



# SUSTAINABLE CHICKEN PRODUCTION

## LIVESTOCK PRODUCTION GUIDE

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### Introduction

Selling "farm-fresh" chicken and eggs is a marketing opportunity for enterprising farmers. These farmers raise chickens on outdoor range or in existing farm buildings to keep overhead costs low. Little or no medication is used in the feed. Market potential exists for products from poultry raised in what consumers consider to be "natural" environments.

Per-capita consumption of poultry products has climbed dramatically as large integrators have made poultry among the "best buys" at the supermarket. Each U.S. citizen ate an average of 97 lbs. of poultry and 234 eggs in 1993 (1). However, many consumers are also interested in homegrown poultry. Some consumers consider homegrown poultry more "natural" than industry-raised poultry; others want to support family farms and locally produced goods.

In the industry, usually large, loose-litter houses are used for broiler production. Layers are usually kept in small cages with 3 to 4 birds in each. In "sustainable poultry production," alternatives to confinement housing and cages are considered, such as access to range. Preventative management to maintain health is emphasized instead of routine medication. Nonconventional processing and marketing channels may be explored as part of alternative production. Poultry production can be a low-capital farm diversification strategy. Sustainable agriculture stresses environmentally sound and economically viable approaches to agriculture, and focuses on low-input strategies and support of rural communities by maintaining the family farm.

A common feature of alternative production models includes access to range. Access to range can help reduce feed costs, reduce stress

compared to confinement, and provide a marketing advantage for certain market segments. An alternative poultry production strategy can reduce health problems and eliminate routine medication. This adds to the marketing advantage since some consumers want birds raised with no pharmaceuticals in the diet. Poultry manure can add fertility to the pasture and the manure is spread directly onto the field, eliminating waste disposal problems. Many pasture-based systems are seasonal – young birds need to be fully feathered before putting them out on pasture. These systems tend to be low cost and require little capital for start-up. Pasture-based systems are widely used in Europe on a large scale.

The focus of this publication is alternative chicken production. General information on small-scale poultry production is already available from many sources such as books, magazines, and Extension publications. Information on general topics – such as setting hens, brooding, culling, etc. – can be obtained from these sources. Some small-scale chicken books listed at the end of this publication in the Resources Section.

This publication is part of a series on sustainable chicken production. Please also see the ATTRA publications [Sustainable Egg Production](#), [Feeding Chickens](#), [Processing and Marketing Chicken Products: Meat and Eggs](#).

### **Alternative Production Methods**

The terms for alternative poultry operations are loosely defined in the U.S. Countries in the European Community (EC) have specific criteria defined by EC trading standards regulations in order to label eggs as free range, semi-intensive, deep litter, perchery, etc. (2); however, for the purposes of this publication, the following operations are described:

- free-range
- pastured poultry
- semi-intensive
- “yard and coop”
- innovative

Most of these models feature access to pasture but with modifications. Simply turning the chickens loose to run free on the farm may be fine for a family flock, but not to produce poultry commercially.

### Free-range

"Free-range" refers to operations using moveable housing and access to pasture. In free-range operations, portable houses or pens are moved regularly so that chickens may forage grass, seeds, and insects. Maximum stocking density should be 200 birds per acre (3).

Some free-range operations have automatic watering systems in the field and specially constructed feeders to protect feed from the weather. The pasture area may be tightly fenced to keep predators from entering; portable housing provides safety at night.

Ohio farmer Herman Beck-Chenoweth (4) uses a free-range model to produce broilers. Long portable houses (skids), which hold up to 400 broilers each, are towed by tractor every few weeks to new locations in the pasture. The wooden skids are enclosed with chicken wire with litter-covered floors, tarp-covered gable roofs, and doors on both ends. Concentrate feed costs are reduced by access to range. He uses Cornish cross broilers and finds that they range about 100 feet away from the skids. The only fencing required is a strong perimeter fence to keep out neighbors' dogs. Predation at night is not a problem if the chicken wire is tightly attached to the skid; during the day, the birds run back to the skid if threatened. Since the birds are never confined, except at night for safety, this model appeals to those interested in animal welfare issues. In order to use this free-range model, you need a tractor, draft horse, or a strong pick-up to move the skid. Beck-Chenoweth's model is described in great detail in his book [Free-Range Chicken Production and Marketing](#) (4). He also edits a newsletter called the [Free-Range Forum](#).

