Although maximum production will not occur for four to five years after establishment, the project's second year was expected to produce enough marketable stems to warrant their production.



Comprehensive Integrated Agroforestry Project

FNC 96148
Tom Wahl
Wapello, IA

Raising perennial crops requires a multi-year investment in production, especially when the crop may take more than 10 years to produce income. Tom Wahl's project involved many years of planning to convert 10 acres of ridge top woodlots. To prepare the site, he cleared dense brush, leaving desirable species such as oak, walnut, and hickory saplings. To increase biodiversity, he divided the ridges into blocks with different tree species planted in each block.

He used six different methods to establish 12 different tree species: chestnut, pecan, shagbark hickory, hican, black walnut, heartnut, persimmon, pawpaw, hazel, nut pines, ginko. Mortality was low in the first year, with 95% survival.

Some of the benefits he hoped to see over time: 1) a reduction in soil erosion from 11 tons / acre / year to about 0.006 tons per acre, a 2000 fold reduction; 2) profitability of up to $30,000 / year if woodland medicinal plants such as ginseng and goldenseal are incorporated into the system after the trees are established; 3) greenhouse gas reduction; 4) rural community development by showing farmers a new way to make a living on fewer acres because tree crops have higher per acre profitability.

Table: Income projections at maturity for Comprehensive Integrated Agroforestry Project

Years to maturity	Wholesale $/#	#/acre/year	Gross/acre/year
Black walnut 25-50	Nuts 10-20 cents/lb, lumber $3/board ft	1,000 # nuts 100 bf	$100-200 + $300 = $400-500
Chestnut 15-20	Nuts $1.30/#	3,000 #	$3,900
Hazel nut 6-7	Nuts 0.40-$1 /#	5,000 #	$2,000-5,000
Heartnut 8-10	Nuts $3/#	3,000 #	$9,000
Pawpaws 15-20	Fruit $1 / #	2,500 #	$2,500
Persimmon 15-20	Fruit $1 / #	2,500 #	$2,500
Goldenseal 3-5	$25/ #	400 #	$10,000
Ginseng (wild) 10-15	$500 / #	40 #	$20,000

Farmer Networks Can Support Planning Efforts

For many farm families, setting aside the time to plan is the biggest hurdle to Whole Farm Management. To help maintain time in their schedules for planning, some farmers form networks to learn about alternative approaches to farming, to share ideas and get feedback, and to share risks inherent in experimentation. For some, farmer networks simply give structure to their time so they have an opportunity to think creatively about their farming operation. The Kansas Rural Center describes network evolution as "Forming, Storming, Norming, and Performing." Elements of successful networking include leadership, positive group dynamics, goal-setting, funding, and building partnerships.

Farmer Networking to Direct Precision Agricultural Technologies Toward Sustainability

FNC97186
Tom Waller
Coldwater, MI

Waller's goal was to lend support to farms in his community by sharing his interest and expertise in computer technology and electronics. Working with the farmer network already established – the Innovative Farmers of South-Central Michigan – he developed a learning team with farmer cooperators who had been collaborating on other sustainable projects. They standardized field trials for credibly demonstrating fertility management, purchased a weigh wagon, published reports, hosted farm tours, networked with agribusiness, and raised funds to continue demonstrating their various activities aimed at maintaining clean water and sustaining agriculture.

Waller worked with participating farmers to learn the Graphic Information System (GIS) and yield monitoring techniques through this grant. Because the network was already in place, they were able to focus on involving other farm service providers in the project, thereby formalizing their relationship to the network. Representatives from USDA-Extension, USDA-Natural Resources Conservation Service, supply cooperatives, chemical and seed representatives, implement dealerships, and private consultants learned about farmer data needs and constraints when using GIS systems, and they brought their own expertise and networks to the project. This diverse team was able to provide numerous workshops on multiple topics concerning the use of GIS on-farm in just one year.

The network helped farmers reduce the time and cost it takes to learn about GIS. The network also reduced the costs of evaluating the technology, although thorough evaluation necessarily requires more than one year to be useful on a farm-by-farm basis.

Iowa Network for Community Agriculture

FNC96 138
Jan Libbey
Kanawha, IA

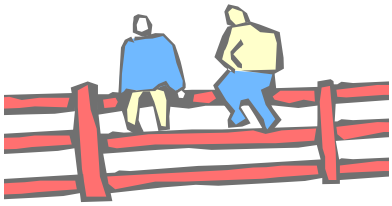
Farmers initiated this network to expand the Community Supported Agriculture (CSA) movement in Iowa. With only five CSAs available to Iowa consumers in 1996, the network was formed to support farmers engaged or interested in providing locally-grown produce to their communities.

It requires extensive planning to create CSA production systems that are farm-specific and marketing strategies that suit the specific community. The network offered workshops, field days, roundtable discussions, and a newsletter to address issues of concern and interest to growers.

> Within three years, 40 farms were actively supplying their communities with locally-grown food using the CSA approach.

The network actively linked with other organizations to increase the visibility of CSAs. Within three years, 40 farms were actively supplying their communities with locally-grown food using the CSA approach. Another 20 farms were involved in other direct marketing approaches. Overall, the network estimates that in 1999 $420,000 in food sales had remained in the local economy as a result of the network's efforts to promote local food production and marketing.

Farmer Networks Can Support Planning Efforts -continued



Nitrogen Management on Sandy Soils for Environmentally and Economically Sustainable Corn Production

FNC95113
Edmond Groholski
Burlington, MI

Not all farmer networks are formally organized. Edmond Groholski, a third-generation beef and feed producer, wanted to explore nitrogen management alternatives to minimize purchased fertilizer by taking credit for organic nitrogen sources.

He worked with a team of researchers from Michigan State University Extension, Natural Resources Conservation Service, and private consultants to design and manage test plots in 1996.

He met with a group of 20 other farmers at least three times to discuss their experiences. At least 70 farmers attended a field day Groholski held with his Extension colleagues to demonstrate his production strategy.

> Not all farmer networks are formally organized.

This informal network of producers and agricultural service providers made it possible for Groholski to successfully experiment with new technology, despite the "chiding from family and friends wondering if this was the right way to go."

Using variable rate technology he used 20-35% less total nitrogen without decreasing average yields.

Innovative Farmers Seeking Sustainable Solutions Through On-Farm Demonstrations

FNC97167
Kevin VandyBogurt
Tekonsha, MI

and

Innovative Farmers Seeking Lowest Nitrogen Rates for Corn on Sandy Soils to Protect Groundwater

FNC97166
Eric Hiscock
Climax, MI

Within two years, the informal group of growers in Groholski's neighborhood had become a tighter network — the Innovative Farmers of South-Central Michigan. Kevin VandyBogurt wanted to figure out how to weigh harvest data with a higher degree of accuracy so that the network could compare on-farm research and demonstration efforts from one farm and one year to the next.

The network used SARE funds to purchase a weigh wagon that was used by network members with demonstration plots to compare yields and better document the profitability potential from various practices.

Also that year, Eric Hiscock worked with VandyBogurt, Groholski and Mark Kies to continue on-farm experimentation with nitrogen management. That year's experiment indicated that higher nitrogen rates are more favorable in growing seasons when rain is timely and there are more growing degree days than usual.

The network decided that one year of data was inadequate for decision making, and committed to basing their nitrogen rates on five-year averages. At this point, they decided that 0.8# nitrogen was a reasonable rate for optimum corn yields, regardless of the weather.

Evaluating Your Farming System

Natural Components

Since 1985, federal farm policy has moved toward rewarding farmers who practice conservation. In 2003, federal agencies are considering how to recognize farmers who go above and beyond meeting regulations that protect the environment by rewarding farmers who restore and improve environmental systems on their farms. Whole farm planning includes "environmental management system" components that can help farmers qualify for these new federal programs, including the Conservation Security Program. Check with your local Natural Resource Conservation Service office for more information. See box on page 7.

Natural and biological components include the water cycle, the mineral cycle, energy flow, and plant and animal relationships. None of these components function separately from the others. They are inextricably linked. Identifying the comparative strength of the various sub-systems may help one to manage the entire system more effectively.

The Water Cycle

An effective water cycle is one where plants are able to make maximum use of rainfall or melting snow. There is little run-off, soil erosion, or nutrient loss because the soil is porous, thereby absorbing the water. Plant cover further reduces erosion.

An effective water cycle smoothes out erratic rainfall patterns by increasing the amount of water stored in the soil and ground water aquifers ,and by increasing water movement through the plants into the atmosphere.

Crusted soil detracts from an effective water cycle because it prohibits plant growth and the movement of water to underground storage. It does not provide habitat for soil organisms that help decompose organic matter.

Three factors contribute to an effective water cycle – soil cover, either with living or decomposing plant material; a high level of organic matter in the soil; and good soil aeration and drainage.

With a few exceptions, the Midwest region is blessed with abundant rainfall, plentiful groundwater, and in some places, easy access to rivers and lakes. Where water quantity is not an issue, water quality can be the focus of attention.

Many farms involved in SARE projects are evaluating how rainfall flows through their farming system and looking for ways to minimize soil erosion, manure run-off, and stream bank erosion. Integrating farm animals' water needs without degrading water quality is a challenge for many farmers.

Water Quantity

Growing Day-Neutral Strawberries Using the Sunbelt Polyacrylamide Gel System

FNC96135
Arden and Cheryl Compton
Tunas, MO

The Comptons wanted to raise high-value fresh market crops, but were concerned about soil salinity problems that were likely to occur from using irrigation, as well as other environmental problems common to intensive farming systems.

