

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Background

For many people, the words “poultry production” invoke a pastoral image of hens scratching freely in a yard or on green pasture. This is the image associated with poultry production nearly fifty years ago. Over the past five decades, however, this picture of the barnyard flock has changed radically. A combination of new technologies and integration among processors, feed mills, and hatcheries has turned poultry into a large-scale commercial enterprise. Most poultry production, primarily broilers and turkeys, now takes place under contract with handful of regional companies, called integrators, in what we call “industrial” conditions — highly automated barns housing thousands of birds in confinement. Every detail of breeding, feeding, and flock productivity has been worked out to a science.

Some experienced farmers are now looking at alternatives to this industrial-style management. They are beginning to explore systems such as rotational grazing and modified pasture systems. Why? Marketing opportunities, land stewardship principles, financial objectives, and quality of life are common answers. In this chapter we describe five poultry management options: (1) Industrial; (2) Traditional; (3) Pasture: Day-range; (4) Pasture: Daily Move Pens; and (5) Organic (Pasture and Semi-confinement).

Housing, equipment, feed, health, labor, and financial requirements differ under each management alternative, and we discuss requirements in detail. When appropriate, we’ve included sections on legal issues and pasture management. Real-life poultry grower profiles, based on interviews with growers in Michigan, Minnesota, and Wisconsin, accompany each management system description and offer a look at how each management system (or combination of systems) works on the ground. You’ll notice that no one system is “pure” — that is, growers have adapted and modified management system models to accommodate their own goals, resources, and experience.

Before you dig into the system descriptions, take a few minutes to review *Management Basics* below, particularly if you are new to poultry production. Information in this section gives you a benchmark from which to study the systems’ similarities and differences, as well as their suitability for different species.

Management Basics

If you are a prospective poultry grower, you will need to become familiar with a few management basics before studying the details of a particular management system. These basics include poultry housing, equipment, supplies, flock management, and labor. Under flock management we address poultry feed, water, and health at different stages of production (brooding, laying, grow-out). Many commercial growers purchase day-old chicks or immature birds (such as pullets) from hatcheries when new birds are needed. If you are interested in raising your own replacement birds or managing breeding stock, see **Resources** under *Species/Class/Breed Information* for a list of recommended publications.



Layers in traditional housing.

There will be a lot more to managing your flock — these are just the basics. Figure 22 shows general poultry management standards for the brooding, laying, growing and finishing stages. Detailed poultry rearing publications are available such as *Storey’s Guide to Raising Poultry* (see **Resources**, under *Poultry Husbandry*). Many publications apply to chicken and turkey production. For information about waterfowl or wild game species, check out *Storey’s Guide to Raising Ducks* and *The Book of Geese* as well as some Extension publications listed in **Resources** under *Poultry Husbandry*.

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Figure 22: Management Standards by Stage of Production

BROODING (day-old to grow-out)

Chicken hatchlings, turkey poults, ducklings, goslings, and captive game brooders should be ordered and scheduled to arrive with enough time to finish them to market weight, which varies according to the final product desired. Look for breeders or hatcheries that are pullorum- and typhoid-free and flocks that have no history of sinusitis or air-sac infection. Vaccinations are often administered at the hatchery. Most brooders are reared inside, although some farmers are returning to range rearing during summer. Before the hatchlings arrive, your brooder house (where young birds are raised) should be set up with brooder rings and adequate floor space (seven to twelve square inches per chick), feed (such as a starter mash), water, litter, and a heat source. Hatchlings are stressed easily and very susceptible to drafts and dampness. Clean and disinfect the brooder house at least two weeks before brooders arrive. Cover floors with two to four inches of absorbent litter material such as wood shavings, rice hulls, or even ground corncobs. Warm the space to a temperature appropriate for your birds at least 24 hours before they arrive (heat requirements differ by species and even breed). Adjust temperatures throughout the brooding period according to supplier recommendations. Specially formulated starter rations and grit are available for chicks, turkeys, waterfowl, and game birds.

GROWING/GROW-OUT (pullets up to start of lay; meat birds from end of brooding to finishing)

During this stage of production, birds grow quickly. Birds may be housed in confinement or put on pasture to roam. Stocking rates vary by species and management practice. Adequate floor space is important to prevent overcrowding and stress. Overcrowding can lead to death loss through smothering and cannibalism. Broilers are fed a diet that produces a fast rate of gain while layers and roasters are fed on a slow rate of gain or “grower” diet. In the Midwest, turkeys are typically fed a ration of ground corn and soybean meal along with supplemental vitamins, minerals, and fat.

FINISHING (last one to two weeks before processing)

Chickens, turkeys, and other birds are typically finished in the same housing used for growers. Heavy meat birds, such as turkeys, often are fed supplemental corn or a “finishing diet” during the last two weeks before processing. At the end of the finishing stage, growers typically clean confinement facilities to remove manure and litter.

LAYING (hens aged 22+ weeks)

The typical laying cycle for hens is 13 to 15 months. Hens naturally molt (shed feathers) at about 18 to 20 months of age and begin laying again after a 4- to 8-week rest period. The most critical management factors for laying flocks are housing, light, temperature, and feed. For years, confinement style housing has been favored for layers because it keeps eggs clean and safe from predators. Because of strong marketing preferences for “free-range” products, however, some producers are returning their layers to the field and providing mobile nesting shelters. Range shelters and confinement housing must include nest boxes and roosting bars as well as an artificial light source if laying and molt cycles are to be controlled throughout winter. Feed and nutritional requirements vary by breed and size, climate, and age. Protein needs, for instance, are higher during the beginning of the birds’ laying cycle when egg production is at its peak. On average, each bird requires one-quarter pound of complete feed per day, depending on housing conditions and opportunity to supplement feed rations with pasture. Poultry author Leonard Mercia describes feed requirements for brown and white egg layers by stage in his book *Storey’s Guide to Raising Poultry* (see **Resources** under *Poultry Husbandry*).

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Housing and infrastructure. The primary purpose of poultry housing is to protect flocks against adverse weather and predators (coyote, fox, stray dogs, raccoons, and raptors). Weather is of critical concern in the Upper Midwest, where summers can be extremely hot and winters bitterly cold. Housing must provide shade from sun and cover from rain. It must be able to withstand high winds and snow loads if it is to be used for year-round operation. These basic housing considerations apply to all poultry.

Housing designs will differ depending on species, flock size, and stage of production. See Figure 23 for a look at how floor space requirements vary by species and sex. Likewise, housing design will vary dramatically with your management philosophy, production goals, and labor availability. Some management alternatives call for permanent housing, total confinement, and the use of cages, while others rely on moveable shelters, open floors, and range. Management-specific designs generally fall into one of four categories: cage confinement, open-floor confinement, free-range, and yard-and-coop.

Figure 23: Poultry Housing Recommendations*

TYPE OF BIRD	FLOOR SPACE (SQ. FEET/BIRD)	NEST BOXES (SQ. FEET/BIRD)	PERCH SPACE (SQ. FEET/BIRD)	MIN. TEMP (°F)	MAX. TEMP (°F)
Hens, layers	1.5	1.5	0.75	55	70
Broilers	1.5	N/A	0.75	65	70
Turkey, toms	4	N/A	N/A	65	70
Turkey, hens	3	3	N/A	65	70
Pheasants	5	3	N/A	65	70
Ducks	3	2	N/A	N/A	N/A
Geese	6	3	N/A	N/A	N/A

*These are general recommendations. Floor space and other housing requirements vary by flock size and management system. Source: Ekarius, 2004.

Detailed housing recommendations accompany each management system description and address floor, wall, roof, and nest box construction, as well as ventilation, insulation, heating, lighting, water, and predator control. As you read through each housing and management description, consider your own:

- Site (water and sewage, drainage, soil type, access roads)
- Climate
- Predators (land and air)
- Flock size
- Water (municipal system, private well, spring, pond)
- Neighbors
- Regulations
- Cost

Housing design and construction plans often are available free on the Internet or from your local extension office (see **Resources** under *Housing*).

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Equipment and Supplies. Specialized equipment and supplies are needed for poultry production. Basic equipment such as brooder stoves or lamps, feeders, waterers, nesting boxes, and fencing are relatively inexpensive. As you read through the management descriptions, note that some of the equipment is available automated. Most automated equipment is specially designed to reduce hand labor for large flock owners. We review these options under *Industrial Management* and *Traditional Management*. If you are a small- to medium-sized flock owner, nonautomated equipment is often the most practical and economical choice. Leonard Mercia thoroughly reviews nonautomated brooders, feeders, and waterers in *Storey's Guide to Raising Poultry: Breeds, Care, Health*. We've reproduced Mercia's equipment recommendations in Figure 24.

Figure 24: Equipment Requirements (per 100 Birds)

BIRD TYPE	AGE (WKS)	BROODERS		FEEDERS	WATERERS
		HOVER TYPE	INFRARED LAMP		
Chicken (broilers, roasters, capons, and pullets)	0-2	700 sq. inches	2	1 feeder lit to 7 days 100 inches of trough or 3 hanging	20 inches trough or 2 one-gal.
	2-6	700 sq. inches	2	200 inches of trough or 3 hanging	40 inches trough or 3 one-gal.
	6-maturity	—	—	300 inches of trough or 4 hanging	96 inches of trough or 1 automatic
Chicken (layer)	22-market	—	—	300 inches of trough or 4 hanging	96 inches of trough or 1 automatic
Turkey	0-2	1200 sq. inches	2-3	1 feeder lit to 7 days, 200 inches of trough or 3 hanging	20 inches trough or 2 one-gal.
	2-6	1200 sq. inches	2-3	400 inches of trough or 5 hanging	96 inches trough or 1 automatic
	6-market	—	—	480 inches of trough or 6 hanging	120 inches trough or 1 automatic
Waterfowl, duck and goose	0-2	1200 sq. inches	2-3	1 feeder lit to 7 days 100 inches of trough or 3 hanging	20 inches trough or 2 one-gal.
	2-4	1200 sq. inches	2-3	200 inches of trough or 3 hanging	50 inches trough or 3 automatic
	4-market	—	—	200 inches of trough or 5 hanging	50 inches trough or 3 automatic

Source: Mercia, 2001.

Also note that while most poultry equipment (such as brooder stoves) can be used for a range of species, you may have to make some adjustments depending on the birds you raise. Commercial waterfowl growers, for instance, brood their young birds in much the same way as chicken growers—using electric and gas brooders. But they adjust the brooder height to accommodate the larger birds, and provide more “hover space.” (Geiger and Biellier, 1993a). Most equipment manufacturers can help you determine what is right for your flock. Moreover, some supplies such as incubators and egg trays are available by species (see **Resources** under *Suppliers* for a list of new and used equipment suppliers).

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Feed. Poultry require fresh water and nutritionally balanced feed. Grit is also necessary if you feed whole grains or pasture your birds. Poultry digestion is highly dependent on water, which softens food in the gizzard. Consequently, birds' water intake is almost double the volume of food intake. Diets that lack adequate water and nutrition can slow growth, reduce egg and eggshell quality, limit feed efficiency, and inhibit a flock's immune system.

The nutritional needs of poultry are complex and vary with the species, breed, age, and sex (Damron and Sloan, 1998). Nutritional needs also vary with management practice. Many of today's poultry producers use "complete" feeds. These are grain-based, species-specific feeds that contain all the nutrients necessary in the poultry diet (proteins, carbohydrates, fats, vitamins, and minerals). Commercial, premixed complete feeds are usually labeled for rate of gain or stage of production. Hatchlings, for instance, usually are fed a "starter" ration that contains the highest level protein that birds receive in a lifetime. Once birds begin to mature, they are switched over to "grower," "finisher," or "layer" diets depending on the birds' age and ultimate use.

Almost all starter, developer, and finisher diets are available "medicated," "nonmedicated," "natural," and "organic." Low-level antibiotics and coccidiostats are added to medicated feed to prevent common poultry diseases for all birds with the exception of waterfowl. Dr. Jacqueline Jacob, University of Minnesota Extension poultry specialist, warns that waterfowl should never be fed medicated feed, as antibiotics can cause lameness and/or death in this species. The "natural" label typically means that antibiotics have not been added, while "organic" ensures that the feed has been grown and certified without the use of synthetic chemicals and that it does not contain animal by-products.

Most complete feeds are available from a local supplier or feed mill. If you are lucky enough to live near a mill, bulk feed is usually discounted and sometimes delivered. If you are having trouble locating feed or have questions regarding its contents and recommended feeding schedule, see **Resources** under *Feed and Diet* and *Suppliers*. If you prefer to mix your own feed or supplement with pasturage, consult with an extension poultry specialist or refer to one of the many publications on poultry nutrition listed in **Resources** under *Feed and Diet*. Of special interest is an article from the Manitoba Department of Agriculture and Food titled *Increasing Omega-3 Fatty Acids in Eggs from Small Chicken Flocks*. If your market research suggests your buyers are willing to pay more for Omega-3 enriched eggs, you'll want to explore feed and management alternatives that aid in Omega-3 fatty acid production.

Health and Welfare. Flock health and welfare are critical management issues. Health is fairly straightforward and depends on how well you are able to control both infectious and noninfectious diseases. Welfare is another matter and concerns the well-being of your flock. In livestock housing author Carol Ekarius' words, welfare is violated when birds are abused or neglected and/or bored and confined to restrictive environments (Ekarius, 2004). A number of poultry growers, among them Michigan growers Frank and Kay Jones, argue that birds' welfare or well-being depends on their ability to practice natural behaviors such as scratching (see Farm Profile: Day-range—Earth Shine Farm).



Layers at feeders.

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Some animal welfare advocates feel that industrial management practices, including confinement housing, beak and toe trimming, and artificial lighting, are unacceptable (Robinson, 2004). Still others argue that allowing birds outside exposes them to disease and parasites as well as predators. Welfare concerns are addressed independently alongside each management alternative in the following sections. Health management basics are reviewed below.

Infectious disease comes from bacteria, viruses, fungi, and parasites. Noninfectious disease is the result of nutritional problems (either a deficiency or excess), chemical poisons, injury, or excessive stress. Gail Damerow, author of *The Chicken Health Handbook*, explains that “diseases are introduced from reservoirs of infection, defined as any source or site where a disease-causing organism survives or multiplies and from which it can be transferred to a host.”

Damerow’s list of disease reservoirs include chickens and other domestic poultry, exotic and caged birds, wild birds, wild animals (including rodents), livestock, household pets, humans, earthworms, snails, slugs, arthropods (fleas, mites, ticks, lice, mosquitoes, sow bugs, crickets, and grasshoppers eaten by your birds), feed containing fungi, stagnant water, litter, soil, dust, and poorly sanitized equipment such as incubators, crates, and brooders. In addition, Damerow warns that environmental factors such as cold and heat can lead to frostbite on wattles and combs, stress, and even cannibalism among chickens and turkeys (waterfowl are “completely clothed” meaning that they do not have exposed wattles and combs) (Damerow, 1994).

Disease can be spread directly from hen to embryo or from one bird to another as well as indirectly by something that can transport the disease (like the bottom of your boot). Poultry growers limit the introduction of disease through what are called “biosecurity” measures. Biosecurity includes the use of:

- Disease resistant breeds
- Regular sanitation
- Housing to keep out wild animals
- Closed flocks
- Visitation limits
- Planned labor movements (caring for younger, more susceptible birds first before moving to older birds)
- Flock history records

Management alternatives, species, and flock size will, in part, determine which biosecurity practices you utilize. Some management alternatives, for example, organic management, preclude the use of medicated feed and beak trimming, and emphasize access to fresh air and sunshine to break up disease cycles. Moreover, species choice dramatically affects the need to introduce biosecurity measures. Ducks and geese, for instance, are considered much more disease resistant than chickens. In fact, waterfowl growers typically do not vaccinate or employ what have become routine biosecurity practices on broiler and turkey farms. “Even when kept under less than ideal conditions,” says Holderread, “small duck flocks are seldom bothered by sickness or parasites” (Holderread, 2001).

In addition to biosecurity measures, growers often promote flock health through the use of vaccines, medicated feed, beak trimming, and healthy chicks. Poultry specialists recommend purchasing day-old chicks and pullets from hatcheries that participate in the National Poultry Improvement Plan. These hatcheries blood test their flocks to check for common diseases. For a list of hatcheries participating in the National Poultry Improvement Plan, contact the USDA APHIS (see **Resources** under *Hatcheries* for contact information) (Mercia, 2001).

As you read through the management alternatives, think about what combination of biosecurity measures and health promotion practices might work best for you.

MANAGEMENT ALTERNATIVES

POULTRY BASICS

Labor. Experienced producers will tell you that poultry, like other livestock, must be tended seven days a week. However, this doesn't mean seven *full* days. Expect to spend some time (one to six hours) every day on basic production management tasks such as feeding, watering, observation, recordkeeping, and sanitation.

Your tasks and actual hours will vary with species, flock size, production objectives (egg production versus meat production), season, and with the management alternative you choose. Some alternatives, for example, the industrial system, make use of automated equipment to reduce labor required to feed the flock or collect eggs. At the same time, automated equipment may increase the number of hours you spend maintaining machinery. There are labor trade-offs with every management alternative.

Daily chores and seasonal maintenance requirements are reviewed in the labor summary for each management alternative. We've included labor estimates from other growers when available to give you a feel for how much time and skill it may take to run your poultry enterprise under each management alternative.

Finances. Finances are critical to any business. Poultry is no different. You will need to consider:

- Capital investments
- Credit availability
- Fixed costs
- Variable costs
- Cash flow
- Income
- Net worth change

We briefly review these financial considerations for each management system. Generally, however, income and expense estimates are not reported. While some figures do exist, they come from a range of sources and therefore are not comparable. Instead, we reference the sources and encourage you to put together your own budget numbers using the *Generic Poultry Enterprise Budget* developed by the Center for Integrated Agricultural Systems (CIAS). See www.wisc.edu/cias for a sample budget that includes fixed and variable expense estimates. Use these figures as a guide only. Your situation will be unique as will be your management preferences, resources, and, consequently, your budget.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT



Turkey chicks in brooder house.

Industrial Management: Confinement

The industrial management alternative is familiar to most growers because it originated in the poultry sector. During the 1920s synthetic Vitamin D was developed. This scientific achievement allowed growers to bring their birds inside. Layer hens were the first to be raised in total confinement as commercial markets for broiler meat had not yet evolved (Kennard, 1951). By the 1950s, however, markets for chicken meat had grown to the point where large-scale, indoor broiler production made economic sense (Fanatico, 2002a). Today, nearly 100 percent of all broiler production in the United States takes place on farms that use industrial management practices. This management alternative is characterized by:

- Large flocks (20,000 – 1,500,000 birds per farm)
- Confinement housing
- Automated equipment
- Marketing contracts
- Substantial capital investments

Birds are raised inside barns year-round. Many of the daily tasks such as feeding, watering, and egg collection are automated through the use of specialized equipment. However, there is a price for this labor-saving technology. Industrial-style barns and equipment are expensive compared to the alternatives. Large capital outlays and financing are typical. And, because of the large volume of birds required to make these capital investments worthwhile, most industrial production and promotion takes place under contract with regional or national companies. These companies, called integrators, conduct all of the product marketing and pay growers a prearranged contract price to manage hatching eggs, broilers, turkeys, and laying hens.

Contract terms differ by species. For instance, the majority of industrial turkey production takes place on farms where growers manage their birds independently and purchase poults, feed, and other inputs on their own. These growers sign contracts in advance of production. Contracts often stipulate a live-weight price. By contrast, almost 100 percent of broiler production is managed under “grow-out” contracts where farmers own their barns and equipment independently, but are legally obliged to use birds, feed, and other inputs supplied by the integrator. Contract broiler producers are also required to work regularly with a company-paid service person who is assigned by the integrator to make many flock management decisions (Jacquie Jacob, University of Minnesota poultry extension specialist, personal communication, 2004). Consequently, broiler grow-out contracts have been likened to service contracts where the farmer supplies day-to-day labor (services). Hatching egg contracts are similar to broiler contracts in that integrators supply the majority of inputs, including pullets (birds that are ready to lay). Like the broiler producers, hatching egg growers are responsible for financing the land, housing, equipment, utilities, labor, and litter (Cunningham, 2002a).

