



Pastured Poultry for Small Farms in North Carolina

NC STATE

EXTENSION

This guide provides an overview of pastured poultry production for small and beginning farmers in North Carolina, with a focus on planning that can result in a profitable poultry enterprise. This publication is a starting reference for anyone interested in pastured poultry production. Links to internet resources are presented throughout this publication for additional reference. Information is also available from N.C. Cooperative Extension centers, the North Carolina Farm School (ncfarmschool.ces.ncsu.edu), and other state university resources.

Contents

Introduction	1
Pastured Poultry Systems	1
Breeds and Species Selection	1
Stocking Density and Buying Poultry	2
Pastured Poultry Best Management Practices	3
Housing	3
Feed and Water	3
Predator Control and Fencing	4
Molting	5
Health and Risk Management in Pastured Poultry	5
Waste Management: Manure and Mortality	6
Understanding Regulations and Managing Risks	6
Market Analysis and Production Costs.....	7
Marketing	7
Production Budgets and Profitability Estimates	8
Fixed Costs.....	11
Miscellaneous Fixed Costs.....	11
Annualized Fixed Cost	11
Variable Costs.....	11
Capital Variable Cost.....	12
Developing Your Own Budgets	12
Summary	13
Additional Resources	13

Introduction

Pastured poultry is one of the most popular enterprises for beginning farmers. Layers and broilers are the two main types of poultry enterprises. Layers are raised to produce eggs. Broilers are chickens raised for meat. In North Carolina, pastured poultry producers may sell up to 30 dozen eggs per week and market up to 1,000 meat birds per year with fairly minimal licensing requirements.

Lower start-up costs, compared to other animal enterprises, make small-scale poultry a potentially attractive use of capital. Pastured poultry meat and eggs are widely sold through the market channels commonly used by beginning farmers—including community supported agriculture (CSA), on-farm sales, and community farmers markets. In these markets, poultry products can complement other farm products, such as produce. In the right market, it can be relatively easy to sell pastured poultry products.

There are many risks involved in small-scale egg and poultry enterprises. Profitability varies widely depending on the value and total cost of the operator’s labor. Predators and flock disease can create large losses and stunt productivity. Furthermore, new producers may find that the local market demand for poultry products is already met.

This publication includes some definitions and descriptions of pastured poultry systems. It also discusses poultry types and breeds, best management practices for pastured poultry, poultry health, and marketing and financial costs. Sample budgets are provided for both layer and broiler production in pastured systems.

Pastured Poultry Systems

The Agricultural Marketing Resource Center defines pastured poultry as “a poultry production system that is characterized by chickens, turkeys, or ducks being raised primarily on pasture. The birds supplement their grain feed by foraging for up to 20 percent of their intake and are often moved regularly to fresh pasture.” The United States Department of Agriculture (USDA) does not maintain a formal definition of pastured poultry. See Table 1 for definitions of standard practices.

Breeds and Species Selection

Pastured poultry growers may select a particular poultry breed or species based on a host of factors—including size and productivity; foraging characteristics; and consumer preferences.

Farmers raising pastured chickens often select breeds that produce meat and eggs efficiently; that is, meat chickens that gain weight on a modest amount of feed and layers that do not demand huge amounts of feed to produce eggs.

Different breeds of chickens are more outstanding egg layers than others (Table 2). Other breeds may produce a broiler more efficiently (Table 3) or have specific carcass characteristics, such as a wide breast. Still other breeds are dual-purpose, with favorable characteristics for both egg and meat production.

Some poultry breeds and crossbred birds (sex-link hybrids) may have characteristics more favorable to pastured production. Certain duck breeds are noted for their foraging characteristics, for example, making them possibly more desirable for pastured production than some chickens.

Table 1. Distinct Practices for Pastured Poultry.