They experimented with woven plastic mulch (Sunbelt). Day-neutral strawberries require the removal of runners to promote more fruiting. The couple tested two cultivars under five different treatments. They compared the efficiency of poly-acrylamide gel as a tool for irrigation to a traditional drip irrigation system.

They found that the synthetic mulch eliminated erosion, provided excellent weed control, and helped to retain soil moisture, protecting plants against water stress. However, it may have reduced mid-summer production since it trapped heat, and it seemed to promote soil-borne and other disease. The gel did not work as well as hoped, and the Tristar variety performed much better than Tribute.

Overall, the day-neutral berries, because they bear all summer, require much more labor and tend to bear small, but flavorful, berries.

Water Quality

Tree Filter & Wetland Livestock Waste Management Plan: "A Living Waste Facility"

FNC 97198
Bob and Karla Sextro
Seneca, KS

The Sextros wanted to manage the waste from their 100 milking cows in an environmentally friendly way and without using an expensive lagoon system. They wanted to use the manure as fertilizer and to increase soil quality. Using cost share dollars, they constructed a waste facility using a solids basin, wet cells, berms and a vegetative lay out comprised of shrubs and trees that would work the best and prove most beneficial in the various areas.

After creating the design on the land, they planted maples, cottonwoods, hackberry, walnut, ash, sumac, plum brush, lilac and willows along the filter strip and wet cells. Cattails were introduced into the first cell, with limited success.

The results have been favorable. They use a conventional manure spreader to haul tested solids onto the fields where they are tilled into the soils, which has reduced the need for chemical fertilizers. The exit samples on the water are high, but acceptable. As the plants grow they hope that more of the ammonias and nitrates will be pulled out of the discharge waters. They report that there is a little more work to this system, but more songbirds to compensate.

Intensive Management Grazing

FNC 96-132
Gary Stump
Lancaster, MO

Stump runs a cow-calf business on 160 acres and wanted to improve pasture and water quality while reducing fertilizer costs.

He divided his acreage into 14 paddocks and fenced a creek drainage area. By continually moving the cattle, he found that the grass rebounded rapidly without fertilizer. He found that moving the cattle frequently took more work, but also allowed him more contact with his livestock to spot problems and the movement made them calmer and easier to control.

Improving Ground and Surface Water Quality by Reducing Commercial Fertilizer Applications to Fields Receiving Livestock Manure Applications.

FNC 95-125
Calvin Dyke
Coopersville, MI

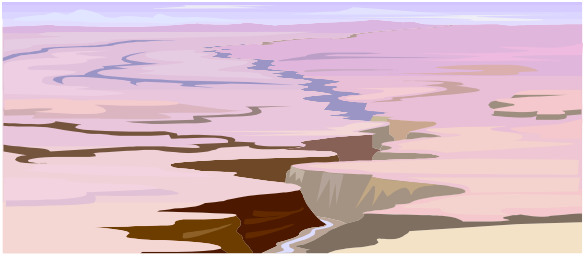
Dyke learned how to calculate credits for nitrogen, phosphorus, and potassium for the manure generated on his dairy operation. He tested his manure and experimented with reducing commercial fertilizer applications and checking yields.

His local fertilizer dealers told him he needed a phosphorus corn starter, while his tests said no. He did not need to apply full rates of nitrogen and always use a phosphorus corn starter regardless of the manure applications. He established corn fertility plots on uniform fields, established yield goals, tested the soil, tested the manure, and began to compare results. He also tested the plots for soil nitrates, leaf tissue, end of season stalk nitrate, and yield tests.

Wherever the soil tests showed that the phosphorus levels were adequate he did not see a yield increase with increased phosphorus. The farmers now use nitrogen only at planting time, banded by row.

He found that even when nitrogen was applied in the manure to meet the yield goal as calculated by credits, there was still a yield increase when nitrogen was banded by the row at planting time. He believes this is because the manure on the cold ground has not begun to mineralize.

His work reinforces the premise that farmers can calculate the credits from manure and reduce the inputs of commercial fertilizer with out impacting yields.



Where Access to Water is Limited

Strong winds can stir up trouble for farmers in the Central Sands region of Wisconsin. Every year, according to area estimates, high speed gusts sweep several million tons of soil from cropland, scattering seeds and sandblasting fields. To protect against these windy forces, farmers can use nature to their advantage by planting or maintaining windbreaks. These long stretches of trees surrounding fields create natural barriers to wind that can reduce soil erosion, protect crops, and increase crop yields.

Despite this low-tech solution to wind erosion, windbreak numbers have fallen in the Central Sands area in recent decades because of tree damage, disease, or removal to accommodate center-pivot irrigation, says University of Wisconsin-Stevens Point forestry researcher Clive David. The result, says David, is that the region has lost track of one of its best natural defenses against wind. "We need a lot more protection of erosion-prone land than we have," he says. “Windbreaks are an important component of this effort to control wind erosion."

His local fertilizer dealers told him he needed a phosphorus corn starter, while his tests said no.

Used in conjunction with contour planting, minimal tillage systems, cover crops, and crop rotation, among other practices, windbreaks offer long-term strategies for preventing soil loss and crop protection. These strategies, which are part of a systems approach that takes into account farming practices, economics, and land ethics, suggest that using nature as a technology can protect soil and land resources in low-tech ways.

-Clive David
University of Wisconsin-Stevens Point
College of Natural Resources

Natural Components

The Mineral Cycle

A biologically living soil is a prerequisite for a vigorous mineral cycle. The key is to prevent nutrients from escaping the cycle and to increase the amount of nutrients available to growing plants. Ideally, biological activity is the best way to break down organic matter to improve soil fertility.

It is possible to break down organic matter through chemical or physical means, but these management approaches detract from the health of the overall system. Minerals are then moved underground by water and / or animals.

Water may leach nutrients out of the plant root zone and into ground water unless there is adequate organic matter in the soil. Protecting the soil surface from rainfall and wind is critical to insure that biological activity can break down organic matter and return the nutrients to the soil.

Low Cost Waste Management System

FNC 94-79
Joel Rissman
Waterman, IL

Joel Rissman raised a number of crops on nearly 400 acres in an extended rotation – corn, soybeans, wheat, alfalfa, oats, and hairy vetch. He planned to extend the rotation further with high-value crops such as spelt and sesame. Within two years of the project's initiation, Rissman expected all his crops to be certified organic.

Rissman also purchased about 250 head of feeder cattle that he fattens on typical cement lots with sheds, and beds with straw, cobs, or stalks.

Rissman realized three project goals throughout the course of the project. He learned how to handle waste water runoff from his cattle operation, how to handle raw manure for composting, and how to eliminate off-farm soil amendments through use of compost and extended crop rotation.

Rissman realized three project goals He learned how to handle waste water runoff from his cattle operation, how to handle raw manure for composting, and how to eliminate off-farm soil amendments.

He built a retention pond to handle runoff water from his cattle lot. He measured the total surface area of the cattle lot in square feet and then multiplied this number by the amount of rainfall (in feet) to give the cubic foot of water storage needed. Rissman used a 50 year maximum rainfall number to determine the size of his pond and an elevations map to site the pond. He reduced the cost of the project by ensuring that all materials needed to construct the pond could be found on his property. Finally, he installed a safety fence around the pond to discourage his children from playing near the water.

To accomplish the second goal, Rissman built a composting pad so that runoff from the immediate area would drain into has retention pond. He simply graded an area, applied hi-calcium lime to seal the soil surface and after it sealed, added a layer of gravel to create an "all weather road." He then allowed the compost pad to rest for at least a year to allow the ground to settle.

The composting process he developed starts in the

cattle sheds. Rissman spreads hi-calcium lime on the bare floor to absorb the nitrogen-rich urine. He prefers hi-cal lime to dolomite because it is low in magnesium, one mineral for which his soil tests high. Once the bedding in his shed is four inches deep, he sprays it with a compost starter inoculant that helps lock up the nutrients, speed the breakdown process, and eliminate odor.

Rissman cleans the sheds every four to six weeks, and moves the material to the compost pad in piles four to five feet high and 10 feet wide. He composts using the controlled microbial composting (CMC) method pioneered in Austria. It is a completely aerobic composting process that reduces the volume of manure and bedding by 60%, makes more nutrients available to his crops, and renders pathogens and weed seeds unviable.

He tests his piles daily for carbon dioxide and temperature criteria, and turns the piles based on his measurements. He uses water from the retention pond to maintain the proper moisture level in his compost, and within six to eight weeks has good compost to apply to his fields.

Compost allowed Rissman to eliminate the need for purchased nutrients for his farm, saved him labor, and made it easier to go organic.

Management Rotational Grazing System and Well-Planned Calving Facility

FNC96-142
Daniel and Mary Howell
Frankfort, KS

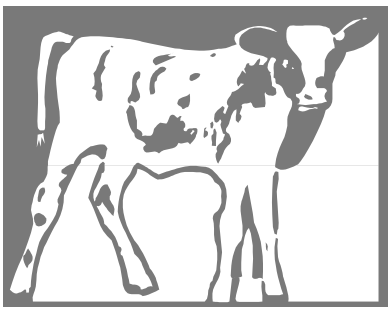
Past wet years meant severe flooding on nearly half of the Howells' farm. To prevent more flooding, the Howells' primary objective was to convert the home farm from erosion-sensitive cropland to a mix of legumes and cool and warm season grazing grasses.