According to University of Minnesota Extension poultry scientist Jacquie Jacob, the majority of table egg production in Minnesota, Michigan, and Wisconsin takes place in facilities owned by large companies rather than by independent growers. In this case, companies control all aspects of production and hire employees to perform daily tasks. In some cases, these companies may purchase table eggs from independent growers if they are short on supply or if they are in the market for specialty eggs (such as organic or cage-free eggs). Specialty eggs are typically produced under contract and sold under the company’s label. These types of arrangements may grow in the future. But for now, the overall volume of table eggs raised under contract by independent growers is relatively small. For this reason, the industrial management description that follows focuses on contract broiler and turkey meat production.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

Industrial Management Overview

Birds:	Cornish Cross broiler chickens, Broad Breasted White turkeys
Land:	Level area for housing with access to acreage for manure and litter disposal
Buildings:	Newly constructed, highly specialized barns
Stocking density:	0.8 – 1.0 square feet per broiler to 3 square feet/tom turkey
Equipment:	Automated feeders, waterers, ventilation, heating, and lighting
Labor:	Full-time or part-time
Operation:	Year-round
Finances:	Large capital investments, low return on equity, predictable annual income
Advantages:	Raise large number of birds on small land base, shared market price risk, year-round cash flow
Disadvantages:	Large capital investments, no marketing flexibility, need for continual equipment/technology investments, relatively low return on assets, little or no salvage value for equipment, poor air quality

The industrial management alternative may be a good option if you: enjoy managing “by the book”; seek a more predictable annual income; prefer to have someone else handle marketing; have access to financing; and live near integrator facilities.

Birds and Performance. Turkeys and chickens are the two birds most commonly raised in the United States in volume under confinement conditions. As mentioned, the majority of contract turkey growers are completely independent from integrators when it comes to breed selection and other flock management decisions. Large-scale, commercial turkey growers almost always use the Broad Breasted White. The Broad Breasted White has become most favored thanks to its excellent growth rates and light colored (more marketable) meat. Broad Breasted White hens can be expected to reach 18 to 20 pounds at 15 weeks, while the toms will reach 27 to 29 pounds by the same age (Mercia, 2001).

As a contract broiler or hatching egg producer you won't have any say when it comes to breed selection. Integrators, who have invested a great deal of research and development money in bird genetics and breeding stock, supply day-old broiler chicks and hatching egg pullets, and almost always use the Cornish Cross chicken for broilers. This breed has been genetically selected for confinement production, rapid growth, and uniform carcass size. Broilers typically reach their market weight in 49 to 56 days, when they weigh six pounds or more. Feed efficiency ratios of 1.60 to 1.87 pounds per pound of feed during the grow-out period are typical, according to a commercial breeding source (Arbor Acres, 2004).

Housing. Contract broiler farms can range in size from 25,000 birds per year to 125,000 birds per year. Commercial turkey producers, on the other hand, typically raise 45,000 turkeys per year (three flocks of about 15,000 birds each) (Minnesota Turkey Research and Promotion Council and the Minnesota Turkey Growers Association, 2004). This housing system is what NCAT poultry specialist Anne Fanatico calls “high density.” Houses are built to allow one square foot per bird for broilers and a maximum of 3.5 square feet per bird for tom turkeys.

Site location should be your first housing consideration. Ideally, poultry house(s) are located near the farmstead on a site where there is good soil drainage, air movement, and access to a water supply. These site conditions will help ensure that your flock is safe, healthy, and productive, and will make your maintenance work easier. It is also important to consider siting the poultry house to minimize negative impacts on your neighbors.

Specific building designs vary by bird species, stage of production, climate, and by integrator. “Each integrator will have specific building design, equipment specifications, and location requirements,” note Oklahoma State University Extension specialists (Doye, et.al., 1996). Plans for industrial housing requirements are available from USDA, North Dakota State University, and Colorado State University (see **Resources** under *Housing*).

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

Brooder houses. Most contract broiler growers are expected to brood and rear their birds. The same barn is used for brooding and grow-out of broiler chickens, since the short grow-out period does not justify the use of separate facilities. An average flock of between 20,000 to 25,000 birds is typically housed in a 16,000 to 20,000 square foot barn. The chicks are usually brooded in small “rings” and given access to the entire house after two to three weeks of age. An all-in-all-out biosecurity system is used.

Turkeys are almost always sexed. Males and females are brooded separately and grown-out separately. This method is more practical with the longer grow-out period. To minimize health risks, brooders are reared and housed separately from the more mature grow-out birds (young birds are susceptible to pathogens carried by older birds). Housing construction is similar for both brooding and grow-out. Industrial houses or barns are usually built new on hard ground or cement pads, insulated, and equipped with automated feeding, lighting, and ventilation systems.



Turkey chicks in brooder house on Bussis Farm.

Houses may contain windows and must be well insulated to help regulate indoor temperatures throughout the year. Automated and natural ventilation systems also aid in climate control. Many turkey growers provide natural ventilation through the use of curtains that can be raised and lowered to allow in fresh air (see Farm Profile: How Cooperation Saved Turkey Farms from Death by Dis-integration). End curtains or doors must be wide enough to accommodate a skid steer loader or tractor for litter removal. Broiler houses tend to use more mechanical ventilation, often tunnel ventilation, and are thus more likely to be windowless. The house floor is always covered with a litter; in the Midwest this is usually wood shavings. Birds are allowed to move around freely in the barn (cages are used only for laying hens).

Turkey poults are always raised in houses that are separate from adult bird houses. One resource suggests constructing brooder barns a minimum of one-half to one mile away from the adult grow-out barns to minimize health risks (see Health and Welfare below). Inside the brooder houses, poults are placed in brooder rings with stoves for the first week and closely monitored. For the remainder of the brooding phase (one to six weeks), these young birds are given approximately one to one-and-a-half square feet each of floor space. They may continue to need supplemental heat, depending on the time of year and your building’s climate control system. Once birds are past the brooder stage, they are moved to grow-out houses.

Grow-out houses. Stocking rates and equipment are typically the only things that distinguish industrial-style brooder turkey houses from turkey grow-out houses. The basic structure is the same and utilizes a combination of unrestricted natural and artificial lighting; windows and natural ventilation to control moisture, dust, and temperature; and litter.

Hens and toms are raised in separate grow-out houses to accommodate their different growth rates and feed needs. During the grow-out phase, toms require a minimum of 3.5 square feet per bird while hens need a little less: 2.5 square feet per bird. This means that a 25,000 square foot house will accommodate 7,000 toms and 10,000 turkey hens.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

Feed and Water. Birds raised in confinement are fed very specialized diets to meet nutritional needs throughout different growth and production stages. Complete feeds are nutritionally balanced to promote bird health, growth, and production for the least cost (least-cost diets). They may contain grain, livestock byproducts (such as meat and bone meal or feathermeal), and medication (Fanatico, 2002a). The integrator with which you contract will provide a complete feed for your birds. You may use between four and eight different diets, depending on your contractor's feed regimen, to take your birds from the brooder stage to slaughter (California Poultry Workgroup, 1998).

Feeding is done entirely indoors with the help of equipment. Feeders are activated by a time clock to ensure fresh feed is available for broilers, turkeys, and layers. In most cases birds are given continuous access to feed and water (called "free choice" or "*ad libitum*"). More recently, however, some commercial broiler and breeder operations have begun turning to a restricted feed routine to reduce late-term mortality associated with heart failure. When feed is restricted to eight hours for broilers during days 7 to 28, there is a significant reduction of ascites (fluid in the heart cavity) and late-term mortality (heart attack) rates (Mattocks, 2002).

Equipment and Supplies. Industrial equipment is almost always automated and designed for very specific tasks. The most common equipment and supplies needed include:

- Brooder stoves
- Automatic feeders and waterers
- Nipple drinkers
- Misters
- Fans
- Bulk feed storage bins
- Pan-type feeders
- Front-end loader for clean out
- High-pressure sprayer for cleaning
- Hoses and brushes
- Disinfectants
- Manure spreader
- Truck with trailer

Integrators will help you determine what equipment is needed and where to find it at the lowest cost. Most likely, you will be purchasing equipment new since technological improvements occur so frequently that used equipment is quickly considered inefficient. Specified equipment is purchased by the producer.

Health and Welfare. Flock mortality averages five percent for broilers and between ten to twelve percent for turkeys on industrially managed farms (National Chicken Council, 2002). Growers who employ industrial practices maintain health and welfare from a biosecurity approach. Industrial-style managers use the following preventive measures to limit disease, bird injury, and mortalities:

- Biosecurity precautions
- Sanitation
- Vaccination
- Beak trimming for turkeys
- Staff training

Biosecurity precautions. Routine biosecurity measures include: limiting visitors; providing foot-baths, showers, and protective clothing; restricting workers' contact with other poultry; controlling rodents and wild birds; and confining pets away from production barns (California Poultry Workgroup, 1998). Sanitation measures involve the complete cleaning and disinfecting of housing and equipment in between flocks.

Another biosecurity issue is air quality—both inside and outside the barn. Litter moisture must be maintained at the proper level to prevent the buildup of dust and ammonia, which can be fatal to the birds. During the winter, this can be a challenge—managers must carefully balance ventilation and fresh air with the need to retain heat in the buildings.

Vaccination and beak trimming. Vaccination is a common preventive measure performed at the hatchery for both broilers and turkeys. Follow-up vaccines depend on which diseases, if any, are prevalent in the area. Beak trimming is another common preventive measure performed at the hatchery for turkeys.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

Staff training. Training is essential for anyone involved in poultry management. Bird injuries and stress occur when they are improperly handled or when environmental conditions are ignored. Broilers, for example, bruise when improperly handled (catching and containing birds). Proper training, combined with catching in the dark, can help prevent bruising. The California Poultry Workgroup, in its publication *Turkey Care Practices*, notes that the development of a positive attitude is the most important part of training (1998). Moreover, your assigned service person should help you learn the skills needed to regulate barn temperatures, air flow, and humidity. When moisture levels are too high, for instance, ammonia develops in the litter pack. High concentrations in the air can cause breast blisters on turkeys or even death from respiratory failure.

All poultry operations must deal with dead birds, which must be removed and recorded each day. Dead birds may be buried, incinerated, rendered, or composted. There are pros and cons to each. Check with your local zoning and planning commission to learn about regulations.

Labor. Integrators market contract broiler production as a part-time job. Many growers disagree. A 1999 survey of more than 1,400 contract broiler producers in ten states suggests that industrial production is more than a part-time job. However, the number of hours worked depends on the number of broilers produced each year and on the stage of production. On average, growers with two to four houses (total average of 394,000 birds per year) reported spending 7.4 hours per day during the brooding period (two weeks after chick delivery) (Schrader and Wilson, 2001). Daily labor requirements dropped to 5.5 hours per day in the weeks that followed. Additionally, routine and major cleanouts absorbed a total of 33.3 and 43.3 hours, respectively, and were performed with the help of some hired labor. Similarly, hatching egg production is a full-time job requiring six to eight hours of work each day, seven days per week (Cunningham, 2002b).

So, where do the hours go? Regular tasks associated with industrial-style management involve: flock management; catching and moving birds; building and equipment maintenance; recordkeeping; cleaning out and sanitizing housing and equipment; and communicating with a service person.

Catching and moving birds. Catching and moving birds require some skill, and is one of the most difficult tasks producers must perform (California Poultry Workgroup, 1998). Broilers must be caught and moved to crates by hand. Full-grown turkeys are moved by walking them from the grow-out barn onto trailers. These are large, temperamental birds that are injured easily if improperly handled.

Maintenance. Housing and equipment maintenance is an on-going job, even when equipment is fairly new. Preventive maintenance on ventilation and feeding equipment is essential and must be done routinely. Growers are encouraged to do maintenance and repair work themselves, since hiring this type of work can be expensive and can substantially increase operation costs (Cunningham, 2002b).

Clean-out. Once your birds are headed to the grow-out house or processor, clean-out must begin. Growers are responsible for cleaning out, washing, and disinfecting barns as well as disposing of manure and litter after each batch of birds has been removed. Manure and litter packs are often removed with a skid steer loader or other equipment and hauled off-site for biosecurity reasons. Broilers deposit four pounds of litter per bird over an eight-week period (Mercia, 2001).



Nearly fully grown turkeys on the Bussis farm. At this stage, Joel can move slowly among the birds to monitor their condition.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

In many areas of the country, manure and litter disposal (waste management) has become a contentious issue, since contracted farms are concentrated geographically (to be close to processing and feed plants). As noted by USDA staff, “In some parts of the country, animal wastes pose no environmental threat, but in other, more environmentally sensitive areas, the high concentration of animal wastes has resulted in nitrogen and phosphates leaching into groundwater or washing into streams, causing water quality problems and environmental degradation” (Ollinger, et al., 2000). The issue has become so contentious that many integrators now require their growers to present a plan for manure and litter disposal. In the Upper Midwest, most farmers have adequate access to cropland for waste disposal, and because the manure is mixed with litter, it can be applied directly to fields (Fanatico, 2002a).

Communication. Contract growers receive technical assistance from a service person who is assigned to the farm by the integrator. This service person may visit the farm daily during start-up (especially with new growers) and weekly once production is underway. The service person helps with flock management, proper ventilation, litter, pest control, and disposal of dead birds (Doye, et al., 1996). He or she can visit your farm unannounced any time in accordance with most contracts. The majority of contract broiler growers surveyed in 1999 reported having a good relationship with their assigned service person. In fact, the majority of survey respondents said that “the service person always or usually takes the time to help the grower understand and follow [company] recommendations” (Schrader and Wilson, 2001). Additionally, some integrators provide “growing guides” to help with broiler management basics. Once familiar with new equipment, most farmers find their daily tasks fairly straightforward.

Finances. Industrial contract production has the appealing financial advantages of shared price risk and guaranteed income. On the flip side, however, substantial capital investments are required. Farmers, lenders, and lawyers alike have raised questions concerning the financial prudence of signing broiler production contracts. Careful budgeting and evaluation are necessary before entering into contract production. Consider the following:

- Capital required to build and equip poultry houses
- Availability of financing
- Contract payment formulas and conditions
- Equity and expected return on investment
- Cash flow and income during debt pay-down period

Contract growers are usually paid a base price per pound of “useable” bird. In Minnesota, one company’s base price recently amounted to one-fifth the retail price per pound for fresh, whole chicken. In addition to this base price, growers may earn bonuses or incur discounts for above average or below average performance, respectively. As a general rule, bonuses are paid for above average feed efficiency (more pounds of chicken produced per pound of feed). Some other companies give discounts for poor feed efficiency and above average mortalities (Doye, et al., 1996). Contract terms vary by integrator.

In a ten-state survey, some growers reported earning income that was equal to or greater than what they expected, but the majority of growers generated less income than expected from their contracted broiler operations (Schrader and Wilson, 2001). Many contract broiler growers reported struggling with negative cash flow while capital loans (for housing and equipment) were being paid off. Under most contracts, growers are expected to put up a minimum of two houses (to reduce input expenses associated with transport). It is not uncommon, however, for a grower to construct four or five barns that each cost over \$100,000. According to the University of Georgia Cooperative Extension Service, these capital investments—if well maintained—have a physical life of 30 years or more. A long physical life, however, doesn’t necessarily translate into real equity. Some critics of the industrial management system note that the specialized buildings and equipment require constant equipment upgrades to remain competitive and have limited market or salvage value (Taylor, 2002).

If you are considering industrial management, make phone calls to identify local capital costs and input expenses, in order to develop realistic enterprise budgets, projected income statements, and projected cash flows. Talk to your prospective integrator and other growers to learn more about required capital investments and your potential returns.

MANAGEMENT ALTERNATIVES

INDUSTRIAL: CONFINEMENT

Legal Considerations. Drake University Law professor Neil Hamilton examined broiler contracts offered by 18 different companies. He found that the contracts generally fell within one of two categories: “standard” contracts and “grower friendly” contracts. The grower friendly contracts generally included terms similar to the standard contract with the addition of provisions “that appear to provide some level of protection or assurance to growers” (Hamilton, 2001). Standard and grower-friendly broiler contract terms are summarized in Figure 25. If you are considering contract production, compare these terms with those offered by the contracting company in your area. When considering contract production for broilers, turkeys, or other poultry enterprises, be sure to consult with a lawyer who is familiar with the industry. Farmers’ Legal Action Group, located in Minnesota, may be able to help you identify an appropriate lawyer. Moreover, you may want to contact the National Contract Poultry Growers’ Association or an experienced farmer to review your contract terms *before* you sign.

Figure 25: General Broiler Production Contract Terms

STANDARD CONTRACT TERMS	GROWER-FRIENDLY CONTRACT TERMS
<ul style="list-style-type: none"> ■ Duties of the company ■ Duties of the grower ■ The grower’s independent status ■ Incorporation of an attached payment schedule subject to change by the company ■ Term or length of the contract ■ Timing, frequency, and number of flocks at company’s discretion ■ Timing of removal and processing of birds at company’s discretion ■ Grower to be present or represented during catching or accept risk ■ Title to the birds with the company and prohibition on grower liens ■ Prohibition against keeping other fowl on the grower’s property ■ Prohibition against using supplies not provided by company ■ Company’s right of access to the grower’s facility ■ Company’s right to take over the grower’s facility or remove the birds ■ Grower actions considered by company to be a default of the contract ■ Only written contract terms applicable with no modification unless in writing ■ Assignment of contract only with approval of the company 	<ul style="list-style-type: none"> ■ Right to join any organization or association ■ Prompt weighing of live birds ■ Chick placement from hatchery is random ■ Payment possible if birds die due to Act of God ■ Grower can view feed weighing and live bird weighing ■ Company agrees to use certified scales for weighing ■ Delivery of weigh tickets and records ■ Assistance program for growers with poor performance ■ Incorporation of a written “Broiler Growing Guide” establishing standards ■ Company employees excluded from the payment pool

Source: Excerpted from Hamilton, 2001.

Summary. Industrial production may be an excellent alternative for someone who would like to produce year-round, has access to capital, and is not interested in marketing independently. Be aware, however, that most integrators have waiting lists. If you are interested in industrial, contract production, contact an integrator in your area to learn about contracting opportunities and to request a copy of a sample grower contract. Poultry growers who contract with integrators say the most important thing you can do before signing a contract is to read it!

- Know your commitments (and those of the processors).
- Ask questions.
- Talk with other producers who have signed contracts with the same processor.
- Review the contract with a lender and a lawyer.

An excellent resource to assist with contract evaluation is Oklahoma Cooperative Extension Service’s *Broiler Production: Considerations for Potential Growers*. Although this publication is aimed at Oklahoma producers, the information and advice apply to Midwestern producers (see **Resources** under *Legal Considerations*).

Joel Bussis, Trestle Town Turkeys
Hamilton, Michigan

How Cooperation Saved Turkey Farms from Death by Dis-integration



Joel Bussis

In most large poultry operations, farmer-producers are “integrated” into larger systems in which most management decisions are made by others. Those in charge, the integrators, might be feed or equipment supply companies, processing companies, or marketing companies. For 10 years, John and Joel Bussis were part of a system like that, growing turkeys for Bil-Mar Foods, a division of Sara Lee. John and Joel owned the buildings and provided the labor, and they could earn bonuses if the birds performed well. But the kind of birds they fed, when and what they fed them, and what they would be paid for them were all part of the contract written by Bil-Mar. In 1997, Bil-Mar management decided the real money in the turkey business lay in *marketing* a brand name product—not in its actual *production* or *processing*. They told their growers there would be no future production contracts, that existing contracts would be terminated at the end of 1999 and growers paid off, and that turkey processing operations in Zeeland, Michigan, would be phased down in 1998 and ended the next year.

The Bil-Mar decision to “dis-integrate” gave real meaning to the word, for it left the growers disconnected, without a market, and without the coordinating services Bil-Mar provided along with the market. The Bussises suddenly faced the extinction of their farm. They owned only 58 acres, more than half of it devoted to specialized buildings and a manure composting area. What do you do with facilities dedicated to the production of 100,000 tom turkeys a year? Luckily (it turned out), about 15 other turkey growers faced the same problem. And because it was a broad problem—the future of an entire regional industry—the state of Michigan saw an economic and social interest as well. With help of the state, the work of poultry scientists at the land grant university, the desire of growers to continue growing turkeys, and the skills and needs of former Bil-Mar employees also facing loss of jobs and careers, the industry was saved within a new structure.

Today, growers and workers within the Michigan Turkey Producers’ Cooperative are producing about 4.5 million heavy tom turkeys a year, processing them through their own plant, and selling turkey meat to end users. A brand name, “Golden Legacy,” has been developed for, as Bil-Mar aptly perceived, the real money is in marketing branded products.

