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SUSTAINABLE AGRICULTURE NETWORK
THE NATIONAL OUTREACH ARM OF USDA-SARE

Transitioning to Organic Production



Growing an array of crops remains one of the hallmarks of successful organic farming. Diverse rotations improve soil fertility, break up pest cycles and provide many marketing options. – Photo by Jerry DeWitt

PART 1

Introduction to Organic Farming

WHEN JOHN VOLLMER, A THIRD-GENERATION TOBACCO FARMER in Bunn, N.C., decided to stop growing tobacco and start raising strawberries organically, it was an unexpected move for someone who describes himself as a “chemical-oriented farmer.” Yet, Vollmer, whose main priority was finding a way to keep the family farm in the family, recognized that organic production might be a route to greater profits.

“It was not an easy transition for me to think in other ways,” said Vollmer, a former agricultural chemical salesman. Yet, as he read books on organic soil management, he soon found himself fascinated by organic farming concepts. Over the next two years, he built soil organic matter with composts and cover crops and carefully researched organic techniques. Then he began his transition.

Since then, his two acres of organic strawberries have been so successful that Vollmer brought another

25 acres into mixed fruit and vegetable production using the same soil and pest management techniques. While he has not certified that new acreage because he still wants to apply agri-chemical sprays if needed, he now considers himself more organic than conventional in the new field. In fact, asked whether he has any doubts about organic farming, Vollmer replied that he has only one: whether he should be transitioning those 25 acres now – or later.

Vollmer typifies the enormous changes that have occurred in organic farming over the last 20 years. Two decades ago, it would have been impossible to predict the huge expansion of the organic industry.

Since 1990, according to industry sources, growth in the organic retail sector has equaled or exceeded 20 percent per year, compared with 1 percent in the overall food industry. In 2005, according to the *Nutrition Business Journal*, organic sales reached \$13.8 billion,

accounting for approximately 2.5 percent of total U.S. food sales. Following the establishment of federal USDA standards for organic production in 2002, industry experts expect annual growth of 20 percent well into the next decade.

“The food industry clearly continues to be excited about the organic sector,” said Catherine Greene, an Agricultural Economist with the USDA Economic Research Service, who has been tracking growth patterns of the organic industry since the late 1980s.

Fueling this rapid increase in organic sales are large numbers of consumers who want organic food; according to a market survey by SPINS, 68 percent of consumers have tried organic products. Consumers also want organic foods across a range of categories, including pre-packaged meals, salad dressings and even pet food.

In response to this explosive increase in demand, acreage in certified organic cropland and pasture more than quadrupled between 1993 and 2005, according to USDA estimates. While organic acreage is still only 0.5 percent of the total U.S. agricultural acreage, some production sectors are much higher. For example, 3, 6

and 4 percent of all apples, carrots and lettuce, respectively, are grown organically.

WHAT IS ORGANIC FARMING?

THE USDA DEFINES ORGANIC AGRICULTURE AS “A PRODUCTION system that is managed to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”

More specifically, organic farming entails:

- Use of cover crops, green manures, animal manures and crop rotations to fertilize the soil, maximize biological activity and maintain long-term soil health.
 - Use of biological control, crop rotations and other techniques to manage weeds, insects and diseases.
 - An emphasis on biodiversity of the agricultural system and the surrounding environment.
 - Using rotational grazing and mixed forage pastures for livestock operations and alternative health care for animal wellbeing.
 - Reduction of external and off-farm inputs and elimination of synthetic pesticides and fertilizers and other materials, such as hormones and antibiotics.
 - A focus on renewable resources, soil and water conservation, and management practices that restore, maintain and enhance ecological balance.
- Many organic farmers, including Wende Elliott and Joe Rude of Colo, Iowa, view organic production as a means to work with the environment and maintain the balance of their ecosystem. “Natural systems work hard if you incorporate biodiversity into your operation instead of fighting it,” said Rude, who co-farms 125 acres of pastured poultry, corn, hay and alfalfa.
- Using nature as a model for the agricultural system – recycling nutrients, encouraging natural predators to manage pests, increasing plant densities to block weeds – organic farmers don’t merely substitute non-toxic materials for pesticides and fertilizers, but rather consider the farm as an integrated entity, with all parts interconnected.
- When livestock and poultry are incorporated into organic systems, the potential for diversification and integration is even greater: Livestock feed on grasses and mixed forages, both of which help improve soil structure. At the same time, livestock provide manure to fertilize soil, and can be used to “cull” any non-harvestable crops.

TABLE 1: U.S. CERTIFIED ORGANIC PRODUCTION

Year	1992	2000	2005
U.S. certified farmland (acres)			
Pasture/rangeland	532,050	557,167	2,281,408
Cropland	403,400	1,218,905	1,722,565
Total	935,450	1,776,073	4,003,973
Certified organic livestock (number)			
Beef cows	6,796	13,829	70,219
Milk cows	2,265	38,196	86,032
Other cows ¹	n/a	n/a	58,172
Hogs & pigs	1,365	1,724	10,018
Sheep & lambs	1,221	2,279	5,347
Total livestock	11,647	56,028	229,788
Certified organic poultry			
Layer hens	43,981	1,113,746	2,031,056
Broilers	17,382	1,924,807	11,225,879
Turkeys	n/a	9,138	144,086
Other/unclassified	n/a	111,359	792,249
Total poultry²	61,363	3,159,050	14,193,270
Total certified organic operations*	3,587	6,592	8,445

1. Includes unclassified cows and some young stock.

2. Total poultry includes other and unclassified animals.

* Number does not include subcontracted organic farm operations.

Numbers may not add due to rounding. Source: Economic Research Service, USDA.

WHAT MAKES A SUCCESSFUL ORGANIC FARMER?

The old image of an organic farmer as a small “back-to-the-land” type is long gone. Some organic operations have been so successful that they have been gobbled up by large multinationals such as Kraft and General Mills, which have recognized the powerful market potential for organic goods. Other organic farmers have organized into successful cooperatives. The largest organic cooperative in the country, Organic Valley, has more than 500 organic farmer-members across 13 states and successfully markets organic dairy products, beef, pork and poultry.

For many farmers, a driving force to convert to organic

production is economic: Organic crops can fetch a price premium of anywhere from 25 percent to 200 percent or more over conventionally grown products, according to USDA’s Economic Research Service.

However, most organic farmers produce crops and livestock organically because they believe their methods are better for the environment. Many seek a safer food supply. “The main motivation for us going organic is out of a certain stewardship ethic toward the soil, the earth and ultimately, for mankind,” said Altfred Krusenbaum, a Wisconsin farmer who began the transition to organic corn, soybeans, wheat and alfalfa in

1990. Krusenbaum was profiled in the University of Wisconsin’s *College of Agriculture and Life Sciences Quarterly*.

In fact, switching to organic farming requires a major philosophical shift. Said Joe Rude, an Iowa poultry and crop farmer, “It’s about trying to get the ecological system harmonious and working with it, rather than overriding it.” Farmers who turn to organic farming solely to capture market premiums often fail because it does not mean simply substituting one type of inputs for another, such as replacing a synthetic pest control with *Bacillus thuringiensis* or applying organic fertilizers in place of synthetic ones.

“In organic farming, a mind shift is essential,” agreed Brad Brummond, North Dakota State University extension agent from Walsh County, who specializes in organic production. “You must go from treating problems to treating the causes of the problems and recognize that every decision you make will affect other aspects of your system.”

When deciding if organic farming might be right for you, consider the list of characteristics shared by successful organic farmers:

- A commitment to a safer food supply and protection of the environment
- Patience and good

observation skills

- An understanding of ecological systems
- Good marketing skills and motivation to spend time seeking out markets
- A willingness to share stories of successes and failures and to learn from others (information networks are often underdeveloped for organic farmers).
- Flexibility and eagerness to experiment with new techniques and practices (adapted from a North Dakota Extension publication written by Brummond available at: www.ext.nodak.edu/extpubs/plantsci/crops/a1181w.htm)

Elliott and Rude, like many organic farmers, want to raise food free of hormones, antibiotics and pesticides. For many years, organic producers and proponents have claimed that organic farming is gentler on the environment. Research now confirms this:

- The Sustainable Agriculture Farming Systems (SAFS) project at the University of California-Davis, a 12-year research station experiment comparing conventional and organic systems, showed water infiltration rates to be 50 percent higher in the organic system. The project, supported by a grant from USDA’s Sustainable Agriculture Research and Education (SARE) program, also showed that the organic system had one-third the amount of water movement into surface and groundwater as the conventional system. The organic system was more efficient at storing nitrogen and had positive effects on soil quality, including higher biological activity and a doubling of organic matter in 10 years.
- An organic cropping system consumed three to four times less energy than a conventional system, while also producing six times more biomass per unit of energy consumed in a South Dakota State University comparative trial at the Northeast Research Station near Watertown.

- A SARE-funded study evaluating pesticide and nutrient loads in subsurface drainage on organic and conventional farms in Illinois found less nitrate, chloride and atrazine in the water draining from the organic fields.

More recent research also shows that organic farming systems can be equally productive and economically competitive with conventional systems, and in some cases, more resilient. Consider that:

- A study comparing long-term established organic and conventional tomato farms in California’s Central Valley found comparable yields.
- An article published in the *Organic Farming Research Foundation Bulletin* reviewing data from seven universities and two research station experiments verified that organic corn, soybean and wheat yielded, on average, 95 percent of conventional.
- Many studies have shown that organic systems perform better than conventional ones under drought conditions.

HISTORY OF ORGANIC FARMING IN THE U.S.

J.I Rodale, founder of the Rodale Research Institute and *Organic Farming and Gardening* magazine, is commonly regarded as the father of the modern organic farming movement. Beginning in the 1940s, Rodale



THE NATIONAL ORGANIC STANDARDS

The national organic standards address the methods, practices and substances used in producing and handling crops, livestock and processed agricultural products. The standards specify that, in general, all natural (non-synthetic) substances are allowed in organic production and all synthetic substances are prohibited. The National List of Allowed Synthetic and Prohibited Non-Synthetic Substances contains specific exceptions to the rule. This summary is from the USDA National Organic Program (NOP).

Organic crop production standards specify:

- Land will have no prohibited substances applied to it for at least 3 years before the harvest of an organic crop. Use of genetic engineering, ionizing radiation and sewage sludge is prohibited. Soil fertility and crop nutrients will be managed through tillage and cultivation practices, crop rotations, and cover crops, supplemented with animal and crop waste materials and allowed synthetic materials.
- Preference will be given to the use of organic seeds and other planting stock.
- Crop pests, weeds, and diseases will be controlled primarily through management practices including physical, mechanical, and biological controls. When these practices are not sufficient, a biological, botanical, or synthetic substance approved for use on the National List may be used.

The organic livestock standards, which apply to animals used for meat, milk, eggs,

and other animal products, specify:

- Animals for slaughter must be raised under organic management from the last third of gestation, or no later than the second day of life for poultry.
- Producers are required to give livestock agricultural feed products that are 100 percent organic, but may also provide allowed vitamin and mineral supplements.
- Organically raised animals may not be given hormones to promote growth, or antibiotics for any reason. Preventive management practices, including the use of vaccines, will be used to keep animals healthy.
- Producers are prohibited from withholding treatment from a sick or injured animal; however, animals treated with a prohibited medication may not be sold as organic.
- All organically raised animals must have access to the outdoors, including access to pasture for ruminants.

A civil penalty of up to \$10,000 can be levied on any person who knowingly sells or labels as organic a product that is not produced and handled in accordance with the National Organic Program regulations.

For more information go to <http://www.ams.usda.gov/nop/> or call the USDA NOP, (202) 720-3252. *Organic Farm Certification and the National Organic Program* is available for free from ATTRA, (800) 346-9140 or <http://attra.ncat.org/attra-pub/organcert.html>.

provided the main source of information about “non-chemical” farming methods and was heavily influential in the development of organic production methods. Rodale drew many of his ideas from Sir Albert Howard, a British scientist who spent years observing traditional systems in India. Howard advocated agricultural systems reliant upon returning crop residues, green manures and wastes to soil, and promoted the idea of working with nature by using deep-rooted crops to draw nutrients from the soil.

By the 1970s, increased environmental awareness and consumer demand fueled the growth of the organic industry. However, the new organic industry suffered growing pains. Although there was general agreement on philosophical approaches, no standards or regulations existed defining organic agriculture. The first certification programs were decentralized, meaning that each state or certifying agent could determine standards based on production practices and constraints in their region. An apple farmer in New York has very different challenges than an apple farmer in California, for example.

The downside of this decentralized approach was a lack of clarity about what “organic” meant from state to state. A movement grew to develop a national organic standard to help facilitate interstate marketing. In response, Congress passed the Organic Foods Production Act (OFPA) in 1990 to develop a national standard for organic food and fiber production. OFPA mandated that USDA develop and write regulations to explain the law to producers, handlers and certifiers. OFPA also called for an advisory National Organic Standards Board to make recommendations regarding the substances that could be used in organic production and handling, and to help USDA write the regulations. After years of work, final rules were written and implemented in fall 2002.

Although the actual production techniques of organic food have not changed dramatically since the implementation of the national standards, “organic” now is a labeling term that indicates that food has been grown following the federal guidelines of the Organic Foods Production Act. The national standards also specify that any producers who sell over \$5,000 annually in agricultural products and want to label their product “organic” must be certified by a USDA-accredited agency. Companies that process organic food must be certified, too.

Any farms or handling operations with less than \$5,000 a year in organic agricultural products are exempt from certification. Those producers may label their products organic if they follow the standards, but they are prohibited from displaying the USDA Organic Seal.

FROM TOBACCO TO FRESH FRUIT, NORTH CAROLINA GROWER RETOOLS TO REAP ORGANIC PROFITS

IN THE EARLY 1990s, JOHN VOLLMER, A THIRD-GENERATION tobacco and small grain farmer, knew that the outlook for tobacco farming was bleak. Between cuts in tobacco quotas, cheap imports and increased regulations, tobacco farming no longer made economic sense. “My main goal was to keep the farm in the family for the next generation,” Vollmer said.

For Vollmer and his family, that meant “unhooking” from tobacco production and being open to new techniques as they kept an eye on the practical aspects of making a living.

“In 1992,” he said, “we looked at strawberries and saw they were a very good crop.” Moreover, Vollmer had seen the number of farms dwindle in his area from about 250 in the 1970s to just 30. He realized that organic production might provide a means to keep the farm viable. Finally, after learning of the Environmental Protection Agency’s plan to eliminate methyl bromide for disease control, Vollmer decided that organic was the way to go.