They expected this change to save 224 tons of soil annually and improve the quality of the creek running through their farm.

In the process of switching to a grazing system, they wanted to redesign their calving operation so that the cows would calve at the peak of grass production, and allow them to calve at the home farm. This was expected to reduce feed costs, improve reproduction rates and cow-calf gains.

To accomplish their goals, the Howells worked with the National Resources Conservation Service to place pastures and cattle moving lanes that would also serve as riparian filter strips. The filter strips / lanes were planted with switchgrass, a vigorous native grass that can be used as hay and will provide wildlife habitat.

This project was part of the Clean Water Farms Project, organized by the Kansas Rural Center, in cooperation with the Kansas Extension Service, The Four Season's Grazers, the Kansas Biological Survey, and the Marshall County Erosion Sensitive Farm Program.



The Mineral Cycle- continued

Farm-Scale Composting for Waste Management and Disease Suppression

FNC97163

Richard DeWilde, Viroqua, WI
& Gary Zimmer, Avoca, WI

There is no better way to improve soil than using compost to build biological activity. Richard DeWilde and Gary Zimmer were interested in finding a way to make compost from various farm waste products and then test its quality based on its ability to suppress plant disease, particularly for their stored root crops. DeWilde raises a wide variety of high-value fresh market produce, but he does not raise any animals.

For the first year, DeWilde and Zimmer experimented with sawdust, spoiled hay, and composted chicken manure from a nearby farm, The chicken manure was difficult to handle and mix, and it was took a lot of time to adequately turn a large volume. It was not disease suppressive, but it did contribute nutrients to crops.

In the project's second year, the team purchased a Wildcat turner and a hydrostatic drive tractor so that the windrows could be slowly turned. They also changed composting materials, procuring dairy manure from a neighbor that they mixed with cornstalks. They also experimented with a mix of goat manure, hay, and cornstalks. Within 10 weeks, both mixes proved to be good compost.

There was a 10% increase in yield from plots where both of these compost mixtures were applied.

The goat manure mix took longer to cure because it was hotter for longer than the dairy manure mix. Neither mix was sufficiently cured for use on the mid-summer crops where it was used.

The dairy manure compost proved to be very disease suppressive in the greenhouse potting mix. They applied it directly to fields at a rate of 10-15 tons per acre on land that had a previous history of compost and green manure treatments. There was a 10% increase in yield from plots where both of these compost mixtures were applied. On the Misato winter radish field, for instance, a 10% yield increase meant $750 per acre net increase in profitability.

Measuring Nitrogen Benefits of Hairy Vetch Cover Crop for Corn Production and Evaluating a Portable Soil Nitrate Test Kit
FNC95108

and

Multiple Site Evaluation of Cover Crops Established in Wheat Stubble
FNC96-136
Rich Bennett
Napoleon, OH

Rich Bennett had experimented a bit with cover crops and wanted to be able to perfect the practice on his and other farms, and document the benefits of nitrogen fixation from hairy vetch.

The first year, Bennett worked on his own to seed hairy vetch into wheat stubble and then measure the benefits. He compared the soil test results from a soil nitrate test kit with results from an analytical lab and found no appreciable difference in the results when averaged over the six test plots.

Not only did both means of testing for soil nitrogen agree, indicating that the field test kit was accurate, both tests also showed that hairy vetch releases a significant amount of nitrogen.

Tissue tests in August and yield tests in October showed no significant difference between hairy vetch strips and control strips that received over ninety pounds per acre more nitrogen.

Comparing the vetch and controlling for costs indicated that it cost $2.60 per acre less to use vetch than purchased nitrogen. This cost accounting did not include other environmental benefits from using a vetch cover crop, such as improved soil quality and reduced soil erosion.

The next year, Bennett and four other farmers in his area decided to expand the experiment on their farms using the same measures. A cool, wet spring in conjunction with early corn planting meant that the cover crop did not perform as well as it had the year before.

The cover crops would need to contribute 115 pounds per acre of nitrogen to break even economically with purchased inputs.

It cost $2.60 / acre less to use vetch than purchased nitrogen, and this cost accounting did not include the other environmental benefits.

However, this economic comparison did not account for other benefits from cover crops, such as soil erosion control, weed suppression, and soil tilth.

Natural Components

Energy Flow

The primary management activity of any farmer is making it possible for plants to capture solar energy. A farmer can increase the amount of energy stored as carbon in plants and animals above or below the soil in three ways: increase the leaf area of plants, increase the density of plants growing, or increase the rate of growth and length of time that plants grow.

Direct intervention with machinery, chemicals, genetics, irrigation, and drainage may increase energy flow, but not without throwing other aspects of the system out of whack.

Continuing Process Towards Intensive Rotational Grazing System, Organic Farming, and Seasonal Dairy

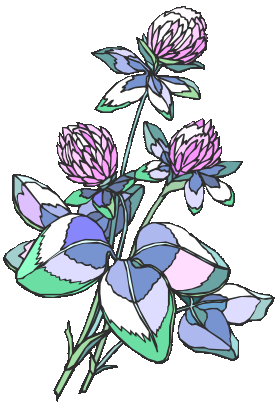
FNC9355

and

Lane Construction & Pasture Renovation, Maintaining High Quality/ Quantity Pastures While Protecting the Environment and Maximizing Profits

FNC9597

Myron and Marcie Herek
Stevens Point, WI



In 1992, the Hereks began rotational grazing on 60 of their 150-acre dairy farm. They have 100 head of cattle, mainly Registered Brown Swiss, a few Holsteins, and Holstein/Brown Swiss cross. They want to keep expenses at a minimum and profits at a maximum, use as little labor as possible to run the dairy farm, and protect the environment and groundwater.

The entire farm was seeded down to a grass/legume blend for grazing, using no chemical treatments. They installed a fencing system and water supply to all paddocks so that the farthest any animal had to walk for water was 600 feet – consistent with research recommendations. The entire farm can be grazed or, if necessary, mechanically harvested.

The Hereks determined that when all the controlling factors are in place, a rotational grazing system produces milk at one-third to one-half the cost of conventional farming. Once a farm is past the construction/transition period it is only half as labor intensive as the conventional system.

The Hereks continued to improve the efficiency of the farm in a second project to improve quality and legume content of the pastures. They chose to experiment with top-seeding legume seed, using the ATV and spin-seeder, in early May after all danger of frost had passed — with excellent results. The Hereks had plenty of grass coming in the paddocks so were not seeding bare ground.

Their research determined that grass or alfalfa would not "catch" as well as the clover did. At the minimal cost of the spinner-seeder and seed, no physical labor or other expense was involved in reintroducing or increasing "clover" legumes into the pastures.

Grazing Yearlings on Annual Forage Pastures

FNC 97176

Paul Klamm
Waterford City, ND

Klamm wanted to graze annual forage pastures as a method of increasing net returns while still providing the farm manager flexibility in choosing cropping, haying and grazing alternatives. He arranges his

farmland into nine units of varying acreage. Within each unit, annual forages were seeded to provide for sequential grazing over a four-month period. The system resembled a high-intensity, short-duration system in that each grazing period lasted from five to 21 days. Each pasture was grazed from one to three times.

Annual forages used for grazing included crested wheatgrass (not annual) forage barley, fall rye, a sorghum-oats mix, and a rye-oats mix. The grazing management system used fall rye in mid-May, rye-oats in late-May, crested wheatgrass in early June, oats in mid-July, forage barley again in mid-July, oats again in mid-July, fall rye again in early August, oat again in mid-August, forage barley again in late August and sorghum-oats mix in September.

The project confirmed research that suggested beef cattle can successfully and profitably graze annual forages in the Northern Great Plains during the growing season. Live weight gains of 110 pounds per acres were achieved while some excess forage was still produced. Net income for the yearling enterprise was $4322 or $4.35 per acre. Net income for the entire system was $20,904 or $21.07 per acre. This compares to a net income of $8.25 per acre for traditional spring wheat production.

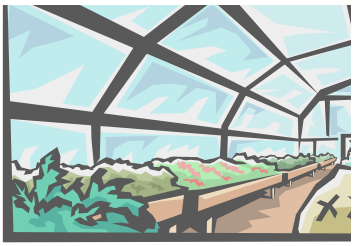
Permaculture Greenhouse System

FNC96-139
Rick Meisterheim
East Jordan, MI

The Meisterheims say their goal is "whole farm resource stewardship." They want to find "waste" created on the farm and use it as a resource. They put up a permaculture green-house system to capture excess heat generated by chickens in a coop, and used it as a supplemental heat source for a greenhouse.

In the first year, the greenhouse allowed them to grow an adequate number of starter plants and to protect them until after the frost period. They also maintained back-up starters as "insurance." Records show that the supplemental heat provided by the chickens increased the temperature by eight degrees on average, prior to any additional modifications to generate or hold heat.

The green house not only provides a very cost –effective energy efficient way to meet their needs but also allows them to use less expensive seeds instead of more expensive starter plants.



They installed insulating window covers to hold the heat overnight. No outside resources were utilized to maintain adequate temperatures in the greenhouse. The greenhouse not only provides a very cost-effective, energy efficient way to meet their needs, but also allows them to use less expensive seeds instead of more expensive starter plants. Additionally, they can successfully raise plants earlier than normal so that they have a jump on the growing season.