The new structure is no less integrated than it was under Bil-Mar. But now, the 15 growers sit on a board of directors and make decisions once made by Bil-Mar. These decisions affect the strains of birds the growers produce, the size the birds will be at slaughter weight, feed, and the kind of products the cooperative will sell. The members also attempt to keep antibiotic use low, but antibiotic use is not proscribed. “It’s been six months since we’ve used any medication in the brooder barns and more than two years since we’ve used them in the grower barns,” Joel said. “But not many producers can say that.”

Joel’s father, John, was an important driver in formation of the cooperative. As his work was starting to pay off, he died of cancer at age 61. So Joel is now the sole proprietor of Trestle Town Turkeys, Hamilton, Michigan. He is production-oriented, he said, and is pleased that his dad’s legacy includes a friendly marketing structure in which his skill and experience growing turkeys can pay off.



These turkeys are close to market weight of 40 pounds.

FARM PROFILE • Industrial: Confinement

Production system

The production system at Trestle Town involves starting 17,000 day-old turkey poults every eight weeks. They stay in one of two 40 ft by 216 ft brooder barns for five weeks before moving into one of four 55 ft by 476 ft grower barns, where they gain about 0.3 pounds per day, reaching a 40-pound live weight at 19 to 20 weeks of age. They will dress about 88 percent and produce a large breast commanding a premium price, some intermediate value products, and ground turkey, the residual product.

“Turkeys are highly sensitive to their environment,” Joel said. Success for the producer depends upon how well he is able to monitor the environment, interpret what he sees, and respond quickly. Poults need heat, even more than chicks. Bussis heats the area within two 10-ft diameter cardboard rings with 12 radiant heaters, each suspended seven feet above the floor below. Each ring holds 720 baby turkeys. Temperature at the top of the softwood shaving litter is kept at 105 degrees at day one, and can be dropped one degree per day as they grow older. Thermometers—and bird behavior—are used as monitors. “Their behavior tells you whether they’re comfortable,” Joel said. “They pant if they’re too warm and huddle if they’re too cold.” Radiant heat heats what it touches, not the whole environment, so room temperature is about 88 degrees—still pretty warm. When the turkeys leave the brooder barns, they need 75 to 78 degree temperatures. By 16 weeks, they need temperatures of 50 to 55 degrees, and cooling becomes more important than heating, except in winter.

The grower barns are naturally ventilated in summer but power-heated and ventilated in winter. Curtains 5.5 ft tall cover the top sides of the 10-ft tall building sidewalls and can be rolled up or down depending upon temperatures inside and out.

Mortality is a fact of life with poultry, Bussis said. What has to be prevented is catastrophic loss. The farm has “stand-by generators in case of electrical failure. “When I was young and we were producing eggs, we lost 40,000 pullets in cages in a power failure,” Joel said. In heated, ventilated brooder barns, heat and ventilation systems have to work.



Feeding system, waterers, heaters, fans for ventilation and side curtains in a grow-out building.

Sudden loud noises—such as sonic booms—can cause problems. Turkeys, when frightened, will rush away and pile up, with massive death loss possible from suffocation. But, Joel said, that’s rare. “Turkeys are inquisitive and gregarious. They want to be around anything different. When you enter the barn, they gradually crowd around you—while chickens will run in the opposite direction.”

“Coccidiosis is the more common disease that can hurt you,” Joel said. Coccidiostats are added to the first four brooder rations. (The birds are fed nine different rations of various protein and energy levels over the 19 weeks of their lives.) Vaccination is used to prevent hemorrhagic enteritis, one of several poultry diseases that can take the joy and profit out of raising turkeys. “There are a lot of potentially deadly diseases and deficiencies,” Joel said. Access to his poultry buildings is strictly controlled to prevent spread of contagious diseases.

Even with good management, a 10 percent death loss is “decent,” 8 percent “really good, excellent” and 11.5 percent “OK,” he said. Luckily, losses are greatest at the start, when poults may not adjust to feed during the first five days, a time of “starve-out.” Turkeys are notorious for heart problems and leg problems, which gradually take a toll on the birds, even

FARM PROFILE • Industrial: Confinement

some that are almost fully mature, and “birds are naturally cannibalistic,” Joel adds. The term “pecking order” came from a common bird behavior in which weak birds are attacked and often killed.

Some people think that turkeys would be better off in less restricted environments—open or free range. Joel doesn’t agree. “Some people do grow turkeys in open range,” he said. “But you lose your control over the environment. Skunks, opossums, raccoons—a whole range of omnivores and rodents—spread diseases such as cholera. Birds such as starlings carry avian influenza and mycoplasmic diseases.” Joel likes his turkeys inside, where he can exercise effective environmental controls.

Family-size business

While 100,000 turkeys sounds like a lot, Joel said his is really about a family-size operation. He employs one other person full-time. His wife and three daughters, ages fourteen, twelve and ten, work when new poults arrive and must be settled into their new homes, 720 to each cardboard ring. From then on, it’s a monitoring process for Joel and his employee. Daily chores include:

- Monitor new poults. They need to be checked every couple of hours during the first few days. Little turkeys can die if they get turned on their backs as they sleep, so Joel walks through, staff in hand, and stirs up the sleepers.
- Pick up dead birds.
- Check and move drinkers, which hang from the ceiling. If litter is wet, fork it up so it dries and remains friable.
- Check feeding system. Feed moves into feeder pans from bins serving each barn. There are two 18-ton grain bins at each grower barn and two 9-ton bins at the brooder barns. Flexible augers deliver grain to feed pans suspended from the ceiling.



Two-day old turkey poults in brooder house, 720 poults within each ring.

It takes about an hour per barn per day for this monitoring, Joel said. Other routine, but not daily, tasks include manure management. Joel is one of a few poultry producers who composts manure. He uses four acres of land and generates 1,500 to 2,000 cubic yards of compost each year. “We hope to cover our costs,” he said of the composting operation. Joel sells the compost, mainly to organic farmers. As markets become better established and more growers see the value of compost, he hopes it will command a profit. “We no longer make sales of small quantities,” he said. “It is just too time consuming.” But with just a few acres of land, and no crop production, manure has to move away from the farm, and do so in a nonoffensive manner. The farm is right outside the town of Hamilton—and upwind. The manure composts “acceptably,” Joel said. All barns are bedded with softwood shavings. Each brooder barn is cleaned out completely and disinfected between batches of poults. Brooder barn waste is high in shavings (carbon) and low in manure (nitrogen).

Grower barns need not be cleaned completely or often. The litter in the growing barns is kept dry and aired out by mechanical rototilling until the barns become so crowded with maturing birds there’s no longer room for the tractor. During the last few weeks, a crust of concentrated manure builds up, and is removed before a new batch of birds comes in. High-nitrogen manure and the brooder barn shavings compost fairly well. Overall, he said, the carbon to nitrogen ratio is 15 to 18 to 1; an optimal level would be a higher carbon 30 to 1.

FARM PROFILE • Industrial: Confinement



Turkey manure composting. Joel Bussis markets the compost to local farmers.

The compost is short one element—water. “The manure cake is quite dry, 17 to 22 percent moisture, and the brooder manure is drier still,” Joel said. “You need 40 to 50 percent moisture to get a good heat going.” He piles the manure into windrows and waits for rainfall to raise the moisture level. A 1,500-gallon water wagon can be used to add water if needed. Composting is a key part of the operation, for without a good waste disposal system the operation is not viable.

Feed and feeding are highly automated. Trucks bring prepared feed several times a week, unloading it into bins. Flexible augers move the feed from bins into feeders.

The Cooperative

The term used to describe the organization of much of the poultry industry is “vertical integration.” When Bil-Mar informed its contract growers of the company’s plans, it didn’t call it “dis-integration” but “de-verticalization.”

Dr. Allan Rahn, a poultry economist at Michigan State University (MSU), analyzed the potential impact of Bil-Mar’s decision. A conservative estimate of the economic impact that elimination of the growing, slaughter, and boning of turkeys would have had on the region’s economy was \$171 million and 1,344 jobs, he said. Roughly \$113 million and 464 of the lost jobs would be accounted for by farm level impacts. Bil-Mar’s move would also have had adverse consequences on local corn and soybean market prices, as the growing turkeys used more than two percent of the corn and almost four percent of Michigan’s soybean production. The remaining dollar and job impacts were attributed to the slaughter and boning activities, mitigated somewhat by other value-adding activities Sara Lee planned to conduct in the reclaimed space at the Zeeland plant.

Faced with the economic consequences of the shut-down, the turkey growers had to decide whether to meekly quit or try to protect their industry. They decided to join together and face the problem as a group rather than as individuals. They created the Michigan Turkey Producers Cooperative (MTPC), electing John Bussis their first chairman of the board. Ultimately, they acquired property and, using cutting-edge technologies, retrofitted an old plant to perform the turkey slaughter and processing operations that Bil-Mar had discontinued.

MTPC’s facility started accepting birds for processing the week of March 6, 2000. Remarkably, Rahn said, this occurred only slightly more than a year after Bil-Mar closed its plant. When the growers decided to band together and form a cooperative that would replace the Bil-Mar structure from growing to processing to marketing, they had only a few resources to start. They had their own on-farm investments to consider. They had a pool of Bil-Mar employees who had skills and were losing their jobs. But they had no processing plant and no market.

First, they turned to Rahn, the MSU poultry economist, for his opinion. Dan Lennon, the chief executive officer and general manager of the finished plant, said: “Al Rahn did most of the in-the-trenches work for us, meeting with our growers and helping us figure where we’d fit in the industry and what the opportunities were.”

Rahn received funding support from MSU’s special Animal Agriculture Initiative and also from MSU Extension. Ottawa County, where the Michigan turkey industry was concentrated, chipped in county money and Extension help to organize the growers. Extension agent Chuck Pistis still serves as the co-op’s recording secretary. A retired MSU Extension poultry economist, Bud Search, helped the co-op develop a new brand identity, called “Golden Legacy.”

The new cooperative located an idle potato processing plant in Wyoming, just south of Grand Rapids in western Michigan. While the exterior of the plant is warehouse-like and nothing special to look at, Lennon describes the interior as “top drawer.” “This was the first new facility built in the U.S. in 15 years,” he said. “It is state-of-the-art, incorporating all the newest knowledge for safe food handling.”

FARM PROFILE • Industrial: Confinement

The plant was set up to process 4.25 million turkeys a year, producing boned turkey meat valued at about \$72 million. Plans included adding further-processed, value-added cooked products under the name “Golden Legacy,” at some point in the future. Those original goals have been met or exceeded, Lennon said. Despite some bad years for turkey since 2000, the plant has sold at least \$72 million worth of products each year. Running one full shift a day, it processes 4.5 million birds a year. It has captured contracts with the state of Michigan’s Department of Corrections to provide cooked and raw turkey to state prisons. It has contracted with other companies to prepare cooked turkey products valued at about \$10 million a year. It has added one grower member to the original 15, and several growers have expanded production.



Biosecurity: a warning sign at the entrance reminds visitors of the need for disease control.

The plant originally hired 215 line employees and 55 in sales and management—many of them experienced Bil-Mar workers. It now has 400 employees. The facility cost more than \$20 million to build. Funding came from CoBank, part of the Farm Credit System, on condition that the co-op members raise half the money. The 15 grower members contributed most of it, but some came from outside investors. Several of the grower loans were guaranteed by the USDA’s Rural Development Agency.



Layout of the building complex. Open land is rented out to a grower of plant nursery stock.

So the story is not just of the growers and the cooperative, but of a broad base of cooperation from public agencies of all sorts. Joel Bussis is proud of the role his father played. The Golden Legacy brand has literal meaning for him.

MANAGEMENT ALTERNATIVES

TRADITIONAL: CONFINEMENT AND SEMI-CONFINEMENT

Traditional Management: Confinement and Semi-confinement

Traditional poultry management is the system that has been used for generations by commercial poultry growers. Houses may be newly constructed barns or renovated outbuildings. Hens and broilers, in flocks of 500 to 5,000, are stocked at a rate of up to six square feet per bird and allowed to roam a well-littered barn floor. They are given continuous access to complete feed and water. In some cases, birds may be allowed to scratch in a small, adjacent yard. Generally the birds spend most of their time confined indoors, making the traditional management alternative a suitable choice for year-round production.

Traditional Management Overview

Birds:	Chickens, turkeys, and waterfowl
Land:	Level area to accommodate barn and yard size
Stocking density:	Four to six square feet per hen or broiler
Buildings:	Retrofitted barn; new insulated and ventilated house
Equipment:	Automated or non-automated feeders and waterers
Labor:	Semi-intensive
Operation:	Year-round
Marketing:	Moderate capital investments, low return on equity, predictable annual income
Advantages:	Relatively inexpensive compared to industrial alternative; can use existing housing and used equipment
Disadvantages:	Increased risk of parasite/pathogen build-up in house; air quality must be managed carefully; independent marketing.

Birds and Performance. Broilers, turkeys, and laying hens are the most common birds reared under traditional management. Growers can mail-order day-old chicks from independent hatcheries or breed their own replacements on the farm. Favored breeds include the Cornish Cross for broilers and the Gold Star, Red Sex-Link, and Black Sex-Link for layers. These breeds are known for their quick growth rates and productivity. Layers are managed on an “all-in-all-out” practice. Producers try to time laying so that all hens reach their peak within a few days of one another. This makes it easier to control the hens’ molt and induce a second laying period among the entire flock. After second lay, most commercial growers replace their flocks.

Housing. Traditionally managed birds are housed indoors in nonportable buildings year-round (though some producers provide access to dirt or cement yards). Floors may be covered in two to three inches of litter or bedding material. No cages are used; broilers and hens are free to move about inside the building with considerably more space than that given to industrial flocks (approximately one-and-a-half square feet per bird for broilers and up to six square feet per bird for geese). Plastic pools or swimming tanks may be added for waterfowl. In some cases, the building may be divided to provide separate brooding, laying, or grow-out space (see traditional chicken coop housing diagrams in Carol Ekarius’ *How to Build Animal Housing* in **Resources** under *Housing*). One or more raised feeding and watering stations (located in the middle of the house) are shared by the flock. Water lines are buried to prevent freezing during winter. Air quality is controlled using automated and/or natural ventilation systems. Most layer houses are windowless. Artificial light is used with layer flocks to control molting and maximize egg production.

Houses may be constructed new or retrofitted from an older barn. New houses are often built upon a concrete slab or gravel/earth floor foundation. Wooden floors are not used, as they can become damp and rot. Materials such as two-by-four and two-by-six wood studs are used for framing the walls and roof, which can be covered with shingles or tin. Walls are usually sided with plywood, covered with 6-mil polyethylene film inside, and insulated. Supplemental heat may or may not be required depending on insulation, site location, and stocking density. If you are building from scratch, you will need to obtain a building permit from your municipal government office.

MANAGEMENT ALTERNATIVES

TRADITIONAL: CONFINEMENT AND SEMI-CONFINEMENT

Old barns and outbuildings may be retrofitted by adding utilities, feeding stations, nesting boxes, roosts, vents, lights, and heat. Minnesota grower Alvin Schlangen, for instance, converted his ten-year-old 48 ft by 368 ft high-rise style barn (originally built to contain 80,000 caged layers under contract with an integrator) to a multilevel house for 6,000 layers. He lined the walls with a poly-type plastic to improve insulating capacity. He also covered the plywood floor beneath feeding stations with plastic to protect against rot. Alvin cut several side openings in the barn to give birds yard access between May and October. The barn is also equipped with two 24-inch exhaust fans, a 500,000 btu corn-burning furnace, and overhead fluorescent lighting. Alvin added standard galvanized nesting boxes (ten spaces per box), floor pan-feeders, and a nipple watering system. He uses natural convection cooling in summer months to reduce energy demand.



Nesting boxes in Schlangen retrofitted barn.

For more information, including traditional poultry housing designs, see *Small Scale Poultry Housing* by the Virginia Cooperative Extension Service, *How to Build Animal Housing* by Carol Ekarius, and *Renovating and Retrofitting Older Broiler Houses* from Auburn University. The Ekarius publication, though geared toward industrial managers, has some good tips and diagrams to help with the installation of insulation and ventilation equipment in older barns (see **Resources** under *Housing*).

Feed and Water. Birds raised indoors must be fed a complete ration with protein levels appropriate for their species and age. Traditional growers often use medicated feed to help control disease and illness among their flocks. Feeders are filled daily and fresh water supplied continuously.

Equipment and Supplies. As a traditional manager, you'll need some or all of the following equipment: fans; heaters; brooder stoves; hanging plastic or galvanized metal feeders; nipple waterers, founts or plastic jugs; garden hoses; nesting boxes; roosts; and egg collection crates.

Much of this equipment is available automated or nonautomated. Automated feeders, waterers and egg collection equipment can make work much easier. However, automated equipment is geared toward larger flock owners — those who manage several thousand birds or more. Schlangen and Wisconsin grower Dean Dickel both say they have had trouble finding automated equipment geared small enough for their 4,000- to 6,000-bird operations (personal communication, 2004). “It’s real tough to automate these buildings in Wisconsin,” said Dickel. “With 98 percent of the laying in this country done in cages, you’re kind of on your own if you want to do things differently” (see Farm Profile: “Traditional” Doesn’t Mean “Old-fashioned” on Dickel Farm).

If you plan to manage a smaller flock, nonautomated equipment may make the most sense practically and financially. Ekarius includes excellent construction plans for homemade nesting boxes, roosts, and feeding troughs in her book, *How to Build Animal Housing*, as does Leonard Mercia in *Storey’s Guide to Raising Poultry* (see **Resources** under *Housing*).

Health and Welfare. The most common health concern for traditional growers is disease. Generally, predators are not an issue because birds are confined indoors. Disease, however, can spread quickly from one bird to another or from rodents. Traditional managers use a variety of disease-prevention measures including medicated feed and vaccinations. Growers may further control disease by maintaining “closed” flocks. Ekarius notes that by dividing a barn into two “rooms,” growers can further limit the spread of disease by rearing birds of different ages separately. Rodents are discouraged through brush control (keeping the area around the barn clear of weeds), raised floors (1 ft off ground), tight feed storage, and traps.

MANAGEMENT ALTERNATIVES

TRADITIONAL: CONFINEMENT AND SEMI-CONFINEMENT

One final concern is smothering. Because birds are confined but not caged, there is a risk of smothering, particularly when a high stocking density is maintained. Wisconsin grower Dean Dickel said suffocation (caused by flocks crowding in corners) has proven to be a more serious problem than disease.

Labor. Daily chores include filling feed troughs or buckets, checking on water, observing birds, and collecting eggs (if you have layers). During the brooding phase, the workload is a little heavier as chicks require regular monitoring. Likewise, the workload will increase when it comes time to catch birds for market. Several hands may be needed to move your birds from barn to crate and truck. Seasonally or between flocks, the barn floor must be cleaned and disinfected. You can do this manually or with the help of a skid steer loader if your building can accommodate one. Pressure washing the walls and floors is common practice in newer buildings. New litter is usually added after the floors have been cleaned.

Finances. Traditional management system expenses vary widely with your choice of new or used housing, equipment, and, of course, flock size. Ekarius has developed a budget to help you estimate the cost of building a new poultry barn. New housing budget items include:

- Loan costs
- Liability insurance
- Building permits
- Temporary utilities (during construction)
- Excavation
- Footings
- Foundation
- Concrete for slab
- Framing lumber
- Windows
- Doors
- Roofing
- Siding and trim
- Heating, venting, and insulation
- Plumbing
- Electrical
- Waste disposal (sewer and septic)
- Equipment rental

As for equipment, you'll need to price feeders, waterers, nesting boxes, and pools. Day-to-day operating costs should include an estimate for birds, feed, litter, utilities, and labor.

Summary. Traditional production is perhaps the most flexible management alternative because it can be adapted for year-round or seasonal production (depending on your goals and investments), operated with or without automated equipment, sized for large and small flocks, and combined with yard systems. Most traditional growers renovate existing outbuildings or barns, making this alternative a much less expensive investment than industrial confinement production.

Dean and Mary Dickel, New Century Farm
Shullsburg, Wisconsin



Dean Dickel takes his eggs to Madison, Wisconsin, each Thursday in this refrigerated truck.