There are many modifications of free-range, especially “protected free-range,” such as field

pens that are regularly moved to fresh pasture. One that has received a lot of attention is "the pastured poultry model" (discussed below). There are also many models of free-range egg production, such as the "eggmobile," discussed in the ATTRA publication [Sustainable Egg Production](#).

### Pastured poultry

"Pastured poultry" is a term used to describe a modification of free-range—a field pen where the grazing area and bird density is strictly controlled. Joel Salatin (5) has developed this innovative model in which broilers are pastured in floorless pens, which are moved daily to fresh pasture. Seventy-five to one hundred chicks (two to four weeks old) are placed in 10' x 12' x 2' pens. The pens follow a cattle rotation. Feed concentrate is provided in the pen, along with water. In this system, allowing the birds to forage on plants, seeds, insects, and worms reduces concentrate feed costs by 30%.

Salatin raises 8,000 birds a year from March to October. Death losses at the Salatin farm average less than five percent, with mortality under two percent in some flocks. Bird performance is good—reaching slaughter size by eight weeks with a carcass weight of 4 to 4½ pounds.

The cages are moved by hand by putting a specially designed dolly on one end and lifting the pen with a handle on the other end. The pens, weighing about 200 lbs., can be dragged in this way. The pasture needs to be kept short (about 4-8 inches). Further issues about pasture usage and feeding is available in the ATTRA publication [Feeding Chickens](#).

Several producers have modified the cage design by constructing it with PVC pipe, instead of wood, to lighten it. Some producers have installed a gabled tarp roof tarp to allow more heat to escape.

Salatin's pastured poultry model is described in great detail in his popular 330-page book, [Pastured Poultry Profits](#) (6). This publication

includes information on brooding, pen construction, feeding, pasture management, processing, and marketing. The book and a video can be ordered from [The Stockman Grass Farmer](#) (7).

In response to growing interest about the pastured poultry model, an organization called the American Pastured Poultry Producers Association (APPPA) (8) was formed in 1996. APPPA was formed to help producers network for information, used processing equipment, etc. Membership costs \$20 per year and includes a subscription to the newsletter [Grit!](#) The newsletter editor is Diane Kaufman (8), a longtime pastured poultry producer—contact Kaufman for more information on APPPA and to join.

Heifer Project International (HPI) (9), an Arkansas development organization is sponsoring a project to integrate pastured poultry onto the farms of limited resource farmers in the South. (Case studies from this project will be available from ATTRA in 1999.) Skip Polson at HPI coordinates the project and is also a pastured poultry producer.

The pastured poultry model has also been adapted for egg production as described in the ATTRA publication [Sustainable Egg Production](#).

### Semi-intensive:

"Semi-intensive" refers to permanent housing with access provided to a yard or pasture. According to an article from [World Poultry Science Journal](#) (3), chickens in semi-intensive operations are raised in non-moveable buildings with access to outdoor grazing in pens that are used in rotation. Feed and water are provided within the houses; stocking density is up to 500 birds per acre.

The chickens should be rotated through different pens; otherwise, a classic dirt chicken yard can result. Vegetation may disappear, because chickens are rough on plants and too much hot manure is deposited. Medicated feed may be needed to control disease in an

overcrowded chicken yard, but rotating the chickens to fresh ground helps prevent disease.

Entrepreneur David Wilson (10) led an effort in this decade to establish semi-intensive broiler production on a commercial level in the U.S. Based in Kentucky, Wilson used contracted growers with older chicken houses, some built in the 50's, on their farms. The flocks were generally no larger than 6000 birds—actual flock size depended on the square footage of the particular house. Stocking density was 1 square foot per bird in the houses (industry averages are about 0.5 to 0.7 square feet) and 22 square feet per bird on the range. Wilson believes an ideal set-up would be 4500 birds in a 4500 square foot house.

The total range space was usually a couple of acres around the house. According to a former production manager, John Purdy (11), it was problematic setting out the range area since the houses were built without regard to range. Wilson believes an ideal would be to have at least two ranges in order to rotate. If the house is oriented east-west, then it would be possible to have north and south ranges. Wilson did not have the opportunity to improve the range, but he believes that with legume plantings, ranges could provide a substantial portion of the broilers' diet.

The broiler operation was year-round, but the birds did not go outdoors when the temperature dropped below 40°F, making a 90-day window in Kentucky in which the birds stayed indoors. During this time, stocking density was reduced and alfalfa was added to the feed. The birds were allowed to range at 4 weeks of age during the summer and 5 weeks during the fall.