Implementing Sustainable Agricultural Practices Using Rotary-Tillage and No-Till Drill Equipment To Farm In 30 Foot Strips

FNC94-63
Larry Kennel
Lowpoint, IL

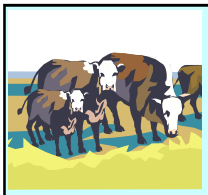
The 270-acre Blue Heron Farm was certified organic in 1994. The farming practice is a four-crop rotation of alfalfa, corn, soybeans, and wheat. The farm has marginal soil types – sand and clay — and Kennel wanted to reduce crop stress by farming in 30-foot strips to allow more sunlight and air to the corn and bean plants.

They divided the farm into two halves, one half stripped with wheat and corn and the other half stripped with alfalfa and soybeans. By the time the wheat was mature, the corn was the same height so it didn't shade the wheat. The alfalfa never outgrows the beans so the beans were never shaded. The next year the corn and wheat were planted where the alfalfa and beans had been, and the reverse was done with the alfalfa and beans.

They used a rotary tiller to plant corn and beans and a no-till drill to plant alfalfa, wheat, and rye. They rotary tilled the ground as early as possible and again in early May to kill weeds. They rotary hoed the corn four days after planting and again eight days later to allow the corn to grow ahead of the weeds.

The results were much better than expected. Weed control in corn was outstanding, and very good in soybeans. The advantage to this program is reduced investment risk with better than average returns.

Natural Components



Plant and Animal Interactions

Of all the natural interactions on the farm, the relationship between plants and animals is the most important. Mineral and water cycles degrade and solar energy does not flow if the relationships between plants and animals have been over-simplified or otherwise limited. All living things are adapted to thrive in specific environments and with other plants and animals. Collaboration and cooperation between plants and animals holds biotic communities together through synergies.

As the complexity and diversity of biotic communities increases, so does the stability of the communities. Most biological activity occurs underground on plant roots and decomposing organic matter. Managing a biotic community – simple or complex – requires that you understand the relationships between plants and animals and what environment the favored plant or animal prefers. Then it is a matter of tweaking the environment to favor one set of species over another.

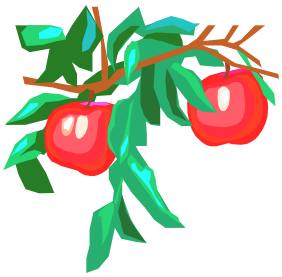
The plant-animal interactions most commonly incorporated in sustainable agriculture operations are those involving intensive grazing, where the grower focuses on harvesting solar energy through grass production to best meet the animals' need for food, and then allowing the animals to harvest their own feed.

Since there are other examples of grazing operations in this book, the projects below focus on other plant and animal interactions.

The Study of Alternative Management Strategies for European Red Mite in North Central Ohio Orchards

FNC 96-141
Richard Eshleman
Clyde, OH

Twenty family orchards in five counties comprising about 750 acres participated in this project to more effectively monitor pest populations and avoid the use of calendar-based spray programs. The project team included three Ohio State University specialists and their local extension agent.



For many of the growers, the area-wide management program began in 1990 and their participation was clearly to their economic benefit. They also saw an increase in beneficial insect populations. In the case of the European red mite, natural control agents such as predaceous mites and *Stethorus punctum* populations helped to keep the mite pests in check.

One grower reduced his sprays by 55% without compromising fruit quality.

Understanding that both pest and beneficial insect populations needed to be monitored, the group hired two part-time scout/ technicians to monitor about 330 acres across the five counties.

Growers reduced the number of sprays by 36%. One grower reduced his sprays by 55% without compromising fruit quality. They also saw a side-benefit from the monitoring program through increased control of San Jose scale in older trees.

Reducing pesticide applications saved growers time and money, increased natural controls through beneficial insects, and helped them meet their environmental goals.

Leafy Spurge Control Program

FNC 94-73
Dennis Dietz
Western North Dakota

Leafy spurge infestation was wreaking havoc on the Dietz' Black Angus cattle operation, requiring him to reduce the cow herd number in half to adjust to poor grazing conditions. Leafy spurge had taken over about 80% of his 640 acre pasture area, despite his long-time, repeated use of chemical controls.

Working with USDA Agricultural Research Service staff, NDSU extension agents, and the experience of Nebraska farmer Marvin Lange, Dietz developed a successful control program that included beneficial insect releases, adding sheep to his grazing herd and targeted use of chemical controls.

He divided his pasture into grids and used a variety of control methods to determine which was most effective. He had sheep grazing for three weeks, herding them by day and fencing them by night and hauling water daily. Dietz and volunteers released five species of beneficial insects: *Nigriscutis, Cyparissiae, Oberea, Czwalinae, Flava*. Tordon was used for chemical control, without impacting beneficial populations.

Within a single year, Dietz observed considerable control in his test plots, with the return of native grasses. His Angus were able to return to these areas of the pasture for grazing and Dietz hoped that soon he would be able to harvest the beneficial insects from his test plots to spread in other parts of his pastures.

Dietz developed a successful control program that included beneficial insect releases, adding sheep to his grazing herd and targeted use of chemical controls.

Using Integrated Pest Management to Grow Better Crops

FNC 94-58
Brian Churchill
Depauw, IN

To diversify his farm for a stronger economic return, Churchill grows 250 acres of grain (mostly food grade) and 110 acres of fresh vegetables for sale wholesale, at the roadside market, or through direct sales to restaurants in Louisville, KY. Churchill's vast experience in field crop agriculture led him to calendar spray his vegetables, but he could see no need to spray so often.

He worked with Purdue to train his employees to scout the vegetables. Using pheromone traps to monitor for insects, he was able to reduce chemical use in his sweet corn stand by more than more than 200 applications, saving $2500, saving money for inputs, and saving time by applying fewer pesticides.

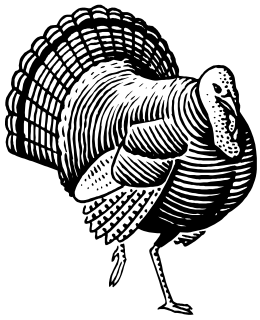
He grew his cantaloupes with plastic mulch to reduce weed pressure and row covers that protected the plants from pests and from an early frost.

Composting Poultry and Swine Carcasses

FNC 95-093
Mark Hart
Portland, IN

Mark Hart was raising 12,000 turkeys and 60 sows for a farrow-to-feeder operation. A weak link in his system was that he had to dispose of dead carcasses off-farm to avoid disease transmission. This required a weekly hour-long trip to a collection point and a fee to a contractor to deal with the carcasses.

By setting up a composting facility on-farm, he was able to save considerable time and expense. Working with private poultry suppliers and a consulting firm, and his county extension agent, he investigated information for poultry composting and determined that a roofed composter should be effective.



He originally sized the composter based on chicken specifications, but recommends that the composter be 10-20% larger to accommodate the larger turkey carcasses. He applies this compost on-farm and is able to supply about 10 tons of compost per acre, meeting nearly all his nutrient needs on his 140 acres of row crops.

Seeding Night Crawlers as Natural Soil Conditioners

FNC 93-38

Bob Van Hoveln
Milford, IL

Van Hoveln was raising corn and soybeans in a no-till system on 715 acres. He noticed that there was no evidence of night crawlers, and began using a variety of methods to seed his fields with them. It was difficult to monitor the results of his experiment because worms move.

However, he reported that three years after seeding the night crawlers, there was good evidence of middens and live night crawlers after a rain. Although they are doing the soil some good, he is unable to numerically assess their impact. He found the easiest method of seeding the night crawlers worked fine. He placed them on the ground and let them burrow. As long as the worms were lively and the sky was overcast, this method worked well.

Biological Control of Canada Thistles Using Insects

FNC 95-119

Dennis Demmel
Ogallala, NE

The Demmels were interested in raising organic field crops but found their problem with perennial weeds, such as the Canada Thistle, to be an obstacle to success. They decided to release beneficial insects on a 250 acre irrigated tract where they raised wheat, sunflowers, corn, and soybeans. They released two insect species to control the thistle — a defoliating beetle and a stem miner — but found the approach to be an ineffective control in the first two years. Both beneficials did some damage to the thistles, but not enough to make a difference.

He concluded that he needed to take a multi-pronged approach, including fertility factors in the mix, to develop an effective thistle control system.

Whole Farm Planning and Local Food Systems: Forging the Links in the Value Chain

Whole farm planning forms the nucleus of an ever-widening circle of relationships. On the farm, the relationship of family to land to economics creates the value of sustainably produced food. From there, it is linked in a value chain that carries the value of that food through to consumers. Many farmers who use whole farm planning are also engaged in building local food systems because that is one way they can be assured of receiving higher margins for their products.

A value chain in which food is produced, processed, and consumed locally ensures that dollars that would otherwise leave the region remain there and circulate in the local economy. As local food systems become more sophisticated, farmers are redefining "the middle," the functions of processing and distribution. Processing, packaging, and distribution account for 80 cents of the food dollar, according to the USDA. If that 80 cents is circulating among the farms, processors, and retailers in a community, there would be a significant economic impact.

Reclaiming the processing and distribution "middle" within a single farm is one approach to forging the links in the value chain. Another is to use local processing businesses to supply local food systems. The processing sector is in many respects the crucial missing link.