“Traditional” Doesn’t Mean “Old-fashioned” on Dickel Farm

In 2003, Dean and Mary Dickel’s Southern Wisconsin New Century Farm sold more than a million organic eggs from 4,500 laying hens housed in a handful of small, renovated buildings that once held hogs, cattle, and horses. Ten years after starting by selling turkeys and a few eggs to neighbors, egg sales provide the Dickels with the majority of their family income.

They had no experience with poultry when Dean began managing a small laying flock for his landlord in the early 1990s. Dean had grown up on a conventional Iowa livestock and crop farm, but couldn’t make it financially in the 1980s

with a 600-acre hog and cash crop operation of his own. Dean went back to school for a degree in journalism, and for a decade worked at newspapers in Iowa and Illinois, sometimes writing articles about farmers. He clearly remembers visiting a Wisconsin dairyman who relied on management-intensive grazing for his cattle and tried to avoid “farming” because he couldn’t afford to “farm.” “That was the most profound thing I ever did,” Dean describes. He started doing more articles about farmers who were successfully employing alternative production and marketing methods. Dean, who was becoming tired of working for someone else, started plotting his return to agriculture.

Dean and Mary, who also worked for the newspaper, developed two goals. One is to be “economically viable,” which to Dean means setting his own price for his products while adopting production strategies that control costs. The other is to be environmentally and ecologically sustainable, and thus provide a legacy of stewardship for future generations. The Dickels wanted a good environment in which to raise their two children.

While still working their newspaper jobs and living at the rented farmstead, the Dickels gradually expanded their laying flock to 900 hens as local demand for their eggs grew steadily with relatively little marketing effort. In 1996 they purchased seven acres that had a house and several older outbuildings, and started building the egg business toward a goal of 3,000 laying hens. Dean quit the newspaper that year, and Mary quit two years later, although she still does part-time writing and editing work.

Facilities and operations

From the start, Dean’s production model was driven by his goal of developing egg marketing into a year-round enterprise that could provide a full-time family living. Dean felt that a pasture-based production system that kept groups of layers housed in portable buildings regularly rotated among grass paddocks, would not meet his marketing goals. He said the farm is too small for pasture programs that have capacities of 250 to 450 birds per acre. Also, weather conditions in southern Wisconsin normally allow layers to be pastured for little more than six months each year. Dean views pastured poultry as fitting within a diversified marketing program in which eggs are a seasonal product.



New Century Farm’s new egg processing and storage building under construction.

However, the Dickels felt they needed to differentiate their eggs from larger competitors. They decided to certify their operation under organic standards, which require organic feed and access to the outdoors when weather conditions permit. Dean considered building a new facility capable of housing at least 3,000 birds while also providing an outdoor run, but did not like the prospect of paying for it. “And I wasn’t sure I would have the markets for that many eggs right away,” he explains.

So he decided to pursue a strategy of gradually renovating the farmstead’s existing buildings by clearing inside spaces of obstructions and adding heating, insulation, and ventilation. Two smaller sheds hold about 750 laying hens, while a third houses 1,500. Each provides about one-and-a-half square feet of free-roaming interior space per bird, while the outdoor lots offer at least ten square feet during about half the year. Dean recently started contracting about 30 percent of his production out to an Amish farmer who manages the hens in similar fashion.

Three times a year, the Dickels purchase a group of 1,500 day-old chicks from a proprietary breeding firm. They prefer a breed that lays brown eggs because the shells tend to be thicker and less likely to break during transport, and because their customers prefer brown eggs. The young birds spend 17 weeks in one of two renovated starter barns heated with gas-fired brooders and bedded with about four inches of wood shavings. Laying buildings are also bedded with shavings. “The big thing you learn about chickens is that you have to keep them dry,” Dean emphasizes.

With a portable mill, Dean mixes a laying ration that includes organic-certified corn, soy meal, a small grain, a vitamin-mineral pre-mix, and a free-flow calcium product. He struggled to find affordable feeding equipment that could be converted for use in his cage-free buildings. “It’s real tough to automate these small buildings in Wisconsin,” he warns. “With 98 percent of the laying in this country done in cages, you’re kind of on your own if you want to do things differently.” Eventually Dean found a used, push-button feeding system from a pheasant barn that includes flexible augers within 1.5-inch diameter piping. He suspended the auger 18 inches above the floor, and it drops feed into pans below. Water is supplied by a low-pressure valve system fed by overhead pipe. The laying buildings are kept at 50 to 60 degrees through the winter months.

Each spring, Dean waits until warm weather has settled in before opening the doors to dirt lots bounded by 4-ft high wire mesh that is topped with a single electric wire to keep predators from climbing over the top. He said egg production decreases about five percent when the move is made. “But they definitely are healthier from being outside,” he said. The building lights are left on after sundown to draw the hens indoors each night, although the access doors remain open during warm nights. The facilities are cleaned once a year with a skid loader. Dean composts the material and sells it to local farmers.

Dean said he used to worry about major death losses since organic rules prohibit antibiotics. However, predators and suffocation caused by flocks crowding into corners have proven to be more serious problems. “Compared to disease, we lose five times more chickens to smothering and accidental death,” Dean said.



Layers have access to an outdoor run for about half the year.

Egg processing

Old-fashion laying boxes hang from the walls, and eggs are gathered each afternoon and placed in plastic milk crates. The boxes are bedded with wood shavings, which keep eggs cleaner than straw bedding. Cleaning, sorting, and packing take place in a converted one-car garage attached to the farmhouse. Dean found a used processor for \$2,000. Dean places the eggs on a conveyor chain at one end of the unit. They pass over a high-sodium light to be candled for cracks before going through a hot water wash. After washing, the eggs are automatically sorted by size at the other end of the processor. Mary places the eggs into cartons with a bar code and "New Century Farm" labels. Most are then packed in boxes holding 15 cartons, and placed in a cooler. Dean then loads many of the cartons into a refrigerated panel truck for delivery to customers. Daily tasks normally take Dean and Mary about one-and-one-half hours to complete.

Marketing

"What makes this whole thing work is the sales," Dean asserts. "I enjoy sales. If I have something I believe in, I can sell it." About 80 percent of New Century Farm eggs are sold in Madison, Wisconsin. Restaurants buy 30 percent of the total volume, with groceries and food cooperatives accounting for most of the rest. Each Tuesday Dean spends two or three hours on the telephone with his regular customers to determine how many eggs they need. Each Thursday he makes the 90-minute drive to Madison. With 30 stops throughout the city, the trip usually requires at least 12 hours to complete.

The farm's wholesale price is \$2.25 per dozen. Sales have steadily increased even though in 2003 Dean raised the price 25 cents to cover rising feed costs. He said this increase was easier to make because general egg sales and wholesale prices have risen sharply, driven by the popularity of high-protein, low-carbohydrate diets. Dean also credits the relationships he has developed with store and restaurant managers, and the flexibility he is willing to offer in helping these customers balance their inventories. "They get the eggs they want, when they want them," he explains. Dean believes that such service, along with low overhead, will keep his business competitive.

The farm's sales vary seasonally, with demand peaking during the Thanksgiving-Christmas baking season, and falling sharply during hot summer weather. The Dickels were forced to dump eggs during the summer of 2002, but in 2003-04, more often than not, they did not produce enough eggs to meet demand. In early 2004, Dean was purchasing 25 percent of his total egg supply from an Amish group in Iowa. Although this was cost-effective, Dean was not excited about making the 300-mile round-trip to obtain these eggs. "We've turned the corner from being just a producer to being more of a marketer," he said.

Organic production

In early 2004, Dean struggled with whether to maintain organic certification in the face of rapidly escalating feed costs, including soy meal that had reached \$800 per ton. He said organic certification was important in developing his customer base, but may not be necessary to maintain that business. "Organic eggs have become a commodity, so customer service and cost are important," Dean said. "Organic gets you in the store, but quality and freshness keeps you there."



Until the new processing building is ready, eggs are manually candled for deformities and sorted for size in the Dickels' garage.

Growth concerns

The Dickels are also debating growth. In early 2004, the Dickels were making plans to build a new processing and egg loading facility that would provide the option of handling at least twice as many eggs with their current processing equipment. Dean said he and Mary do not want to put any additional labor into the business, but also need to face the reality that sales must increase to match rising expenses. "I hate to say that, because I used to say that's what's wrong with agriculture," he said. They hire help to gather eggs two days a week, and Dean is considering expanding contract production to more growers. "Rather than giving up my customers, I would rather hire someone to take care of my chickens," he explains. "I don't think integration is bad. It's just who's doing it."



Inexpensive laying facilities include wall-mounted egg boxes and a recycled feeding system housed in an old hog building.

The farm may also diversify its offerings rather than greatly increasing egg sales. The Dickels have provided some restaurant customers with vegetables from their market garden, and Dean would like to offer pasture-raised pork produced on contract. He is also thinking about starting a specialty breeding and hatchery business to produce hens that would do a better job of maintaining body condition and producing thick-shelled eggs under non-cage, organic production management.

Words of advice

The lack of automated equipment scaled to smaller poultry operations is a problem, Dean said. The organic egg market has become more competitive, and finding sales outlets is getting more difficult as major retail chains assume a larger share of the organic market. These stores want track records and prefer to deal with wholesalers who can provide a variety of products with each shipment. Dean said start-up egg producers need to realize that they are not going to automatically have markets for all the eggs they produce at the prices they want to receive. It is better to grow slowly as the markets allow, rather than cutting prices on a large volume of eggs produced in the early stages. Overproduction is an unnecessary burden and financial drain. While producing too little for the marketplace is a lesser financial problem, it can be frustrating to both producer and customers.

Dean said that he learned from his first farming experience that financial management must not be neglected. Either the manager must be proficient in all aspects of accounting and finance, or these tasks should be farmed out to an expert. Most important, he urges prospective egg producers to gauge whether they would enjoy operating such an enterprise, and have the skills to be successful. "Just because something is profitable on paper doesn't mean it will work for everyone," he said.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

Day-range Management: Pasture

Day-range production is one of several popular pasture-based management systems. Housing is semi-permanent with perimeter fencing used to create multiple yards or pasture areas. Birds have continuous access to pasture from the house during the day and are locked in at night when predation is more likely to occur. Shelters made from relatively inexpensive materials are moved each week, month, or season, depending on bird species, flock size, pasture composition, and other management factors.

Day-ranging in the Upper Midwest is a seasonal management alternative. Most growers day-range their birds for six months or so each year, though there are exceptions like the Coon Creek Family Farm in Wisconsin, which allows winter ranging (www.cooncreekfamilyfarm.com). In Michigan, Minnesota, and Wisconsin, the typical pasture poultry season stretches from early May to late September or October.

During this short season, however, farmers in the Upper Midwest use day-range practices (also called “net range”) to manage broilers and layers in commercial flocks of up to 25,000 birds (Hamilton and Hamilton, 2004). Commercial growers are drawn to the day-range alternative because it can be less labor intensive than the system developed by Virginia farmer Joel Salatin, who moves pens and birds to new pasture on a daily basis (see *Daily Move Pens: Pasture*).

In the words of Indiana day-range managers Andy Lee and Patricia Foreman, “This new production model [day-range] is less costly, higher yielding, and [has] lower labor requirements than other pasture-based poultry models, and can result in near zero mortality” (Lee and Foreman, 2002). Much of the information in this section comes from Lee and Foreman’s book: *Day Range Poultry* (see **Resources** under *Day-range/Free Range*).

Day-range Management Overview

Birds:	Waterfowl, Bourbon Red turkey, heavier and dual-purpose chickens, light colored breeds and replacement pullets
Land:	Level, well-seeded grass and legume mix pasture
Stocking density:	200 to 300 chickens per acre
Buildings:	Floored, machine-moveable shelter with lots of shade
Equipment:	Electric fencing, poultry netting, feed troughs, water fountains
Labor:	Feed and water daily; move fence daily or weekly; move shelter weekly, monthly, or seasonally.
Operation:	Seasonal
Finances:	Minimal investment
Advantages:	Niche marketing opportunities; no daily movement of shelters; low entry cost; complement to other livestock enterprises
Disadvantages:	Need tractor or skid steer loader to move shelters; increased risk of parasite/pathogen build-up around shelter; independent marketing; risk of predators.

Birds and Performance. Your choice of poultry species and breed is important if you want to make maximum use of your pasture forages and encourage healthy breeding stock. However, there are few specialized breeds for pasture in the United States at this time. The recommendations below come from a range of sources, including farmers themselves. Your decision about which species and breed to raise will depend on a host of factors including climate, soil topography and type, pasture composition, target markets, and your own management preferences.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE



Frank Jones puts out supplemental feed. Portable houses are moved frequently to provide fresh pasture, and limit manure build up.

Domesticated waterfowl, such as “weeder” geese, tend to do well on grass and, because they are easily corralled into shelters, require less labor than most pastured poultry (Manitoba Agriculture and Food, 2002). At about five to six weeks of age, goslings can “subsist entirely on good pasture” (Geiger and Biellier, 1993). Just about any waterfowl breed will perform well since grass is its natural food. Some waterfowl growers recommend choosing breeds that have light-colored skin and feathers because they do not absorb and retain as much heat.

Chickens and turkeys, though not as voracious as waterfowl, may consume up to 20 to 30 percent of their diet intake from pasture if offered good forage. Many producers who use pasture-based systems, including the day-range alternative, choose heavier breeds that feather early, are light in color, and are well-suited to roaming and foraging. Chickens will roam

up to 40 feet from their house or shelter (Muntz, 1999). For poultry layers, the Barred Rock, Production Red (a commercial version of the Rhode Island Red), and Golden Comet breeds have been recommended as productive layers on pasture.

Growers who pasture turkeys and chicken broilers, however, don’t currently have many choices. Specialty broiler genetics for pasture-rearing have been developed in Europe but are not yet available to farmers in the United States (Fanatico, 2002b). For this reason, most farmers who raise broilers commercially on pasture use the readily available Cornish-Rock Cross (usually called the Cornish Cross). The disadvantages of Cornish Cross birds are that they tend to have weak legs, poor heat tolerance, high incidence of heart failure, and tend to be poor grazers (Polson and Fanatico, 2002). Turkeys, like the Bourbon Red, are a favorite for pasture systems.

Some broiler growers are beginning to develop their own pasture breeding flocks. Tim Shell from Virginia began raising parent stock on pasture to produce hardier chicks. The Shells call their chicks “Pastured Peepers” or the “CornDel” cross (a mix of Cornish Cross and Delaware stock). The CornDel broilers are said to produce a four-pound carcass in nine weeks (as opposed to eight weeks with the Cornish Cross breed). While the Shells no longer offer hatchlings, Wisconsin breeders Julie and Vince Maro are now offering day-old CornDel chicks. Other growers are experimenting with heritage breeds, but warn that they take significantly longer to reach market weight. Because of the extended growth period, heritage birds consume more feed and often produce a tougher carcass. This may be all right if you are raising replacement pullets, where rapid growth is not desired, or if your customers want a heritage bird (Mercia, 2001).

See **Resources** under *Hatcheries* for a list of breeders that raise birds suitable for pasture production.

Pasture. The day-range system relies on good, well-managed pasturage (grasses, legumes, insects, and seeds). Pasture quality and maintenance play a big role in your birds’ health and in your success. So, what’s involved in managing pasture for poultry?

Seeding. Pasture should be planted with a special forage mix. Remember that poultry are not ruminants and therefore won’t do as well as some other livestock on predominantly grass pasture. Chickens, for example, are said to prefer broad-leaved plants and legumes, such as alfalfa and red clover, to grasses. For geese, you may want to reduce the amount of alfalfa in your mix, although industry experts say that just about any tender forage and small grains will make good green feed for these water birds (Geiger and Biellier, 1993b). Holderread recommends the following mix for permanent pastures: Orchardgrass, timothy, brome, perennial rye, and one or two clovers. On lower lying, poorly drained land, reed canarygrass and meadow fescue are recommended forage for geese and other waterfowl (Holderread, 1993). You may also want to check out the **Resources** under *Pasture Management* for Upper Midwest forage publications by Craig Sheaffer and Dan Undersander.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

Mowing, watering, fertilizing. In order for pastures and paddocks to remain palatable and productive, particularly during summer months, they must be kept short, watered, and fertilized. In most cases, the birds will take care of your fertilizing—after all, this is one of the most-touted benefits of pastured poultry. Lee and Foreman recommend that pastures be maintained at four to eight inches. “If the grass is much taller than eight inches, the birds eat less and it also makes the pens more difficult to move” (Hamilton and Hamilton, 2004). Moreover, by rotating frequently and confining geese and other “heavy polluters” at night (as prescribed for day-range management) you will reduce the amount of grass that is trampled and matted down with manure. In other words, by locking up your birds in their shelter at night you are protecting your birds from predators and preserving forage quality.

Rotating. Last, and perhaps most importantly, your birds should be rotated among pastures to prevent pathogens and intestinal parasites and to encourage foraging on fresh greens. Rotation gives pasture time to rest and recover and can be accomplished in two ways. The first is by moving feed and water around daily within the paddock to spread traffic. The second way is to isolate ranging sites from the shelter by dividing the area into smaller yards or paddocks with poultry netting. In this way, birds are rotated daily, weekly, or monthly between paddocks. The frequency of paddock rotation will depend on several factors: stocking rate, pasture composition and quality, bird species, and the amount of supplemental feed provided. The less frequent your rotation, the more likely you are to have nitrogen problems around the house, since concentrated manure can burn the grass rather than fertilizing it.

Housing. Regardless of whether you raise chicken broilers or laying hens, turkeys, or ducks, day-range housing needs to be portable, weathertight, and predator proof. All shelter designs have doors or access holes to a fenced pasture area. Pastures are enclosed with electric, predator-proof perimeter fencing and divided into paddocks using one-inch poultry netting. When it comes to the perimeter fencing, livestock specialist David Pratt said “More elaborate designs are often needed for predator control. A high-tensile fence design that has effectively prevented dog and coyote predation consists of nine wires mounted at heights of 5, 11, 17, 23, 30, 37, 44, 52, and 60 inches. Every other wire is electrified (including both top and bottom wires). Wood posts are spaced 75 to 100 feet apart with fiberglass stays installed at 20-foot intervals.” Contact the Center for Integrated Agricultural Systems (see **Resources** under *Agencies and Organizations*) for more information about pasture fencing and installation.



Machine-portable broiler house.

Broiler house. Day-range housing typically is used for more mature birds in the growing, laying, and finishing stages; but because they are semi-permanent structures, you may be able to convert them for use as brooder houses quite easily. There are many moveable broiler housing options thanks to ongoing innovation among poultry farmers. Oregon chicken farmer Robert Plamondon describes some of these housing alternatives in *Range Poultry Housing*. He divides housing into daily move shelters and machine portable houses. Daily move shelters are discussed in the next section, *Daily Move Pens: Pasture*. Two machine-portable housing alternatives, popular for the day-range systems, are outlined briefly below. Both of these housing options are inexpensive and relatively easy to construct.

Machine-portable houses are basically buildings on skids. They may be constructed from greenhouses, tents, sheds, hoop houses, or mini-barns. Most have floors and use litter, though there are some growers who prefer a floorless shelter. Plamondon discusses the advantages and disadvantages of various construction designs and materials in *Range Poultry Housing*, as do Herman Beck-Chenoweth in *Free-Range Poultry Production & Marketing* and Anne Fanatico in *Sustainable Poultry: Production Overview*. All of the machine-portable houses, however, do have one thing in common: they are designed to be more durable and wind-resistant than hand-moveable pens, yet small enough to be moved by tractor. Construction costs will vary according to design, size, and the materials used.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

Figure 26: Day-range Housing Considerations

- **High winds.** Lower, heavier houses will generally be more windproof than taller, lighter houses. Staking down houses works quite well. Choose a plan that has been tested for at least one year in exposed locations.
- **Heat and cold.** Housing should be rain- and windproof while providing some protection from the sun during summer and cold during winter. Mature chickens can tolerate low temperatures, but production will suffer if drinking water freezes or if they do not have a windproof area in which to sleep.
- **Predators.** Protection from nighttime predators is essential. Floors provide some protection against predators.
- **Turf destruction and parasite build-up.** Chickens must be moved to new areas before turf damage becomes too great. Concentration of manure can create conditions conducive to pathogens and parasites.

Source: Plamondon, 2003.