Heartened by the fact that scientists at North Carolina State University were focusing on organic production to help make farms more profitable, Vollmer started asking for help.

“The extension agents would come to the farm and tap on my head lightly,” he said of their effort to introduce him little by little to the concepts of organic farming. “They’d leave an article on the counter about how chemicals might affect earthworms, and eventually it would sink in.”

Vollmer strongly recommends that other growers move into the process gently, and build up the soil through compost and cover crops. “I knew my soils were in the same condition as everyone else’s – basically sand with a little bit of nutrients and everything burned out. If I was going into organic, I knew I better put something in.”

Vollmer also recommends that farmers thoroughly evaluate what specific equipment they will need for organic farming. In his case, tools such as plastic mulch and drip irrigation helped bring about a successful transition. Now, Vollmer finds organic strawberries easy to grow because the plastic mulch and drip irrigation help with both weed and insect control: The plastic helps conserve moisture, keeps soil disease off plants and helps eliminate spider mites. (The plastic provides a solid layer off which he can use a high-pressure sprayer to bounce insecticidal soap onto the bottom of the leaves.)

While Vollmer does not farm all his fields organically,



he has been so persuaded by improvements to soil quality, pH and water-holding capacity, that he applies many of the same techniques, such as compost and cover crops, to his non-organic fields.

Vollmer finds great success from direct marketing, and does not wholesale any product. “Every time we wholesale, we get beat up,” he said. He and his family direct market all of their fresh market vegetables and fruits through five farm stands and at the farm. Bringing people to the farm provides entertainment for families and a boost in profits for Vollmer. On the farm, he and his family offer “u-pick” strawberries and sell strawberry ice cream and strawberry shortcake.

Using a SARE grant, Vollmer investigated how to convert one of his tobacco greenhouses to grow specialty crops – and now also has a successful lettuce operation. With the organic lettuce he provides recipe cards – and a ready-made salad mix of three types. “The SARE grant was wonderful,” he said, “as it allowed me to experiment without too much risk.” At first, he was going to wholesale the lettuce, and then decided to direct market, taking the lettuce in Ziploc bags to the farm stands.

His lettuce operation offers one other benefit: increased contact with an engaged public. “I’ve now had more people coming to the greenhouse to look at what we’re doing,” said Vollmer, who thoroughly enjoys this part of farming. “People who come out to visit know it’s important to think in sustainable ways, and they want to talk with me. I like the process of sharing what I’m doing.”

John Vollmer (right), who grows organic strawberries in Bunn, N.C., credits much of his success with the new venture to Franklin County Extension Director Cedric Jones (left).

– Photo by Jim Haskins



opposite page

At Purple Haze Farm in Washington’s Dungeness Valley, visitors can pick their own lavender bouquets from 50 varieties raised organically. Lavender thrives here because of low rainfall and mild winters.

– Photo by Rosemary Gray

PART 2 Organic Crop Production – Overview

“Nobody could have possibly predicted such a dramatic difference in the water runoff and infiltration between the organic and conventional systems.”

**– Steve Temple
University of
California-Davis**

University of California-Davis researchers comparing long-term farming systems found that organic safflower yields equaled conventional safflower over 10 years.

– Photo courtesy of University of California-Davis

DESIGNING A FARMING SYSTEM TO TIE TOGETHER PRINCIPLES of sustainability and productivity is complex. Organic farmers must consider how the various components of their system – rotations, pest and weed management, and soil health – will maintain both productivity and profitability. This section outlines the major principles incorporated into organic farming systems.

ROTATIONS

ALTHOUGH PRACTICES VARY FROM FARM TO FARM AND REGION to region, at the core of any successful annual organic farming system is the crop rotation. According to “Cereal-Legume Cropping Systems: Nine Farm Case Studies in the Dryland Northern Plains, Canadian Prairies, and Intermountain Northwest,” productive rotations:

- Enhance soil conservation and build soil organic matter;
- Provide weed, disease and insect control;
- Enhance water quality and conservation, biological diversity and wildlife habitat; and
- Ensure economic profitability for the farming system.

As the main management tool for all aspects of the farming system – including weeds, pests, insects, soils, and crop production – a well-planned rotation is more than the sum of its parts, addressing the connections between all of those factors. For example, successful rotations, according to “Switching to a Sustainable System” by Fred Kirschenmann:

- Include the use of cover crops to provide fertility, control weeds and provide habitat for beneficial insects;
- Have a diversity of plant species to encourage natural predators, discourage pest and disease build-up, and minimize economic and environmental risk;
- Provide a balance between soil conservation and crop production by adding organic matter to the soil to both supply nutrients and improve soil quality properties such as water infiltration and water holding capacity; and
- Provide weed control by alternating between warm and cool weather plants and including weed inhibiting plants (such as rye and sorghum).

Newark, N.Y., organic vegetable farmer Elizabeth Henderson, who farms 15 acres, considers rotations fea-

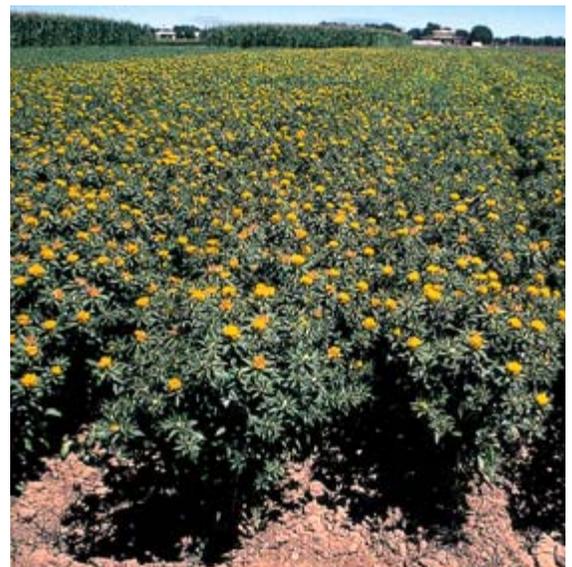
turing summer and winter cover crops a key component of her successful system and relies on them to minimize erosion, maintain and build soil quality, and control pests.

For agronomic crops, a standard organic corn belt rotation of alfalfa, corn, soybeans and small grain accomplishes multiple functions because:

- The legumes fix nitrogen, providing for the subsequent non-legumes in the rotation;
- Several pest cycles are interrupted, especially that of the northern and western rootworm species, which can be devastating to corn;
- Several plant diseases are suppressed, including soybean cyst nematode; and
- Weed control is enhanced when perennial weeds are destroyed through cultivation of annual grains; most annual weeds are smothered or eliminated by mowing when alfalfa is in production.

(From ATTRA’s *Organic Crop Production Overview*, available at: <http://attra.ncat.org/attra-pub/summaries/organiccrop.html> or call (800) 346-9140.)

For some farmers, switching to an organic rotation may not be more difficult than expanding upon or changing the timing in an existing rotation. When Lydia and Dennis Poulsen of Snowville, Utah, decided to convert their 800-acre beef, hay and small grain operation to organic, making the switch was much easier than expected.



“An organic dairy was coming and they needed feed,” recalled Poulsen. “We had alfalfa in our original rotation and we were already trying alternatives to make the ground healthier.” Because their alfalfa-wheat-oat hay rotation fit right into an organic system plan, the only substantial change they made on their ranch was to plow in alfalfa as green manure for their subsequent wheat crop, rather than letting the cows mow down the alfalfa in its final year.

SOILS

ALONG WITH DEVELOPING A SUCCESSFUL ROTATION, ENSURING healthy soil is imperative to a profitable and successful organic system.

“A lot of people don’t think of the soil as an ecosystem but, in fact, it’s probably the most complex ecosystem on earth,” said Ray Weil, a University of Maryland soil science professor. “A healthy soil should be breathing out carbon dioxide, breathing in oxygen. It should hold and absorb water so the plants can survive between rains. It should resist erosion.”

By contrast, a less healthy soil can wash away and pollute surface waters. From a production standpoint, poor quality soil can limit plant growth and vigor.

In organic farming systems, the majority of nutrients are supplied from organic matter additions such as compost, manures and cover crops. These amendments not only feed the plants, but the soil organisms as well. As soil organic matter accumulates, soil structure improves, and populations of other important soil organisms, such as earthworms – which tunnel through the soil, improving aeration and infiltration – increase. Those organisms break down organic material to release nutrients at a steady pace so they are available for plant uptake. Soil microorganisms also hold nutrients in a more stable form so they are less susceptible to being lost – through leaching, soil erosion or runoff.

The soil is a virtual microscopic zoo of organisms. Soil biologists are just beginning to tease apart how those organisms function in organic farming systems. Numerous studies show that organic systems have higher microbial populations and activity. The long-term SAFS trial in California’s Central Valley comparing organic and conventional farming systems in a tomato, bean, corn and safflower rotation found significantly higher microbial populations and activity in organic systems than the conventional ones. New research from North Carolina State University shows that increases in microbial populations and microbial activity may occur by the first or second year of the transition to an organic system.



Researchers also are discovering that they can improve fertility in organic systems by micro-managing the soil fauna. In the SAFS experiment, researchers studied the role of bacteria-feeding “good” nematodes, small soil organisms that help make nitrogen available to plants. The researchers found that by irrigating plots in the fall to improve cover crop germination, the nematode population increased. This higher beneficial nematode population led to more nitrogen release from the cover crop in the spring. The nematodes also stored nitrogen over the winter that might otherwise have been lost.

Cover crops, an essential part of organic systems for soil building and soil fertility, also benefit the soil by improving soil structure, which in turn improves water infiltration and water-holding capacity. The long-term systems trial at UC-Davis proved some of those benefits dramatically, such as 50 percent higher water infiltration and 35 percent lower runoff in the organic plots.

“Nobody could have possibly predicted such a dramatic difference in the water runoff and infiltration between the organic and conventional systems,” said SAFS project leader Steve Temple. “It’s given us a new appreciation of the importance of cover cropping and residue management.”

Cover crops planted after a crop is harvested – also known as catch crops – recover nutrients that would otherwise leach into the subsoil and groundwater.

Cover crops prove invaluable to organic growers who don’t have access to affordable sources of compost and manure. A study of potato production in Idaho found that legumes such as alfalfa, pea and pea-oat hay could provide 80 to 100 percent of nitrogen needed for a potato crop, and if harvested for feed or seed, 40 to 60

Jack Lazor of Butterworks Farm in Westfield, Vt., shows the end product of composted dairy manure, which he uses to build soil organic matter, during one of his popular pasture walks.

– Photo by Lisa McCrory

“Cover crops, coupled with my managed applications of animal manures, have become the mainstay of my soil nutrient-building management plan.”

*– Carmen Fernholz
Madison, Minn.*

percent of the required nitrogen for the subsequent crop. Similarly, a northern California research project showed a nitrogen replacement value of 150 pounds per acre with cover crops.

Carmen Fernholz, who grows organic barley, oats, wheat, flax, corn, soybeans and alfalfa on his 410-acre west central Minnesota farm, manages a three-year, four-year or even longer rotation heavily reliant upon cover crops. Without exception, he underseeds all of his small grains with a legume crop, such as red clover or annual or perennial alfalfa. After harvesting the small grain, he allows the underseeded legume cover crop to serve as a green manure – or, with perennial alfalfa, as a cash crop. The number of seasons for the perennial alfalfa will depend on the weed and nutrient histories of the particular field.

“Cover crops, coupled with my managed applications of animal manures, have become the mainstay of my soil nutrient-building management plan,” Fernholz said. “They are the foundation of my rotation because they supply a significant portion of the nitrogen needed for crops such as corn and wheat. They are a reliable, nature-friendly, easily managed fix between my cash crops.”

Organic farmers also use manures and composts regularly, especially when they are accessible and affordable. Many organic farmers make their own compost, either by using livestock manure from their own operations or from a nearby source and combining it with straw or wood shavings. Manures and composts provide many of the same soil-building benefits as cover crops. (Federal regulations dictate that raw manure may not be applied 90 days prior to harvest if the edible portion of the crop does not contact the soil, or 120 days prior to harvest if the edible portion of the crop does contact the soil).

Vollmer, the North Carolina tobacco farmer who converted to organic strawberry production, ripped into “The Secret Life of Compost” by Malcolm Beck to learn how to make his own compost. He uses horse manure, wood shavings, oat straw and any other suitable materials he can find.

Compost provides many other benefits, too. Since transitioning to organic, said Vollmer, “I’m able to see improvements in the soil – the pH has risen from 5.2 to 6.7, I don’t need to add lime, the water holding capacity has increased, and there’s less soil crusting.”

(For more information on soil management, see *Building Soils for Better Crops* in “Resources”, p. 30)

WEEDS

ALTHOUGH THEY JOKE ABOUT IT NOW, IT PROBABLY DIDN’T seem too funny when Joe Rude and Wende Elliott thought they’d lost their first year alfalfa crop to an invasion of weeds (see profile on p. 17). Yet weed management for organic and transitional farmers is a formidable problem and ranked number one among research priorities in a national survey of organic farmers.

Standard organic weed management strategies include:

- **Smothering weeds with cover and forage crops.** A dense mat of cover crops will prevent weed germination or crowd out weeds struggling to gain a foothold. Residue from a grass cover crop decomposes slowly, while legume residues break down faster. Grass-legume mixtures also can control weeds while providing more nitrogen to the cash crop. Forages serve a similar process; in his five-year alfalfa, corn and oat rotation, “the three year alfalfa goes a long way to getting the weed seed bank out of the field,” said Joe Rude.
- **Managing weeds selectively.** Identify weeds and manage them according to their lifecycle and reproductive strategies. For example, tilling weeds like quack grass and Canada thistle is ineffective in the short run, since tillage may propagate their rhizomes. Repeated cultivation, however, forces them to draw upon their storage, and can eventually weaken the population. Biennials, on the other hand, must not be allowed to seed and persistent mowing can eventually exhaust root reserves.
- **Conservation tillage.** Mark Davis, an agronomist working on a long-term organic farming systems research trial run by the USDA Agricultural Research Services Sustainable Agricultural Systems Lab in Beltsville, Md., uses a regular no-till planter to sow corn directly into a living stand of vetch, and then rolls and crimps the vetch with a Buffalo Stalk chopper. “This system has great potential for no-till organic cropping systems because it provides weed control and nitrogen fertility at the same time,” Davis said. By allowing the vetch to grow longer in the spring, the researchers are increasing the amount of nitrogen added to the system. At the same time, the mat of vetch smothers the weeds long enough for good early season weed control. “It gives you the best of both worlds,” Davis said. “Your no-till practices help reduce soil erosion, improve soil structure and increase organic matter, and you can still manage the system organically.” The one caveat, he

UTAH ORGANIC GRAIN PRODUCER BUILDS ON LAST GENERATION'S SUCCESSES

WHEN LYDIA POULSEN WAS A SMALL CHILD, SHE RECALLS THAT the ground on her parents' Utah farm "would set up like cement. We had areas that we called 'alkali slicks' where, because of the high pH, nothing would grow."