Processing is the means by which the values in the value chain are tested, and either passed on to the next step or dropped out of the system. Consumers are questioning whether animals raised carefully in free-range conditions were slaughtered humanely. Was the organic milk processed in plants that respected the practices that went into producing the milk? Was the organic GMO-free grain milled in a plant that made sure that it wasn't contaminated with GMO grain from previous customers?

Processors who are also market developers provide opportunity to the most threatened segment of American agriculture, the mid-sized family farm. Unlike those who started small and identified niche specialty markets early, mid-size farmers who have been selling products into commodity markets, such as dairy farmers before they convert to organic, have a hard time adjusting their enterprises to direct marketing. They need to find ways to supply local food systems that include larger volume sales, and local processors can help facilitate that.

By carefully assessing their options for processing and distribution, farmers carry the logic of whole farm planning one step further, carrying the value of sustainability contained in their products to the broader community.

-Karen Lehman, Minnesota Project

Evaluating Your Farming System

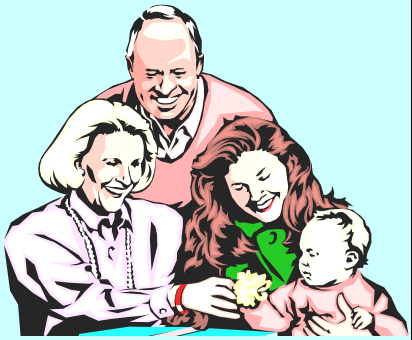
Human and Social Components

The quality of plant and animal interactions on the farm ultimately tells a story about human health at the individual, family, community, and societal levels.

You may be managing these components directly, or managing around social components, or managing for them. Regardless, they provide the context for on-farm management.

Family and Quality of Life

Do you farm to support a full, satisfying life, or are you living to get the farm work accomplished? Family satisfaction with farming as an occupation can serve as an indicator of management success. Has the farming business overshadowed or under-supported family needs? Is farming as fulfilling an occupation as you think it could be? Are your spouse, children, and relatives engaged in the business in a healthy, productive way that meets their needs?



The process that you use to manage and set goals for your farm can improve or detract from your quality of life. Including your family in the process is risky, time-consuming, and messy. But not doing so can be even more disruptive; it can even tear a family apart. Asking each family member to clearly articulate his or her needs and desires for the farm takes the pressure off the farm manager to assume what it will take to make everyone happy.

Swedish-Style Hog Production System Utilizing a Multi-Phase Structure With Attached Pasture

FNC 94-88
Nolan and Susan Jungclaus
Lake Lillian, MN

The Jungclaus farm, like many others, relied on off-farm income to get by. They determined that to generate enough income to support three families – father, his two sons, and their families — and accommodate evolving family needs, changes were required. Nolan Jungclaus found it necessary to quit his off-farm job to manage day-to-day farm business, and to develop another source of income.

The project goal was to diversify current farm operations by establishing a farrow-to-finish swine facility with attached pasture. This would increase "family time" and create a community friendly facility. They also wanted to maintain flexibility in operations so that if the new project was not as successful as anticipated, they could salvage their investment.

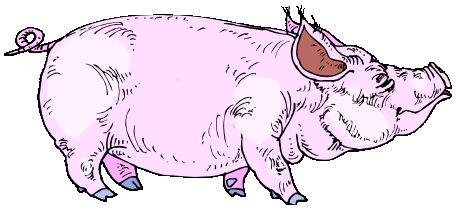
The Jungclaus family chose to adopt the practices of the Vastgotmodellen, Sweden's sustainable alternative for swine production. This system uses group housing dynamics, deep straw bedding, and relies on the pig's natural behavior as well as good husbandry skills to be successful. Jungclaus chose a subtype of the system called Thorstensson that utilizes portable "nesting boxes," which are set up in the nursery and removed after two weeks.

They remodeled an existing pole shed to accommodate the four phases of swine production: breeding, farrowing, nursery, and grower. The shed utilized owner-built windows, was well insulated, and used a passive solar heating system. He design a ventilation system using input from *The Pork Industry Handbook*, dealers, and from tours of other farms. The shed accessed a field where Jungclaus had established a mixed clover and grass pasture. They built a 12' by 60' lean-to overhang on the north side of the building for sows during the weaning period.

Jungclaus wanted to run his first group of 15 bred gilts on the same timetable from start to finish. Ideally, all sows would farrow within five days. His first experience took 19 days. Additional trouble came from scours, because a dealer ran out of hay they had ordered. They prevented stock loss by jumping on the treatment. They had only planned on one group in the first year, but their breeder offered 14 bred gilts at a reduced price. This group farrowed in five days, they processed all the pigs on one day, castrated two weeks later, weaned at four weeks, and sold the sows two weeks after that.

The first group of growers was put on pasture and supplied with two portable 12' by 20' shelters picked up for $100. They stayed on pasture until October, when they were marketed. The second group of growers were put on pasture to free the barn for the fist group of sows that had been bred back in July. The breeding program was not as successful as anticipated due to a nonperforming boar and a very hot summer breeding period.

At the end of the project, expenses of $41,712 exceeded income of $38,274. However, much of the investment was long term and usable for years to come. The financial report also does not show the input reduction realized by adding a livestock enterprise. They spread composted manure on approximately 30 acres of cropland — at a $20 per acre input reduction, they saved an extra $600 of fertilizer expense. The family and community goals were also met. "If you could put a dollar amount on a smile, a good down to earth belly laugh, or the look of amazement we experienced . . . we are very well off," says Jungclaus.



Winter Farrowing in a Low Input System

FNC95-89

Jim Van Der Pol
Kerkhoven MN

Van Der Pol farms 320 acres and runs a diversified crop and livestock operation. He features a grazing sheep flock, a farrow-to-finish hog business based on pasture and deep straw practices, and has a crop rotation of corn-peas-corn-grain-hay using ridges and conservation tillage. His son has joined him as a partner in the hog operation.

He wanted a solution to the problem of farrowing sows in the wintertime, which he uses as a complement to his summertime pasture production. Sows do well with their litters in the fall, and grazing gestating animals during the months of rapid grass growth fits well into his pasture management. He decided to try to put pasture shelters, in his case Port-a-Huts®, into the hoop house. The farrowing will be accomplished in a free stall arrangement with deep straw bedding. He wants to "bring the pasture inside" as much as possible. The hut arrangement takes maximum advantage of what the sow wants to do at farrowing: get away from the others in some way and stay separate with her pigs for a week or 10 days.

The first year he farrowed 21 sows in the hoop house in a free stall arrangement with the huts. Watering and feeding was done at one end of the building. The sows farrowed 191, just over nine per sow. The first load were marketed before they were five months old. These pigs were handled less than any others he had produced because they were born where they were fed. The second year he farrowed 24 sows. They had 228 pigs, of which 192 were weaned. He used no vaccinations or drugs in the feed.

He concludes that this is a low labor approach, comparing favorably with the former confinement practice. "These are low labor pigs. The sows do all the work!" Furthermore, the pigs are healthier, like pasture pigs.

Human and Social Components - continued

Intensive Rotational Grazing to Reduce Workload

FNC 9343
Dale Kellenberger
Munith, MI

The children were grown and gone, and Dale and his wife needed to assess and change the workload on their farm, where they have a Holstein herd of 55 milking cows and 65 young stock on 255 acres owned and 150 rented. They wanted to move to Intensive Rotational Grazing from a more conventional farm using stored feed, confinement feeding, and use of small exercise paddocks.

They fenced 50 acres, divided into 10 paddocks. The paddocks were seeded to eight different species or mixes. Water sources were installed at two locations to serve all paddocks. As the milking herd rotated from one paddock to the next, a log was kept to provide a measure of pounds of milk produced per paddock and the number of days grazed per paddock. The amount of forage produced by different species was compared by days of grazing per paddock and number of grazing days per acre. They measured pounds of milk per acre per day grazed, as well as pounds of milk per acre grazed.

Their results indicated that a mix of legumes and grasses are more productive in both dollars and tonnage than grass or grasses alone. While it is difficult to estimate the economic impact of the project short-term, it appears positive. The practice has opened up many other optional feed sources, such as crop residues and other feeds unharvestable by conventional means.

Labor and Quality of Life Comparison with Expansion to Include Transitioning to Seasonal Dairying

FNC 9344
Ed Jeanquart
Forestville, WI

The goal of the project was to identify how sustainable farming techniques and methods impact on time and labor management in conventional sized dairy operations. They studied how the available labor pool — both family and hired — is used to accomplish various tasks and how time is spent on two farms for work and family.

Daily logs were kept for each family member and hired laborer on each farm. Data recorded included the time spent on each task and who was involved. In addition, family members who kept the logs wrote journal entries beside the log entries where appropriate. All the data was computerized for analysis.

Based on the log sheets, tasks were divided into four main categories:

Dairy Enterprise Tasks such as barn chores, cow care, manure management, feeding.
Cropping Enterprise Tasks such as corn tillage and planting, haying, machinery repair, crop records, and field scouting.
Household Tasks such as child care, household tasks, personal time, and family time.
General Tasks such as errands, general farm management, fence or building repair, and time for this project.

Creating this log, and analyzing it will allow for better use of time and time planning. Various task may be reassigned or realigned.

Whole Farm Planning and monitoring can lead to better decision making and quality of life choices.

ECONOMICS AND MARKETING

Farm economics follow one of two fundamental pathways to profitability: higher volumes or higher profit margins. Farmers who choose to build sustainable farming systems create or adopt methods that offer the potential for higher margins. In whole farm planning models, this pathway is driven by quality of life issues as defined by the farm family.