Another day-range housing alternative is the wooden “mini-barn.” Lee and Foreman constructed 8 ft by 16 ft mini-barns from chicken wire, galvanized tin and plywood to house 128 broilers (one square foot per bird) or 25 full-size turkeys (five square feet per bird). The roof was designed with a pitch to allow standing room for workers, and for turkeys, which like to roost high, they added above-ground roosting space. They did not insulate the structures. If you plan to use your house for year-round shelter in the Upper Midwest, you may need to add insulation or at the very least enclose the open walls with tarps or plywood. The entire mini-barn structure can be placed on pressure-treated skids for mobility.

Layer house. Either of the broiler housing options described above can be used for layers in the day-range system. However, you will need to reduce your stocking density, build-in nesting boxes, and add roosting bars for hens and turkeys. Lee and Foreman recommend roosting space of 7 linear inches per hen and overall floor space of 1 to 1.25 square feet per bird during summer (more space is required for the larger dual-purpose breeds). Plamondon recommends 2 square feet per hen. As the weather turns cold and your birds spend more time inside, you will need to give them a little more space. When there is enough insulation and ventilation to eliminate condensation, approximately 2.3 square feet per hen is recommended. If you are not controlling ventilation, then 4 to 5 square feet is advised (Plamondon, 2003).



Machine-portable layer house with roosting bar.

Making decisions about housing and shelter designs for your flock doesn't need to be difficult. Keep in mind the building considerations outlined by Plamondon in Figure 26 and choose the plan that seems like a good match for your site, climate, and situation—be willing to experiment.

For more housing information and designs, see **Resources** under *Housing*. Firms selling construction materials can be found under *Suppliers*.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

Feed and Water. Research suggests that birds on pasture consume 5 to 20 percent of their feed needs from grasses, legumes, and insects (Mattocks, 2002). Experienced farmers like Joel Salatin and Ron Desens say forage consumption may be even higher—around 30 percent of birds' daily feed intake (see Farm Profile: Sleeping Cat Organic Farm). Forage intake varies by species and breed. Geese, for example, can be productive on a diet of only grass, water, and grit (Holderread, 1993). On the other hand, modern chicken broiler breeds like the Cornish Cross do very little foraging unless they are enticed with high quality grasses and legumes (Mattocks, 2002).

Regardless of how much foraging your birds do, they will need high-protein feed and mineral supplements, particularly during the growth stage for broilers and laying cycle for hens. Many farmers who practice pasture-based management provide this supplemental feed on a restricted basis; that is, they withhold feed when birds are likely to forage on their own. Birds on pasture tend to forage most often during the morning (when temperatures are cool) and on overcast days (Chisholm, et al., 2003). By removing feed during these times, you can encourage your birds to forage for more of their food.

Feed can be mixed on your own farm with supplements or purchased as a complete ration. Many day-range growers feed simple or low-protein feeds instead of complete rations as a way to encourage more foraging and to save on expenses. If the feed contains all or most of the dietary requirements, the chickens will depend on the feed instead of the forage. In *Pasture-Raised Poultry Nutrition*, poultry nutritionist Jeff Mattocks provides nutritional requirements and diet recommendations for chicken broilers and layers, turkey starters and finishers, as well as meat ducks raised on pasture.

Temperature affects how much birds consume, creating a management challenge for anyone using day-range or other pasture-based management alternatives. Pay careful attention to the changing water requirements of your birds during hot weather and ensure that water does not freeze for an extended period during fall and winter. Jody Padgham, editor of the American Pastured Poultry Producers Association's *GRIT* newsletter, reviewed four watering systems that are commonly used on pasture (open pan, bell, nipple, cups) and are appropriate for most species in the brooding, growing, laying, and finishing stages (see **Resources** under *Housing*).

Figure 27: Water Consumption of Layers Based on Environmental Temperature

TEMPERATURE (°F)	GALLONS PER DAY FOR 100 LAYERS
20-40	4.2-5.0
41-60	5.0-5.8
61-80	5.8-7.0
81-100	7.0-11.6

Source: Mercia, 2001.

Average water consumption needs, reported by the New England Poultry Management and Business Analysis Manual, are summarized in Figure 27.

Equipment and Supplies. In addition to shelter, you'll need some basic equipment and supplies. Your biggest piece of equipment will be a skid steer loader or tractor. Day-range growers also use portable electric perimeter fencing, poultry netting, feed trays or troughs, and waterers (see Figure 28).

Figure 28: Equipment Checklist – Day-Range Management

✓ Skid steer loader or tractor	✓ Electric fencing	✓ Hanging waterers or water buckets and heaters (if necessary)
✓ Housing supplies (hoops, roofing material, plastic tarps, plywood, chicken mesh/wire, roosting bars)	✓ Poultry netting	✓ Nesting boxes and liners (if used)
	✓ Automatic or covered feeders	✓ Litter material

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

Younger birds need two-inch mesh fencing, while common woven field fencing will work for birds aged four weeks and older. If you are raising waterfowl and other heavy birds that seldom fly, standard 18-inch to 24-inch high fencing should do the trick. If you raise turkeys, captive game, or chicken breeds known to be more active, you may have to use a taller (36-inch to 48-inch) fencing.

Lee and Foreman built their own feed troughs from PVC pipe — an inexpensive option detailed in their book *Day Range Poultry*. Another option is to purchase ready-made, galvanized steel or heavy duty plastic feeders.

All feeders should be covered to prevent weather-related spoilage (wet feed will become moldy, unpalatable, and hazardous to bird health). Depending on the length of your production season, you may also require pan heaters for your waterers to prevent freezing (see **Resources** under *Suppliers*).

Health and Welfare. Many producers who practice day-range and other types of pasture management report low mortality rates, citing access to fresh air and sunshine, which can help break up disease cycles. Birds on pasture face three significant health risks as described under “Management Basics”: (1) predators; (2) weather; and (3) pathogens and internal parasites transmitted by wildlife and other livestock. Some of the most important things day-range managers can do to maintain healthy flocks are:

- Vaccinate chicks.
- “Harden off” young birds before turning them out on pasture.
- Create predator-free shelters.
- Build weather-safe shelters with shade.
- Provide fresh water.
- Cover feed or place indoors so spilled grain won’t attract wild birds.
- Rotate shelters and feeding areas to prevent pathogen build-up.

Responsible management, such as hardening off brooders and providing shelter at night, can minimize most predator-, weather-, and disease-related threats. “By using the electric poultry nets and closing the birds in at night, we have virtually eliminated predator losses in our broiler flocks,” write Lee and Foreman. “And by hardening them off properly from the brooder and putting them back in their shelter at night so they don’t get rained on, we have virtually eliminated death losses due to weather” (Lee and Foreman, 2002). Learning these skills can take a while; beginning poultry growers often experience high mortality among flocks when they first adopt day-range and other pasture-based management systems.

Birds raised in accordance with the day-range model face one additional risk: pathogen and parasite build-up around housing or shelter areas. Some critics of the day-range model warn that infrequent shelter movement creates a slow build-up of pathogens: “While the day range system may work great the first year, and the second, the pathogens in the paddocks and houses can increase until things become hazardous. This can be addressed [by moving shelters], but because it happens slowly it’s easy to overlook or underestimate” (Eco-Friendly Foods, 2003). For this reason, some day-range producers are experimenting with different paddock/yard designs and rotations.

Labor. The size of the flock, type of housing, timing of paddock rotations, frequency of shelter movements, and experience affects labor load and the tasks involved. Birds and shelters are not moved daily; therefore the day-range system may be more suitable for owners of larger flocks, because it requires less time in the field. Most poultry growers who raise birds on pasture, say they spend most of their time:

- Feeding
- Watering
- Moving fences and netting
- Repairing fence holes
- Cleaning out brooder houses and shelters
- Rounding birds up during inclement weather

One grower mentioned feeling tied down to the farm when his birds were on pasture, since rain and extreme heat are potentially lethal.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

The Center for Integrated Agricultural Systems (CIAS) surveyed nine Minnesota and Wisconsin farmers who raised an average of 14,500 chickens on pasture in 2000 to learn about labor on large-scale pastured poultry operations. All nine farmers had been raising poultry for at least six years and had, at one point, raised chickens using daily move pens. Five had switched to day-range management and, at the time of the survey, moved housing weekly and fences daily. All of the farms performed their tasks by hand and relied heavily on family help. They spent an average of 2.6 hours per day managing their birds during the pasture season. Detailed labor results are reproduced from the CIAS report in Figure 29.

Figure 29: Average Labor Requirements for Pastured Chicken Production at Two Farm Sizes.

	NUMBER OF CHICKENS SOLD	
	4,000-10,000 (FIVE FARMS)	10,001-25,000 (FOUR FARMS)
Average # hours/year	656	1,814
Average # days/year	254	264
Average # hours/day during pasture season	2.6	6.9
Average # minutes/chicken in production	7.4	6.0
Average # family members	2.0	3.75
Average # hired workers	0.4	1
Average % of labor contributed by family	83	64

Source: Center for Integrated Agriculture Systems, 2003.

Finances. In addition to some one-time start-up costs, the biggest ongoing expense is feed. Some observers suggest that feed costs may be reduced with the day-range alternative because birds obtain some protein naturally from insects, worms, and plants on pasture (Fanatico, 1998). Reduced feed intake and expenses, however, may not translate into improved bird performance. No trials have been conducted to test bird performance and feed intake on pasture.

Minnesota and Wisconsin pastured poultry growers who took part in the CIAS survey mentioned above, reported earning \$2.19 to \$2.24 profit per bird in the year 2000. The profits come from reduced feed and housing expenses as well as above-average gross income. See Figure 30 for more financial detail.

Figure 30: Gross and Net Income from Pastured Poultry

	NUMBER OF CHICKENS SOLD	
	4,000-10,000 (FIVE FARMS)	10,001-25,000 (FOUR FARMS)
Gross income from pastured poultry	\$39,000	\$155,863*
Gross income per bird sold	\$7.30	\$8.61
Cash expenses per bird sold**	\$5.06	\$6.42
Net income per bird sold	\$2.24	\$2.19

Source: Center for Integrated Agriculture Systems, 2003.

*Does not include the largest farm with 50,000 chickens; however this farm's information is included in the per bird statistics.

**Includes feed, chicks, buildings, and hired labor. Does not include family labor, capital, and land costs.

MANAGEMENT ALTERNATIVES

PASTURE: DAY-RANGE

When preparing your own day-range budget be sure to include the following variable expenses:

- Pasture seed
- Houses or construction materials
- Covered feed and water equipment
- Fencing
- Fence charger
- Battery
- Hoses

See *Growing Your Range Poultry Business: An Entrepreneur's Toolbox* and *CIAS Generic Poultry Enterprise Budget* for a sample day-range budget—complete with expense and break-even estimates (**Resources** under *Budgeting, Enterprise Planning and Recordkeeping*).

Summary. The day-range system is an excellent alternative for those interested in experimenting with pasture production. Housing can be designed to accommodate birds seasonally or year-round and on a large or small scale. This management alternative requires less labor than the industrial and daily move pens models. Investments are minimal compared to the confinement housing models; however, a tractor is required to move shelters when necessary.

Frank and Kay Jones, Earth Shine Farm
Durand, Michigan



Frank and Kay Jones, Earth Shine Farm.

Pasturing Poultry Creates a Different Kind of Product

Frank and Kay Jones work hard to produce the kind of poultry products they do. And they expect to get paid for doing it. They charge \$2.90 a pound for dressed broilers they grow on their 10 acres near Durand, Michigan, using labor-intensive methods, a topnotch, on-farm processing facility they built, pasture, and organically grown grains they grind themselves. They get \$3 a dozen for eggs.

The enormous change that took place in the poultry industry starting about 50 years ago was all about labor. Confining hundreds of thousands of birds, broilers or layers, in buildings where they could be managed *en masse* greatly reduced the labor associated with raising poultry, and mechanized systems replaced manpower. It also changed the nature of poultry products. On the plus side, products were cheaper. Chicken wasn't just for Sunday dinner anymore. But it was different, too. Less exercised broilers mature at a younger age, the meat is juicier and more tender, but some say blander tasting. Layers on controlled diets produce eggs with yolks that are lighter in color and milder in taste.

Is "modern" poultry better, worse, or just different? The Joneses believe there are health and social issues to consider. Are confinement-reared broiler chickens exposed to too many antibiotics? Do they produce meat and eggs with an unhealthy balance of fatty acids? Is denying chickens the right to scratch in a pasture both less humane and bad for us as well? Some think so, including Frank and Kay.

To make poultry products their way requires, literally, that they get up with the chickens. They operate a day-range system, in which chickens come into shelter at night and go outside by day to feed and forage, confined only by an electrified net fence that keeps them within a hundred feet or so of their houses. Each morning at daybreak, Frank or Kay opens the houses to let the birds out, and every evening, after birds come inside to roost, Frank closes the doors behind the birds.

Housing

Why not just let the birds come and go as they please? The big concern is predators, Frank said, primarily foxes and raccoons, but also owls that could come into the roost areas and wreak havoc on the defenseless birds. While the electrified net fence offers fair protection by day, he doesn't consider it adequate for the terrors of night. So the birds are put into coops fortified with metal walls and chicken wire mesh.

Both the coops and the netting are portable, so when pasture gets eaten down or worn down to bare earth near the houses, the houses can be moved. Lots of variations are possible, but the Joneses like to move the netting three or four times to enclose fresh pasture before moving the houses. They have tried several other variations. They used the moveable pen system developed by Joel Salatin, but abandoned that. "It was just too much labor to move the pens to fresh pasture two and three times a day," Kay said. "The pasture area inside the pen was just too small and too many birds were injured while moving the pens."

They tried using more permanently placed houses and fences. These provided greater protection from predators, but sacrificed the advantages of pasture. The birds killed vegetation close to the building, and it was hard to provide enough pasture without fencing large areas. Manure collected in the buildings, which needed to be cleaned. Moveable houses just leave manure in place, to disintegrate naturally.

FARM PROFILE • Pasture: Day-range

The Joneses don't know for sure just how much green grass and clover, bugs, and worms their chickens eat while pasturing, but probably less than 30 percent of their feed needs. Still, Kay and Frank are sure that pasture makes all the difference. Being outdoors and getting light, exercise, and fresh air is better than total confinement, but forage consumption is the key to quality meat and eggs, Kay believes.

Birds

Frank and Kay use mostly Redbros broilers—the kind favored by French farmers who produce Label Rouge chicken. Most of the layers are Golden Comets, but there are other breeds as well. Frank and Kay buy some replacement layers each year and usually buy different breeds. They can tell bird ages by the breed, which include Barred Rocks, Rhode Island Reds, New Hampshires, Black Astralorps, and others.

Labor

On any given day, the Joneses have 500 to 600 chickens—250 of them laying hens, two batches of 100 growing broilers, and another 100 broiler chicks in the brooder house. In late summer, there are also 60 turkeys growing toward Thanksgiving. Each group needs daily care.



Frank Jones checking on birds in machine-portable broiler house.

Eggs are gathered once a day, and dirty eggs must be washed. Designing the nests so eggs roll away after they are laid helps keep eggs clean. Frank enjoys building things, and part of his day is devoted to making feeders or building houses, roosts, and nests for layers. House construction is simple—two-by-fours, chicken wire, conduit bent into the proper shape, plastic tarps for roofs.



Feed and waterer in pasture.

Feed and water

After Frank or Kay let the birds out in the morning, each group gets feed and water. Feeders are simple devices made of plastic eaves trough and are filled using a five-gallon plastic pail. Five-gallon buckets of water are inverted over special bases, dispensing water as it is consumed. The broilers are fed all they will eat, but the layers are limit-fed to keep them productive but lean. They feed twice a day.

Frank and Kay buy organic grains that Frank grinds in batches of 1,000 pounds with a portable feed grinder powered by tractor power take-off. Chicks need higher protein and a finer grind. Grains include oats, corn, wheat, soybeans, and field peas. The Joneses use Fertrell minerals and supplements that include oyster shells, which can enhance egg shell quality.

Health and welfare

Chicks need special care. They are kept in a brooder house, where heat lamps keep temperatures at the 95-plus-degree level young chicks need. Need for heat decreases rapidly, about one degree per day, and by the time they are three weeks old, the chicks can be moved into houses on pasture. It only takes seven to nine weeks to bring a broiler up to the four-pound dressed weight the Joneses want.

Layers are completely different, and quite a bit more frustrating, according to Kay. "For one thing, they are stronger fliers than meat birds," she said. They can—and do—get outside the net fence. They take up more space than the broilers, a factor on their small acreage. While broilers are summer projects, layers live much longer—several years.

There is really no “time out” with layers. They must be raised in a non-pastured environment for the winter and providing with supplemental lighting to keep their rate of egg laying high. Kay talks about getting out of layers completely—but would miss the income, as she and Frank have a strong market for eggs.

Marketing and processing

For Frank and Kay, the lure of direct marketing has been strong but the road slow-going. While they have processed and sold both eggs and broilers for five years, the “final look” of their Earth Shine Farm is still evolving. Kay’s interest is in selling healthy food to consumers direct and through the traditional marketing system. She would prefer to sell eggs and broilers to retailers and restaurants and not rely heavily on sales from their farm. It is difficult to make money from direct-from-the-farm sales of eggs, Kay said, if each sale involves a cup of coffee and conversation. Similarly, it’s difficult to orchestrate 30 customers arriving to pick up two or three chickens apiece the day after butchering.

That is the approach taken by Virginia farmer Joel Salatin, described in his 1993 book *Pastured Poultry Profits*. The idea appealed to rural America and especially to those looking for a more sustainable and sustaining agriculture. Salatin described a low-cost production and marketing system by which a farmer could “net \$25,000 in six months on 20 acres,” generating wages comparable to having a good job in town by raising broilers in cages on pasture. Salatin gives the impression that marketing is no problem, that customers are waiting at his door, and that selling dressed poultry is simply a matter of taking orders. But farmers considering entering the business seem quite concerned that the opposite may happen for them. What if they have 150 fully grown birds, only 75 have been spoken for, and another 75 need freezer space? What does a producer do with birds for which no production contract has been signed?

The Joneses’ experience is that customers have limited freezer space, don’t buy large numbers of birds at once, are impulse buyers, and may not be willing to devote their entire poultry budget to their more expensive, organic birds. They confronted those realities, and decided to build a processing facility that could be government-approved.

The couple worked closely with local and state officials in designing a processing facility, which is nearly complete. They invited inspectors to review their plans. Inspectors from the Michigan Department of Environmental Quality, which deals in daily outputs of thousands of gallons of wastewater from large plants, saw very low levels of environmental threat in this facility that generates a few hundred gallons of wastewater three or four times a year. The inspectors were often challenged to wonder whether the standards they enforced were even applicable.

Frank designed the building in which they will kill and process about 100 broilers at a time. They intend to do several batches a year—perhaps 1,000 birds a year in all. The system will be about the same as the methods they now use.

Currently, birds are killed and bled in four killing cones, then transferred to a scalding tank for 30 seconds in 140-degree water. Scalded birds go into a seven-bird-capacity picker and then onto a stainless steel table for evisceration. The last stop is an ice-water bath for cooling, but Frank and Kay don’t like water cooling and plan to change that.



The Joneses’ new processing facility.

In the new building, birds will be hung on shackles and eviscerated as they hang. The hanging birds will be rinsed inside and out, then rolled into a cooler for chilling. The Joneses are convinced air chilling will produce a superior carcass that is firmer and less hydrated than water-chilled birds. They also believe there is less chance of bacterial contamination if birds are not plunged into a common water bath, and they want to avoid the chemistry, taste, and odors associated with using chlorine as a sanitizer.

FARM PROFILE • Pasture: Day-range

The process will generate very little wastewater and less than two pounds of offal and feathers per bird. Yet Frank and Kay want to be sure they meet legal requirements. They built a 250-gallon holding tank for wastewater, which they will pump out and irrigate onto land. They are building a new three-bin composter to compost entrails and feathers.

When farmers venture into processing, they leave the traditional world of farming and enter the world of food processing—for Kay this also means educating consumers about food nutrition. She often refers them to a website, www.eatwild.com, which extols the virtues of pasture-raised animal products.

One clear image of what the Joneses are trying to achieve became evident October 5, 2002. They hosted a party and treated guests to a taste test, serving three kinds of chickens: two of them organically grown free-range birds of two different breeds and one from the supermarket. Labeled 1, 2, and 3, the differences were easy to see. Roasted the same way, two were firm and the muscle very distinct, one was softer in texture, juicier, and the muscle broke apart easily. Transparent beakers of fluid from the roasting pans told a story. The juices from the free-range poultry were “juices,” while those from the supermarket bird divided into two levels, juices topped by a floating layer of liquid yellow fat.