Term	Definition
Pastured poultry pen	Birds are confined to a portable pen, without a floor, that is regularly moved. Poultry eat pasture forage, insects, and supplemental grain. The birds work manure into soil by scratching.
“Net” range or “day” range	Birds are housed in a portable shelter that is situated among paddocks—fenced areas created with electric poultry netting. The birds feed on pasture forage and supplemental grains. Typically, a larger area of pasture is provided than with a pastured poultry pen or chicken tractor.
Chicken tractor	Birds are housed in a portable pen moved throughout a field or between garden plots. The poultry feed on plants; insects and their larvae (grubs); and supplemental feed. Poultry “till” the soil by scratching, and manure can provide fertilizer for cover crops or future garden crops.
Free range	Birds are allowed “free range” forage across pasture and other land. Portable housing encourages birds to change locations.
Yarding	Birds are released from a coop or building, giving them freedom to range on adjacent fields or yards. Birds are regularly moved among different locations to prevent forage depletion and promote flock health.

Egg-producing breeds used in small-scale poultry production include Leghorns (for white eggs) and Rhode Island Reds, New Hampshire Reds, and Australorps for brown eggs. Sex-link hybrids such as Red Stars and Black Stars are usually brown-egg layers. Some hatcheries also offer sex-link crosses that lay white eggs. Ameraucana often lay eggs with blue and green tints. There is also varied consumer interest in slower-growing breeds that may produce desirable flavor attributes.

Consumer preferences are an important factor in choosing what birds to grow. Size and aesthetics are characteristics important to some customers. For example, some people buying locally grown eggs may want specific egg colors (Table 2). Some consumers might have no interest in whole roasting chickens but be very interested in purchasing a locally grown turkey for their holiday meal.

When selecting pastured poultry birds, producers should carefully evaluate the potential costs and returns of producing any breed. More detailed discussions of breeds for small flock production are included in Additional Resources. It may also be helpful to research breeds used by other North Carolina pastured poultry producers.

Table 2. Comparison of Significant Traits Among Common Pastured Poultry: Egg-Producing Breeds.

Breed	Egg Color	Layers Prolificacy Trait
White Leghorns	White	Excellent
California White	White	Excellent
Minorca	White	Excellent
Ancona	White	Good
Black Sex-Link (Rock Reds)	Brown	Excellent
Red Sex-Link (Golden Comet, Gold Start, Cinnamon Queen)	Brown	Excellent
Australorp	Brown	Excellent
Dominique	Brown	Good
New Hampshire	Brown	Fair
Plymouth Rock	Brown	Fair
Rhode Island Red	Brown	Fair
Aracauna/Ameraucana	Blue/green	Fair

Source: *Poultry Breeds for the Small Farm*, www.uaex.edu/publications/pdf/fsa-8012.pdf (PDF, 341 KB)

Table 3. Comparison of Significant Traits Among Common Pastured Poultry: Meat-Type Breeds

Breed Name	Growth Rate Trait
Cornish Cross	Fast
Cornish	Slow
Jersey Giant	Medium
Freedom Rangers	Fast

Source: *Poultry Breeds for the Small Farm*, www.uaex.edu/publications/pdf/fsa-8012.pdf (PDF, 341 KB)

Stocking Density and Buying Poultry

The local market and customer demand are central to the decision of whether to raise layers, broilers, or both (see Section 4 for more detail on finances). It's also important to evaluate how much space is needed for the birds.

Chickens raised in a shelter for meat production need 1.5 to 2 sq. ft. of floor space per bird (Table 4). That requirement is the same for portable pens, such as chicken tractors, to house broilers on pasture. Broilers raised to have free range on pasture can use a yard as small as 5 to 10 sq. ft. per bird, provided birds are rotated among pasture spaces. Different breeds of chickens have different space requirements. Cornish Cross broilers, for example, can generally use smaller spaces than dual-purpose and heritage breeds raised for meat. Laying hens being rotated among pastures may require more space, especially breeds best suited for foraging. One laying hen requires 1.5 sq. ft. inside and 8 sq. ft. for outside runs.

Table 4. Minimum Space Required, Per Bird, for Different Types of Pastured Poultry.