After Poulsen converted 800 acres of small grains and hay and 3,000 acres of pasture to organic production in 1989, the alkali slicks all but disappeared. And now, following rainstorms, the soil no longer crusts.

"There are a lot of positive things about organic farming," she said, attributing the improvements in her soils to the elimination of chemical fertilizers. For Poulsen, who farms with her husband, Dennis, near Snowville, Utah, the switch to organic production was not that hard because she was already rotating small grains, alfalfa and oat hay for her 130-head beef operation. About 10 percent of her grains stay on the farm for the cattle while she sells the rest off the farm.

Poulsen's father also employed many environmentally sound methods in his production system, including techniques compatible with current organic practices. When he subdivided the farm, leaving 800 acres to Lydia, she merely adapted many of his successful practices.

"My father recognized that sprays were limited in how long they would control the bugs in alfalfa," Poulsen said, "and could see that there was a better, more complete way to go."

To control aphids, weevils and other insects, her father introduced ladybugs. Following in his footsteps, even before Poulsen switched to organic, she used "nola-bait" to control grasshoppers. After years of releasing ladybugs, along with lacewings and praying mantises, "the natural population is now established," Poulsen said.

Poulsen converted to organic after a large organic dairy in the area asked her to certify her grain. At that time, the transition period was only one year instead of the current three, and with a ready-made market, her transition was smooth. For growers looking to transition to organic production today, Poulsen recommends that they research a reliable market before beginning.

Poulsen also wanted to find ways to improve the health of her ground. While additions of organic matter clearly have improved her soil, Poulsen has been frustrated by fertility constraints in her organic operation, specifically in wheat.

"It's hard getting fertility into the ground and getting the microbial population up," Poulsen said, referring to



the prohibitive cost of transporting compost or manure to her land. Potential organic farmers, she adds, should calculate costs of manure or other amendments for their systems.

Instead, Poulsen has tried winter peas and clover as nitrogen suppliers, but seed is very expensive. She also has experimented with gypsum and fish emulsion. But while she admits that wheat yields do suffer from less nitrogen – they tend to be half of what they are the first year following alfalfa – she hasn't seen net profit drop.

While profit is important, it's not the sole argument for farming organically. More than anything, Poulsen said, "Organic provides a way to educate people about agriculture. People are far more interested in why I farm organically than why I farm."

For Poulsen, who farms with her husband, Dennis, the switch to organic production was not that hard because she was already rotating small grains, alfalfa and oat hay for her 130-head beef operation.

Utah farmer Lydia Poulsen sells about 90 percent of her organic grain to area livestock producers. When she transitioned between 1992 and 1994, she found a ready market, but advises other farmers to thoroughly research their sales options.

– Photo by Jerry DeWitt

cautions, is that in years with a dry spring, the late growth of the vetch can deplete soil moisture for the following crop.

☛ **Using living mulches.** Inter-seeding one crop into another can be done on a large scale by sowing rye from aircraft over corn acreage, or from tractors or by hand. The second crop, which should germinate after the first, will compete for nutrients and moisture so this technique should only be used when crops are well established or have ample soil fertility and moisture. Dutch white clover, for example, is effective in corn or late season brassicas. Its high density keeps out weeds, it fixes its own nitrogen, and it is low growing so it doesn't compete with the crop for sunlight.

Many organic farmers also use some sort of mechanical weed control in combination with the above strategies. (For more information on mechanical weed control see *Steel in the Field* in "Resources", p.30)

Some organic farmers believe that weeds do not need to be eradicated, just managed. Knowing when a weed is a threat and when it can be ignored, something often gained by experience, remains a common strategy.

"Our farm becomes so much simpler all the time," said Dan Nagengast, who farms five acres of cut flowers and mixed vegetables in Lawrence, Kan., and has been growing organically for 15 years. "We've learned from our mistakes – it used to be if we were eight to 10 days away from harvesting lettuce, we would hoe the weeds. Now we know when the crop will make it, and we don't have to do all the extra things we thought we needed to."

In a bit of a radical departure from the conventional approach of "the only good weed is a dead weed," some organic farmers choose to integrate weeds into their cropping systems for the benefit of the whole farm. Steve Gilman, who farms 15 acres in Stillwater, N.Y., and grows fresh market vegetables such as lettuce, tomatoes and peppers in 4-foot-wide raised beds, decided there was no need to spend the "time and energy needed to keep the two-foot wide, permanent strips between the beds clean-cultivated."

As explained in his book "Organic Weed Management," Gilman was concerned about the susceptibility of the bare soil to erosion. So he began planting "bio-strips." First, he eliminated perennial weeds such as quack grass and thistle with repeated cultivations before forming the beds. Then he sowed Dutch white clover between them, allowing a mix of perennial grasses, wild herbs and wildflowers to flourish.

Gilman sees numerous advantages of these bio-strips, including:

- ☛ A diverse, protective habitat and food supply for beneficial insects and microorganisms in the field alongside the crops;
- ☛ A source of organic matter or mulch from the clippings of the plants (making sure to mow before any wildflowers go to seed); and
- ☛ Confinement of potential compaction to bio-strips, where the soil is supported by root system of this mix. The planted inter-spaces also provide muck-free footing when Gilman needs to walk or drive a tractor between the beds.

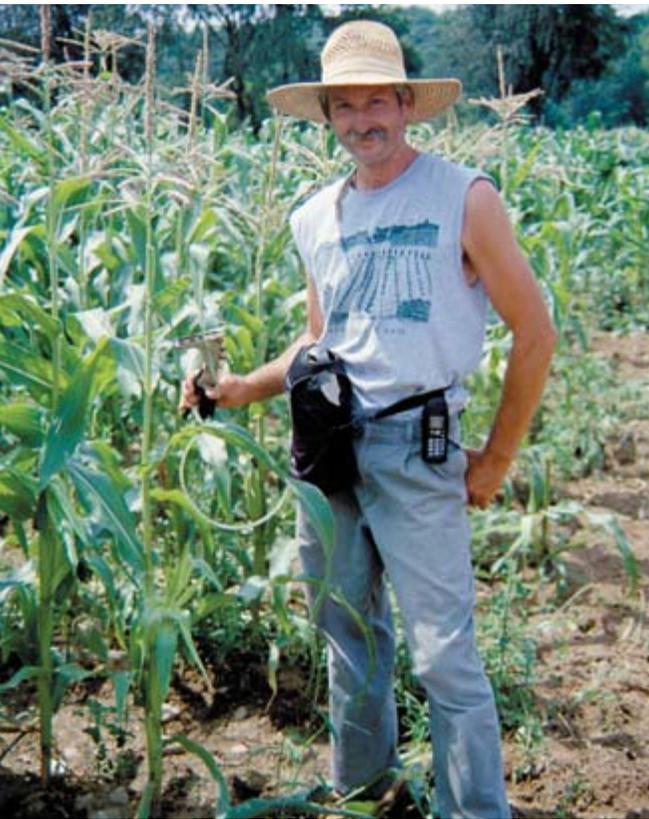
(To learn more about *Organic Weed Management*, a book produced with support from a SARE grant, see "Resources" on p. 30.)

The bio-strips enable Gilman to retain one-third of his farm acreage in permanent no-till, preventing erosion and preserving soil organic matter. In the beds themselves, Gilman quickly sows catch crops after each harvest to keep the soil covered and to prevent weeds from taking hold. The increased growing capacity of the raised beds, which can support much higher plant densities, offsets the land lost to interspaces, while the high density planting helps prevent weeds.



Researchers at USDA's Agricultural Research Service find that dense mulches of cover crops, particularly grasses such as rye, provide excellent early-season weed control. No herbicides were applied to this soybean field – the rye was killed with a modified Buffalo stalk chopper.

– Photo by Dr. Aref Abdul-Baki



INSECTS & DISEASES

“ORGANIC FARMING REQUIRES MORE INTENSIVE MANAGEMENT than conventional methods,” said Joe Rude, the poultry farmer from Colo, Iowa, “because without access to a broad spectrum of pesticides and antibiotics, you have to understand the life cycle of the pests that are attacking your crops and animals. You have to understand the biological and chemical processes and work with the environment.”

For organic farmers, this means employing strategies such as crop rotations, enhancing biodiversity, determining threshold levels of pest populations, introducing natural enemies and using good sanitation practices. Although certain sprays such as *Bacillus thuringiensis* (Bt) and rotenone are permitted, many organic farmers do not rely upon them exclusively. Rather, the key focus of organic pest control is prevention.

In California, where dry summers make it less challenging to grow organic fruit, a SARE-funded on-farm study comparing organic and conventional apples found that synthetic pheromones, biological control agents and sanitation successfully controlled codling moth mating in most locations. Disease control with sulfur and copper, when timed right, was as effective in scab control as the synthetic fungicides used in conventional systems.

In New York, where the wet humid summers pose enormous challenges for organic fruit production, Robert Pool, a Cornell University viticulture professor, found that organic grapes could be managed to be as pest-and disease-free as conventional ones. During a three-year, SARE-funded experiment, which compared organic and conventional grape production on three varieties, pheromone disruption and insect scouting allowed researchers to eliminate regular insecticide use.

“Going in, we thought the main problem would be diseases,” said Pool. But instead, researchers applied, on average, less than one spray per year and found that the powdery mildew commonly observed on Concord grapes was far less destructive than predicted. The researchers also learned that pheromones successfully controlled grape berry moth and that scouting allowed them to control insects that emerged when the regular spraying was eliminated. They avoided an expected huge spike in grape leafhopper by releasing predatory wasps.

Other SARE-funded research has shown similar control:

- In a study of potatoes in Idaho, researchers were able to control Colorado potato beetle with mineral and biological compounds.
- In the Northeast, where sweet corn can be devastated by caterpillar pests, Bt and corn oil were used effectively to control corn earworm. Eight farmers from Vermont to Connecticut found that the oil controlled ear damage in 83 percent of their trial plots in 2000.

Many organic farmers have observed that, over time, pest populations seem to decrease. Results from a California on-farm organic tomato experiment showed the presence of 46 percent more predators and parasitoids and 43 percent more natural enemies on the organic farms, which could provide one possible explanation for reductions in pest populations. A SARE-funded study in Washington testing mowing frequency in pear orchards found that mowing only once a month rather than more frequently as done on conventional farms, creates alluring habitats, attracting beneficial insects that control pests.

“By reducing the frequency to once a month, we see a dramatic increase in natural enemies moving into the ground cover without a big increase in pests that feed on fruit,” said David Horton, the ARS researcher testing mowing regimens.

Stone fruit grower Marilyn Lynn of Bridgeport, Wash., relies on living mulches to attract beneficial insects that prey on potential pests before they can harm her peaches, apricots and nectarines. “We mulch

Vegetable growers like Steve Mong of Stow, Mass., have controlled corn earworms, a significant pest for organic farmers, by using a new device designed by SARE-funded researchers that dispenses corn oil and *Bacillus thuringiensis* (Bt).

— Photo by Ruth Hazzard

Lady beetles, such as this one preying on an aphid, are used widely by organic growers to control pests. See University of California organically acceptable recommendations pest management guidelines at www.ipm.ucdavis.edu/.

— Photo by Jack Kelly Clark, courtesy of UC Statewide IPM Program



extensively,” Lynn said during a satellite broadcast about organic production aired by Washington State University in spring 2003.

Calling their orchard grass, yarrow and clover covers a “bed and breakfast” for beneficial insects, she added: “They give a nice diversity to the floor of our orchard, providing food and water in the spring when they wake up.”

For soil borne-disease control in organic systems, many growers use composts, long known as effective plant pathogen suppressants. Rotations also are important for decreasing pathogen populations, as most pathogens are plant specific. In general, rotating the crop, planting resistant varieties, and adding organic

matter have all been shown to reduce the incidence of soil-borne diseases: In the SAFS project in California, a four-year organic rotation had lower incidence of corky root and red root rot than a two-year conventional rotation; an on-farm tomato study in the Central Valley of California showed that organically managed soils may be suppressive to the organism that causes corky root; and in North Carolina, another SARE-funded study showed disease was significantly reduced by organic soil fertility amendments and on organic versus conventional farms.

LIVESTOCK SYSTEMS

TRADITIONALLY, LIVESTOCK HAVE PLAYED AN IMPORTANT ROLE in integrated operations and fit well in organic farming systems. Livestock feed on forages and grasses, essential elements of organic rotations, and provide manure, an important organic fertilizer. Although semi-confined livestock systems are allowed under the federal organic rules, the animals must be given access to fresh air, sunlight and the outdoors. Most organically raised animals do have access to the outdoors and pasture, and spend limited time in confinement. Organic confinement systems are typically less crowded than conventional confinement operations. (For more information, see: NCAT’s *Organic Livestock Workbook*, available for free. Call (800) 346-9140 or see http://attra.ncat.org/attra-pub/summaries/livestock_workbook.html.)

At the core of many organic livestock systems is the grazing system. Animals forage on pastures for their own feed while spreading manure, yielding energy and labor savings, and reduced equipment costs. Composed of legumes, grasses and other broadleaf species, pastures provide multiple benefits for the soil and ecosystem as well.

“The fibrous roots of the grasses in perennial pastures hold soils in place and help reduce soil erosion,” said Heather Karsten, assistant professor of crop and soil science at Penn State University, who has researched pasture management and rotational grazing systems in both New Zealand and the U.S. “When the roots and stubble of the grazed grass die back, they contribute organic matter to the soil. These improvements in organic matter from the grasses, as well as the legumes, help improve water infiltration, soil structure and nutrient accumulation and storage.”

Nick Maravell, who has been farming organically since 1979, branched into beef not long after he increased his Buckeystown, Md., operation to 165 acres

INTEGRATING ORGANIC CROPS AND LIVESTOCK

Even if Darrell Parks didn’t like working with pigs, he would still raise hogs on his 400-acre farm in the Flint Hills of Kansas, if only for the manure. Parks’ 50 sows provide manure that makes up a key part of his soil fertility program.