Still, guests liked the chicken from the supermarket just fine, finding it juicier, tastier, and softer in texture than the chickens produced the open-range way. People have to want to eat healthier food, and want it enough to seek it out and pay more for it. The Joneses know such folks exist, and they’re betting on them.

MANAGEMENT ALTERNATIVES

PASTURE: DAILY MOVE PENS

Daily Move Pen Management: Pasture

Joel Salatin is a Virginia farmer who popularized the idea of “pastured poultry” for broilers when he published *Pastured Poultry Profits* in 1993. We refer to this poultry management system as the “daily move pen” model. Since then, thousands of farmers across the country have adopted Salatin’s daily move pasture model for poultry. This management system relies on daily movement of pens and is suitable for broilers, layers, and turkeys. Fresh pasture encourages foraging, which, in turn, improves bird performance and feed efficiency while minimizing the risk of pathogen and parasite build-up in the housing areas. In Salatin’s words, the system can be characterized as “high density, short duration grazing.” Pens make it relatively easy to move the birds and provide 24-hour shelter from predators and weather. We present an overview of the system detailed in Salatin’s *Pastured Poultry Profits*.

Daily Move Pens Management Overview

Birds:	Cornish Cross broilers
Stocking density:	1,000 chickens per acre
Land:	Level, well-seeded grass and legume mix pasture
Housing:	10 ft by 12 ft by 2 ft floorless pens
Equipment:	Bell waterers, five-gallon buckets, nest material, dolly
Labor:	Feeding and water daily; move pen daily
Operation:	Seasonal
Advantages:	Raise large number of birds on small land base; 24-hour protection from predators; inexpensive; builds soil fertility; easily integrated with other livestock grazing enterprises; niche marketing opportunities
Disadvantages:	More labor intensive than day-range; bird stress may increase with daily moves and exposure to temperature extremes

Birds and Performance. Joel Salatin raises broilers and layers using the daily move pen system. He purchases day-old chicks from a reputable hatchery. For broilers he uses the Cornish Cross, saying that, despite their problems, the Cornish Cross birds do well with the pasture-pen model because they do not have to roam more than 12 feet during pen movement or for fresh foraging material. All of the chicken breeds described in the day-range pasture system should do equally well using Joel Salatin’s daily move pens.

Pasture. By “fencing the birds, not the pasture” and moving pens daily, Salatin raises up to 1,000 chickens on one acre of pasture. If you are just establishing pastures, your first consideration should be topography. The daily move model relies on moving shelters daily. You won’t want to haul shelters over rolling hills nor will you want your birds sitting in low lying, damp areas. Design pastures so that they have an eight-week resting period or longer for chickens and at least a two-year resting period when pasturing turkeys. *Coccidia* can survive eight weeks in the field and other pathogens can survive longer (Manitoba Agriculture and Food, 2002).

In response to criticism that daily pen movement is too labor intensive, Salatin claims “you simply cannot get the level of health and forage utilization without the [daily move] pen.” He recommends maintaining pasture grasses at a height of 2 to 4 inches. He suggests mowing ahead of the pens or, preferably, introducing other grazing animals ahead of the flock to achieve the desired pasture height. It is not necessary to allow a rest period between livestock grazing and the flock—there should be enough good forage left over for the birds.

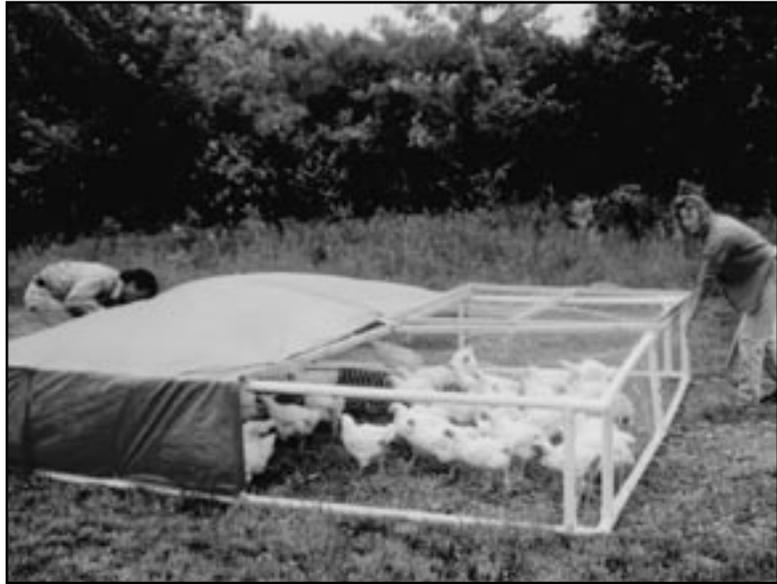
Housing. Salatin designed three pasture housing alternatives to accommodate brooders, broilers, and layer hens. The brooder house is a semi-permanent structure, while the broiler pens and layer pens are both designed for daily movement. Salatin constructs all of his huts and pens with simple, inexpensive materials: pressure-treated lumber, aluminum (corrugated) roofing, plywood, and chicken mesh/wire. The descriptions below are what we call “classic” Salatin-style housing and come directly from his book: *Pastured Poultry Profits*. See the book for

MANAGEMENT ALTERNATIVES

PASTURE: DAILY MOVE PENS

photos and details. Other growers have modified the original Salatin-style pens over the years to accommodate climates, flock sizes, and other factors. The modified pens may be larger in size, have permanent wheels, or be designed to be moved with a tractor.

Brooder huts. Salatin recommends brooding birds on pasture and exposing them to cool temperatures at three weeks of age in order to develop hardiness. He constructs semi-permanent brooder huts to accommodate 250 to 300 birds. If raising more than 300 birds at a time and using a large brooder hut or pen, Salatin recommends partitioning off the birds into the smaller groups. He also uses temporary, 18-inch high plywood partitions within the brooder space to confine the birds tightly during the first week. This temporary partition is gradually moved to open up more room for each group of chicks until birds are ready to go out on pasture.



This daily pen was used by Frank and Kay Jones when they first started pasturing poultry. Pens were moved several times a day.

Each brooder hut or section is 8 ft by 10 ft with an 18-inch high, floorless bottom that is predator-proof and draft-proof. The huts have peaked roofs and are sided with chicken mesh to allow ventilation and natural light. Huts are deeply bedded with 4 to 8 inches of litter material. And, for those of you who dread cleaning out the brooder house in between batches, you'll appreciate Salatin's next bit of advice: don't clean out bedding between groups! He does not sanitize housing and instead leaves old litter to compost and create heat for the new batch of chicks.

Compost alone will not create enough heat for young chicks, and you will need to use an artificial heat source, such as warming lights. As with any other management system, the brooder huts must be maintained at the proper temperature during hatchlings' first few weeks.

Broiler pens. Broiler pens are arranged in a wing or "V" formation on pasture to prevent the creation of alleys in between houses. Each pen, built to house 75 to 100 broilers, measures 10 ft by 12 ft by 2 ft and weighs approximately 200 pounds. The floorless pen frame is constructed from one-by-three boards and reinforced with diagonal braces. Most of the walls are made from chicken wire mesh, although the back is made from aluminum roofing material.

The roof is flat and divided into two panels. One panel is made from aluminum roofing material and permanently attached to the pen. The second panel is removable and made from the same aluminum material as well as chicken wire mesh to provide ventilation during hot days.

The flat roof design makes the pen wind-resistant (that is, it is less likely to blow away) and the removable panels or hatches provide easy access to the birds when adding feed and water. The 2 ft wall height is low enough to step over, but tall enough to prevent broilers from flying out. If you plan to raise anything other than the Cornish Cross broilers (such as traditional breeds, turkeys, and waterfowl) you may have to modify the design to prevent the birds from escaping (Plamondon, 2003). For detailed design and construction instructions, see Joel Salatin's *Pastured Poultry Profits*.

MANAGEMENT ALTERNATIVES

PASTURE: DAILY MOVE PENS

Problems noted by those who have used the Salatin pens include:

- Low roofs can trap heat and kill birds
- Birds crowd in corners for shade (can cause suffocation)
- Messy pens due to overstocking
- Non-uniform bird sizes result from uneven foraging

Recommended modifications to make pen movement easier and to create more shade for the birds include covering the entire roof to create more shade, adding wings that close at night for protection, raising the roof to three or even four feet to increase air flow, and adding wheels to make the pen easier to move (Lee and Foreman, 2002). Another common design modification involves shrinking the pens to accommodate small flocks. If you do so, be sure to provide adequate pen space, particularly during hot summers, since the pens don't have fans or other reliable ventilation (Manitoba Agriculture and Food, 2002).

Layer pens and the “eggmobile.” Salatin has successfully retrofitted his broiler pens to accommodate laying flocks by adding nesting boxes and modifying the roof to make egg collection possible. The nesting boxes are 1 ft by 1 ft by 1 ft each, made from pressure-treated lumber and the boxes are filled with nesting material. A 3- to 4-inch tall board across the front of the boxes prevents bedding loss when hens scratch. All of the boxes hang from one 6-ft piece of lumber that attaches to the back of the pen under the enclosed roof. Salatin stocks the same 10 ft by 12 ft by 2 ft pens with 40 to 50 hens (2.5 square feet per bird). Salatin also developed what he calls the “eggmobile” — a larger, sturdier, portable hen house for use on pasture. The eggmobile is 12 ft by 20 ft and accommodates 100 hens (2.5 square feet per bird). It is equipped with nesting boxes, feed trays, and waterers. Birds have unlimited access to range (they are free-range) and the house is moved every two to three days behind a cattle herd.

Turkey pens. Turkeys can be successfully grown and finished on pasture using the Salatin-style daily move pens. One producer who uses the Salatin method for his turkeys has found that the 10 ft by 12 ft by 2 ft pens allow adequate space and foraging material for about 30 turkeys. This same grower experimented with taller pens to accommodate the bigger birds, but found 3-ft high pens too cumbersome to move and noted that turkeys do as well (and become a little more “subservient”) in 2-ft high pens.

Feed and Water. Salatin's feeding regimen for brooders, broilers, and layers is described below.

Brooders. Salatin encourages baby chicks to develop their foraging skills early on by supplementing high protein feed (which he formulates and mixes on the farm) with fresh grass clippings, dandelion blossoms, ragweed seeds, or vegetable matter in season. Chicks are given access to these fresh greens for only 10 to 20 minutes to prevent overconsumption of what Salatin calls “low octane” feed. He also feeds creek sand and aggregate to introduce silica and grit, rather than commercially manufactured grit. By feeding sand and aggregate, which contain bits of roots and bugs, along with hay chaff, Salatin says the chicks learn to scratch in search of food while consuming a diversity of minerals. Linear feeders and waterers are used. Salatin advises providing enough feed and water space to accommodate 35 to 50 percent of the flock at one time.

Broilers. More than 80 percent of Salatin's prepared feed consists of corn and roasted soybeans. Roasting is said to preserve the natural fat and oil content of the beans and more important, is necessary to destroy anti-nutritional compounds. In addition, Salatin feeds crimped oats, fishmeal, kelp meal, feed grade limestone (calcium), and Fertrell's “Nutri-Balancer.” By adding the balancer to his ration, Salatin says the birds taste better, gain well, and produce a more balanced manure that is good for pasture quality (see **Resources** under *Feed and Diet and Suppliers*).

MANAGEMENT ALTERNATIVES

PASTURE: DAILY MOVE PENS

During the grow-out stage of production, linear feeders are still used, but white five-gallon buckets and hanging bell waterers are introduced. The buckets are placed on the roofs of each pen and gravity-filled from large water tanks that Salatin mounts on a trailer. The five-gallon buckets in turn serve as reservoirs for the bell waterers. Salatin restricts feed and water for a few minutes immediately after moving the pens to encourage foraging on the fresh pasture.

Laying Hens. Layers are more aggressive foragers than broilers and, according to Salatin, will consume at least 30 percent of their diet from grasses, legumes, and insects when turned out on pasture. While on pasture, Salatin feeds his hens whole grains as well as a calcium supplement for strong eggshell production.

NCAT Poultry Program Specialist Anne Fanatico cautions that birds managed under the Salatin system may not be able to forage sufficient insects for protein, and therefore you may want to purchase a complete, well-balanced ration for the flock (Fanatico, 1998).

Equipment and Supplies. Most of the equipment needed to manage birds using the daily move pen system can be found at your local hardware and poultry supply stores (see Figure 31). The only “special” piece of equipment you’ll need is a homemade dolly for moving pens (see the Pasture Logistics chapter in Salatin’s *Pastured Poultry Profits* for construction details).

Figure 31: Equipment Checklist – Salatin Pasture

- | | |
|---|---|
| ✓ Truck and drums for hauling water to fields | ✓ Plastic tubing |
| ✓ Pasture pens (plywood, aluminum roofing material, 1” chicken mesh/wire) | ✓ Brooder lamps |
| ✓ Dolly (for moving pens) | ✓ Electrical cord |
| ✓ Feed trays | ✓ Hanging nesting boxes (pressure treated lumber) |
| ✓ Hanging bell waterers | ✓ Nesting material |
| ✓ Five-gallon buckets | ✓ Feed |
| | ✓ Mineral supplements |

Health and Welfare. Salatin believes in a “natural” approach to bird health and welfare. He does not use vaccinations or antibiotics, but encourages natural disease resistance and behavior through early exposure to fresh air, natural light, pasture greens, and the molds and fungi that develop in composting bedding. He believes small group size will promote birds’ natural flock behavior and that not trimming beaks will encourage foraging.

Salatin’s brooders average one to two percent mortality within the first week. Broiler flocks average less than five percent mortality on pasture. Cannibalism is virtually nonexistent among his flocks because, he believes, the birds’ diet is well balanced and they have plenty of foraging to keep them busy. Remember that Joel Salatin is an experienced producer who has perfected the pasture pen model on his farm. If you’re just starting out, mortality rates can be considerably higher.

The main health concern for Salatin’s birds is the weather. Salatin has lost mature birds due to extreme heat. He recommends propping up the backside of pens during early afternoon to create additional airflow on hot days. Heavy rain can “turn depressions into ponds.” Therefore, Salatin recommends monitoring birds, particularly chicks on pasture, to make sure their housing is relatively dry. It may be necessary to add bedding material, such as “hay pads” in brooder houses to get birds off the wet ground or to turn shelters away from the prevailing winds and rain.

MANAGEMENT ALTERNATIVES

PASTURE: DAILY MOVE PENS

Labor. Daily chores during the pasture season include feeding, watering, moving pens, and monitoring birds. Feeding and watering take Salatin about one hour for 26 pens (2,400 birds). Daily pen movement is the reason that the daily move pen management model is often labeled more “labor intensive” than other pasture-based systems. Salatin estimates that the task of moving pens takes up to one minute/pen. He moves 26 pens (2,400 birds) in approximately 30 minutes. The pens are designed to be moved by hand using a specially-designed dolly placed at one end of the 10 ft by 12 ft pen and lifted by a handle on the other end. After removing feeders and waterers, Salatin drags the pen to the new pasture section. The birds walk on the ground (inside the pen) as the trailing edge of the pen pushes them forward. See Figure 32 for a full estimate of labor required to produce birds in the daily move pen system.

Figure 32: Minutes Required per Bird Each Season* for Pastured Poultry Production

ACTIVITY	200 BIRDS/WK	400 BIRDS/WK	600 BIRDS/WK
Chick pickup at post office	.35	.17	.12
Brooding	1.21	1.21	1.21
Chicken move to pasture	.30	.23	.20
Brooder prep	.35	.22	.17
Pasture grow-out	3.63	3.03	2.83
Chicken pickup for processing	.45	.30	.25
Delivery to processing plant	1.38	.87	.69
Building projects	.23	.23	.15
Repair and maintenance	.35	.35	.23
Total minutes/bird (may not add due to rounding)	8.22	8.22	5.85
Total hours per season	715	1119	1522

*season = 26 weeks
Source: Neufeld, 2002.

Finances. The full title of Joel Salatin’s book is *Pastured Poultry Profits: Net \$25,000 in Six Months on 20 Acres*. Indeed, some growers have been able to make this kind of income on a small scale thanks to reduced input expenses and efficient management. Feed, labor, and housing costs are responsible for savings on the expense side. Salatin estimates that producers who rotate broilers and layers daily to fresh pasture (while confined to the pens) can reduce feed costs by 30 percent (Plamondon, 2003).

See *Growing Your Range Poultry Business: An Entrepreneur’s Toolbox* for a 1,000-bird pasture pen enterprise budget and *Consumer Preferences for Organic/Free-Range Chicken* by Liz Neufeld for sample pasture pen budgets (see **Resources** under *Budgeting, Enterprise Planning and Recordkeeping*).

Summary. The daily move pen model is an alternative that may be most suitable for beginners who want to make a minimal capital investment or for smaller scale operations that have land available for pasture. This model requires minimal labor when compared with the “industrial,” “traditional,” and “organic” models. It encourages birds’ natural foraging activity while allowing producers to take advantage of niche market opportunities for “pastured” products. In Salatin’s words: “I cannot overemphasize the value of the pen to the smooth running of the pastured poultry model. It answers the need for small flock grouping, sanitary conditions, fresh forage, proper manure management, and predator control. It is also far cheaper and simpler to maintain than a stationary house of equal square footage.”

Jeff and Beverly Berens, Uphill Farms
Holland, Michigan

There's a Market for Broilers Raised on Pasture

Many farmers remember “Mom’s egg money” from back in the days before farmstead chicken flocks virtually disappeared. Well, those flocks are coming back. And, hard to believe, Mom’s egg money can be 50 bucks a day. It’s the same story for broilers. When raised with access to the out-of-doors, they sell for about \$7 each, which adds up if you raise a few batches each summer. The same is true for turkeys. While turkey is selling in the supermarket for 69 cents a pound, a range-reared bird brings \$2.25 a pound.

At the small farm of Jeff and Beverly Berens near Holland, Michigan, the family works to make extra money and create an attractive lifestyle on 40 acres of land. The land is well-suited for cash crops and they have rented it out in the past, but they prefer to use the land to develop their own enterprises without investing in tractors and expensive field equipment. They’ve settled on pasturing. One August evening, pasture walkers—mostly sheep, dairy, and beef producers—visited their farm to see something of the opportunity offered by pasturing nonruminant creatures like broilers, laying hens, and turkeys. The laying hens and turkeys are raised in a free-range system and the broilers in cages on wheels moved every day or oftener, the system popularized by Virginia farmer Joel Salatin.

Bev Berens estimates that chickens can get about a quarter of their feed needs from pasture, if you choose breeds that are “grazers and diggers,” as she calls them. They still need a high-protein, high-energy grain ration. But it’s really not the feed that makes the difference. It’s the whole issue of how they’re raised and how customers react to that. It’s really about marketing. Grass-fed animals and animal products are said to be high in omega-3 fatty acids—the good ones—and low in omega-6 acids—the bad ones. That fact, and the fact that the Berenses use no antibiotics or growth promotants, are marketing tools.

Broilers

The Berenses have been producing about 1,000 broilers each summer, using the system developed by Joel Salatin. They raise one batch every seven weeks, raising the broilers in cages built on wheels they move each day across a pasture. About 75 birds are confined in a cage made of chicken wire and measuring about 12 feet square and three feet high. The sides are open, the top covered to provide shade. The birds follow beef animals, pecking through the droppings and eating flies and larvae as well as grasshoppers and other insects. But they must be fed grain and given water, and that requires the labor of moving both into the pasture.

On the plus side, Jeff and Bev can charge \$1.90 a pound for the dressed chickens, which is well above the store price for chicken. They have an area under a roof, open at the sides, in which they process the presold broilers. It is equipped with killing cones, a scalding tank, a feather plucker, and eviscerating tables. The dressed birds are cooled in vats of ice water and bagged for customers who are told when to come to pick them up, usually the day after slaughter. This system requires that the birds be preordered, and Bev feels that this is a weakness in their current marketing. It’s not easy to line up customers to order birds for delivery six weeks down the road, so there is always the potential for uncontracted birds. They have consulted and worked with the local Michigan Department of Agriculture inspector to ensure that they are meeting state requirements; still Bev is looking for alternative ways to process and market their broilers.

The Berenses would like to diversify and expand sales. Bev hopes to add vegetables and start a CSA. She wants to work with other CSAs by providing them with eggs. She wants to find other small farmers who want to raise broilers for her to sell through her sales network.