Poultry Type	Inside Requirement, sq. ft./bird	Outside (run) Requirement, sq. ft./bird
Chicken	1.5 – 2	8 – 10
Duck	3	15
Goose	6	18
Quail	1	4
Pheasant	5	25
Turkey	3 – 5	167

Sources: *Small Scale Poultry Housing*, Virginia Cooperative Extension (www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/2902/2902-1092/2902-1092.pdf.pdf) (PDF, 1.6 MB))

Small Flock Turkey Production, PennState Extension (extension.psu.edu/small-flock-turkey-production)

Birds for pastured poultry egg production are most commonly purchased as day-old chicks or adults of egg-laying age. According to the North Carolina Farm School budget estimates, the most economical option for pastured egg producers is to buy older birds. For pastured broilers, turkeys, and other meat birds, buying day-old chicks is the most common (and economical) practice for pastured poultry. Hatching eggs is an option for pastured poultry producers if brooder facilities are available and the operator can provide or afford the labor needed to raise chicks to maturity. Pullets are young hens usually less than 1 year old that have not started laying eggs yet. Starting with pullets instead of chicks will mean you will have eggs to sell at least six months sooner.

Pastured Poultry Best Management Practices

Housing

A pastured poultry enterprise can draw on existing farm resources, such as buildings and fields. Financial returns from pastured poultry production are unlikely to justify a large investment in facilities.

Shelter is critical for pastured poultry. The kind of poultry enterprise (eggs or meat) dictates the type of shelter required. In addition, different ages and types of birds have different needs. Three required elements for sheltering birds of all ages are bedding, ventilation, and lighting. If chicks are raised, supplemental warmth will also be needed.

Bedding helps maintain a dry surface for the birds, especially in coops. Pine shavings are usually the recommended bedding material for small flocks, especially for chicks.

Ventilation is important in coops, as well as in portable shelters used in pastures. Adequate ventilation helps maintain the proper air temperatures and air quality for poultry. Existing buildings may need to be modified to improve ventilation, especially if poultry will roost in the buildings at night.

Supplemental lighting is particularly important for laying hens. Hens need 14 to 16 hours of light per day to continue laying. A high intensity is not needed; one 25-watt light bulb per 40 sq. ft. of space can provide adequate light.

Brooders

A brooder is needed to house day-old chicks upon arrival. A brooder is an indoor pen with a heat source to maintain the appropriate temperatures for the young birds (around 90°F during the birds' first week of age). Brooders should be dry and free of drafts. Pine shavings are usually used as absorbent bedding for the hatchlings. Young chicks can develop feet and leg problems if they are kept on hard or wet surfaces. Brooders usually have a temporary barrier called a brooder guard to confine chicks to the warmest area and keep them from wandering.

Heat sources for brooders depend on the size of the brooder space, which is determined by the number of hatchlings brooded. For specific requirements on space and temperature, see *Small Flock Series: Brooding and Growing Chicks* (extension.missouri.edu/publications/g8351).

Shelters

Many types of shelters are used to produce pastured poultry. Temporary fencing is necessary because poultry kept on the same pasture or forage area will deteriorate pasture quality and promote avian disease. Fencing is also an important management tool for predators (see section on predator control and fencing).

Nesting boxes are compartments in which laying hens lay their eggs. One 10x10-inch nest should be available for every five hens. The nest should be about 2 feet above the floor or field. For a portable layer shelter, outside access to nesting boxes makes egg collection much easier and faster.

Feed and Water

Pastures provide poultry access to insects and seeds that may have some nutritional value. However, a pasture ecosystem will not provide a balanced poultry diet, so commercial poultry feed must be provided. A clean, constant supply of fresh water is also necessary, as water is the most important nutrient in animal diets. Laying hens daily drink about twice the volume of water (in weight) as they consume daily in feed.

Producers will need to provide pastured poultry with all the nutrition necessary for producing the quality meat and eggs demanded by local consumers.

Complete poultry feeds are usually readily available from local feed companies and agricultural supply stores. These feeds are often made from soy, corn, and other crops; some of these crops may be sourced from local or in-state growers, depending on where the

feed is manufactured. Poultry feeds are often made in pellets or crumbles, in which the ground ingredients are bound together; pellets and crumbles can improve feed efficiency (the conversion of feed to weight gain).

Pastured poultry producers and their customers are often very interested in feeds that are certified organic, lack genetically modified organisms (GMOs), or are soy-free.