Higher margins can occur on a limited scale by cutting input costs; however, product differentiation and value-added strategies can significantly increase profit margins to meet farm family financial goals. Both strategies are usually planned in the development of sustainable farming systems.

In order to receive higher prices for farm products, the products must differ from those commonly found in the marketplace. This might be as simple as selling yellow bell peppers at a farmers market when every other vendor only sells green peppers. That strategy is usually short lived as others catch on quickly.

In differentiating products from the low margin/high volume production models, farmers focus on the other two pillars of sustainability: environmental stewardship and social or community considerations. There exists considerable growth in the community of people who are seeking food with fewer or no chemical inputs into the production and processing of those products.

Differentiated products must be marketed through non-conventional channels in order to receive higher prices. Models that include these strategies must also include a marketing component that requires strong management by the farm family.

Differentiation of Products for Market

FNC97199
George and Sally Shetler
Kalkaska, MI

The prices that dairy farmers receive for bulk milk sold to conventional processors tend to fluctuate radically and are currently at twenty-year lows. Small farmers are financially squeezed at the low point and must expand profits to stay in business.

George and Sally Shetler, with the help of a NCR-SARE producer grant and FSA loans, were able make the transition to processing and bottling their own milk, starting the transition to sustainability.

In the mid 1980s, George decided to "go organic" as a production strategy to improve their profits and reduce the environmental impacts of farming. They implemented an intensive rotational grazing system for their herd of 40 cows, reducing the cost of milk production considerably. The conversion of the entire farm to forages in 1990 also ended all tillage and the need for herbicides, crop insecticides, and much of the farm's machinery.

What began as a reduction of chemical inputs progressed. Following the mandatory 3-year period after the use of any synthetic farm chemicals, the Shetler Farm received its organic certification.

Planning was the key to the transition process. Using holistic management strategies, the Shetlers established a whole farm goal that was based on their family values and a desired quality of life. Significant among these was the goal to bring their adult children back to the family farm. This strategy required sustained profits to support the additional family members.

The Shetlers conducted a marketing survey for their bottled milk. They surveyed 43 natural food stores and several restaurants. The responses supported the Shetlers' plans for development.

The Shetlers visited other family based businesses in the region that were already adding value to milk through bottling and product differentiation. By sharing information, the Shetlers avoided costly mistakes.

Their product differentiation of no synthetic chemicals, pasture-based production, and local distribution has been very appealing to consumers. The dairy reached its goal of bottling and distributing 400 gallons per week in six months and is now bottling and selling all of the milk produced on the farm.

With a successful start-up based upon good planning and careful execution of the steps in the plan, the Shetlers are confident that they are on track to meet their goals.

Marketing

Marketing includes all the steps necessary to sell products. These include market research, brand or product identification, market identification (finding customers), and advertising. Marketing is probably the hardest task for farms to perform well. The drawbacks are that it takes time away from farming, and marketing concepts are sometimes difficult for individuals to master.

Identifying and occupying a specific marketing niche is the usual strategy for long term sustainability. Most of the phases of this type of marketing require farmers to implement specific strategies to successful. Farmers typically do not have experience or knowledge in direct marketing. Rather, they have traditionally been involved in commodity agriculture, in which agricultural products are produced and then sold to commodity buyers who pool the products. These arrangements take the farmer out of the value-added loop upon the first transaction of the commodity. Consequently, farmers receive only from 10 to 30 cents of the retail price of commodity agricultural products.

Innovation — thinking out of the box — is often the key to a successful marketing plan. In some areas of the North Central region of the United States, population centers are scattered and reaching markets is difficult for small farmers.

South Dakota Goosemobile

FNC98216
Tom Neuberger
Canistota, SD

To build a bigger customer base in South Dakota, Tom Neuberger developed the South Dakota Goosemobile, a mobile meat market . For 14 years, it traveled to population centers to sell free-range poultry. The vehicle was a freezer delivery truck. Only one person at a time could stand at the door to be served.

In 1998, with help from a SARE producer marketing grant, Neuberger recruited two more farmers to expand the product lines and help develop a larger vehicle. For this project, a 26-foot cargo trailer, outfitted with eight freezers and pulled by a pickup, became the Goosemobile. Several people could occupy the trailer to shop for products in the freezers.

All farmers was responsible for their own meat production, processing, vacuum packing, and weighing. All farmers set their own prices, which were generally 30-50% above supermarket prices. The product line of free-range pastured meats consisted of beef, lamb, and pork along with the poultry. Buffalo, goat, and ostrich were added later.

At the project's conclusion, the mobile market was traveling a route that followed the four major east-west highways of South Dakota during the first three weeks of December in 1998-99. The route was about 3,500 miles each year.

All farmers set their own prices, which were generally 30-50 % above supermarket prices.

The Goosemobile's primary advertising method had been sending newsletters to former customers who had joined a mailing list. Grant money was used to advertise in daily and weekly newspapers, radio and shopper inserts in 1998. Advertising expenses were reduced in 1999 when they decided to place advertisements only in weekly newspapers as a cost effective strategy. Newsletters remain the mainstay of advertising.

In 1998, the Goosemobile made 62 stops in larger cities for 1-4 hours at a time. The next year, 185 stops were made in every village, town, and city along the route for shorter durations of time. Gross revenue averaged $18,262 for each of the two years. This was only 16% more than the poultry sales alone in previous years.

In May through October, the mobile market was used at a farmers' market in Sioux Falls, a city with of population of 100,000. In 1998, farmers' market sales amounted to $11,332, a 117% increase over poultry sales alone the previous year.

Neuberger says they have substantiated two factors that are necessary for family farmers to operate a marketing program such as theirs. The first is to sell a niche product that can command a premium price. The second is to provide their own labor until sales volume can support hired workers.

Cooperative Marketing

Cooperative marketing is one approach that benefits many farmers by concentrating efforts toward common goals. This model overcomes many of the difficulties of individual marketing programs.

Creating the Link: Cooperative Marketing of All Natural Beef

FNC97171
Diana Endicott
Bronson, KS

The All Natural Beef Cooperative consists of 20 small family farms in north central Kansas and southeastern Missouri. None of these farms depends upon off-farm income as their main source of family income.

The differentiation of beef products in All Natural is that all member farms use sustainable farming practices. Production follows the Beef Farm Sustainability Checksheet from the Appropriate Technology Transfer for Rural Areas (ATTRA).

Several of the farms are certified organic and they also raise grain organically, much of it sold through another co-op marketing group, the Kansas Organic Producers Cooperative.

The cooperative has a USDA-approved special claims label that states that the beef is raised locally on family farms without growth-promoting hormones, sub-therapeutic doses of antibiotics, or animal by-products.

These beef are free-ranged on grass until they are finished on a corn diet. The carcass is dry-aged 10 to 14 days. Since all cattle are raised and finished on member farms, the beef is traceable from the retail counter to the farm and animal of origin.

The cooperative was awarded a NCR-SARE grant to address two weaknesses in co-op marketing: quality and consistency assurance, and affordable, cutting edge marketing research.

Quality and consistency are absolutely necessary for a marketing cooperative to be successful. Otherwise, customers must rely on individual members for the traits they desire in meat. This degrades the strength of the cooperative as a whole.

...farmers were able to determine the breed and the production methods that returned the best price to them.

Small federal and state inspected meat plants usually lack a USDA-certified meat grader. It would be cost prohibitive for small farmers and cooperatives to pay for the cost of such a grader to come into the plant for such small volumes of carcasses to process.

A producer sheet and a processing sheet were maintained for each animal marketed during the two year grant period. These sheets featured a grid that listed the wholesale primal weights (wholesale yield) and current wholesale primal prices to calculate the price the producer would receive for each animal marketed through the All Natural Beef Cooperative.

Farmers were able to determine the breed and the production methods that returned the best price to them. This created an incentive to closely monitor production methods. The system resulted in a marked improvement of meat quality and consistency throughout the co-op.

Another focus of the study surveyed meat managers in stores where All Natural Beef products were sold. Managers were provided vouchers to purchase different cuts to be cooked, eaten, and evaluated for fifteen weeks.

Each weekly survey required managers to rank product attributes. These included price, flavor, shrinkage, appearance before and after cooking, juiciness, tenderness, attractiveness, moisture, freshness, overall eating experience, and willingness to recommend.

The project developed and placed a computer assisted self-interview kiosk in supermarkets to survey consumer attitudes. This data was important in improving consumer outreach methods.

The cooperative gained valuable experience in improving production and optimizing profit. The members also gained a new awareness of the advantages of working together toward the common goal of using sustainable beef production as a means to ensure environmental sustainability and small farm profitability.

Civics, Community, and Culture

Expanding the next generation of farmers is vital for rebuilding rural community infrastructures.

Sustainable agricultural practices are management intensive. By nature, they require the watchful eye, footprint, and thoughtfulness of the farmer. The need for more labor provides an opportunity to invigorate rural communities with meaningful employment, passing on skills to another generation and recapturing the art of agriculture that has slipped away with increased centralization/ industrialization/consolidation.

Implementing Sustainable Agricultural Practices: "Dancing With Hooves"

FNC92-23
Pete Ferrell
Beaumont, KS

The Ferrell Ranch consists of 9,800 acres of native tallgrrass prairie. Located 45 miles east of Wichita, Kansas, the ranch has been in the family for three generations. In the mid-90s, the ranch's enterprises were cow/calf, bred heifers, and custom grazing.