Parks, who raises organic corn, milo, wheat, soybeans and alfalfa, relies on nitrogen-fixing legume cover crops such as yellow clover, red clover and Austrian winter peas to amend the soil. But for areas in need of extra fertility, Parks spot-treats with hog manure, illustrating one of the benefits of his integrated crop/livestock farm.

“I’ve worked to better utilize farm-produced manure and cover crops, as well as a

crop rotation and management system that allowed me to eliminate purchased fertilizer, herbicides and insecticides,” said Parks, who received a SARE grant to hone his use of manure on cropland.

Parks especially likes how manure corrects micronutrient deficiencies in his soil. He regularly tests his soils, and then targets problem areas with a heavier application of manure.

Cover crops supply most of his nitrogen. Parks grows a legume cover crop in the winter, followed by a cash crop of milo or soybeans. Before planting, he’ll treat the field with manure to ensure the cash crop will not lack nutrients.

At the root of Parks’ system is increasing organic matter in

the soil, which will improve water infiltration and soil structure. The cover crops help compensate for what Parks describes as “heavy” soils. He chooses cover crops such as sweet clover that break through compacted soil with their deep taproot and anticipates continued improvements in his soil structure as he continues to perfect his rotation.

“Back in the ’20 and ’30s, they did some of these things and had good systems in place, then fertilizer became cheap and everyone forgot about cover crops as a possible solution,” he said. “I have some fairly tight, heavy soils, and this system provides a way to make those soils better over time.”

in 1997. “When I expanded, it just made sense to become more diversified,” said Maravell, who was already growing organic forages, hay and grains. “When you have animals, you complete the cycle of feeding the vegetative matter through the rumen, and it comes out the other end to fertilize the soil.”

Maravell, who pastures a small herd of Black Angus on 16 acres, also likes the additional flexibility. “The cattle can be used in different ways,” he said, “by sending in the cows to cull the crops – rye, barley, alfalfa, or even soybeans, when green – if you decide you don’t want to harvest them.”

Although pastured animals are not necessarily organic, and some organic producers do not extensively pasture their livestock, organic growers can capitalize on the benefits of grass-raised animals by marketing their product as “grass-fed” as well as organic.

Maravell feeds no grain to his cattle and grows all his own grass and hay on his farm. The lack of grain means that his animals do not have high intra-muscular fat – which fetches a higher USDA rating than the lower fat meat – “but,” he said, “my customers want this beef because it is grass-fed and organic. They’ve seen articles documenting the benefits, and they don’t want antibiotics, hormones or pesticides, all of which you eliminate when you raise animals organically.” Maravell, who sells direct to his customers, added that another benefit of pasture-raised beef are the higher levels of conjugated linoleic acid (CLA) and omega-3 fatty acids.

“There is good evidence that conjugated linoleic acid can prevent cancer in animals and may protect against heart disease and diabetes and obesity in humans, while omega-3 fatty acids have the potential to decrease the risks of cancer and cardiovascular disease,” said Donald Beitz, a Professor of Animal Science and Biochemistry at Iowa State University.

Beitz, who collaborated on a SARE-funded study in Iowa on the effects of pasturing animals, added that CLA levels can be 4 to 6 times higher in the milk of cattle who feed on fresh pasture versus cattle who eat stored feed such as silage hay and grain. Karsten, the Penn State researcher, also found that the eggs of pastured poultry had three times the amount of omega-3 fatty acids and higher levels of vitamins A and E than did the eggs of conventionally fed poultry.

Managing good health for organic livestock presents challenges since no antibiotics or hormones may be used. (See “National Organic Standards” box on p. 4). In general, the focus on animal health is preventive, and the incidences of diseases typical to animals in

confinement can be reduced or mitigated by pasturing the animals, focusing on good nutrition and providing preventative care.

According to Karsten, there is evidence that the health of pastured animals is better. “Since the animals are not standing on cement, they have fewer foot and leg problems, the fresh air reduces respiratory problems and the incidence of mastitis is decreased since the animals are not lying in their own manure in the barn.”

Dairy farmers also successfully manage their herds without the use of the standard conventional treatments. “Some people believe that you must use penicillin or manage dry cow treatment with antibiotics, but organic farmers don’t add anything for dry cow treatment,” said Lisa McCrory, the dairy technical assistance coordinator for the Northeast Organic Farming Association of Vermont (NOFA-VT). “If a cow does get mastitis, homeopathic methods and colostrum products work well.”

Focusing on animal nutrition through high quality feed and good soils also goes a long way toward reducing stress, illness and the need to treat animals for medical problems, added McCrory.

Hubert Karreman, a veterinarian in Lancaster County, Pa., who has been treating organic dairy cows for almost 10 years, agreed that the incidence of many diseases is lower in organic and grazed herds. “But,” he added, “just because you’re using organic management does not mean you won’t have health problems.” He sees more pasture bloat and hoof punctures and abscesses in grazed animals, but also believes that preventive strategies such as probiotics (immune system builders), and homeopathy and botanical medicines can be used very successfully to manage and treat organic herds.

Jersey cows at Butterworks Farm in Westfield, Vt., lounge on a deep-bedded pack of straw, their cold-weather alternative to pasture during New England’s severe winters.

– Photo by Lisa McCrory



PART 3 The Economics of Organic Production

Wende Elliot expects a 37.5 percent operating profit margin, largely due to lower input costs and a premium price for organic poultry, hay and row crops.

ORGANIC SYSTEMS MAKE GOOD ECONOMIC SENSE

ORGANIC FARMERS ARE OFTEN THE FIRST TO ADMIT THAT AS they were transitioning to organic systems, their yields declined. Many studies have shown that, initially, a decline in yields occurs during the conversion to organic production.

However, once the transition period has passed – usually in three to five years – organic crop yields often rebound to within 90 to 95 percent of conventional yields, according to an Organic Farming Research Foundation review of comparative studies.

Perhaps even more important, once the farming system has been certified, price premiums for organic crops, added to the reduced production costs, help boost profitability. (See Table 2).

For many organic farmers, equivalent yields are not necessarily the goal. “High yields are not always connected to profitability,” said Wende Elliott. On her farm, she expects a 37.5 percent operating profit margin, largely due to lower input costs and a premium price for organic poultry, hay and row crops.

Jeff Moyer, farm manager at The Rodale Institute in Kutztown, Pa., explains in a fact sheet published by the Institute (available at www.newfarm.org/depts/midatlantic/FactSheets/transition.shtml) how organic farming makes good economic sense.

In 2001, his organic corn and soybean yields were only 90 percent of conventional yields, yet the organic corn fetched \$4.70 bushel compared to \$2.10 for conventional. The soybean price disparity was even larger – conventional soybeans went for \$3.80 per bushel, while organic livestock feed beans brought

\$10.50 per bushel and organic food grade beans \$15 a bushel.

Ed Fry, who farms 400 acres of grain and has 240 milk cows in Chestertown, Md., points out in a marketing fact sheet from Rodale that while his corn yields were comparable in 2000, his total production costs were lower for organic corn – \$1.79/bushel versus \$2.23 for conventional. The labor per acre was higher in his organic corn, but because the organic corn fetched \$4 a bushel versus \$2.50 for the conventional, he didn’t need to farm as many acres for the same amount of profit.

In organic dairy operations, a similar principle of reduced production and higher profits applies. When Vince Foy and Debbie Yonkers of North Danville, Vt., converted their 70 Jersey cows to organic, their milk production decreased by 10 to 15 percent, but their gross income increased from \$125,000 to \$165,000. Moreover, they cut their debt-to-cow ratio in half.

In fact, said Lisa McCrory, dairy technical assistance coordinator for the Northeast Organic Farming Association of Vermont (NOFA-VT), “organic dairy producers almost always reduce their production numbers, due to management changes such as feeding the animals less grain.” And even though the price of organic grain is higher, other costs such as veterinary bills, fertilizer and labor decrease, improving net income.

A statewide study conducted in Vermont by the Northeast Organic Dairy Producers Alliance showed that although milk production was lower in the organic systems, the organic producers received an average net return of \$477 per cow per year compared to the conventional average of \$255 per cow.

TABLE 2. ORGANIC AND CONVENTIONAL PRICES FOR FIELD CROPS 2000-2002

Production System	2000 Organic	2000 Conventional	2001 Organic	2001 Conventional	2002 Organic	2002 Conventional
Corn (\$/bushel)	\$3.51	\$1.86	\$3.01	\$1.89	\$3.96	\$2.13
Soybeans* (\$/bushel)	\$13.02	\$4.73	\$12.29	\$4.43	\$12.29	\$4.93
Spring Wheat (\$/bushel)	\$5.72	\$2.82	\$5.75	\$2.96	\$5.54	\$3.47
Oats (\$/bushel)	\$2.00	\$1.17	\$2.00	\$1.42	\$3.64	\$1.89

* Clear Hilum, cleaned.

‘Prices of Crops Products Grown Organically in the Northern Plains and Upper Midwest.’ *Economics Commentator*. South Dakota State University. #437, April 4, 2003.



“Looking beyond production and making decisions based on profitability and the bottom line makes good business sense,” McCrory said.

While more research is needed on the economics of transition, the long-term economic viability of established organic systems is quite positive. A 1999 Wallace Institute review of six midwestern land-grant university studies found:

- Organic grain and soybean production systems are “competitive with conventional production systems.” In fact, with current market premiums, producers of organic grain and soybeans earn higher profits than conventional growers.
- Without a price premium for organic crops, half of organic systems were still more profitable than the conventional systems. Those systems less profitable than conventional quickly surpassed the conventional systems when organic premiums were figured in.

In cases where organic systems were more profitable without price premiums, it was generally due to lower production costs, higher net returns due to the types of crops in the organic systems, and better performance of the organic systems under drought conditions or in drier areas.

Production costs tend to be lower in established organic systems because of reduced input costs.

One exception to this, perhaps, is labor. Organic farming systems are often more labor intensive because of increased time spent managing weeds and monitoring pests. Labor costs, however, can be measured in different ways.

“If a farmer views his/her time spent on the farm in terms of its opportunity costs, e.g., what he or she could be earning off the farm, labor costs for organic farming are higher than conventional,” said Jim Hanson, extension economist in the Department of Agricultural and Resource Economics at the University of Maryland. “However,” he added, “for those farmers who don’t view off-farm income as an alternative source of income the labor costs between the two systems are similar.”

In a forthcoming study to be published by Hanson, he found that family labor was about 30 to 40 percent higher in an organic mid-Atlantic grain operation than in a conventional one, but hired costs were equivalent between the two systems.

Production costs also vary by region, climate and production system. For example in humid areas, pest and weed control measures can raise costs.

A recent study in a corn-soybean system in Iowa found costs of conventional production were only slightly higher than organic. The organic farms had lower fertilizer and pesticide costs, but higher seed and machinery costs.

However, in a SARE-funded project that compared organic and conventional apple production across California, Sean Swezy, formerly a researcher at the University of California and now director of UC-SAREP, found production costs of organic apples 10 to 25 percent higher than conventional ones in the coastal fresh market systems due to labor and material costs. However, statewide, the organic systems were determined to be commercially profitable.

Finally, in a SARE-funded potato study in Idaho comparing 18 conventional and organic farms, the average material costs were lower in the organic and the labor costs higher, but overall there was no significant difference in fixed and variable costs.

Organic livestock systems often cost less, thus can be a viable option for beginning farmers or those who have trouble raising capital, because those systems do not require elaborate or expensive housing. Poultry, for example, can be raised on pasture using inexpensive, easy-to-build structures.

As with any successful business, good management is essential. “I’ve discouraged some farmers from going organic if they were already struggling with their conventional farm and not ready to embrace the mind shift involved in transitioning to organic,” said Brad Brummond, the extension agent from North Dakota who specializes in organic production. “Conversion is a learning process, not a fix for a failing conventional farm.”

Organic livestock systems often cost less, thus can be a viable option for beginning farmers or those who have trouble raising capital.

Organic vegetable transplants can fetch at least 30 percent more than conventional plants and are snapped up by eager gardeners at farmers markets across the country. Rebecca Sexauer of Deep River, Iowa, displays a tray of tomato transplants.

— Photo by Jerry DeWitt

NEW RESEARCH SUGGESTS SMOOTHER TRANSITIONS MAY BE POSSIBLE

Researchers are responding to farmer needs for more information about transitioning to organic systems. Their old hypotheses predicted a yield decline for the first three years, due to the time it takes to build soil fertility and biology, establish natural controls for pests and weeds, and the inevitable “learning curve” associated with managing a new system. For many farmers, that “triple whammy” of yield decreases, initial cost increases and no economic premium available during transition has been a big barrier to conversion. Recent findings in North Carolina and Iowa, among other places, however, indicate that producers might not always see declining yields during transition.

Recently, researchers have designed experiments that compare organic systems not just to conventional ones, but to each other. “We want to determine if there are strategies farmers can use to ease into these systems without taking a financial hit,” said Nancy Creamer, director of The Center for Environmental Farming Systems at North Carolina State University and one of the lead researchers on a transition study that compares four methods of conversion to organic.

Early findings from this new body of research are encouraging. Creamer’s study compares going organic “cold turkey” (withdrawing all chemical inputs) to a series of treatments, each of which have a gradual withdrawal of different

classes of inputs and uses a soybean-sweet potato-wheat/cabbage rotation. Results from the first two years showed no differences in yields when soybeans were grown in the first year of the rotation, or in marketable yields for sweet potatoes in the second year. Early analysis shows that some of the transitional treatments are not as profitable as the conventional one, due primarily to the high input costs associated with soil building. (See “What’s in a Name?” on p. 24 for ideas on how to increase returns on “transitional” crops.)

While the study will continue until 2007, Creamer is excited that the results thus far show comparable yields in the organic and conventional systems. She partially attributes

the production success of the transition to the fact that researchers are more knowledgeable about organic systems. “We’ve learned a lot from growers,” she said, referring to the production techniques and management decisions. “For example, in our study we knew we should start with soybeans and we also understood some principles of organic weed management that helped us have relatively weed-free fields.”

Other results from SARE-funded research have shown:

• A transition experiment on Iowa farmland previously enrolled in the Conservation Reserve Program (CRP) found that soybeans grown organically had yields equivalent to county

averages beginning the first year of transition. CRP land can be certified without the three-year waiting period if the producer can document that the land has received no prohibited materials. By the third year, the returns for the organic soybeans were 180 percent above conventional soybeans. • Researcher Elizabeth Dyck in Lamberton Minn., found that by the third year of transition to organic production, soybean and corn yields could match conventional yields, if those crops had been preceded by one to two years of a small grain/forage legume as opposed to a row crop.