- Certified organic feed is made from ingredients that are grown according to regulations in the National Organic Program, administered by the U.S. Department of Agriculture (USDA). The feed must also be manufactured in facilities that meet organic guidelines.
- Non-GMO feeds are made from ingredients that do not contain GMOs. Many of the corn and soybean varieties grown in the U.S. have been genetically modified to assist producers with pest control and related production challenges. Some producers and consumers choose to avoid GMOs because of philosophical reasons, including environmental concerns. Non-GMO feeds tend to be cheaper than certified organic feeds but more expensive than feed made without GMOs. The majority of the U.S. feed supply is sourced from GMO corn and soybean crops.
- Soy-free poultry feeds do not contain soybeans. Some consumers with soy allergies avoid meat and eggs from birds fed diets containing soy.

How much feed will poultry eat? That depends on the type and breed of poultry; health, age, and sex of the bird; water consumption; and ambient temperature. Some breeds or types, such as Cornish Cross broilers, will require much less feed to gain weight. Male birds will consume more feed per week, on average, than females. Older birds will eat more than less-mature birds; laying hens will consume more feed than hens not laying.

Carbohydrates (energy) make up the largest part of poultry diets. Corn and other grains are the main energy sources. Forage crops grown in pastures will not supply adequate energy for chickens and other poultry because the bird's digestive system cannot digest high-fiber feedstuffs to obtain energy from those feeds.

Fats and proteins provide poultry the means to gain body mass and muscle, absorb fat-soluble vitamins, and provide the essential amino acids (proteins) needed for meat and egg production. As with other nutrients, the required fat and protein levels will change according to a bird's age and growth stage.

The percentage of protein in the feed is a main feed concern. Layers need an 18% to 20% protein feed during the first six to eight weeks after hatch; after that stage, a 14% to 15% feed can be fed until 20 weeks of age. Once hens begin laying, they need feed containing 16% to 18% protein.

Broilers are often fed a 20% to 23% protein feed until processing. Roasting chickens, raised to heavier weights, are usually fed a 20% protein feed for the first six weeks then switched to an 18% protein feed.

Minerals and vitamins are essential in poultry growth and production. Complete poultry feeds will provide the appropriate balance of minerals and vitamins.

Predator Control and Fencing

Preventing predation is essential in pasture raised poultry operations. Pastured poultry are at risk from two types of predators: terrestrial (wild and domestic) and aerial (raptors). Appropriate fencing, including electric fencing, and vigilant flock management (like securing pens and houses from wildlife at night) can significantly limit losses from predators.

Terrestrial animals like foxes, coyotes, raccoons, and opossums are the most common predators of pastured poultry. Free-roaming dogs and cats are also a threat.

Fencing, preferably electric, is the best prevention against terrestrial predators. Electric fences are not only a physical barrier, they also constitute a behavioral deterrent by delivering an electric shock to predators trying to breach the fence. Follow manufacturer's guidelines and other best practices for installing electric fencing systems.

Shelters used to house pastured poultry during nighttime should be predator-proof. Use recommended poultry housing designs (see Additional Resources) to keep predators from digging or tunneling their way into the shelter.

Some pastured poultry producers choose to accept some level of predation loss from raptors; others keep birds confined to moveable pens that cannot be penetrated by raptors.

Poultry fencing has benefits beyond predator control. Portable fences are also important in rotating birds among different fields and paddocks to prevent overuse of pasture and minimize disease potential. Thoughtful planning for fences has many long-term benefits for the

pastured poultry producer. For more information, see *Predator Management for Small-Scale Poultry Enterprises in Kentucky* (www2.ca.uky.edu/agcomm/pubs/ID/ID245/ID245.pdf).

Molting

Molting is natural feather loss. By the time they reach maturity, poultry will have molted three times. The natural shortening of daylight hours during fall and winter months can promote molting. Laying hens will reduce or stop laying during the molting process, resulting in a potential sales loss; however, some hens will have improved egg quality and laying afterward. Understanding molting is important for the beginning poultry producer.

Providing supplemental light in the winter months can keep hens from molting so that they continue to lay regularly. A technique called “forced molting” is sometimes used in poultry operations to manage molting and ensure uniform egg production. Pastured poultry producers should consult with poultry production specialists, such as Cooperative Extension personnel, to ensure that the technique is used properly.

Health and Risk Management in Pastured Poultry

Regardless of size, poultry operations must manage health risks that can decrease productivity, lower profitability, and expose the farm to potential liability issues. This section addresses flock disease prevention, waste handling, and financial risk management for small-scale pastured poultry operations.