The project's goal was to simulate the activity and biological response observed in existing grazing cells using none of the conventional technology (i.e.: permanent fence and piped water), but rather by using a professional herder. Using good stockmanship skills, the herder, either on foot, horseback, or on a mountain bike, was to solely contain a large herd on 30-50acres for 24-48 hours. This "human fence" would routinely move the herd to fresh grass, simulating the confines of a permanent grazing cell. Ferrell had several motivations. The first was to improve ranch profitability — could an investment in a herder prove more profitable than investment in depreciable capital? His second was to reduce erosion:— could flexible paddock boundaries discourage permanent trailing? Last was investing in people and husbandry — can this be a means to provide more jobs in economically distressed rural areas?

A herder possessing vital stockmanship skills and commitment to managing cattle without the use of temporary fence could not be found. Instead, the herder used temporary fence materials to build a 30-50 acre paddock every day or as needed. Using five 1-mile reels of polytwine, a solar powered charger, three dozen steel posts, and 300 step-in fiberglass posts, they kept one to three paddocks in front of the herd.

After a *vigorous* season, the portable fencing proved economically viable in comparison with a cow-calf herd. Ferrell recommended this grazing technique to ranchers whose equity precludes the availability of capital for permanent infrastructure, and those determining the best layout for permanent grazing cells.

	Herding	Grazing Cell	Con-ventional
# of Cows	342	342	342
Stocking Rate	5.2	5.2	10.0
Acreage Needed	1780	1780	3420
1994 Gross Margin	$53,135[1]	$53,135[1]	$53,135[1]
Gross Mar-gin/Acre	$29.85	$29.85	$15.54
1994 Over-heads/Acre	$26.82[2]	$26.76[3]	$26.22[4]
Overheads Needed for Enterprise	$47,740	$47,633	$89,672

1. Market lost 20% of its value this year.
2. Includes cost of herder, materials: $3.30/acre.
3. Excludes cost of herder and materials; includes 1/10th depreciation on projected capital expenditure.
4. Excludes cost of herder and materials, and projected depreciation.

Support for family farm infrastructure includes those who provide education services to producers. Educators with a real-world understanding of sustainable farming operations can embrace diversity and foster opportunities for rural communities. NCR-SARE programs provide funding to bring educators into the field, working shoulder to shoulder with farmers to learn and solve problems innovatively.

New Opportunities for Families on Small Farms

LWF 63-327-0612

John Ikerd, University of Missouri & Dyremple Marsh, Lincoln University, MO

In 1997, 42 University Extension faculty met with farmers from seven states in the North Central Region at the "National Small Farm Trade Show," an annual gathering that draws 4,000 farmers for a lively trade show, Farmers Forums, and workshops. Sponsored by the NCR-SARE Professional Development Program, the training was designed to increase awareness among extension workers and other information providers on innovative delivery methods and new opportunities for enhancing the economic viability of small farms by focusing on alternatives that fit well with family farming operations.

Participants were divided into diverse teams and given case studies representing real small farm situations. Over During the two-day event, they engaged with seminar speakers and trade show exhibitors, made individual and collaborative assessments of the economic, ecological, and social sustainability implications of different ideas, enterprises, methods, or products, and developed a team report concerning the new opportunities they discovered for the families on their case study farms.

This training gave farmers and educators a way to learn from one another in a setting rich with ingenuity. Here, the learning method moved beyond technical transfer to facilitating relationships.

To the extent that SARE programs focus on reducing reliance on off-farm inputs by intensifying the management of internal resources, such programs create information and knowledge that is of use to those who think like "small farmers" no matter the size of their operation.

Rolling Prairie Farmers Alliance Cooler Development Project

FNC 94-85

Dan Nagengast
Lawrence, KS

The Rolling Prairie Farmers Alliance is a group of eight producers selling produce, chickens, boxed beef, flowers, herbs, honey, and eggs through a subscription service in Lawrence, Kansas, with delivery at the local food coop. In 1994, they received a NCR-SARE Producer Grant to develop four small-scale, low cost, produce cooling devices for vegetables and flowers. Rolling Prairie engaged Kansas Extension faculty, an industrial design class at Kansas University to design two coolers, and an architect who also lent assistance for the modified air-conditioner technology.

Each cooler was developed on a participating farm, adapted for the farmer's production and usage. The coolers — built at one-third to one-fifth the cost of conventional coolers but with the same capacity — increased product quality.

Gross sales increased by $45,000 after the coolers had been in operation for two years. Working with specialists gave Rolling Prairie knowledge about available choices and problem areas with air conditioner technology. With this foundation, growers developed low-cost technologies that suited their individual enterprises.

Employing appropriate technology impacts farms' bottom line:

Rolling Prairie Gross Sales:

Year prior to coolers	$28,000
First year with coolers	$53,000
Second year with coolers	$73,000

Implementing a sustainable agricultural system calls for development beyond the farm gate. Creating opportunities to strengthen links between farms themselves, and farms and local businesses, can be key in revitalizing the culture of agriculture.

Building Diverse Markets and Strong Businesses with Limited-Means Farmers

LNC01-189

Colin Donohue
Rural Action
Trimble, Ohio

Appalachian Ohio has a history of extractive "boom and bust" industries, including coal, oil, and clay extraction, which left widespread poverty. Farms are generally small, averaging 180 acres, and economically precarious. Counties in the region have total annual production profits ranging from $2.7 million to $12 million, as contrasted with $70 million to $110 million per county in Ohio's grain belt. Between 1952 and 1992, Athens, Meigs, Vinton, and Hocking counties all lost more than 50% of their farmland, and between 1900 and 1995, each county lost approximately 3,000 acres of farmland. This loss of farms and farmland threatens the social fabric of their communities.

The small, family owned farms in the region generally have unsophisticated marketing strategies and the farmers often have limited business skills. Many are hovering on the edge of economic disaster. At the same time, there is increased demand in the region and nearby urban areas for high quality fresh produce, particularly organic produce, while consumer have expressed willingness to pay premiums prices for quality produce. More than 10 million people live within a four-hour drive of Appalachia, Ohio.

Good Food Direct (GFD), a project of Rural Action, is a multi-grower catalog and web site of local Southeast Ohio farm products. The goals of expanding Good Food Direct were to:

•Geographically expand markets and capture new customers on the internet.
•Increase networking, information sharing, and sharing of materials among regional farmers markets.
•Increase understanding of and experience with active marketing on the part of farmers.
•Create better business practices and crop selection.

Customers placed orders on a weekly basis throughout the growing season, and also received a holiday catalog featuring value-added products and gift items. GFD used various marketing techniques in addition to catalog distribution throughout the community, including advertising on the local National Public Radio affiliate station, media releases, and a weekly e-mail newsletter. Other activities such as product sampling and testing events raised their profile and visibility.

In 2001, customers ordered through Rural Action and farmers brought produce to a pick-up site for customers to collect. In 2002, the catalog included contact information for producers and acted as a marketing mechanism without a labor-intensive central ordering system. Over two years, 35 producers sold $44,372 through GFD catalogs, 500 customers purchased from GFD, and $5,326 of their products were sold to Ohio University.

Ohio University is the largest food purchaser in Athens County, serving more than 10,000 meals a day. Sales to Ohio University were successful for a first effort. One farm family from Meigs County, the Cowdreys, sold the same amount of produce to Ohio University with significantly more income and no broker/ distributor involved. The Cowdreys plan to increase sales to Ohio University, and are planting new crops specifically for the OU market. Randy Shelton, director of food services at Ohio University, also says he is happy with the process. He is currently buying from eight local producers and says that the quality and freshness is outstanding. OU's goal is for 10% of food purchases to be locally sourced.

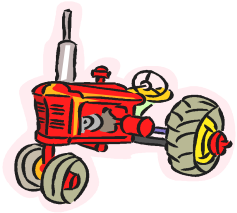
Good Food Direct made tremendous inroads in collaborative marketing and appropriate training for farms. The catalog was eventually discontinued, as labor costs for marketing and organization were greater than· profits earned. Given additional incubation time, and a more advanced web site to help automate ordering, GFD could have reached self-sustainability. Work with Ohio University continues, receiving national notoriety.

The GFD program had high visibility throughout the state of Ohio, and inspired others to think through mechanisms to develop venues for local food products both within and outside of their communities. It is a model that can be built on to redevelop rural community and cultural infrastructure.

Civics, Community, and Culture - continued

Free-Range Poultry Production and Marketing

FNC 95-118
Linda Lee
Creola, OH



Linda Lee and Herman Beck-Chenowith had been producing and processing free-range poultry for four years when they received the NCR-SARE grant to produce a manual for farmers wanting to start and operate a free-range poultry business. The information they had gathered was not available elsewhere. Because most operations are confinement systems, much of the information about free-range poultry systems have been lost.

The first suggestion Lee and Beck-Chenowith listed in their manual is to evaluate the farm's position, and decide whether one should even start a poultry operation.

If the answer is positive, the manual provides information to help with key issues including: amount of land, breed selection, equipment construction, how to improve pastures and put up fencing, how to arrange the processing plant, how to obtain equipment and governmental approval, and how to choose a marketing style and obtain publicity.

They hope to build a network of farmers interested in free-range production to share ideas and innovations that can help keep farmers on the land and part of the rural community.