RISK MANAGEMENT

ON THE SURFACE, ORGANIC FARMING MAY SEEM TO BE RISKIER: Organic farmers are limited to a much smaller range of pest control materials, are learning a new management system and may be subject to pest and weed outbreaks during what is known as the “ecological” transition period.

Fred Kirschenmann, director of the Leopold Center in Iowa and a long-time North Dakota organic farmer, believes that the nature of organic farming and its reliance on crop rotation provides protection against vulnerability. “Diversity spreads out risks and vulnerabilities,” he explains in the introduction to *Cereal-Legume Cropping Systems*. “If you have one or two crops, you are vulnerable to market and natural adversities of that narrow band of crops. That makes farming a high-risk venture. As diversity on the farm increases, growing risks get spread out and market opportunities increase.”

Substantial expansion in one product could cause prices to drop, so premium prices are not always a guarantee. Most research, however, seems to indicate that organic row crop and small grain rotations can be competitive, even without the price premium.

Diversifying the production system is paramount for economic security. “If you’re going with contracts, you need to plan very carefully because organic premiums fluctuate a lot,” said Steve Temple, the UC-Davis researcher. “It’s OK if you have a high-value crop in the rotation but it’s more important that producers count on more modest premiums on all crops than simply depending on just one high-value premium. The market for high-value crops can get saturated and the prices can decrease.”



Although raising organic apples can cost 10 to 25 percent more than growing conventionally, according to a University of California study, price premiums still make them a profitable choice for farmers.

— Photo by Jerry DeWitt

NEW IOWA ORGANIC CROP/LIVESTOCK FARMERS WIN OVER SKEPTICS

JOE RUDE AND WENDE ELLIOTT, WHO GROW ALFALFA, OATS and corn and raise pastured poultry, ducks, turkey and lamb on 120 acres, routinely receive compliments on the appearance of their alfalfa field.

But it wasn't always that way for the two farmers from Colo, Iowa. After they bought their farm in 1999 and planted their first alfalfa crop, "people drove from miles around just to look at the weeds in the field," said Rude, who now laughs about it. One person even stopped to inquire about renting the field, unaware that it had been planted.

With repeated mowing, however, the alfalfa rebounded, and by the second and third year, Elliott and Rude were harvesting excellent yields. The crop response, along with a good sense of humor and confidence they were doing the right thing, helped Rude and Elliott remain steadfast in their commitment to farming organically.

"We were organic consumers before we were organic farmers, and we thought for our health and other people's health it was best not to use pesticides, hormones and antibiotics," Elliott said.

Moreover, as new farmers, Elliott and Rude couldn't afford a large farm and needed high revenue per acre. Organic products, they thought, would be more profitable.

Trying to get their crop and poultry production in harmony and working with nature is a challenge they both enjoy.

They market in more than five states now, including the high-end horse market for hay. They also grow corn and oats for their animals, selling only what they can't use on the farm. But Elliott and Rude also know that to compete with the larger farms and international operations entering the organic market, they need other ways to promote their product. Their main idea: starting a meat marketing cooperative to pool products, share responsibilities and improve efficiency and bargaining power.

Using a SARE grant, Elliott conducted a feasibility study on direct marketing that helped her write a business plan to apply for co-op start-up money. The marketing strategy of the co-op emphasizes that the products are locally grown as well as organic to give them an edge over the international and large production.



"We can't compete on cheap food," Elliott said, "but we can compete on quality and freshness and the fact that our product is local."

With 13 other farms, Elliott and Rude co-market their poultry, ducks, turkeys and lambs, and share such tasks as monitoring quality, codifying genetics and nutrition, and sales. The co-op bargains collectively to get better prices on inputs, such as chicks, and members share labor, marketing and equipment.

"As small producers, if we each tried to be a one-man show with direct marketing to the same customers, we would be working against each other," Elliott said. "With the co-op, we can reach bigger markets, and by improving efficiency, we can each grow our farms to greater profits."

Elliott advises farmers to transition to organic one field at a time as they did – phasing in row crops first, then small numbers of animals.

Now that they've proved successful at growing and marketing organic products, neighbors – rather than driving by and laughing – stop by to ask what they're doing. One neighbor even began raising ducks while another renewed his interest in vegetable crops.

"What we're doing makes everyone think about the possibilities," Elliott said.

Wendie Elliott realizes a profit from raising organic turkeys, partly thanks to a unique arrangement that allows her to share labor and inputs with other members of her Midwestern growers cooperative.

– Photo courtesy of Wendie Elliott

opposite page

Organic plums grown in Portland, Ore., draw a premium at area farmers markets.

– Photo by Jerry DeWitt



University of California researchers testing ways to grow profitable organic tomatoes recommend the use of cover crops, mechanical weed control and transplants instead of direct seeding.

– Photo courtesy of University of California-Davis

A six-year study in northeastern South Dakota comparing organic and conventional systems found much less variability in net income over all costs, except for management, in the organic system. The net returns varied by \$16/acre in the organic system versus \$31/acre in the conventional system and there were no negative net returns in the organic system.

Economic effects also vary across different enterprises and regions. For example, an organic apple enterprise might be appropriate for western areas with low disease and pest pressure, but is much tougher in eastern areas, where production costs are too high to price apples competitively. There is less yield risk in organic grains in dryland areas. Finally, enterprises based on direct marketing are less likely to succeed if the grower is far from a major population center.

During transition, risks associated with extra costs such as re-tooling, purchasing additional equipment, extra storage requirements and additional labor can be substantial.

Wende Elliott and Joe Rude helped form a marketing co-op to share some of those risks.

“If we had tried to be a one-man show instead of joining a cooperative group,” said Elliott, “it would have hurt us because we all would have been competing against each other based on price.”

Co-op members share the labor associated with marketing, such as promotion and sales. And by working together on quality control, codification of nutrition and genetics, the co-op members each gained access to bigger markets. Moreover, the growers had more time for their

individual operations. As start-up farmers, Elliott and Rude shared, rather than purchased equipment, whenever possible.

“Having a strategy for managing production, marketing and financial risks is important during the three-year period it takes to transition to organic,” said Sharon Hestvik, small farm coordinator for USDA’s Risk Management Agency. “One risk management strategy for producers transitioning into organic is to keep good records.”

RMA provides risk management tools and crop insurance coverage on over 100 crops for both organic producers and those transitioning into organic farming practices. RMA requires several documents, including:

- Records from the certifying agency showing the locations of fields that are transitional, certified organic, buffer zone acreage and conventional (not maintained under an organic management plan);
- A copy of written documentation from a certifying agent showing an organic plan for the acreage;
- Records of the types of crops grown, yields and whether the crop is irrigated or non-irrigated; and
- The dates that the crops were planted.

As part of the organic production learning curve, costs may go up. Farmer experience and research clearly shows the transition loss can be reduced, however, by taking the time to learn what you’re doing and convert a little at a time.

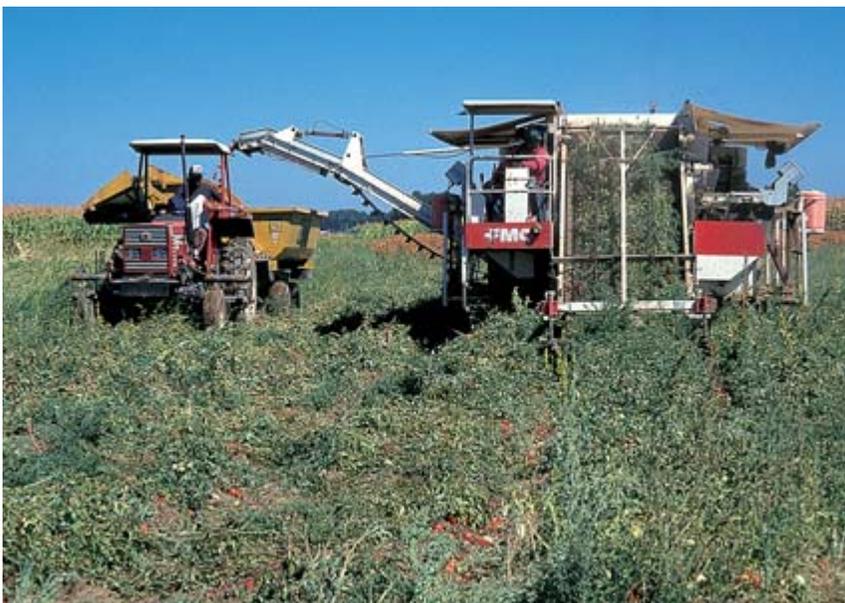
At Taconic End Farm in Vermont, where profits climbed 40 percent during the transition, Annie Claghorn’s and Caitlin Fox’s only change in management was the purchase of organic grain, since their cows were already pastured.

John Vollmer, the N.C. strawberry farmer, attributes part of his successful transition to the fact that prior to converting he had been using organic soil management techniques for two years. (For more information on transition strategies, see part 4, p. 21).

Some states, such as Minnesota and Iowa, also provide technical and financial assistance for growers in transition. (See USDA Economic Assistance box on p. 20.)

MARKETING STRATEGIES

The methods that organic farmers use to market their products are as diverse as the types of organic farming systems proliferating across the country. According to the OFRF survey, about 80 percent of organic farmers market through wholesalers, 13 percent sell directly to the consumer at farm stands, farmers markets and local restaurants, and the remainder market direct to retail outlets or stores.





CHALLENGES FOR ORGANIC FARMERS

One of the hardest challenges for farmers converting to organic is learning how to market products before growing them. Yet, many organic farmers become very successful marketers, particularly those farmers who direct market. They work hard to build relationships with their customers, and rely upon creativity, education and development of alternative outlets, such as alliances, cooperatives and other resource-pooling ventures.

“Many of the most successful growers are the best marketers,” said extension agent Brad Brummond. “Long-term growers have good relationships and are top-notch marketers. They spend time figuring out what the market wants and they negotiate prices, because in organic systems farmers can really affect the final price by the relationships they develop with buyers.”

Farmers markets are an excellent direct market venue for organic farmers. Between 1994 and 2002, the number of U.S. farmers markets grew 79 percent, reflecting the expanding market base. “You may not see a big premium at a farmers market, but you get more customers, people get to know you, and most markets welcome organic farmers,” said Dan Nagengast, executive director of the Kansas Rural Center and an organic farmer.

Grower Alliances. Pooling resources can be invaluable. Organic growers in North Dakota lacked lucrative markets for their fresh produce, meat, grain and value-added products. Ben Larson, a researcher and organic farmer, contacted the Organic Alliance in St. Paul to develop a marketing strategy, consumer education information, and a media plan. Larson also went directly to large grocery stores to introduce available product. He then coordinated all the interested local growers so the stores would only need to make one call a week for their order.

As part of the plan to help educate consumers, Larson provided stores with “point of sale” materials and advertised on public radio and in newspapers to promote organic foods. He also started a new farmers market to focus on locally grown foods. As a result, sales increased at the farmers market and the grocery stores – and their

INFORMATION. Extension agents and farm advisers are increasingly knowledgeable about organic farming, although you still may find it difficult to gain information through typical channels. Many extension agents can recommend someone who specializes in organic production. A nationwide survey conducted by the Organic Farming Research Foundation found that organic farmers find other farmers, suppliers, grower’s associations, books, conferences, seminars and periodicals the most useful sources of information. The Appropriate Technology Transfer for Rural Areas (ATTRA) program, a national sustainable agriculture information service, provides free technical assistance to farmers, ranchers, educators and others, including numerous publications on organic production and a well-respected “Organic Matters” series (See p. 28 for more information about ATTRA and “Resources” on p. 30 for more information about the print series.)

PRICING. According to USDA’s Economic Research Service, organic farmers face challenges in finding markets and negotiating prices. Organic farmers say they would like to see more information on organic prices and lists of buyers. Many small to mid-size organic farmers form cooperatives or alliances with other organic farmers to strengthen their negotiating power (see “Marketing” on p. 18). A new website from the Rodale Institute provides a weekly comparison of conventional and organic prices for 40 products, from grains to vegetables. (www.newfarm.org). USDA’s daily Market News Report for Boston, Mass., and occasionally other terminal markets, reports organic vegetable premiums (www.ams.usda.gov/fv/mncs/termveg.htm). Also, a private firm based in Florida, Organic Food Business News FAX Bulletin (OFBN), has been selling a weekly organic price report containing farm gate prices for grains and produce since the 1990’s (407-628-1377).

RESEARCH. Research on organic farming practices has lagged significantly behind

conventional research due to a lack of institutional interest in organic farming, the complex nature of organic farming systems, and the fact that most agricultural researchers are trained to focus on disciplinary rather than integrated systems research. Now, more organic research is occurring at state and federal institutions, much of it funded by SARE, and while results are not yet widely disseminated, research summaries and links to other reports are available at www.organicaginfo.org. ATTRA and OFRF also summarize organic research. (See “Resources”, p. 30.)

TIME MANAGEMENT. Recordkeeping associated with certified organic production is time consuming. You must keep accurate post-certification records on the production, harvesting and handling of agricultural products sold as organic. Don’t underestimate the additional time needed to gain new skills, such as managing crop species, controlling weeds mechanically and undertaking new marketing strategies. Organic farming requires preventative rather than prescriptive strategies and a considerable amount of planning ahead.

GMO CONTAMINATION. In some regions of the country, contamination of organic crops with genetically modified crops has become a problem. In particular, organic corn and soybean loads grown in the Midwest have been rejected by purchasers after the crop was found to be contaminated. GMO’s “still cause major concern and producers are still trying to work this issue out,” said Brad Brummond, a Walsh County, N.D., extension agent who specializes in organic production. “We’ve already given up on canola because we can’t keep it clean.” Brummond recommends that organic growers communicate with their neighbors who are growing transgenic crops to try and get as much distance as possible. He also points out that contamination can result from shared equipment such as elevators and trucks.

success selling organic potatoes encouraged the grocers to try other products.

“We were trying to reach the larger segment of the population who will choose organics if they’re available in the grocery store,” said Larson.

Restaurants. Many organic farmers direct market to high-end restaurants and farmers markets. A New York chef, quoted in a cover story on organic agriculture in a fall 2002 *Newsweek* said, “When people taste asparagus or string beans grown in richly composted soil, they can’t get over the depth and vibrancy of the flavor.”