There was a low incidence of parasites, even though parasiticides were not included in the diet. Wilson speculates that since it was a closed system and biosecurity was high, parasites never got established. Disease was not a problem.

Purdy speculated that if a producer used conventional Cornish cross birds in this

production model, the birds could possibly be reluctant to range outside— young birds are especially tentative. However, raising the birds in a house with a high level of natural lighting and using a small house with multiple exits may encourage young Cornish cross birds to venture outside. If they are still reluctant to leave the house, placing a range feeder outside may encourage them. Another alternative is to use breeds that are more conducive to foraging; however, the market conformation of the breed is important since most consumers expect birds to have plump breasts.

### "Yard and coop"

"Yard and coop" is a catch-all term referring to poultry operations that do not include a formal plan for rotating pasture or have no pasture access at all. Some producers let chickens, mainly layers, roam the farm at will, shutting them up at night to protect against predators. While this is a low-input system, disadvantages include loss to predators and droppings in undesired places. It is generally not practical for commercial production.

Many producers raise chickens in the familiar chicken coop. Much literature is available on chicken coops. The magazine Countryside & Small Stock Journal publishes many articles on this topic; a useful book is the Homesteader's Handbook to Raising Small Livestock (see Resources Section). For more information on general small-scale chicken housing and equipment such as nestboxes, waterers, roosts, etc., refer to books and other materials that are listed in the Resources Section.

Some producers use unusual housing for small flocks such as hoopouses, where a loose-litter system is employed. The second edition of the book Chicken Tractor (12) describes how to build a straw bale house as winter protection for layers. There has been continued interest in incorporating poultry into greenhouses.

In Europe, open-ended houses with covered straw yards for layers as an intermediate system between wholly outdoor and wholly indoor.

Deep litter houses are more fully enclosed. Other enclosed models include aviaries and percheries.

### Innovative

The “chicken tractor,” developed by Andy Lee, is designed to be integrated with vegetable production. It is a floorless pen, usually 4’x10’, enclosed with chicken wire and a covered top as protection against the weather. Twenty broilers are kept in this size pen. The pen is moved daily on fallow beds. You may need twice the garden space to use this system, but this allows the land to be “treated” every other year. Your land will become very fertile – doubling garden yields or better. The chickens weed, till, and fertilize the beds. They also help in insect control. In addition to a concentrate ration, kitchen and garden wastes are thrown in the pens as feed.

There are several different ways the chicken tractor is used in a garden. The pen is rotated daily to a fresh spot as described above. Or the pen can stay stationary, and fresh straw bedding is added daily to create a raised garden bed. This is especially useful in areas with poor soil. Or something in between these two systems: the pen stays on the garden bed longer than one day, but less than one month. This puts a sheet-mulch on top of the beds to kill grass and weeds and add fertility. Andy Lee’s book Chicken Tractor (12) provides detailed information.

There are also various permaculture models for range chicken production— permaculture integrates natural systems with human needs for food, shelter, fiber, etc. An example is a system in which a central chicken house has doors (popholes) to provide access to four different yards. Chickens have access to a single quarter for 2 months. When the chickens finish tilling and weeding one of the yards (a quarter), they are excluded from the quarter. The quarter can then be planted to high-value crops like vegetables and flowers, followed by forage crops (rye, buckwheat, alfalfa. etc.) that the birds will eat when they move back to the quarter in 6 months (13) Bill Mollison’s book

Permaculture: A Designer’s Manual (14) offers further permaculture designs for poultry. Contact ATTRA for more information on the use of chickens in permaculture systems

A "composting chicken house" provides an alternative for manure management in buildings where manure and litter accumulate. About six inches of dry material, such as sawdust or straw, is spread on the dirt floor of the poultry house and sprayed with compost starter. Scratching by the birds helps mix the dry material and the chicken manure – these products then begin to decompose, eventually becoming compost. The compost is periodically rototilled to keep a crust from forming. Additional litter or water may be added if the mixture becomes too wet or dry. A side benefit is that the composting process stabilizes the floor temperature at about 70°, keeping the birds more comfortable in winter and summer. Litter compost is removed from the house periodically to be used as fertilizer or sold. Composting chicken houses are described in a late-80’s publication called Down on the Farm . This inexpensive publication describes the composting chicken house operated by Natural Foods Associates (15).

### **Breeds for pasture-based production**

Light, heavy and dual-purpose chickens have been bred to suit different production goals. The light breeds lay large quantities of eggs and are generally nervous birds which are not inclined to become "broody." The heavy breeds and their crosses are used for meat production, primarily broilers. Rhode Island Reds and Whites and Barred Plymouth Rocks are dual-purpose breeds – large birds that produce eggs as well as meaty broilers. They are useful for small flocks.