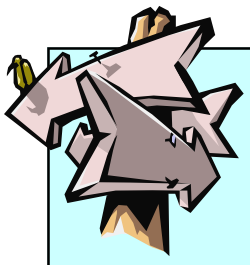
Machinery Link Company

FNC 97188
David and Sheila Govert
Cunningham, KS

The Goverts, active farmers in Kansas, created Machinery Link to provide a database of seasonal equipment within a region. Farmers can search the database to find idle equipment they need but don't want to purchase. Farming is expensive, and equipment that is used for only a short time by a single farm is a large capital investment. The Goverts used the Internet to expand Machinery Link, working to match up farmers with equipment sitting idle that could be rented.

The NCR-SARE grant allowed Machinery Link to expand its membership and outreach, matching up some farmers and watching as others forged matches of their own at workshops to co-lease combines, rent from neighbors, or swap machines.

The Goverts say that "there is nothing more rewarding to us than seeing farmers work together, enjoy what they love doing, and make new friends in the process of making a better living for themselves."



Daily Decision Making and Monitoring

Management excellence requires understanding the components to be managed and their relationship to each other. As discussed in earlier sections, farm sub-systems can be grouped into four areas – natural, biological, human, and social. It is critical that we manage the relationships between these components, not simply the components themselves.

This requires us to ask questions about the relative contribution of each component to achieving farm goals. What is blocking your success in managing the farm? What is the weakest link within and between the components you manage? Whether the greatest obstacle for success is a weakness or a logjam, assessing and prioritizing regularly can help you fine-tune your operation more quickly to meet your goals.

On any given day, a farmer makes hundreds of decisions that influence the course of events on the farm. Measuring these decisions – both large and small – against overall management goals and goals for the season at hand may help the farm stay on the course we set. At least, it will ensure that if you are changing course that you know it and you know why.

Sustainable Organic Apple Production

FNC 9475
Eric Carlson
Bayfield, WI

Blue Vista Farm is a diversified fruit and flower farm specializing in the sustainable production of apples. Carlson wanted to prepare the farm for a high density apple planting for pick-your-own marketing. The trees were to be planted at a density of over 600 per acre. Carlson needed to find the most sustainable organic apple pest control methods on a scab susceptible variety that had the highest success rate and best product.

The trials compared sulfur and hydrogen peroxide for apple scab treatments, evaluated pheromone disruption on codling moth, and traps for apple maggots. They learned that the scab control for both methods was not equal. The sulfur treatments far surpassed hydrogen peroxide in protecting against scab. Traps for apple maggots proved acceptable with less than 3-5% injury. Codling moth control using pheromone disruption was not satisfactory, and is not by itself a viable control option. Carlson will resort to a few well-timed applications of a short-lived organo-phosphate for control.

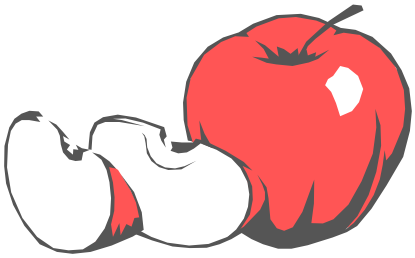
Carlson believes that a farming system should constantly be evolving until it reaches the highest sustainable level and continues to share experience and knowledge among grower to stay on track in reaching his goals.

Comparing Alternative Uses of Land Currently Enrolled in the CRP Program

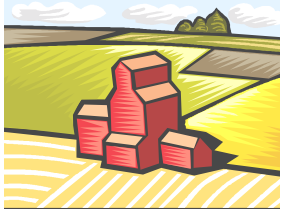
FNC 94-69
Kenneth Widener
Tekamah, NE

Widener runs a diversified operation raising corn, soybeans, and alfalfa with 50 acres of CRP seeded to switchgrass and big bluestem. He also has 22 cows and wants to expand to 50 head. As his CRP contracts neared expiration, he needed to fine-tune his grazing program. He compared two advanced grazing management techniques, learning and adjusting over a three year period.

Tracking the forage's nutrient value throughout the season, measuring cow and calf weights, and strip grazing paddocks to improve forage utilization, Widener is working toward his long term goals with the best information.



Cover Crops' Influence on Soil Quality in No-Till Corn-Soybean Rotations: The Role of Soil Arthropods



FNC 98-23
Gary Manley
Three Rivers, MI

Manley changed over to no-till in 1993. He was interested in the role that ground cover plays in encouraging beneficial arthropod populations in the soil. He collected data on both the total biomass of the cover and the type of cover used and its influence on the type and number of beneficial insects in his fields.

Average grain yields were highest in those treatments with covers. The type of cover, in part, determined which particular species inhabited a particular plot. This kind of information will be indispensable as farmers look at the development of designer ecosystems for crop management systems. This species–level information will also be required to evaluate indicator species for soil quality measures.

He determined that ground covers influence both the micro and macro environments, and may play a key role by providing the potential mechanism for shifting ecological parameters in favor of increased biotic potential for natural controls and at the same time increase the influences of limiting factors for pest species.

Kentucky Blue Grass Management and Variety Evaluation for Sustainable Seed Production

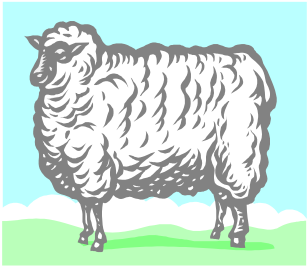
FNC 97-200
Daniel Laursen
Alliance, NE

Laursen introduced grass seed production on his farm, where he grazes cattle and grows wheat, corn, Great Northern and Navy dry beans, alfalfa, and Kentucky Blue grass. Grass seed was added as a cash crop and to extend the crop rotation period and improve soil quality organic matter and tilth.

To maximize the possibility of success, Laursen invited seven seed companies to submit varieties of Kentucky Blue Grass for evaluation. Seventeen varieties were sent. Test plots were managed and the results showed a wide variation in yield as well as growth habit.

The results were grouped into low yield, middle yield with very good turf ratings with acceptable yields, and high yield varieties with acceptable turf qualities. Evaluating the middle yield and the high yield as to available contracts has led Laursen to plant the crop that best conserves soil and water and returns the highest profits.

Suitability of Non-Native Hardy Forage-Adapted Mutton Sheep to a Management Intensive Grazing System



FNC 95-100
Stephanie Mitcham
Tripoli, IA

The Mitchams have been rotationally grazing sheep and goats since 1988, and each year use less harvested feedstuffs. They tested Dorper sheep against Horned Dorset lambs in an intensive grazing set up, and measured rates of gain, back fat measurements, and rib eye area measurements.

The results favored the new Dorper sheep — the Dorper cross lambs have a larger rib eye area because of their thick hind leg muscling. The Dorper cross lambs thrived on pasture and may have been more resistant to internal parasites.

The study also pointed the Mitchams toward new studies, since Dorpers have other features that may increase profitability: the ability to shed fleeces, out-of -season breeding capability, and the fact that yearling purebred Dorpers seem to require much less feed to maintain body condition. This trait alone would reduce winter feed costs considerably.

More monitoring is suggested to quantify the economic and environmental benefits of this "thrifty" sheep.

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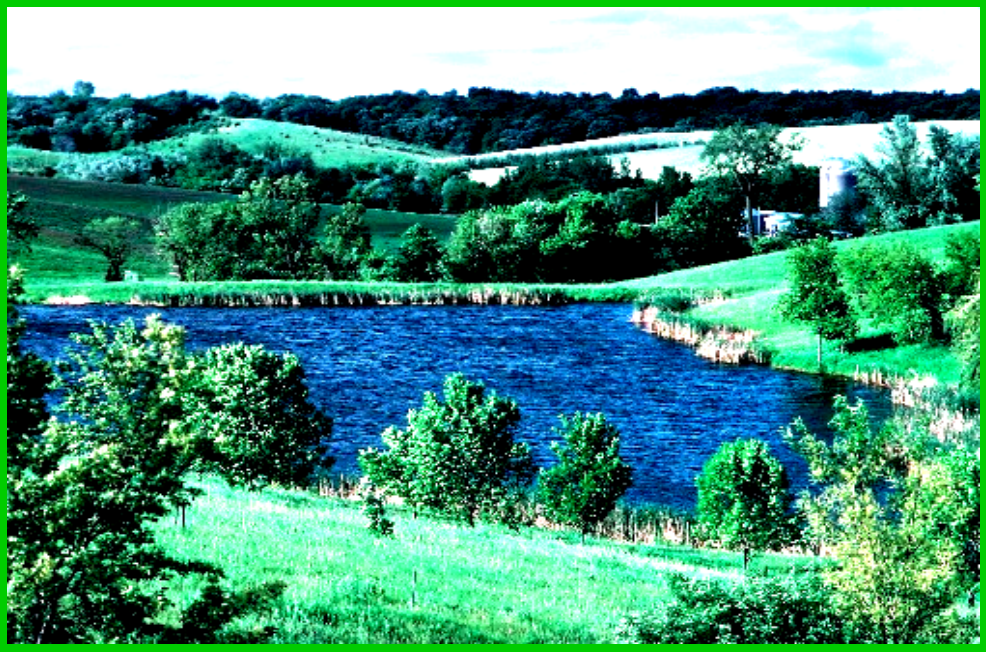

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The Minnesota Project connects people with policy to nurture collaborations that build strong local economies, vibrant communities, and a healthy environment.

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