The farm-restaurant relationship has worked well for Urban Oaks Farm in New Britain, Conn. “Even if you grow the best tomato in the world, if you can’t sell it, it isn’t going to work,” said Urban Oaks co-manager Tony Norris, who grows greens, herbs, tomatoes and eggplant, among other vegetables. Norris sells much of his organic produce to Hartford restaurant chefs based on relationships he built with care.

He advises farmers to arrange an appointment with a sympathetic chef, and bring a sample of products, a price list and clear billing and delivery system. “You have to think it through,” he said. Norris considers himself a “consultant” to the chefs he supplies, but “if you’re not comfortable doing that, maybe a partner or spouse can do it.”

Marketing Companies. Organic farmers Richard and Peggy Sechrist of Fredericksburg, Texas, who have a 50-head herd of beef cattle and raise 750-1000 pastured chickens per month, formed a company specifically for marketing purposes. When they found it too difficult to reach the volume they needed to turn a profit in direct sales, they developed a label to differentiate their products and fetch a premium. Under this label, they now sell their own products and those of neighboring ranchers raising organic meat. Sales go to an initial customer base of about 750 built through mail order, farmers markets, booths at fairs, and small health food stores, but new purchasers also find them.

Their financial success comes from the strong market for chicken and relationships with food distributors. But they also work constantly to educate consumers about their product, how their meat was raised and the issues around organic farming.

Asked whether their changes in production practices and organic certification have increased the profitability of their ranch, Peggy Sechrist responded positively. “Definitely,” she said. “Our distributors understood ‘organic’ and now understand ‘grass-fed,’” a distinction that translates to higher returns.

USDA ECONOMIC ASSISTANCE FOR ORGANIC AND TRANSITIONING FARMERS

Some federal programs provide financial assistance to organic farmers and ranchers and those transitioning to organic systems. Check details with each program to verify current status and obtain additional information.

Conservation Security Program (USDA-NRCS)

Provides technical and annual financial assistance to farmers and ranchers to reward new and ongoing good stewardship practices that enhance natural resources and the environment. Organic producers adopting or maintaining whole farm conservation plans will likely qualify for CSP support. www.nrcs.usda.gov/programs/csp/

Organic Certification Cost Share, National Organic Program (USDA-AMS)

Offers organic producers and handlers financial assistance to offset the costs of certification under the National Organic Program. Each operation is eligible for up to 75 percent of its cost of certification, not to exceed \$500. Administered by state Departments of Agriculture. Contact your state Department of Agriculture for more information.

Organic Transition Payments Agricultural Management Assistance (USDA-NRCS)

In the 12 northeastern states, plus WY, UT, and NV, provides conservation financial and technical assistance to farmers making the transition to organic. www.nrcs.usda.gov/programs/ama/

Environmental Quality Incentives Program (USDA-NRCS)

Provides technical and one-time financial assistance to farmers and ranchers for management conservation practices. Some NRCS state offices have developed specific organic cropping or livestock conservation options under EQIP. Check with your NRCS state office. www.nrcs.usda.gov/programs/eqip/

Value-Added Agricultural Producer Grants (USDA-RBCS)

Organic foods qualify as value-added agricultural products eligible for grant funds through the VAPG program. Individual producers, producer groups, or producer-owned cooperatives or business ventures can apply to develop business plans or feasibility studies or to develop a new marketing or processing venture that will improve farm income and competitiveness. www.rurdev.usda.gov/rbs/coops/vadg.htm



PART 4

Making the Transition to Organic Production

FACTORS TO CONSIDER BEFORE TRANSITIONING

CONVERTING TO ORGANIC PRODUCTION IS NOT A DECISION to take lightly. Organic farmers must learn how to work with nature to solve problems, such as adapting crop rotations to improve soil fertility, manage weeds and control pests rather than simply substituting accepted materials for prohibited ones.

Farmers considering a transition to organic farming should think about the following questions, drafted by the Ohio Ecological Food and Farming Association (OEFFA):

- Do you enjoy walking your fields on a regular basis?
- Can you distinguish pests from beneficial insects?
- Are you curious about why things happen on your farm?
- Can you tolerate a field that is not weed free?
- Do you have the patience to trade short-term economic returns for longer-term “ecological” credits while building soil health?

Farmers converting to organic purely to improve profits often fail because they do not consider the huge range of economic, social and production changes that must occur. The transition period can be particularly stressful because of the need to develop and implement new management skills. In fact, you must be prepared to survive a short-term financial loss if yields drop and costs increase during this period.

Other considerations, posed by OEFFA and others, include:

- How will the transition period, where yields sometimes decrease and price premiums are not yet available, impact your family?
- How will social stigma and negative peer pressure from other farmers impact you? Lydia Poulsen, the Utah cattle and grain farmer, said that when she converted a decade ago, people couldn’t understand what she was doing, or why. Now, people seem more accepting and interested.
- What resources are available? Consider labor, borrowing capability, knowledge base of local extension and information exchange regarding organic production. When the organic dairy industry was expanding in Vermont, SARE-funded researchers designed a study to explore business, crop and animal management on dairy farms. One of the most important findings of



the study, said researcher Lisa McCrory, was “how all the growers benefited from what they could share with each other, the time spent brainstorming and sharing through on-farm demonstrations and conferences, and exchanging pasture management skills.”

- How will you develop the new types of relationships required to market organic products?

Some farmers view the transition period as an investment in education. During this time, when some growers experience declining profits, remember you are not only learning new skills but also are building what some economists call “natural capital.” This refers to improved physical characteristics of soil and plants, such as better soil water infiltration, increased microbial populations, more natural predators, and better control of the weeds.

Like investing in a new stock, there may not be short-term profits, but in the long run, you are setting the stage for the sustainability of your land and farm.

START-UP IDEAS

AFTER DECIDING TO TAKE THE PLUNGE INTO ORGANIC production, consider the following strategies:

- Identify the closest certification organization and start collecting information about how to come into compliance. (www.ams.usda.gov/nop/)

As part of his continuous soil improvement plan, North Carolina vegetable grower John Vollmer, who received a SARE producer grant, mows a cover crop of millet and soybeans to create a rich amendment.

— Photo by Mary Vollmer



HOW TO GET CERTIFIED

USDA accredits state, private and foreign organizations to become “certifying agents.” Those agents certify that a farmer’s production and handling practices meet the national standards.

To initiate the process of certification, the following information must be submitted to an accredited certifying agent:

- Type of operation.
- History of substances applied to land for the previous three years.
- Organic products being grown, raised or processed.
- An organic plan, which includes practices and

substances used in production. This plan should also detail any monitoring practices that will be used to verify that the production system will be organic, including the record-keeping system, and how to prevent co-mingling of organic and non-organic products and contact of products with prohibited substances.

You will also need to evaluate and prepare a description of the physical barriers and buffers on your property that separate your operation from conventional neighbors.

After reviewing the application, if the certifying agent determines you are

eligible, a qualified inspector will schedule a visit for an on-site inspection. If the application and inspection report show compliance with the requirements, certification will be granted. Once certified, you must re-apply for certification every year, and will also be assessed a certification fee of a few hundred dollars each year. Many states currently have cost share programs to offset certification fees. (Contact your local certifier for more information and see “Economic Assistance” box on p. 20).

- Make contacts. Attend meetings of organic and other transitional farmers, collect books and other resources and find extension agents and other educators who are knowledgeable about organic production and transition strategies.
- Experiment with a systems approach that will work on your farm or ranch. Focus on prevention strategies and treating the causes of problems rather than specific problems themselves.
- Develop marketing strategies for your organic products. (SAN’s *Building a Sustainable Business* is a useful planning guide for farm entrepreneurial activities. See “Resources”, p.30.)

In the planning phase, evaluate the strengths and weaknesses of the farm. How will you work with the natural system you have? Are you ready for a transition? For example:

- What are your most valuable natural resources?
- Does topography work for or against you?
- What kind of pest pressure do you experience?
- How healthy are the soils?

(Adapted from *The Transition Process* by the Rodale Institute.)

Soil health is extremely important because you will no longer rely on external inputs, but depend instead on the activity and capacity of the soil. “I knew that my soils were basically sand with a little bit of nutrients and that everything was burned out,” said John Vollmer about why he took two years to even start the transition.

When breaking new ground or exploring new enterprises, “Spend the money to get good soil tests done so you know what amendments you’ll need,” said Tony Norris, an organic vegetable grower in New Britain, Conn.

Think about pest control. Biological pest control is complex, involving complicated interactions among crop rotations, intercropping combinations, planting schedules and beneficial habitats. What strategies or systems are already in place?

MAKING THE SWITCH

FRED KIRSCHENMANN, A NORTH DAKOTA FARMER AND A LONG-time advocate of sustainable farming systems, gives this advice in the foreword to *Cereal-Legume Cropping Systems*, a book for farmers who are exploring switching to sustainable production methods.

“In switching from one system to another, it is extremely important to remember that what one is doing is switching systems and not changing technologies. Many farmers have experienced severe unnecessary losses in making the switch because they failed to appreciate the difference.

“Making this switch is not simply a matter of substituting green manure for synthetic fertilizers or substituting organic fertilizers for conventional ones. Nor is it primarily substituting botanical pesticides for ‘toxic’ ones. Making the switch is a matter of slowly backing out of one system of farming (that relies heavily on off-farm inputs) and slowly introducing another system of farming (that relies heavily on comprehending and using nature’s cycles).

“Effective use of on-site nutrient cycles as the primary source of fertility requires good organic matter, a crumbly soil structure, minimum compaction and high levels of biological activity.

“Effective pest control with reduced or no pesticide use also takes time. It takes time to break the pest cycles that have become established under monocrop management. Good pest control with fewer off-farm inputs requires a thorough understanding of the natural cycles of the weeds, insect pests, and diseases that have established themselves on your farm and then determining what crops and practices are most effective in interrupting those cycles.”

Nancy Creamer, a leader of the North Carolina State University organic transition experiment comparing a range of organic systems, has benefited from the cumulative knowledge gained from the last two decades of organic farming research. Based on past research results, Creamer and her colleagues started their rotation with soybeans instead of corn and applied principles of organic weed management to achieve relatively weed-free fields. “It’s possible that it’s easier to farm organically now, given the cumulative experience that has been gained by farmers over the years,” said Creamer.

By designing research based on results from earlier studies, Creamer and others have shown that it is possible to make the transition with minimal production losses. By preparing the land, building soil, focusing on the right crops and rotation, and not putting too much acreage or too many animals into production, farmers can minimize what has come to be known as the “transition effect.” Creamer’s study, for example, showed that with good weed management, soybean yields can

equal those of conventional beans during the first year of a transition.

MANAGEMENT STRATEGIES

Rotations. Start by deciding how to build your rotation, as this is the most important management tool in an organic system. Your biggest challenges likely will be weeds and nitrogen fertility, so think carefully about how to balance those constraints with maintaining a high-value crop.

Grass/legume mixtures provide good cover and supply nitrogen, but if your soils are low in organic matter, you may need to incorporate the mixtures instead of cutting them for hay. Research cash crop alternatives that will help steady your bottom line. At the Rodale Institute, a five-year rotation was cut to three years to get more high-value cash crops and to allow the grass/legume mixture to be used for improving soil fertility.

Mary Howell Martens, an organic farmer from Penn Yan, N.Y., recommends striving for balance between maintaining soil health and producing economically profitable yields. “One of the problems we’ve seen [is farmers] putting the whole farm into the most profitable organic crop every year. With no rotation, the yields go to pieces,” she said, when interviewed for the SARE-funded educational video, “Organic Grain: Another Way.”

“The crop mix that we have developed maintains our soil health and yields and also gives us a fairly profitable operation. But the overriding consideration is: What does this field need? We do put in some crops that are

“It’s possible that it’s easier to farm organically now, given the cumulative experience that has been gained by farmers over the years.”

*– Nancy Creamer
North Carolina State University*



Rotations have been called the most important management tool in organic systems. Research at this long-term systems trial at the University of California-Davis points to starting a rotation with crops that require less nitrogen.

– Photo courtesy of University of California-Davis

WHAT'S IN A NAME?

Any operation or portions of operations that produce or handle agricultural products sold, labeled or represented as “100-percent organic,” “organic,” or “made with organic ingredients” must be certified. Farmers who sell less than \$5,000 a year in organic agricultural products are exempt from certification, although they must abide by the national standards to label their products as organic. While the new standards allow for easier marketing, some smaller, highly diversified organic farmers, particularly those who direct market to consumers, don't find it worthwhile to certify because of the cost of certification or the time required for record keeping.

If you wish to grow your food in a manner that follows the principles of organic production but don't want to get certified, consider other labels to distinguish your products in the marketplace. Eliot Coleman, a 35-year organic farmer, advocates using the label “authentic.” For Coleman, this label would identify livestock raised outdoors and on pasture; systems focused on “plant positive” rather than “pest negative” processes; systems using cover crops, farm-derived organic matter and crop rotations; and food sold within a 50-mile radius of where it was grown.

Other terms farmers use to carve out a market niche and distinguish themselves as envi-

ronmentally friendly are:

- ☞ Integrated Pest Management (IPM)
- ☞ Hormone or antibiotic free
- ☞ Free range
- ☞ Natural or authentic
- ☞ Transitional

Since none of those labels have third party verification, they are best used when you are direct marketing to your customers and can explain your production practices.

If you are looking for a label that has independent third party verification, Consumers Union, the publisher of *Consumer Reports* magazine, hosts a web site, www.eco-labels.org, which contains summaries and ratings of other environmentally friendly labels.

sequence, showed that in the third year of production, the organic systems where corn or soybeans had been preceded by one to two years of small grain/forage legume versus a row crop had lower weed incidence and higher yields by the third year. This suggests that you should avoid planting two row crops in sequence in the transition.

Other considerations for the rotation:

- ☞ Does the rotation match the crop needs for fertility? Try to have crops with differing root depths so they can access different nutrient zones.
- ☞ Does the rotation have sufficient diversity so that risks will be minimized?
- ☞ Does it provide weed control?

Take advantage of mixtures and niches such as the combination of sorghum-sudangrass/lablab/cowpea planted in early summer following tomatoes and preceding corn in a California experiment.