Pastured poultry producer Joel Salatin (5) recommends choosing a meat type that consumers are accustomed to, such as the industry type, Cornish cross. Although this breed is not an aggressive forager, it is a fast-grower. Other breeds may have less meaty

breasts. It is important to find a supplier that you are happy with. Some hatcheries have their own breeding flocks; others buy eggs from other hatcheries.

Entrepreneur David Wilson's (10) emphasis in pasture-based production was culinary. He wanted to produce a differentiated chicken product—a chicken with an exceptional taste. He was introduced to French chicken by European-trained chefs and he imported the La Belle Rouge™, which is a trademark for breeds accepted into a French program that promoted range production. Since the birds are typically harvested at about 9 to 11 weeks, the slower growout may also contribute to flavorfulness.

The American Livestock Breeds Conservancy (16) can recommend endangered poultry breeds that need protection. An important part of sustainability is maintaining a wide genetic base.

### **Feeding Options**

For information on feeding, home-mixed rations, certified organic diets, feeding concerns for pastured birds, please see the ATTRA publication [Feeding Chickens](#).

### **Flock Health in Alternative Poultry Production**

Chickens in the past used to be range-raised. However, commercial poultry houses may have large amounts of fecal dust and ammonia in the air, and bird density may be high (25,000 birds in a building 40' x 400'). These conditions require routine medication such as antibiotics. Public concern exists about the routine use of antibiotics in livestock production and the perceived risk of transfer to humans of strains of bacteria resistant to antibiotics. Concern about possible residues in meat and eggs also contributes to consumer interest in poultry raised with a minimum of medication. The following sections discuss health concerns for both indoor and outdoor flocks, with details on the special health concerns for outdoor flocks.

### Sanitation and isolation

Sanitation and isolation are preventative measures to control disease problems. The "all-in, all-out" approach is a useful way to maintain flock health in confined flocks. Under this method, each batch of birds is treated as a unit from the time it arrives on the farm until departure. Facilities are thoroughly cleaned and disinfected between batches of birds. Producers not using the "all-in, all-out" approach should quarantine new birds for two weeks or more to make sure they are not bringing in diseases. However, in general it is a good policy not to add new birds to an old flock. Human visitors may introduce diseases if they have been around other flocks. Borrowed poultry equipment, rodents, and poultry shows can be further sources of disease. Sick or dead poultry should be removed promptly. Mixing different species of poultry can spread infections. A disease may not affect one type of poultry and therefore be hidden, but it may be devastating to another species. An example is blackhead, which can be spread from chickens to turkeys.

In contrast to the "all-in, all-out" approach which includes thorough sanitation between batches, some small-scale producers believe that disinfection not only kills pathogens but also beneficial microbes. For example, some producers do not clean facilities between brooder batches because they believe the bedding helps new chicks build defenses against diseases they will eventually encounter, such as coccidiosis.

### Vaccination

Vaccination may be done by the hatchery, but chicks can also be bought unvaccinated. It is recommended to vaccinate for Marek's disease as a rule of thumb, and consider vaccination programs, particularly for layers, since they are kept longer than broilers (17). Producers should be aware of the risks of not vaccinating—if a disease outbreak occurs, it may be necessary to get rid of the whole flock. If there are a lot of neighboring flocks in an area, it is especially important that disease control be effective, so

that diseases do not spread. It may be wise to consult with a local veterinarian or Extension personnel about the importance of vaccinations.

### Alternative treatments

Some "natural products" like diatomaceous earth (DE) have been used for control of external and sometimes internal parasites in livestock, including chickens. DE is the fossilized remains of diatoms, tiny sea organisms, which have microscopic cutting edges that may pierce the outer protective layers of insects and parasites, causing them to die by dehydration. Some producers believe DE is effective, based on their experiences; however, its efficacy has not been documented by research. Cedar chips, tobacco, petroleum oil, and brewer's yeast have also been used to control external parasites such as lice.

Homeopathic treatments in chickens have been used as an alternative to antibiotics in Germany and have been particularly treating respiratory diseases and diarrhea (18). A U.S. referral service, the American Holistic Veterinary Medical Association (19), may be a source of further information on alternative treatments. Some producers believe that probiotics are useful in preventing disease in poultry. Probiotics are live microbial feed supplements that may improve livestock health by "feeding" beneficial gut microbes.