Birds raised on pasture are at risk from health problems originating within the flock in addition to infectious diseases transmitted from outside the farm. Common diseases in pastured poultry operations include:

- Avian influenza
- Fowl pox
- Infectious bronchitis
- Laryngotracheitis
- Newcastle disease
- Coccidia
- Internal parasites (worms)
- Marek’s disease
- Aspergillosis
- Salmonella
- Ulcerative (or necrotic) enteritis
- External parasites (mites, lice)
- Infectious bursal disease

Some of these diseases, including Marek’s disease, can be prevented by vaccinating newly hatched chicks. Purchasing vaccinated chicks or young birds is a good way to manage health risks with a relatively modest investment.

Pastured poultry must be managed for external parasites, including mites and lice. Pastured poultry may also be more susceptible to internal parasites, commonly called worms, because of their outdoor environment.

Providing adequate feed and water through proper methods is crucial for flock health. Poultry feed, balanced for the nutritional needs of each growth stage (chick, maturing bird, layer), should be provided in feeders with 3 inches of feeding space per bird. Fresh water should be changed daily and provided at the rate of one 6-gallon container per 100 birds.

Maintaining dry bedding and a dry environment is very important in poultry health. For brooding chicks, a highly absorbent bedding material (usually pine shavings) should be maintained at 3 to 6 inches deep. Brooding chicks also require supplemental heat. *Small Flock Series: Brooding and Growing Chicks* (extension.missouri.edu/publications/g8351) describes proper temperature guidelines for growing birds.

For older birds raised on pasture, shelters should provide protection from precipitation and be regularly moved to avoid manure buildup and pasture deterioration. “Rescue” pasture or fields, areas that may not normally be used in pasture or paddock rotation, can benefit flock health in unusual situations, such as times of excessive rainfall. A barn or shed that has been made suitable for temporarily housing birds can also function as a rescue or emergency shelter.

Waste Management: Manure and Mortality

Proper manure management is important for maintaining flock health in any poultry production system. Pasture raised layers and meat birds deposit manure into the field, often working manure into the soil by scratching. Pastured poultry manure can promote soil fertility and soil health. However, excessive manure buildup can promote some poultry diseases and can also have adverse impacts on pasture health. You can prevent health problems by ensuring that birds are moved before ground cover is bare and that housing facilities are cleaned out regularly or designed so that manure does not build up.

Mortality and disposal of dead birds are important management issues for pastured poultry producers. Some mortality in large flocks of chicks and pullets (young hens) is expected, and dead birds must be disposed of in a sanitary, legal manner. Two common methods for disposing of dead poultry are composting and disposal.

Composting poultry carcasses uses the same principles as composting yard waste and poultry litter. It is extremely important to follow proper guidelines for safely composting carcasses. The proper compost temperature and moisture levels must be maintained to safely decompose all organic matter. If temperatures are not high enough, disease organisms can remain and pose potential health risks. Composting of poultry carcasses can also attract wildlife and other pests, so the location of the composter should be secure. Composting should be done far from the poultry production area.

Dead birds may also be disposed of as standard solid waste (such as in a landfill) or through burial. Be sure to follow applicable state and local regulations for removal and disposal of dead animals.

Understanding Regulations and Managing Risks

Raising any food for human consumption can pose food safety and other potential risks. Pastured poultry producers who explore regulations and potential risks at the outset can potentially ward off future problems. This section is not intended to replace advice from regulatory agency officials, insurance professionals, attorneys, or other risk management specialists.

Regulations for Selling Eggs

North Carolina has detailed laws and regulations for selling eggs. Producers may sell up to 30 dozen eggs per week without meeting requirements for egg grading and labeling. These eggs must be labeled “Ungraded Eggs.” Producers may also be able to sell more than 30 dozen eggs without grading if the eggs are marketed from the farm or premises where the eggs are produced or processed. For a summary of the “North Carolina Egg Law,” see the NC State Extension publication *Explaining the North Carolina Egg Law for Producers with Small Flocks* (content.ces.ncsu.edu/explaining-the-north-carolina-egg-law-for-producers-with-small-flocks).