“With a nitrophilic crop like corn following tomatoes, it's important to have a mixture that's building the soil,” said Steve Temple, one of the researchers. The mixture, he continued, is designed for multiple functions:

- ☞ The sorghum-sudangrass germinates quickly in the heat and takes up residual nitrogen. It also shades out late summer weeds.
- ☞ The cowpea, which fixes its own nitrogen, grows productively alongside the sorghum-sudangrass.
- ☞ When the sorghum-sudangrass dies back in early fall, the lablab, also a legume, emerges, so that by December, when all three species have winter-



With season extension and sales to a variety of market outlets, organic cut flowers are a value-added crop that bring top dollar. Celosia, amaranth, scabiosa and sunflowers from these mixed beds in Browntown, Wis., went into community supported agriculture (CSA) shares, and were sold at farmers markets and weddings.

— Photo by Jerry DeWitt

not particularly profitable, but then they're being rotated with the crops that make us the best income.”

Begin with cash crops that require less nitrogen and can be effectively managed to control weeds. Many studies have shown that, with proper weed management, soybeans can be planted in the first year of a transition with no declines in yields. Corn, on the other hand, is not a good transition crop because it requires a lot of nitrogen and more weed management.

However, once the system is established, organic corn can be grown quite successfully, said Kathleen Delate, an Iowa State University organic researcher. Her studies show that within three years of the transition, organic corn can produce as well as conventional corn.

Avoid consecutive years of row crops to prevent weed outbreaks and maintain system productivity. University of Minnesota researchers and a dozen or so Minnesota farmers collaborating on a SARE project found that avoiding consecutive years of row cropping during the conversion to organic production could prevent weed outbreaks and maintain system productivity. The experiment, which examined the effect of crop

Connecticut Co-op Expands Organic Sales Statewide

DESPITE THE SOGGY CHILL OF CENTRAL CONNECTICUT IN March, a steady stream of afternoon shoppers side-stepped mounds of snow to enter a farm stand bulging with fruit, potatoes and winter greens for their week's supply of organic fruit and vegetables. Much of the tempting array came from warmer climes, but Urban Oaks Farm managers Tony Norris and Mike Kandefer displayed a whole section of Connecticut-grown produce available through their involvement in a statewide organic growers cooperative.

Since 1996, the Certified Organic Associated Growers of Connecticut (or COAG), which Norris was instrumental in founding with support from a SARE producer grant, has enabled growers to co-market vegetables throughout the state. It's been a great channel for Urban Oaks Farm because Norris and Kandefer can augment their supply of what they grow best – greens, herbs, tomatoes and eggplant, among other vegetables – with crops better suited to other soil types. The onions, potatoes and garlic on display at their farm stand, for example, came from eastern Connecticut growers.

The re-selling arrangement is just one of the benefits Norris and Kandefer realize from their COAG membership. The co-op provides them with opportunities to network with like-minded farmers facing similar issues. The 25-member group also does collective purchasing, such as buying potting soil in bulk to lower costs.

"It took a few years, but everyone got to know each other well and developed friendships," Norris said. "It's a networking tool, but also a way for farmers to deal with issues collectively."

Norris and Kandefer perfected their organic farming techniques throughout the 1990s, when they leased land from a dairy producer in central Connecticut and devised a system based on long rotations of vegetables mixed with cover crops like summer buckwheat and winter rye.

Their pest management strategies were grounded in a generous "rest" cycle. They focused on raising fresh vegetables on three of four fields, with one left under cover crops for a full year to help manage pests and disease. Their rural setting, however, was far from major markets. In 1999, they leased land in New Britain, Conn., just outside Hartford, and launched Urban Oaks Farm.

Their new three-acre parcel is too small to allow for the generous "rest" cycles, so Norris and Kandefer rely



more than ever on soil amendments such as green manure (annual rye and dutch white clover), mulches and a quadrant rotation. The cooperative marketing arrangement allows them to focus on growing what works well under their conditions. They expand their line of produce by re-selling co-op products.

Today, the farm's bustling market, just a stone's throw from enormous greenhouses, plays just one part of a diverse marketing plan that includes direct markets and a community supported agriculture (CSA) operation.

About 85 percent of the farm sales go to restaurants and retail stores, including the popular Wild Oats grocery and a corporate dining club in downtown Hartford.

"Even if you grow the best tomato in the world, if you can't sell it, the farm isn't going to work," Norris said. "There are too many farm stands, so we started selling directly to restaurants and stores."

While many farmers don't like the constant interaction required to meet the needs of chefs and produce managers, Norris, an avid cook, relishes the opportunity.

"We became the people who knew how to wholesale," he said. "You need to have a professional presentation, to think it through. It helps if you grew up in a family where food is a big deal. I can talk their language."

Tony Norris raises greens, herbs and tomatoes, but can offer a wider variety of Connecticut-grown crops thanks to a co-selling arrangement with a statewide organic growers cooperative he helped found with a SARE grant.

– Photo by Len Berton

Mark Davis, an agronomist at USDA-ARS's Sustainable Agricultural Systems Lab in Beltsville, Md., examines a no-till drill as part of a long-term experiment that compares crop production, weed pressure and soil dynamics in organic and conventional cropping systems.

— Photo by Mandy Rodrigues



killed, the dense mass of cover contains fixed and recycled nitrogen.

- With all the nitrogen accumulated and fixed in the fall, and stored in the vegetative biomass over winter, you don't have to wait for spring growth of the cover crops. The dense mixture can be plowed under and the crops planted as soon as the ground is ready.

Soils. Building soil organic matter and improving soil quality is often cited as the most critical step for a successful conversion to organic farming.

- It may take three to five years for the soil to improve, depending on the condition of the soil, so start adding manure or composts and finding other sources of organic amendments as soon as possible.
- Balance production, soil building and conservation. Good crop rotations that include cover crops and animal wastes help build soil organic matter.
- Do research and start experimenting. Reading a book on compost, "made me realize I should just do things instead of figuring out the technical parts," said John Vollmer. (See *Building Soils for Better Crops* in "Resources", p. 30.)

Weeds. One of your biggest transition challenges will be weed management. New studies are showing, however, that with careful management, weeds can be controlled effectively during transition:

- Careful weed control was one reason that an Iowa study found no yield reduction in soybeans, and loss in corn only for the first year of a transition trial. "We attribute our results to high managerial experience in producing diverse crops and accurately operating various implements in organic systems," said project leader Kathleen Delate.

- A SARE study in Minnesota found that a crop of buckwheat harvested for seed was effective at smothering Canada thistle, in both the immediate and the subsequent crops – winter rye and soybeans. The research also showed the economic impact of good weed management; every bushel of soybeans not lost to weeds increased profitability \$12 to \$18 an acre. Moreover, replacing four rotary hoeings or harrowings with two well-timed ones for Canada thistle reduced costs by \$3 to \$5 an acre.

A change in attitude toward weed management is also critical, said John Hall, a Maryland extension educator who co-created the "Organic Grain: Another Way" video. "We think a field has to be weed-less to be productive. What we're seeing by those in transition, though, is that we can tolerate weeds. We just have to know where the threshold is and be willing to accept that."

John Teasdale, a weed scientist with USDA's Agricultural Research Service who has studied non-chemical methods to manage weeds, focuses on controlling seeds. "One aspect of trying to grow crops without herbicides is to control the weed seed population and keep it as low as possible," he said. "It is important not only to try to control weeds and prevent yield losses, but also to prevent those weeds from going to seed and building up a soil seed bank."

Other strategies to consider:

- Identify weed problems before they start, addressing them in crop rotations.
- Distinguish between annual and perennial weeds, as well as those that spread by rhizomes and seeds, to develop effective management.
- Plant higher crop densities to block weed germination.

- Shift between warm- and cool-season crops in your rotation to disrupt the life cycle of various weeds and reduce competition.
- Include crops that have natural weed inhibitors like rye and sorghum.
- Plant crops that can be sown late in the season and easily cultivated. Switching to transplants in horticultural crops can provide a jump on the season, and allows more soil to be thrown up around the plant without causing damage.

Insect Pests. Plan your rotation and soil-building strategies to manage insects and diseases. Be aware that elimination of pesticides can lead to temporary outbreaks of pests.

Before starting the transition, “minimize pesticide applications, and use pesticides with the least impact on natural enemies,” said Abby Seaman, an extension educator with the New York State IPM program and Cornell University, who received a SARE grant to investigate the relationship between management practices and pest populations. “This will make the transition less jarring.” Seaman also recommends:

- Push the envelope with IPM practices, such as scouting and setting thresholds for pest populations. Gain experience spotting natural predators in the field.
- Become familiar with acceptable management materials and start trying them.
- Build soil organic matter to reduce disease pressure.

Livestock. Many farmers and ranchers who are already using pasture-based systems to raise their animals don’t find the transition difficult. Beef producers in Nebraska are entering the organic market by using the pasture-based systems they’ve perfected over the last few years, said Martin Kleinschmit, sustainable agriculture specialist with the Center for Rural Affairs in Walthill, Neb.

“The transition is easy,” Kleinschmit said, although certain rules must be met as you convert to organic production. Ranchers need to provide buffer areas – 25-foot fenced setbacks from conventional neighbors – on their pastures and keep animals out of streams.

Similarly, deep-bedded systems, such as those used in “hoop” barns for hogs, create a jumping-off point for would-be organic pork producers.

With help from a SARE grant, Minnesota pork producer Dave Serfling decided to create a deep-bedded system for his 170 hogs. He converted an old, two-story barn into a straw-based system, an efficient way to generate heat through the animals’ body warmth and

manure, which composts in the straw. Not only does Serfling save on heating bills, but he also avoids manure storage concerns because the manure-straw mixture creates an ideal crop fertilizer.

“They can even stay warm on days when we record 30 degrees below zero,” Serfling said. The hogs are able to grow in a group, exercising and interacting in a herd setting rather than living in individual crates.

Serfling sells his organic pork to an upscale food retailer that established animal welfare guidelines, including a no-crate rule, and supplies restaurants and premier retail stores. Serfling receives at least a 6-cent-per-pound premium.

Dairy farmers are well positioned for transitioning to organic if they use pasture as a major feed source and don’t over-push their cows for production or utilize many antibiotics or hormones, said Lisa McCrory. Even if transitional farmers don’t follow all these strategies, they can start one at a time by trying alternative dry cow therapies, eliminating prohibited materials such as hormones and antibiotics, and getting the cows grazing.

Pastured cows tend to need less medical treatment and antibiotics because of access to fresh air and exercise, so pasturing is an excellent way to begin a transition. Depending on a farmer’s comfort level with grazing, it can take anywhere from one season to five years to

Many organic hog systems rely on deep straw, which, mixed with manure, provides heat in barns or hoop structures and reduces environmental concerns about waste storage and disposal.

– Photo by Jerry DeWitt



ATTRA RESOURCES



ATTRA, the national sustainable agricultural information service operated by the National Center for Appropriate Technology, is an excellent source of information for growers beginning a transition to organic. Two workbooks – one on cropping systems and one on livestock – are designed to assist growers in understanding the range of practices and materials allowed under the federal regulations. Entitled “An Organic and Sustainable Practices Workbook and Resource Guide for Livestock Systems (or “Cropping Systems”), these books are geared to growers thinking about conversion. While they are not official compliance booklets, ATTRA’s checklist approach will help you evaluate how close your farm may be to meeting the standards and what changes are needed. Other useful bulletins from ATTRA include:

- Organic Farm Certification and the National Organic Program – a brief overview of certification
- An Overview of Organic Crop Production – describes the key concepts and practices of certified crop production
- Creating an Organic Production and Handling System Plan – a template for creating the mandatory organic system plan
- Organic Field Crops Documentation Forms – a set of worksheets that farmers can use for documenting activities, practices and inputs to demonstrate compliance with the organic regulations.
- Compliance Checklist for Producers – a checklist designed to assist growers with assessing compliance of farm or ranch with the National Organic Program Standards.

ATTRA also publishes a series of booklets on organic production for fruits, vegetables, flowers, herbs, livestock, field crops, as well as manuals on organic control of pests, soil and fertilizer issues and marketing and certification. Most ATTRA publications can be accessed on line at www.attra.org or by calling (800) 346-9140 and are available for free to farmers.

Erica Renaud, farm manager for the certified organic seed supplier Seeds of Change, shows off a field of organic comfrey.
– Photo by Jerry DeWitt

learn to take full advantage of a pasture. McCrory also advises producers to:

- Network with other successful organic dairy farmers for tips and information at farm demonstrations, conferences and meetings.
- Expect cull rates to go up at first, because the older cows will have a hard time fitting into the new system.
- Stay focused on the bottom line, rather than production numbers. Anticipate decreased production as your ratio of forage to grain increases. Many organic dairy farmers have reduced production goals yet still turn a higher profit than conventional operators because input costs such as veterinary bills, drugs and feed decrease.

Although the land to produce the organic grain must be managed according to organic standards for three years, the cows only need to be managed organically for one year, so some operators transitioning to organic sell off the milkers and keep the young stock for transition. Heifers eat very little grain, and most will be in compliance since they haven’t received antibiotics, or drugs for dry-cow treatment.

For more information about transitioning dairy farms, see Cornell University’s booklet, *The Organic Decision! Transitioning to Organic Dairy Production*. (See “Resources”, p. 30.)

Poultry farmers who have adopted outdoor, minimal-confinement systems also have a similarly easy transition to organic systems. The small but growing practice of raising broilers, layers and turkeys in pasture-based systems lends itself to organic certification because it meets two of the requirements of the national rule for organic meat – outdoor access for livestock and elimination of antibiotics in feed.

Most alternative poultry producers already avoid antibiotics, saying birds not crowded together in confinement systems experience fewer infections. Producers still need to watch for diseases and weather-related stress. To control such incidence, consider:

- Moving the birds frequently, allowing pathogens to die off when their food source is removed
- Cleaning pens and brooders regularly between flocks

TRANSITION APPROACHES

THERE IS NO ONE CORRECT STRATEGY FOR TRANSITIONING TO organic. Growers have used one or more of the following approaches successfully.

Transitioning one parcel at a time. Start with limited acres as dictated by finances and labor availability. Certify your farm one area at a time to minimize risk and experiment with a portion of the farm rather than the entire acreage. Wende Elliott and Joe Rude attribute their success to their careful approach of introducing one field at a time.

“I’ve seen farmers hit a wall the third year of transition,” said county extension agent Brad Brummond. “The chemicals have worn off, and the biological systems haven’t quite come into place, so if you transition piecemeal, you can minimize the amount of land that is subject to problems, and you can learn on a smaller amount of land.” Transitioning one parcel at a time also helps minimize the economic losses you may face during transition.