Poultry books and the Extension service are useful in poultry disease identification, treatment, and preventative care. Gail Damerow's The Chicken Health Handbook (20) is a very practical resource guide for small-scale producers. It is written for non-vets and includes sections on chicken health, parasites, diseases, diagnosis, and postmortem.

### Special Health Concerns for Pasture-based birds

Stress plays a role in the bird's immune system. According to David Wilson (10), stress is reduced by access to range, small flocks, and low stocking density. Since chickens are aggressive, being able to escape from each other reduces stress. Routine medication can often be

eliminated on well-run pasture-based chicken farms; however, the possibility for disease outbreaks still exists.

Farmers should be aware that chickens raised by pasture-based methods are exposed more frequently to wild animals, which can transmit parasites and diseases. Salmonella may be transmitted by wild birds (17). Fowl cholera may especially be a problem in outdoor birds (17). One study showed that mortality can be higher in free-range than caged production (i.e. 15% compared to 4%) (21), but this depends on many factors.

Debeaking is generally not recommended for range birds – it makes foraging more difficult. Although cannibalism can be reduced by debeaking, many range flocks do not suffer from cannibalism.

Control of predators is necessary for outdoor flocks. Tight fences around the range area and housing where birds can be locked in at night can deter predators. Portable housing should have close contact points with the ground. Joel Salatin (5) has found that many predators will not cross a short-grass pasture in the daytime. Guardian animals such as well-trained dogs may be useful in combatting predators.

Weather conditions can be big variables for outdoor operations. The spread of disease is worse for outdoor birds during the times of the year when mosquitoes are active and during wet, rainy conditions. Mosquitoes spread some diseases such as fowl pox (17). Standing water and runoff from heavy rains can be health hazards for chickens on pasture, especially in portable pens. Pastured poultry producer Joel Salatin puts a hay pad under a roofed section of his field pens to allow the birds to get dry.

Larger birds can take the cold if they are dry; however, severe cold will freeze chickens' combs. If the temperature gets above 90° F, birds over seven weeks suffer – Salatin's field pens need to be slightly propped up for ventilation under these conditions. Shade may be necessary.

Internal parasite control is aided by pasture rotation, helping to prevent coccidiosis and worms that affect ranging chickens. Salatin does not return to the same plot of land for three years in his rotation and finds mortality from disease to be low (two to three percent). Most of the literature from the 30's and 40's, when birds were commonly pastured, recommends waiting at least one year before returning to the same plot of land. Birds can build up some resistance to coccidiosis as they get older, but they are susceptible when young. Keeping the grass short (two inches), by mowing or following a cattle rotation, aids in sanitizing the pasture—sunlight penetrates to the grass and soil.

Grower/writer Gail Damerow suggests eliminating intermediate hosts of internal parasites, such as snails, and avoiding mixing chickens of different ages as methods to prevent parasites (20).

### **General Management Concerns**

For more information on general topics—managing breeders, brooding, natural incubation and hatching, molting, etc.—consult some of the publications on poultry production listed in the Resource Section.

Carcass disposal options are various. Burial and burning are often used to dispose of dead chickens, but composting is an alternative that recycles the carcasses. When composting is the option chosen, a carbon source such as sawdust or straw is added. When composting is properly done, temperatures above 130° F destroy pathogens and convert carcasses to fertilizer (22). The Extension Service in Maryland offers a video called "Composting Poultry Mortality" (23). One entrepreneur has fed poultry and hog carcasses to alligators.

Disposal pits are often used in large-scale production, but may be outlawed in some states because of concern about ground water pollution. With any method, it is recommended to be aware of local regulations about carcass disposal.

In large-scale confinement operations, chicken litter should be managed so that it becomes a resource instead of a source of pollution. Poultry litter is often spread on fields as a fertilizer or fed to cattle. These practices need to be done properly to assure that excess nutrients do not pollute the environment.

ATTRA can provide information on alternative methods of fly control in poultry housing. Integrated pest management is carried out with biological controls such as the release of wasps that parasitize fly pupae; physical controls such as light traps, baited traps, and nontoxic sticky tapes; and cultural controls such as removing moist manure, spilled feed, and drainage problems.

### **Processing and Marketing**

For more information on slaughter, processing equipment, regulations, marketing, and the organic market, see the ATTRA publication [Processing and Marketing Chicken Products: Meat and Eggs.](#)

### **Integrating Chickens onto the Farm**

Small-scale poultry production is complementary with vegetable production. Combining poultry production with vegetable production can provide weed and insect controls and fertilization benefits. Chickens eat insects in some vegetable crops, such as potatoes, without damaging the plants. Chickens may be allowed access to the garden after harvest to provide manure for increased soil fertility.