Regulations for Selling Meat

There are very detailed regulations on selling poultry meat in the United States. Most of these regulations fall under the jurisdiction of the USDA.

All farmers selling or handling meat in North Carolina must be a registered meat handler with the North Carolina Department of Agriculture & Consumer Services (NCDA&CS). For information on obtaining this registration, see the NCDA&CS Meat and Poultry Inspection Division website (www.ncagr.gov/meatpoultry/meathandlers.htm).

A USDA-inspected processor can kill and process poultry for sale. Pastured poultry producers can pay a processor, if available locally, to process the birds and then receive the poultry meat for sale. Having birds processed at a USDA-inspected facility is one way some pastured poultry producers choose to manage potential food safety risks.

There are also provisions within state and federal statutes that allow producers to process poultry that they have raised for sale, as long as the producer meets specific requirements. Beginning farmers can process up to 1,000 birds without mandatory inspection. A summary of the 1,000-bird exemption, along with many other details about regulations on the sale of poultry meat, is found in *Selling Eggs, Meat, and Poultry in North Carolina: What Farmers Need to Know* at NC State Extension’s Growing Small Farms website (growingsmallfarms.ces.ncsu.edu/growingsmallfarms-meatandeggs/).

Other Regulations

Zoning restrictions may limit the use of land for poultry production, especially if the property is located near or in metropolitan areas. Producers should know whether their land is zoned for agricultural use and be aware of any applicable local or municipal regulations that could apply to using their land for poultry production.

Product Liability

Meat and eggs produced by a pastured poultry operation are subject to product liability issues. Consumers might be at risk if they do not properly cook eggs and meat. Furthermore, meat and eggs may be exposed to contamination from pathogens at various delivery points as they travel from the farm or processor to the consumer. It is important for farms to protect themselves from possible liability arising from contaminated products.

Purchasing product liability insurance is a common risk management strategy used by farms of varying sizes.

Product liability insurance can often be added as a rider to a farm insurance policy.

Other Potential Liability Risks

Property liability relates to concerns that can arise from using property for pastured poultry production. These include zoning and land use laws, as well as personal injury liability for farm workers and visitors.

Risk Management Strategies

Farm owners and operators can take several steps to develop a farm risk management strategy. Three main risk management principles helpful for pastured poultry producers are to (1) know the regulations, (2) exercise diligence, (3) and use caution when doing something new, like starting new enterprises.

1. *Know the regulations.* New poultry producers should research the egg and meat handling regulations before they start to sell any product.
2. *Exercise diligence.* Exercising diligence with a new farm enterprise means taking significant time (and often great effort) to research and identify any risks from pastured poultry production to yourself, your property, and to the health and safety of others.
3. *Use caution when doing something new.* Pastured poultry could be described as an entry-level farm enterprise. Even though many producers have successfully marketed poultry products raised in pastured systems, each farm is unique. Do your homework, and be prepared to realize that pastured poultry may not be as good a fit for your farm (or you) as you first thought.

For more information about liability issues, see *Poultry Producer Liability* (www2.ca.uky.edu/agcomm/pubs/ASC/ASC193/ASC193.pdf).

Market Analysis and Production Costs

For pastured poultry production to be profitable, consumers must be willing to pay prices that are higher than the cost of production. Two of the most important questions to answer when evaluating a pastured poultry enterprise are:

- What is the market for my products?
- What is my cost of production?

Marketing

Consumers likely to purchase pastured poultry meat and eggs may be motivated by knowing how the birds are cared for on the farm; producers often educate their consumers about the specific production practices.

Pastured poultry appeals to consumers interested in poultry meat and eggs grown outdoors. Consumers often perceive pastured poultry products to have superior taste and health attributes. Eggs from chickens with regular access to grass pasture, for example, may have increased levels of omega-3 fatty acids and potentially higher levels of some vitamins. Consumers may also cite environmental and animal welfare concerns when purchasing pastured poultry products.

Some consumer segments are more likely to be willing to pay a premium for pastured poultry products. Research has indicated that purchasers of specialty (niche) eggs came from

- areas of higher or increasing incomes,
- smaller total household sizes, and
- higher educational levels, compared to the overall population.