Marketing takes time. Bev maintains a mailing list and sends mailings and a newsletter to customers. Their Uphill Farm is listed on the www.eatwild.com website, which touts the benefits of eating products from animals raised on grass. Bev likes the Kalamazoo Farmers’ Market, and could attend all three days a week it’s open instead of just one. They are also in the process of developing a web site, www.uphill-farms.com, to use as a marketing tool.

Organic Management: Pasture and Semi-confinement

Organic poultry production is exploding. “Every category of certified organic poultry showed a surge in growth between 1997 and 2001,” reported the USDA Economic Research Service (ERS) in a 2003 report. The number of certified organic layers, for instance, climbed from 537,826 birds in 1997 to 1.6 million hens in 2001. The number of certified organic broilers grew more than 85 times—from 38,285 birds in 1997 to 3.29 million birds in 2001. It’s the same story for turkeys. In 1997, the growers reported only 750 certified birds. By 2001, ERS estimates that there were more than 98,000 certified organic turkeys being raised by U.S. growers (Greene and Kremen, 2003). Growth of organic poultry farming in Michigan, Minnesota, and Wisconsin was equally staggering over the same period (see Figure 33).

Figure 33: Certified Organic Poultry by State

	YEAR	LAYER HENS	BROILERS	TURKEYS
MICHIGAN	1997	40	900	None reported
	2001	52,335	1,132	9
MINNESOTA	1997	8,006	None reported	None reported
	2001	18,678	1,800	None reported
WISCONSIN	1997	590	3,500	None reported
	2001	15,687	25,733	8,069

Source: USDA, Economic Research Service, 1997 and 2001.

Formal ERS research combined with anecdotal evidence suggests that this growth in certified organic poultry production will continue. Thanks to the long-awaited establishment of the USDA National Organic Program (NOP) in October 2002, consumer confidence in certified organic products is expected to encourage further organic production. National Organic Standards dictate how broilers, layers, and other poultry must be managed under an organic system.

Poultry are not required to have access to pasture, but must be given freedom to exercise, access to fresh air, and exposure to direct sunlight. In Minnesota, Michigan, and Wisconsin, where winter weather can be severe, “inclement weather” exceptions permit temporary confinement (Behar, 2004). Temporary confinement is also permitted to “accommodate the needs of a particular stage of production” such as brooding. For these reasons, it’s typical for an organic producer to pasture birds and/or to house them in semi-confinement and temporary confinement (NCAT, 2004).

All producers who seek organic certification must create their own “Organic System Plan” describing how they will comply with the national rules and how they will manage the flock, house and feed birds, handle waste, preserve flock health and welfare, and maintain records. For a detailed description of organic system plans and what is required, see *NCAT’s Organic Livestock Workbook — A Guide to Sustainable and Allowed Practices Systems* prepared by the National Center for Appropriate Technology (NCAT). Much of the information presented below comes from this excellent resource (see **Resources** under *Organic*).

MANAGEMENT ALTERNATIVES

ORGANIC

Organic Management Overview

Birds:	Conventional day-old chicks, all species and breeds
Land:	Outdoor access (land must be organic)
Housing:	Semi-confinement or pasture
Stocking density:	Sufficient room for natural behavior
Equipment:	Electric fencing, poultry netting, feed troughs, water fountains
Labor:	Recordkeeping, communicating with customers, plus flock labor as outlined for other management systems
Operation:	Year-round
Advantages:	Market premiums for products; environmentally friendly; endorsed by animal welfare advocates
Disadvantages:	Recordkeeping; regulated management practices; higher feed costs

Birds and Performance. Organic managers who do not breed and hatch their own chicks may purchase day-old birds from conventional breeding stock. Only day-old chicks are exempted from organic certification; if you're anxious to get your laying flock started, and wish to purchase pullets or other immature birds, they will have to be certified organic. Some hatcheries do rear birds from organic breeding stock out of principle. Coon Creek Family Farm in Mondovi, Wisconsin, for example, has a small breeding flock of pasture-reared organic CornDel broilers. The hatchlings are not certified organic, but come from parent stock that is fed an organic ration. Coon Creek Family Farm is listed in **Resources** under *Hatcheries*.

Regardless of where you purchase your birds, breed selection will be vitally important under the organic management system. National Organic Standards prohibit the use of conventional medicines and treatments unless the birds' welfare is at risk. For this reason, organic producers are beginning to search for hardy breeds that are more disease resistant and weather tolerant. Some growers have used the Kosher King chicken for broiler production, though on-farm trials have not shown them to be any better than the standard Cornish Cross for pasture-based organic production (Franczyk, 2002).

Pasture. According to the National Organic Standards, poultry producers seeking organic certification must provide their flocks with "living conditions which accommodate the health and natural behavior of animals" (Section 205.239, *Livestock Living Conditions*. National Organic Program, USDA). For some, this signifies access to well-managed pasture, while for others, this means a simple yard where birds can scratch in the sunlight. In truth, the NOP language is somewhat vague and subject to interpretation by certifiers. Cate Irsfeld-Eddy, a certification staff member with the Midwest Organic Services Association (MOSA) in Wisconsin, interprets the NOP language to mean:

- Pasturing is NOP-compliant but not required.
- Outdoor access yards with minimum plant cover are NOP-compliant.
- Outdoor cement yards are **not** NOP-compliant.

Although the NOP rules do not require poultry (including waterfowl and captive wild game birds) to forage on pasture, many organic poultry farmers turn their birds out on pasture for six months or more each year. They argue that this type of outdoor access more closely mimics birds' natural behavior than would time spent in an enclosed dirt yard.

If your organic plan includes the use of pasture or range for your birds, you will need to follow the National Organic Standards for pasture seeding and maintenance. The standards state that you must use certified organic seed (where available) and "approved practices or materials" to control weeds. Consult section 205.206 in the National Organic Standards for the list of approved fertilizer, weed and pest control practices and materials.

MANAGEMENT ALTERNATIVES

ORGANIC

Be aware that organic buyers may have their own interpretation of the national regulations or may require additional management guidelines. Organic Valley™ Family of Farms, headquartered in Wisconsin, is one example. This farmer-owned cooperative has developed minimum plant cover requirements for outdoor poultry areas in addition to indoor and outdoor stocking density limits, and minimum feeder, waterer, and nest box numbers/sizes.

We strongly recommend that you check with organic certifiers and buyers before designing and establishing outdoor areas.

Housing. To comply with National Organic Standards concerning living conditions, housing must be designed so that animals can:

- Exercise
- Practice “comfort” and grooming behaviors
- Escape extreme or inclement weather
- Move without risk of injury
- Breath fresh air

It's possible to achieve these standards on pasture or in semi-confinement. In fact, it is not uncommon for organic growers to house their birds in semi-confinement (see Farm Profile: “Traditional” Doesn't Mean “Old-fashioned” on the Dickel Farm) or temporary, full confinement during inclement weather or a particular stage of production. Organic shelters must be equipped with adequate access doors or “pop holes” so that birds can get out during good weather to a yard or pasture. And while some buyers may have stocking density and nest box requirements, the National Organic Standards do not prescribe minimum stocking rates (number of square feet per bird).

Organic Inspector Harriet Behar, who lives and farms in Wisconsin, recommends that flock owners who have a large or long house (on pasture or in a yard) outfit it with many doors leading outside because one door for a few thousand birds is not enough to give outside access (Behar, 2004). If you genuinely attempt to provide outdoor access for your birds by constructing houses and shelters appropriately, you should have nothing to worry about when it comes to certification. Always check with your certifier before construction to make sure you are building something that is certifiable.

When it comes to layers, you must also consider lighting. According to the National Center for Appropriate Technology (NCAT), National Organic Standards do not include guidelines for artificial lighting or access to natural light and dark cycles. If you are thinking about the use of artificial lighting to induce molts and hence control the production of your laying flock, check first with your local certifier to learn what is allowable. NCAT warns that “the stress caused by this practice [of induced molting] might be viewed as inhumane by some organic certifiers and thus not permitted” (NCAT, 2004).

One final housing consideration (for all stages of production) concerns the use of cleaning products. It is standard practice to disinfect broiler and layer houses in between flocks to prevent the build up of pathogens. If you intend to seek organic certification, be sure to check the NOP National List of Allowed and Prohibited Substances for allowable cleaning, disinfecting, and sanitizing products. This national list can be found on the NOP website www.ams.usda.gov/NOP/NationalList/ListHome.html under “Processing Materials Decisions.” The Organic Materials Review Institute (OMRI) screens products for compatibility with National List requirements. You can view the “OMRI Brand Name Products List” at www.omri.org.

Feed and Water. All feed must be certified organic, and poultry may not consume animal by-products. Rations may contain feed supplements and minerals where needed. A limited number of synthetic substances are allowed for use in organic livestock production (see Section 205.603 of the National Organic Standards).

In accordance with the National Organic Standards, producers who wish to become certified organic must begin using certified organic feed and acceptable supplements for all poultry from the time their birds are two days

MANAGEMENT ALTERNATIVES

ORGANIC

old. This means that you can purchase conventionally bred day-old chicks from the local hatchery but must begin feeding certified organic feed ration (either mixed on your own farm or purchased as a complete feed) the day they arrive. If you choose to mix your own feed, be sure to consult the NOP National List of Allowed and Prohibited Substances and carefully research inputs. Fishmeal supplements, for example, a traditional source of concentrated protein among organic producers, are an allowed substance. However, fishmeal supplements are almost always preserved with ethoxyquin and fishmeal supplements preserved with ethoxyquin are prohibited (Mattocks, 2002). A new fishmeal supplement preserved with “Naturox”, an all-natural preservative comprised of vitamin E, rosemary extract, and citric acid, is available (Mattocks, Fertrell Company, personal communication, 2004) (see **Resources** under *Feed and Diet*).

Farmers seeking organic certification are often scared off by stories they hear about organic feed shortages and prices. The USDA Agricultural Marketing Service surveyed feed suppliers in 2002-2003 and found out that:

- There does not appear to be a shortage of organic feed in the Midwest market; and
- Organic feed prices (for a 2:1 corn/soybean ratio) are 1.5 to 2 times higher than conventional prices in Michigan, Minnesota, and Wisconsin (USDA, Agricultural Marketing Services, 2003).

In the Midwest, several feed suppliers offer organic poultry products. See **Resources** under *Feed and Diet* and *Suppliers* for lists of organic feed suppliers.

Equipment and Supplies. If you plan to raise birds organically, you'll need the same equipment used by other poultry growers (see Figure 34). The National Organic Standards govern many supplies such as cleaning agents.

Figure 34: Equipment Checklist – Organic Management

✓ Feeders	✓ Artificial lights (if certifier allows)
✓ Waterers	✓ Electric fencing (if on pasture)
✓ Litter/bedding	✓ NOP-approved cleansers
✓ Nesting boxes	✓ Organically certified seed (if on pasture)

One source of supplier information comes from the Organic Materials Review Institute (OMRI). OMRI maintains an ongoing “Brand Name Products List” for organic livestock production, processing, and handling. Although the list is not comprehensive (suppliers must pay to have their products reviewed and listed), it continues to grow and is well respected in the organic industry. Although all products listed are screened by OMRI for compliance with the national organic standards, it is crucial that you check with your certifier to determine whether its use is allowed. The list is available on the Internet at www.omri.org or by contacting OMRI directly (see **Resources** under *Agencies and Organizations*).

The Midwest Organic and Sustainable Education Service (MOSES) also publishes an annual directory of organic feed, seed, and equipment suppliers (see **Resources** under *Agencies and Organizations*).

MANAGEMENT ALTERNATIVES

ORGANIC

Health and Welfare. In accordance with the National Organic Standards, poultry growers are responsible for ensuring the health of their flocks by: (1) designing housing and feeding areas so as to prevent predation and injury; and (2) developing an organically acceptable plan for preventing and treating disease.

Your plan for preventing disease and other illness can include sanitizing incubators, disinfecting brooder houses, and using a nutritionally balanced feed. Routine vaccinations are permitted as a preventive measure against common avian diseases such as Marek's, Newcastle, and coccidiosis.

In the event that your birds become sick or injured, organic certifiers encourage the use of "alternative medicine" for treatment, since the majority of conventional medicines are not allowed under the National Organic Standards. As noted by NCAT specialists, however, farmers' expertise in using alternative medicines is limited. When there is no other recourse, antibiotics and other conventional treatments are required to preserve the health of the sick or injured bird. In such instances, the treated bird(s) may never be marketed as "organic" and the birds must be physically identified as "nonorganic" using bands or by separation from organic birds.

NCAT suggests finding a veterinarian who shares or supports your interest in organic production. "With such a vet as your ... partner, it is much easier to develop treatment strategies that are holistic and NOP compliant, and that avoid the accidental use of prohibited medicines when suitable alternatives are available" (NCAT, 2004).

A comprehensive resource for alternative poultry medicine and practices is *Remedies for Health Problems of the Organic Laying Flock*. This compendium addresses preventive care and health concerns using nutritional management and herbal and homeopathic remedies. *The Chicken Health Handbook* by Gail Damerow describes how pathogens and parasites are spread—information that can aid you in developing preventive disease strategies. Damerow also makes recommendations for preventive measures (by stage of production) and treatment (mostly conventional) (see **Resources** under *Poultry Health and Welfare*).

Labor. Due to recordkeeping requirements, organic poultry production may be the most labor intensive of all management systems. Recordkeeping is critical to ensure organic integrity and traceability. The National Organic Standards do not explicitly state the type and number of records required; this will depend on the complexity of your operation and on your certifier. Most organic growers maintain some or all of the following records:

- Pasture maps with pen numbers and/or rangeland units
- Accurate history sheets for fields, pastures, and breeding stock
- Soil and water test reports
- Verification of the organic status of chicks (if applicable), pullets, feed, seeds, and other purchases
- Documentation of efforts to procure organic inputs (when not used)
- Forage crop pest and disease monitoring reports
- Production logs and activity reports
- Flock health records: vaccination dates, mortalities, etc.
- Labels from vaccines and any other medications or health inputs (electrolytes)
- Breeding records
- Labels from sanitizers and cleansers
- Labels from purchased feed and feed supplements
- Equipment, storage, and housing cleanout logs
- Slaughter and processing records or verification of organic certification of slaughter facilities
- Sales receipts or invoices
- Sales records

Talk with other organic poultry growers—find out how much time they spend tracking feed and supplements used, recording paddock rotations, and generally preparing for their meetings with certifiers.

MANAGEMENT ALTERNATIVES

ORGANIC

Finances. As with the other production management systems, feed is the biggest poultry enterprise expense you'll have when going organic. Certified organic poultry feed prices are often 1.5 to 2 times that of the conventional feed. You may be able to reduce feed costs and other expenses by purchasing in bulk, either independently or as part of a cooperative.

In *Growing Your Range Poultry Business: An Entrepreneur's Toolbox* (see **Resources** under *Budgeting, Enterprise Planning and Recordkeeping*) you'll find sample production budgets for three organic models (mobile, fixed hoop, and stationary) at various flock sizes. Remember these are just estimates, and costs may differ for your area—use them as a reference when developing your own enterprise budget.

Once you have an enterprise budget, carefully weigh the higher cost of feed, pullets, and other items against any market premiums you may be able to charge for certified organic poultry products. Calculate your break-even to learn how much you can afford to pay for feed and other inputs as well as what price you must charge for your birds in the marketplace.

Summary

Organic production is a good choice for those who are looking to generate premiums from their poultry enterprise and who are interested in organic principals and don't mind a little extra recordkeeping.

If you are considering organic poultry production, take a good look at your values, goals, and markets. Call the National Center for Appropriate Technology for a free copy of *NCAT's Organic Livestock Workbook — A Guide to Sustainable and Allowed Practices* or ATTRA's *Organic Compliance Checklist for Producers*. Talk with several NOP-accredited certifiers to learn about organic production requirements and to decide if this management alternative makes the most sense for your family and your farm business. A list of certifiers accredited by the NOP is available at www.ams.usda.gov/nop. You can also contact your state department of agriculture for specific information about organic production requirements or certifiers operating in your state (see Figure 35).

Finally, remember that in order to be sold as organic, poultry must be processed organically. The availability of organic processing facilities is often the limiting factor for potential producers.

Figure 35: State Contacts for Organic Production

Michigan:	Colleen M. Collier, MI Department of Agriculture PO Box 30017, Lansing, MI 48909 (517) 373-0280 collierc@michigan.gov www.michigan.gov/mda
Minnesota:	Meg Moynihan, MN Department of Agriculture 625 N. Robert St., St. Paul, MN 55155 (651) 201-6616 meg.moynihan@state.mn.us www.mda.state.mn.us
Wisconsin:	Perry Brown, WI Department of Agriculture, Trade & Consumer Protection 2811 Agriculture Dr., PO Box 8911, Madison, WI 53708-8911 Perry.brown@datcp.state.wi.us www.datcp.state.wi.us

FARM PROFILE • Organic

Ron, Mindy, Arthur and Derrick Desens, Sleeping Cat Organic Farm
Litchfield, Minnesota



Sleeping Cat Organic Farm

The Desenses were interviewed in the spring/summer of 2004. Tragically, Ron died unexpectedly in the fall of 2004. His wife, Mindy, and sons, Arthur and Derek, graciously agreed to include the profile about their farm.

Background

“My family moved to this farm in 1924,” said Ron Desens, a tall, slender man who spoke as quickly as he worked. Ron said they farmed “the old-fashioned way” until the 1950s when they switched to chemical agriculture. He moved away after high school, but when his father retired from farming in 1980, Ron and his wife, Mindy, returned.

“When we came back to the farm, we noticed that conventional farming was creating an enormous amount of soil erosion,” Ron said. The Desenses live in a region with rolling hills and silt-loam soil, a landscape susceptible to soil loss. They decided they would either farm in a manner good for their land or get out of farming altogether. In 1983, they converted to organic farming. Ron said that since converting the farm to organic production, he has noticed an improvement in the quality of the soil. “There’s no more erosion,” he states. He has a few minor problems with cattle paths, “but it’s nothing that can’t be solved.”

Ron, Mindy, and their sons, Arthur, age 24, and Derek, age 22, all contribute to the farm. Ron and Arthur handle farm operations, with Derek, a senior at the University of Minnesota-Morris, helping on weekends when he’s available. Mindy also runs a travel agency, and both Ron and Mindy work night shifts at homes for the developmentally disabled. Ron figures that about a third of their income comes from the farm with the remainder coming from their off-farm jobs. Their off-farm jobs also provide important health insurance benefits.



Ron and Arthur Desens.



Cornish Cross broilers on pasture.

Organic production

Although they began with mostly laying hens, for the past few years, they have slowly been building up broiler production. The Desenses use a standard breed of broiler, the Cornish Cross, but Arthur feels their broilers are “somewhat unique in that we don’t butcher until 13 weeks of age. The result is chicken that is leaner with more texture. It’s a roaster, not a fryer.” One might assume these chickens would be huge after this much time, but “they’re only about three to five pounds. If you give them room and restrict their feed, they will grow slower and remain much more active,” Arthur said. The Desenses have had good results from this method of raising chickens. Arthur states, “No leg problems and no instant heart attacks. If you give this breed unlimited access to feed, they’ll eat continuously, become lethargic, and some percentage of them will drop over dead.”

The Desenses use a day-range pasture production model for both their broilers and laying hens. The layers are in a shelter on skids that gets pulled with a tractor every three to five days; the broiler pens are moved daily. “We don’t go through the hassle of constructing a fence around the coop—we let them run completely free,” Arthur said. The broilers cover a smaller radius around the coop than layers. Arthur said, “The bulk of the chickens range from 50 to 100 feet from the coop. There are some that range 500 or more feet from the coop, which is pretty remarkable!”

Broilers are raised in batches of about 500 to 600 at a time. They initially lost a number of baby chicks to rats, so now keep a cat in the brooder—interestingly, the cats tend to leave the chicks alone.

The Desenses have not kept close tabs on the mortality of the chickens out on pasture, but don't have a big problem with predation. Loss to predators is a weakness of the day-range model of production since there is no net, or canopy, to protect the flock from airborne predators, such as hawks or owls. "I've actually been kind of surprised by [low predation losses]. Occasionally, we'll get a hawk that will pass through the area," Arthur said. Ron added, "It's during August when the young hawks are kicked out of their nests, then you have trouble." By October, hawks are no longer a problem. This year, the Desenses are starting the chickens early enough so they will have reached full growth by August.