Gradual transition. Withdraw one class of inputs at a time, or start by banding fertilizers and herbicides and monitoring pests for threshold levels. Preliminary results from a North Carolina study investigating the impact of withdrawing classes of inputs show that there were no yield differences between conventional, transitional and organic soybeans for the first year of the transition. This approach will delay how quickly land can be certified – three years of complete chemical withdrawal

are required – and may impact your profitability. However, direct marketers may be able to take advantage of transitional status to fetch a higher premium. (See “What’s in a Name?” box on p. 24).

John Vollmer grows 25 acres of conventional fruit and vegetables, including strawberries, which he markets for the same price as the organic strawberries. Consumers want the quality, he said, and when you are direct marketing, and the product is good, they’ll pay for it.

“Cold turkey.” Originally not considered a wise strategy because transitioning was thought to take three to five years, switching to organic within a shorter timeframe actually holds potential. Research shows that if you use crops that do not have high nitrogen requirements, or select varieties that can fix their own nitrogen, you can avoid yield declines. Moreover, legume crops such as soybeans are easy to cultivate and perform well even with all chemical inputs withdrawn. A Minnesota study showed that even corn could perform well by the third year of the transition.

Certifying Conservation Reserve Program (CRP) land. If you can document that it has not received prohibited inputs, CRP land or pasture may qualify for immediate certification. A SARE-funded study on Iowa CRP land showed that there was virtually no economic loss when transitioning using soybeans. By the third year, the economic returns in the certified organic soybeans were 180 percent above conventional.



Cattle producers can make a fairly easy transition to organic production. This Benton, Ark., rancher rotates his herd through paddocks every three weeks in an intensive grazing system.

– Photo by USDA-NRCS

Transitioning to Organic Resources

GENERAL INFORMATION

Sustainable Agriculture Research & Education (SARE) program USDA.

10300 Baltimore Ave.,
BARC West, Bldg. 046,
Beltsville, MD 20705;
(301) 504-5230; san@sare.org;
www.sare.org.

SARE studies and spreads information about sustainable agriculture via a nationwide grants program. See specific research findings at www.sare.org/projects.

Alternative Farming Systems Information Center (AFSIC). USDA

National Agricultural Library,
Rm 132, Beltsville, MD 20705;
(301) 504-6559;
afsic@nal.usda.gov;
www.nal.usda.gov/afsic
Provides on-line information resources, referrals and database searching.

Appropriate Technology Transfer for Rural Areas (ATTRA). P.O. Box 3657, Fayetteville, AR 72702; (800) 346-9140; <http://attra.ncat.org>

Managed by the National Center for Appropriate Technology (NCAT), with a grant from the USDA, ATTRA is the national sustainable agriculture information service, providing information and technical assistance, free of charge, to farmers and other agricultural professionals on sustainable agriculture.

USDA's National Organic Program (NOP).

USDA-AMS-TMP-NOP,
Room 4008-South Building,
1400 Independence Avenue,
SW, Washington, DC
20250-0020;
(202) 720-3253;
www.ams.usda.gov/nop/.
The National Organic Program (NOP) establishes national standards for the production and handling of organically produced

products, including a national list of substances approved for and prohibited from use in organic production and handling. Website has many resources including the national list of allowed and prohibited substances.

BOOKS

The New Organic Grower: A master's manual of tools and techniques for home and market gardeners.

By Eliot Coleman. \$24.95 + s/h to Chelsea Green Publishing Co., (800) 639-4099; info@chelseagreen.com; www.chelseagreen.com. Presents simple and sustainable ways of growing top-quality organic vegetables and provides practical information on marketing, small-scale equipment, and on farming and gardening for the long-term health of the soil.

Northeast Organic Farming Association (NOFA), produces the Hands-on Organic series designed to present a comprehensive view of key farming practices from the organic perspective.

First two in a series of 10 booklets on organic production topics forthcoming from Chelsea Green include:

• *Organic Weed Management*, \$7.95 + s/h.

• *Organic Soil Fertility Management*, \$7.95 + s/h.

To order: Chelsea Green Publishing Co., (800) 639-4099; info@chelseagreen.com; www.chelseagreen.com.

Sustainable Agriculture Network (SAN) Beltsville, MD. SAN disseminates information for SARE through electronic and print publications, including:

• *Building Soils for Better Crops*, 2nd Edition. \$19.95 +

\$5.95 s/h. This 240-page book contains detailed information about soil structure and the management practices that affect soils.

• *Managing Cover Crops Profitably*, 2nd Edition. \$19 + \$5.95 s/h. Explores how and why cover crops work and provides all the information needed to build cover crops into any farming system.

• *Manage Insects on Your Farm: A Guide to Ecological Strategies*. \$15.95 + \$5.95 s/h. Describes crop diversification, biological control and sustainable soil management.

• *Steel in the Field: A farmer's guide to weed management tools*. \$18 + \$5.95 s/h. Shows how today's implements and techniques can control weeds while reducing – or eliminating – herbicides. To order SAN publications contact (802) 656-0484; sanpubs@uvm.edu or visit www.sare.org/htdocs/pubs.

BOOKLETS/NEWSLETTERS

The Organic Decision: Transitioning to Organic Dairy Production, by Cornell University Department of Applied Economics and Management. Bulletin #2002-02. Get online order form at http://aem.cornell.edu/order/pub_order_form.pdf.

Organic Farming Research Foundation (OFRF) Informational Bulletin Newsletter.

OFRF sponsors research related to organic farming practices and then disseminates those research results to organic farmers and growers. (831) 426-6606; <http://ofrr.org/publications/publications.html>.

The Transition Process: Making the Transition to Sustainable Agriculture.

\$1.25/ea from the Rodale Institute; (610) 683-6009; ribooks@fast.net.

A Case-Study Report: Farming Without Chemicals in Ohio.

Report based on in-depth interviews with certified organic grain and soybean farmers in Ohio. \$7 to Innovative Farmers of Ohio, 3083 Liberty Road, Delaware, OH 43015; (740) 368-8552; ifoh@aol.com Free online at: www.oeffa.org/fwc.php?sjt=fwctopics.

Upper Midwest Resource Directory (UMOR Directory) 4th Edition.

Directory of resource groups, certification agencies, brokers, suppliers, processors, consultants and publications in seven states: Illinois, Iowa, Michigan, Minnesota, North Dakota, South Dakota and Wisconsin. Free online at: www.mosesorganic.org/umord/directory.htm.

Manual for Organic Farming in the Upper Midwest.

Practical information for converting to and sustaining organic production. Based on research with organic farmers. Available from Southwest Research and Outreach Center, Univ. of Minn.; nicke002@umn.edu.

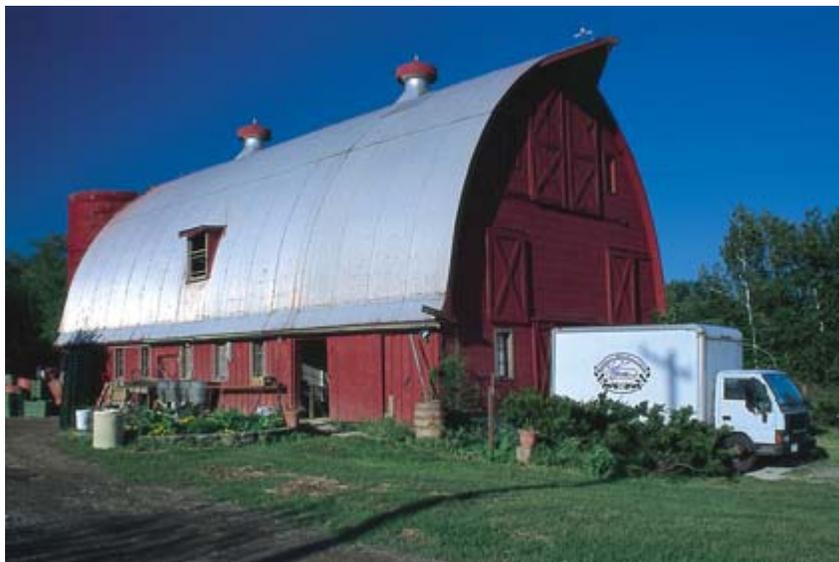
VIDEOS

NOFA Videos: A Library of Introductory and Expert Videos on Organic Growing.

411 Sheldon Road, Barre, MA 01005; (978) 355-2853; nofa@nofamass.org. The NOFA Video Project is a collection of VHS audio/visual videos on all aspects of organic growing. There are a handful of introductory videos, a large collection of expert videos, and a few "organic greats." Nearly all the videos were taped at NOFA Summer Conferences over the past 15 years and are available for rent or sale. www.nofa.org/conference/video.



Organic Grain: Another Way. \$31.50 (3-video package – item #332VOGV), \$52.50 (videos + resource package – item #332OGVP) to Cornell University Resource Center; (607) 255-2080; resctr@cornell.edu. Educational package of three videotapes, two 200-page books, and assorted reprints can serve as a framework for study and discussion groups evaluating alternative methods of grain production. Tapes can be ordered separate from package.



ORGANIZATIONS

The Northeast Organic Dairy Producers Alliance.

Member organization that provides a business directory, industry news, free classifieds, a member directory, and other organic dairy resources. www.organicmilk.org.

The Northeast Organic Network (NEON).

A consortium of farmers, researchers, extension and nonprofits working to improve organic farmers' access to research and technical support. www.neon.cornell.edu.

Organic Materials

Review Institute. Maintains the Brand Name Products & Generic Materials lists online and in print. OMRI conducts scientific research and education on the use of materials by the organic industry. www.omri.org.

Northern Plains Sustainable Agriculture Society.

Grassroots educational organization that works to develop and promote ecologically and socially sound food production and distribution systems in the Northern Plains. Also helps northern plains farmers to convert to organic production. Focuses on GMO issues affecting organic growers. www.npsas.org/.

Organic Trade Association.

Membership-based business association for the organic industry in North America. www.ota.com.

University of California Sustainable Agriculture Research & Education Program (UC SAREP).

California based program with good information on organic and research programs in California, and list of publications for organic production. www.sarep.ucdavis.edu/organic/.

WEBSITES/ON-LINE MATERIALS

All Organic Links.

www.allorganiclinks.com

Minnesota Organic Farmers Information Exchange (MOFIE) Program.

Through MOFIE producers can connect with experienced organic farmers, access information about certifying agencies, and link up with organizations that specialize in organic research and outreach. <http://mofie.coafes.umn.edu>.

Missouri Alternatives Center.

See the "O" list in the Extension Information on Alternatives section for information on certification

and farming. <http://agebb.missouri.edu/mac>.

The New Farm.

Organic magazine from the Rodale Institute that provides an Organic Price Index (updated weekly), online training programs, and various forums. www.newfarm.org See: "Making the Transition to Organic Farming: It May be Easier Than You Think." Online article available at: www.newfarm.org/depts/midatlantic/FactSheets/transition.shtml.

Biological Control:

A Guide to Natural Enemies in North America.

On-line guide to controlling pests biologically. www.nysaes.cornell.edu/ent/biocontrol.

Organic Ag Info.

Provides current information about organic agriculture research. www.organicaginfo.org.

Transitioning to Organic.

Rodale's five-hour online training course that walks farmers through the transition process, including record-keeping requirements and the farm plan. www.newfarm.org/training.

Organic Farming Cost Studies.

A number of cost studies for organically grown products are available from UC Davis. Each publication contains an overview of production practices and sample budgets for producing the crop. www.sarep.ucdavis.edu/pubs/Costs.htm.

Crop Rotational Budgets for Three Cropping Systems in the Northeastern United States.

An index of crop budgets for conventional, integrated and organic production systems prepared by Rutgers Cooperative Extension. <http://aesop.rutgers.edu/~farmgmt/ne-budgets/nebudgets.html>.

Organic Crop budgets for Upper Midwest.

<http://www.ext.nodak.edu/extpubs/agecon/ecguides/2003org.pdf>.

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SAN publishes books and informational bulletins that delve into various aspects of sustainable agriculture. To order, complete and return the form below with payment.
Note: If you are ordering only bulletins, contact Mandy Rodrigues at (301) 504-5411 (ph); (301) 504-5207 (fax) or san_assoc@sare.org.

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- _____ **How to Conduct Research on Your Farm or Ranch, 12 pp.**
Outlines how to conduct research at the farm level, offering practical tips for both crop and livestock producers.
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Offers creative alternatives to marketing farm products, such as farmers markets, direct sales, on-line sales and cooperatives.
- _____ **Meeting the Diverse Needs of Limited Resource Producers, 16 pp.**
A guide for agricultural educators who want to better connect with and improve the lives of farmers and ranchers who are often hard to reach.
- _____ **Profitable Pork: Strategies for Hog Producers, 16 pp.**
Alternative production and marketing strategies for hog producers, including pasture and dry litter systems, hoop structures, animal health and soil improvement.
- _____ **Profitable Poultry: Raising Birds on Pasture, 16 pp.**
Farmer experiences plus the latest marketing ideas and research on raising chickens and turkeys sustainably, using pens, moveable fencing and pastures.
- _____ **Smart Water Use on Your Farm or Ranch, 16 pp.**
Strategies for new approaches to conserve water.

BOOKS

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- _____ **Building a Sustainable Business, 280 pp., \$17**
A business planning guide for sustainable agricultural entrepreneurs that follows one farming family through the planning process.
- _____ **Building Soils for Better Crops, 240 pp., \$19.95**
How ecological soil management can raise fertility and yields while reducing environmental impact.
- _____ **How to Direct Market Your Beef, 96 pp., \$14.95**
Practical tips for selling grass-raised beef to direct markets from one ranching couple's perspective.
- _____ **Manage Insects on Your Farm: A Guide to Ecological Strategies, 128 pp., \$15.95**
Describes crop diversification, biological control and sustainable soil management.
- _____ **Managing Cover Crops Profitably, 212 pp., \$19**
Comprehensive look at the use of cover crops to improve soil, deter weeds, slow erosion, and capture excess nutrients.
- _____ **The New American Farmer, 160 pp., \$16.95**
Profiles 50 farmers and ranchers who have embraced new approaches to agriculture.
- _____ **The New Farmers' Market, 272 pp., \$24.95**
Covers the latest tips and trends from leading sellers, managers and market planners to best display and sell product. (Discount rates do not apply.)
- _____ **Steel in the Field, 128 pp., \$18**
Farmer experience, commercial agricultural engineering expertise, and university research tackle alternative weed control.

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