Consumers of farm-raised eggs from small flocks (which include eggs raised in pastured systems) have characteristics consistent with consumers of locally grown foods.

Common market outlets for pastured poultry and eggs include community farmers markets and direct sale at the farm. Pastured poultry products, especially eggs, are also frequently sold through community supported agriculture (CSA) and other subscription-style marketing. Locally raised eggs may be preferred by small restaurants and niche food manufacturers like local bakeries and caterers.

Many small farms in North Carolina raise a few birds to supply eggs or meat to the farm family, neighbors, and friends. Although “family and friends” may be part of a potential market for pastured poultry, successful pastured poultry operators usually need to formally define their likely customers.

Categories of pastured poultry products include:

- Chicken eggs
- Chicken (fresh, whole broilers)
- Turkeys
- Duck eggs
- Other fowl (for example, ducks, geese, and pheasants)
- Feathers (for fly-fishing products)

Small farms could be well positioned to profit from specialty and niche poultry products. For example, some small or upscale restaurants may be willing to pay a premium for locally grown duck eggs; however, the local demand may be easily satisfied by a single small farm.

Talk with customers before beginning production; this strategy will help you understand potential demand and identify additional products customers may want.

Identify Willingness to Pay.

One question often overlooked when planning a new farm enterprise is: “How much are my customers actually willing to pay for this product?” This question may be easy to answer for some poultry products; for example, there is usually a going price for locally raised eggs. Poultry entrepreneurs can then determine whether those price points may result in a profitable venture.

Estimate Quantity Needed to Satisfy Demand at a Particular Price.

Overproduction creates several challenges for profitability. Excess production can require more input purchases (like feed); such costs might not be recouped if the local market does not support purchases of the end product. Further, when producing meat birds, harvesting too many at once can dilute demand and create product storage issues. Overproduction can also result in higher start-up costs. For example, you may exceed the capacity of a single mobile laying house, but adding another one may not be worth the investment if your market is demanding only a few dozen more eggs per week.

Identify Additional Products or Add-on Services.

Pastured poultry is so popular among small and beginning farms because it is fairly easy to get started in production. As a result, the local market for pastured poultry products can quickly become saturated. Farms that successfully develop pastured poultry enterprises usually already have other products that are being sold along with the eggs, meat, or other products supplied. The most successful pastured poultry enterprises will develop a loyal customer base and retain those customers by producing outstanding and unique products.

Production Budgets and Profitability Estimates

Pastured poultry enterprises have a wide range of expected costs and returns. Facility and equipment costs can vary significantly among farms. Poultry mortality rate and producer expertise can also affect profits. Farm production costs may be divided into two categories. *Variable costs* change with the amount of production. Feed is the classic variable cost for farm animal production: the more animals or birds raised, the more feed is consumed. *Fixed costs* are costs that do not change with the quantity produced. The cost of building or buying a mobile chicken coop, for example, is the same whether it is used to shelter 10 or 30 birds. Tables 5-1, 5-2, 6-1, and 6-2 provide examples of farm assumptions and farm production budgets for both layer and meat operations developed by the North Carolina Farm School.

Table 5-1: Basic Layer Farm Assumptions for Table 5-2

Variable	Value
Spent hens, \$/lb	\$1.50
# of Layers for your Operation	66
Eggs/Week/Chicken	6
Molting Weeks Per Year	4

Table 5-2. Layer Farm Production Budget

Budget Category	Budget Item	Unit	Quantity	Price	Price Per Dozen	Total Annual
Income	Eggs	DZ	\$1,584		\$4.00	\$6,336.00
	Spent Hens (prorated)	per bird	\$33.00	\$6.50	\$0.14	\$214.50
	Gross Income				\$4.14	\$6,550.50
Variable Cost	Cost of Raising Chicks (prorated) ¹	per bird	\$66.00	\$4.36	\$0.18	\$287.95
	Feed Layer	lbs.	\$8,236.80	\$0.25	\$1.30	\$2,059.20
	Grit 2	lbs.	\$411.84	\$0.05	\$0.01	\$20.59
	Medication and Diagnostic	cost per bird	\$66.00	\$1.00	\$0.04	\$66.00
	Egg Cartons	each	\$1,584.00	\$0.28	\$0.28	\$443.52
	Slaughter Fee	each	\$66.00	\$5.00	\$0.21	\$330.00
	Egg Grading	Hours per 10 dz	\$0.00	\$12.00	\$0.00	\$0.00
	Marketing Cost	% of gross	\$6,550.50	8%	\$0.33	\$524.04
	Capital Variable Cost	from cap. exp.	1.00		\$0.19	\$297.42
	Total Variable Cost				\$2.54	\$3,731.30
Fixed Cost	Capital Fixed Cost	from cap. exp.	1.00		\$0.11	\$176.88
	Overhead					
	Total Fixed Cost				\$0.11	\$176.88
Total Cost				\$2.66	\$3,908.19	
Returns to Land, Capital, and Unpaid Labor					\$1.48	\$2,642.31
Break-even \$ per dozen, no spent hens sold						\$2.67