The Desenses also use a video monitoring system that Arthur constructed to keep an eye on the flocks. "If we see them run for cover, we'll come out and chase the hawk away," said Arthur. Ron adds, "We haven't found the final solution to the predator problem, but we're working on it. The biggest predator problem you have is your dog," said Ron, "The second biggest predator problem you probably have is somebody else's dog."

Pasture management

The best way to characterize their production system is "grass organic," with most of their 300 acres in pasture. The hillsides are permanent pasture, but they seed much of the remaining pasture. They have a six-year crop rotation—soybeans in the first year, followed by oats and alfalfa with grass the second year, the third and fourth year hay, the fifth and sixth year pasture again. "So, we only plow once every six years. And that is only on land that is not highly erodible. We use grass as much as we can in our production," Ron said.

His ruminants are fed grass only, and the poultry get as much grass as possible. "The laying hens we want to have out on pasture as much as possible. We're building shelters that are sufficient for them to stay out there all winter."



Layers on pasture on the Desenes farm.



Layer shelter on skids that gets moved every three to five days.

Organic feed

The Desenses mix their own feed to supplement the grass-based diet. They raise their own soybeans and oats and have the soybeans extruded at a nearby certified organic facility. There are several organic farmers in the Litchfield area from whom they buy corn. Crab meal and calcium are added as mineral supplements. Ron said he tried buying prepared organic feed elsewhere, but the chickens didn't eat it as well.

About 30 to 40 percent of the chickens' diet comes from grass. By moving the pens at least 50 feet every day, the chickens get new pasture. Ron adds, "They eat grass. They eat the leaves right off of the alfalfa plant." Arthur adds, "The Cornish Cross chicken isn't as good at foraging for its own food as the standard laying breeds."

Other enterprises

The Desenses raised more than 60 geese in 2003. Because Ron has developed a list of people who frequent the farmer's market, he managed to sell all of the geese. The feedback they received was very positive. Geese eat more grass than chickens, ducks, or turkeys, so geese are cheaper to feed and have a very healthy meat. "Geese start eating grass from the day you get them," said Ron.

The Desenses only raise livestock products—beef, veal, chicken, and eggs at this time, but would like to add goats. They also plan to raise some turkeys this year, but since turkeys like to roam, they may have to find a way to confine birds.

Organic certification

The Desenses' farm has been operated organically since 1983. Presently, they are certified organic by the Organic Crop Improvement Association International (OCIA). Ron developed his organic plan for poultry over one winter. "I've raised chickens for over 20 years," he explains, "so there wasn't much to change, or add, when we certified our poultry." Once every year, the inspector arrives at their farm by appointment and reviews their records and operation. This usually involves viewing copies of labels from all feed supplements and inputs into their soil. The certifier wants verification that a seamless audit trail exists between the inputs to the farm and the product sold to customers.



Organic certified chicken packaged for market.

Chicks must be fed a certified organic ration until they are processed and packaged in a certified organic processing facility. Laying hens must meet these same criteria. Often, farms will buy "ready-to-lay" pullets from another producer. This supplier must be certified organic for the pullets, and subsequently the eggs they lay, to qualify as certified organic. All purchase and sales records of where one buys and sells poultry must be kept on hand for the inspector to review.

Ron spends about one-half hour per week maintaining his records for organic certification. "Grass-based production makes organic farming easy," stated Ron. "If one is considering conversion to organic production, this is the best way to operate your farm." The pastured poultry model of production reduces the amount of organic grain needed for feed, thus lowering the cost of production.



Ron with customer at Minneapolis Farmers' Market.

Marketing

The Desenses direct market to a list of customers they developed over the past 20 years. They also sell at farmers' markets, such as the Minneapolis Farmer's Market on Lyndale Avenue near downtown. "Most of our customers are quite loyal," states Ron. Although the Desenses now sell only frozen chickens for convenience reasons, they plan to market fresh chickens next year because, according to Arthur, fresh chickens are generally more popular.

"Marketing is very important," Arthur said, "you have to like to sell." Over the last twenty years, the Desenses have tried many different outlets for their farm goods. In addition to farmers' markets, they have met people at gas stations to distribute food when there weren't any markets open. Ron feels that they are selling themselves, not just the food. "We let people know that our farm is sustainable and we're not going to trash the resources. We set aside ten percent of our land as wilderness. If people are willing to pay a little more for our product, we'll keep producing ... it's a social contract." He added, "We practice what we preach. We eat organic food while the best car we've got is probably worth \$500. We spend thousands every year on organic food."

MANAGEMENT ALTERNATIVES

Explore Your Alternatives

Every system has its advantages and disadvantages. What works well for your neighbor may not be the best choice for you and your family. Similarly, you may find that a combination of the systems described above may work best. It's not uncommon to start out using one management alternative and modify along the way. In the real world, no management system is pure (see Farm Profile: Returning Chickens to the Range).

Your decision about which management system or *combination of systems* to employ will depend on your proximity to markets and processors; buyer preferences for how meat/eggs are produced; market competitors; other enterprises; management and marketing skills; available physical resources; financial opportunities; and of course, your goals.

The best way to learn more about a particular management system is to visit an operating farm. Don't be afraid to ask questions. Do a little reading and research on your own. Last, but not least, crunch some numbers to explore capital investments and annual expenses for the alternative(s) you're considering. Contact the Center for Integrated Agricultural Systems for a copy of the *Generic Poultry Enterprise Budget*. Use this worksheet to begin estimating your projected sales revenue, variable costs such as feed and birds, fixed costs for buildings and equipment, and labor and management costs. From there, you're ready to calculate net income from your poultry enterprise. And remember, your enterprise budget is only as good as the numbers you put into it. Make phone calls to hatcheries, feed mills, and other suppliers to obtain accurate expenses estimates. Several contacts are listed in **Resources** under *Feed and Diet*, *Hatcheries*, and *Suppliers*.

Mike and Debra Hansen, Gifts From the Good Earth Farm
Milladore, Wisconsin

Returning Chickens to the Range

Despite not being raised on a farm, Mike Hansen feels he was born to be a full-time farmer. When he met his future wife, Debra, a dairy farmer's daughter, it was love at first sight. "I became absolutely infatuated with farming," Mike describes. The day after returning from their honeymoon in 1985, Mike was digging in the dirt of Debra's family farm.

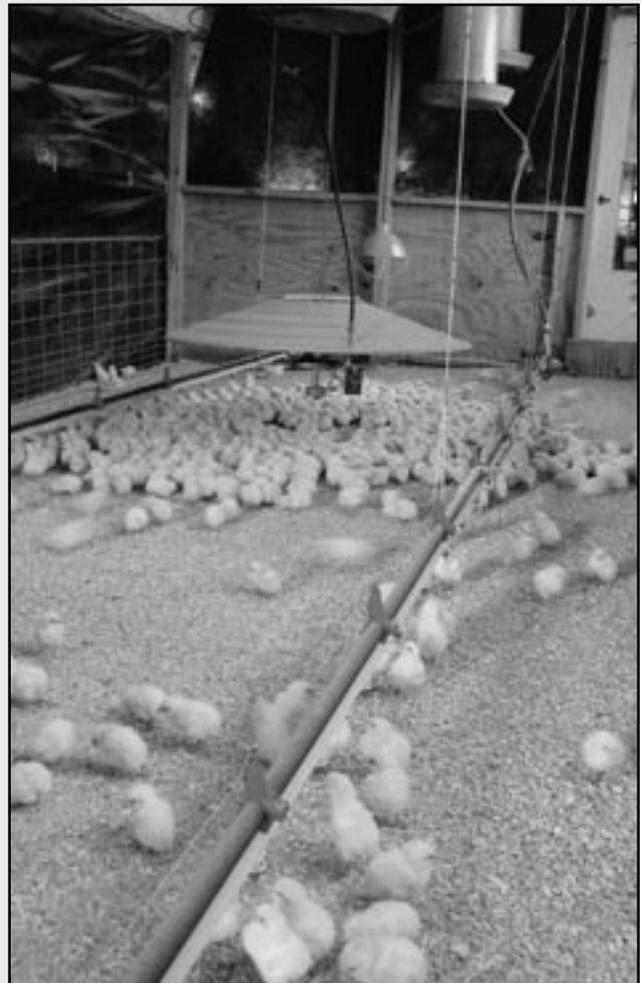
But it has taken a long time for Mike to fulfill his destiny. For 14 years he worked office jobs while operating market gardens, raising chickens, and tending livestock on the side. In 1995 Mike and Debra purchased 76 acres in central Wisconsin, which they certified for organic production in 1998. They launched "Gifts From the Good Earth," which offers organic, pastured poultry, beef, and pork finished on intensively managed pastures. In 2002 they raised 4,600 broiler chickens, selling them through restaurants, groceries, on-farm purchases, and Internet orders, even as both Mike and Debra worked off the farm while raising three children.

Farming and working full time got to be too much for Mike, so the Hansens cut back to 1,200 chickens for 2003. But Mike wasn't giving up his dream. He decided to scale back to half time at his county rural planning job, and quit altogether late in the year. "It just got to the point where we knew I had to do it, because this really is our dream," Mike said.

In 2004 the Hansens aimed to grow and sell at least 4,000 organic, dressed chickens, along with 25 head of grass-fed beef and smaller numbers of turkeys and hogs. For the chickens Mike is developing brooder and pasture-growing systems that he believes can allow one person working half time to produce up to 20,000 birds annually. Even more important, Mike said, is the enterprise's effort to refine its marketing system to sell those birds to customers far removed from their isolated farm.

Starting chicks

The Hansens buy day-old, Cornish Cross chicks from a commercial hatchery starting no earlier than May 1. Mike converted a portion of an old dairy barn into a brooding pen capable of starting 1,200 chicks. The 12 ft by 30 ft area is bounded by wire hog panels covered with chicken wire. The pen is topped by netting to prevent sparrows and barn swallows from entering. Mike leaves the barn doors open during warm weather to allow for ventilation, but hangs lightweight cloth over the outer sides of the brooding area to control air movement through the pen and prevent the chicks from being startled when a barn cat walks by. The concrete floor is bedded with pine shavings.



Day-old chicks gather under LP-fired brooders and drink from elevated water lines in a brooding room.

For the new chicks, a portion of the pen is heated to above 90 degrees F by an LP gas-fired brooder. Temperature levels are decreased as the birds grow. They eat a starter ration from hand-filled, hanging feeders, and water is

provided through a pressure-regulated drip system. After the chickens are moved outside at three to four weeks of age, Mike swings the hog panels up, allowing him to shovel the bedding into a gutter. He tries to allow the pen to sit empty at least a few days between batches.

Mike said the brooding system has worked well and that death loss has averaged 10 percent. Daily chores for 1,200 chicks require no more than 15 minutes. He is considering adding similar brooders to the dairy barn as his business grows, but also fears disease problems. Another option would be developing skid-mounted pasture brooders that, after the heating units were removed, could double as portable growing facilities that would shelter the birds throughout their lives on the farm. “We wouldn’t have to transfer the birds from brooder to pasture, and it would be cleaner because we could give the chicks access to the outdoors almost from the start,” Mike said.

Pasture

The pasture production season starts in late May and ends in early October. The pasture chickens are kept on roughly one-third of the farm’s 60 acres of pasture each year, with the production area in a three-year rotation. The birds provide fertility and insect control that are also important to the farm’s expanding beef cow-calf grazing program. “I want to have a holistic farming system that is good for the earth and produces good quality food for my family and our customers,” Mike explained. He said he needs to learn more about managing broilers, laying hens, turkeys, cattle, and hogs in a system that provides natural pasture fertility and parasite control.

Housing

Mike’s first experience with pasture accommodations was with an 8 ft by 12 ft movable pen made with an oak frame and steel sides that he moved at least daily. “It weighed about 300 pounds, and it just about broke your back to move it,” he recalls.

After some trial and error, he settled on pasture cages made of cattle and hog panels. Two 16-ft wire cattle panels are bowed over a pair of 2 ft by 4 ft frames spaced 12 feet apart. Hog panels are placed on the other two sides, with chicken wire preventing birds from escaping through gaps in the panel wires. About half of the side and roof area is covered with a tarp. Positioning the pens so that the tarp is to the windward side has prevented the hoop houses from being turned over in even the highest winds, Mike said. The structure, which weighs about 125 pounds and requires less than \$100 in materials, can be moved by hand with a dolly.



The Hansens’ pasture shelter consists of wire cattle panels covered with a tarp. It is designed to be moved to new pasture weekly, rather than daily.

Although this pen was easier to move than the wooden pens, Mike grew dissatisfied with the labor requirements and relatively poor growth performance with the cage production method. In 2002 he changed to a modified free-range system, enclosing the chickens within about 8,000 square feet bounded by electrified poultry netting. Mike positions five pasture cages within the enclosure, creating shelter and pasture for more than 1,000 birds. With the chicken wire removed, the birds are free to move to and from the structures by stepping through gaps in the wire panels. The netting and panel shelters are moved to a new area of pasture about once a week, although Mike also shifts the shelters a few feet every day or two to prevent manure buildup. Drinking water is piped from the farmstead to the pasture, with water containers placed on low wagons that can be moved with the enclosure.

FARM PROFILE • Pasture and Market Transition

Feed containers are placed in the shelters, and Mike also sprinkles some feed in the pasture to encourage pecking and grass consumption. He can tend a thousand birds in 10 or 15 minutes, with the weekly moves of the enclosure requiring about an hour. "We found that letting them run free improved their health and demeanor, and it's less labor by far," Mike said. The extra exercise may be slightly reducing weight gains, but grass consumption has increased. Mike asserts that dark meat quality has improved with the change. He said death losses on pasture have declined to less than five percent with the move to the free-range system, as the birds do not peck at each other nearly as much. Other than an occasional hawk attack, predators have not been a problem.

In early 2004 he was thinking about modifying the pasture cages to provide more shelter. One problem stems from the fact that the Cornish Cross meat chickens do not roost. "Right now they're on the ground, and they get wet and cold. I think that's costing us some weight gain," Mike explains. He envisions a structure elevated on skids with slotted plastic floors that could keep the birds warmer and drier. These structures could also serve as brooders, allowing the chickens to be associated with one building during their entire, eight-week life span on the farm. Mike believes that with proper management, the farm will be able to consistently keep death losses at five percent from arrival to departure.



Mike Hansen was building trailer cages capable of hauling 2,000 chickens on the four-hour trip to his processor.

Processing

Mike takes his chickens to a USDA-inspected plant in northeastern Iowa. He built a trailer capable of hauling 1,200 birds housed in four-tier wire cages, and hauls them behind his pickup truck on the four-hour trip to the plant. The dressed chickens, which average about four pounds, are quick-frozen at the processing plant. Primarily because of liability concerns, Mike does not sell any fresh chicken. The farm has a freezer with a capacity of 1,500 dressed chickens, and any additional inventory is placed in rented cold storage space. Mike said it is important to have a year-round inventory to meet the needs of restaurant and grocery store customers. In early 2004 he purchased a different truck and was looking for a larger flatbed trailer to go with it. With redesigned transport pens, he plans on hauling up to 2,000 chickens to the processor.

Marketing

While Mike strongly believes that marketing holds the key to success for his poultry enterprise, he lamented the farm's "lackluster" performance in this area. "That has been the fault of working off the farm," he said. With Gifts From the Good Earth located in a rural area, efforts to market locally have not been very successful. Only about ten percent of marketing revenues come from on-farm sales, and the Hansens gave up on farmers' markets because of the time involved. They sell some chicken to a few natural foods stores in the area, but Mike does not like to spend time delivering product. "There are scattered people in rural Wisconsin who care about what they eat, but you have to get to the larger cities to make sales," he asserted.

Radio advertising drew very few customers. They developed a sales brochure that has brought in some business. Mike has gained several larger restaurant accounts. However, Internet sales to individuals through the Gifts From the Good Earth web site were producing more than 60 percent of the farm's revenues in early 2004. About 70 percent of total sales are shipped in dry ice via multi-day ground or overnight delivery services. "Our main focus is now on the web site," Mike said. "We're part of the 'new economy.' Our storefront is the world."

FARM PROFILE • Pasture and Market Transition

Mike designed his own shipping boxes by cutting two-inch thick polystyrene into panels that can be made into boxes capable of holding up to 12 dressed chickens. Each box requires about \$4 in materials and 10 minutes to make. Mike reports very few problems with shipping products to both coasts, and even as far away as Guam. He dislikes the labor and mess involved with making the boxes and is working with a company that will be able to do the job for him. The farm can offer overnight ground delivery to Chicago and Minneapolis at a cost of \$15 for a 30-lb. box. "Shipping can add 25 to 50 percent to the cost of small orders, even though we don't build any profit into the shipping," Mike said.



In addition to chickens, the Hansens grow turkeys in brooding areas constructed within an old dairy barn.

Mike said he wants to keep his prices within the reach of average families with kids. "We want to provide a reasonable price so that people like us can buy our products," he explains. "If I'm going to be successful at this, I have to produce the highest-quality product I can, and I have to get it to the customer at or near the price they see in the local store. At that point, the convenience of the delivery swings the sale our way."

In the late 1990s, the Hansens priced chicken at \$1.79 a pound, plus shipping. But their calculations indicated production costs at \$1.75/lb., a figure that includes depreciation, but not family labor. With a moderate salary figured in, the breakeven was closer to \$2.35. "I called our customers and said that because the price wasn't sustainable, we were raising it. That day we sold 700 chickens," Mike describes. In early 2004, the standard price on the web site was \$2.89/lb.

With a new, USDA-inspected locker plant scheduled to open nearby in 2004, the Hansens formed a limited liability corporation with a neighbor to operate an expanded pasture-raised, organic and "natural" beef business. They also plan to offer more pastured pork and sell more eggs. Gifts From the Good Earth counts about 250 customers, including about a hundred "regulars" who purchase products at least four or five times a year, Mike said. "The trick is to turn the other 150 into regular customers."

He is targeting the Chicago restaurant market, and envisions working with a warehouse that could provide central storage for several customers, thus limiting the number of delivery trips he'd need to make. Mike said his business may be capable of netting \$80,000 per year in profits from chicken sales alone, with the other enterprises adding to that bottom line. He said hiring labor and contracting production to other farms are possibilities if such moves allow Gifts From the Good Earth to operate at a scale that allows Mike to continue with his goal of full-time farming.

Labor

"We're fanatical about labor efficiency. We constantly analyze how long it takes to do things," Mike explains. When he worked off the farm, Mike was able to handle chicken chores in both the brooder pen and the pasture cages in 25 minutes. He calculates that each chicken requires 3.5 minutes of work to raise, not counting marketing labor or work done on special farm projects. "I feel I can raise 5,000 birds without breaking a sweat," Mike said. If the markets for his chickens continue to grow, he figures it may be possible to raise 20,000 meat chickens a year with about half-time labor. "Our production model has been based on 20,000 birds a year since day one," he explained. Mike intends to spend more time on marketing and business management now that he is not working off the farm. "I'm spending three or four hours a day at the desk doing business work," he explained. "I'm the kind of person who loves having 12 things to do at one time. Not everyone is like that."

Finances

In 2003, the farm grossed about \$40,000 from the equivalent of about one full-time labor unit. During their first nine years of operation, the Hansens grossed a total of about \$120,000, and did not draw any money for family living. “We didn’t want to risk everything by jumping in with both feet,” he explained. “We wanted to slowly build something that was sustainable.” Mike said he has to work harder at scaling up the business now that he is not working off the farm. He and Debra, an accountant, have put together a business plan that calls for growth and provides some family living from the farm. In a typical year, with no major death losses, Mike said the business can clear about \$2 per bird above production costs to pay for family labor and management. He believes net profits in the \$3-\$4/bird range are possible with better production management at a larger scale.



An old dairy barn is home to chicks for the first four weeks until they are ready to go out on pasture.

Words of advice

Mike said his goal is to increase the size and efficiency of his business to give Debra the option of quitting her off-farm job. However, he urges poultry producers to start small. The Hansens began with 50 chickens, and did not reach 1,000 birds until several years later. Prospective producers should first study the market. “Get a feel for how many birds you can sell before you buy the chicks,” Mike said. Even if there is large market potential, “don’t produce more birds than you are comfortable raising.” And, he added, “Never stop learning. Once we think we have a good idea implemented, we begin evaluating how we could have done it better.”