Ducks, guineafowl, and geese have also been used for controlling insects and weeds (24). In orchards, chickens and geese eat fallen, pest-damaged fruit and can be effective in weed and insect control. Researchers at Michigan State University (25) have studied the use of chickens and geese in orchards. Chickens were found to control insect pests while geese aided in weed control.



Chickens are sometimes used for tillage – clearing surface weeds and bulbs out of a plot of land and preparing the ground for planting vegetables. As described earlier, many permaculture systems use chickens for tillage, rotating chickens through fenced areas, where they stay for a period of several weeks, clearing out vegetation, scratching, and fertilizing the soil with their manure and preparing the ground for planting. Other livestock operations can be combined with chicken production. Grazing poultry can work well with other livestock in controlled rotational grazing. Organic beef operations can be enhanced by having chickens follow the cattle rotation and eat insects – chickens pick apart dung pats, destroying harbors for parasites and insect larvae.

### Other Poultry in Sustainable Production

Turkeys are considered more fragile than chickens and more susceptible to disease, but turkeys are more aggressive foragers than chickens. On a small scale, market turkeys may be a seasonal operation, since poults could be started in June and ready for the holiday market in November. Contact ATTRA for information on adapting sustainable poultry production models for turkeys – the pastured poultry model, the free-range model, and the chicken tractor are commonly used with turkey production.

Weeder geese were used on a large scale in California in the '50s to weed cotton fields before the widespread use of herbicides. Geese have been used successfully to weed crops such as strawberries, potatoes, onions, etc. Geese have a strong preference for immature grasses but sometimes eat ripe fruits and berries.

Duck is more commonly eaten in Europe and Asia than in the U.S., where only three percent of the population eats duck (26). Ducks have been used for aquatic plant control in ponds, especially for duckweed and pondweed. Muscovy ducks have been used for fly control on dairy farms.

Of the common domestic species of poultry, only geese do well on a grass-only diet; chickens, turkeys, and ducks need some grain. Geese and ducks are more resistant to disease and parasites than chickens and turkeys, and, as waterfowl, are more able to withstand temperature extremes and wet weather. In addition to the meat and eggs provided by geese and ducks, these poultry provide other services such as insect, snail, and slug control.

Guineafowl are considered luxury food in Europe where they are raised commercially. Their pheasant-like meat is appreciated in the U.S., but they are raised primarily as foragers to control insects in pastures and gardens. Guineafowl and geese can also act as "watchdogs" due to their noisy calls when alarmed.

Poultry species are also valued for show and are exhibited. Some poultry enthusiasts are concerned about the preservation of minor breeds of poultry and believe a wide genetic diversity should be maintained. The American Livestock Breeds Conservancy (16) works to protect minor breeds from extinction, including poultry breeds.

Many other avian species are raised commercially, such as quail, pigeon and ratites. ATTRA can provide production information on these species, as well as on other forms of poultry – such as turkeys, geese (weeder), ducks, guineafowl, and gamebirds.

### Further Resources

Extension and state Agricultural Experiment Stations have older literature (from the '30s and '40s) describing small-scale and pasture methods of raising poultry – this literature is available at land grant university libraries.

County and state Extension agents may be good sources of information on small-scale poultry production. The University of Maryland Extension service offers the publication, [Sources of Poultry and Supplies for Small Flocks](#) (27),

that lists poultry resources for egg production, meat, turkeys, purebreeds, guineafowl, gamebirds, waterfowl, as well as equipment and supplies, etc. The 4-H clubs can support poultry production and may aid in providing good stock.

The Farming Alternatives Program at Cornell University in New York offers a Specialty Poultry Resources Information Package that discusses marketing poultry products, grazing poultry, organic poultry production, and resources (28).

A list of books and magazines dealing with small-scale and alternative poultry production follows at the end of this publication. A particularly useful book is Gail Damerow's A Guide to Raising Chickens (29). Other alternative poultry producers are also good sources of information.

## Summary

Although the present poultry industry offers affordable products, many farmers are interested in alternative poultry production. Market potential exists for "farm-fresh" poultry products. Many models for pasture-based production exist – producers must decide which one best fits their needs. Alternative poultry production, usually small-scale, may involve a grazing component and emphasizes preventative measures for health maintenance.

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Creola, OH 45622  
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