¹The cost of raising chicks is prorated because chickens are on the farm for two years laying eggs. Costs are represented as half of total cost.

²Grit is included as 1/20 the amount of feed consumed in pounds.

Table 6-1. Basic Pasture-Raised Meat Chicken Farm Assumptions for Table 6-2

Variable	Value
Purchased Chickens/Batch Size	100
Mortality Percentage	10.00%
Finishing Weight Dressed ¹	4
Batches per Year	3
Percent Sold Retail	70%

¹The dressed weight is 75% of live weight; birds are raised to 8 weeks in each batch.

Table 6-2. Pasture-Raised Meat Chicken Farm Budget

Budget Category	Budget Item	Unit	Quantity Per Batch	Price per lb	Per Batch	Per Bird	Total Annual
Income	Broilers Sold, Retail Whole Bird	birds sold	63.00	\$5.00	\$1,260.00	\$20.00	\$3,780.00
	Broilers Sold, Wholesale	birds sold	27.00	\$4.00	\$432.00	\$16.00	\$1,296.00
	Gross Income				\$1,692.00	\$18.80	\$5,076.00
Variable Costs	Purchase Chicks	per chick	100.00	\$1.40	\$140.00	\$1.56	\$420.00
	Feed Starter	lbs	225.00	\$0.26	\$58.50	\$0.65	\$175.50
	Feed Grower	lbs	1,200.00	\$0.23	\$276.00	\$3.07	\$828.00
	Grit ¹	lbs	71.25	\$0.05	\$3.56	\$0.04	\$10.69
	Fine Shavings (brooding)	8 cu. ft. bags	3.00	\$9.00	\$27.00	\$0.30	\$81.00
	Freeze-proof Vacuum Packaging	per vac bag	90.00	\$0.50	\$45.00	\$0.50	\$135.00
	LP Fuel Tank Refill	per tank	0.50	\$15.00	\$7.50	\$0.08	\$22.50
	Ice	lbs/batch	60.00	\$0.20	\$12.00	\$0.13	\$36.00
	Electricity, brooding						
	Processing Cost (mobile unit rental)	cost/head	1.00	\$200.00	\$200.00	\$2.22	\$600.00
	Marketing Cost ²	% of gross	1.00	8%	\$135.36	\$1.50	\$406.08
	Capital Variable Cost	from cap. exp.	1.00		\$54.45	\$0.61	\$163.36
	Total Variable Cost					\$959.38	\$10.66
Returns Over Variable Cost					\$732.62	\$8.14	\$2,197.87
Fixed Cost	Capital Fixed Cost	from cap. exp.	1.00		\$104.51	\$1.16	\$313.54
	Overhead						
	Total Fixed Cost				\$104.51	\$1.16	\$313.54
Total Cost					\$1,063.89	\$11.82	\$3,191.66
Returns to Land, Capital, and Unpaid Labor					\$628.11	\$6.98	\$1,884.34
Break-even \$ per lb							\$2.96
Break-even Whole Bird							\$11.82
Break-even lb per Bird							2.4

Notes:

¹ Grit consumption is included at 1/20 of feed consumption. ² Production marketing cost should include:

- Hourly labor to make sales
- Social media and website cost
- Point of sale system cost and sales tracking
- Signage and or market presentation set-up cost

This budget was assembled by Derek Washburn, NC Farm School, NC State University, in collaboration with Gary Bullen, NC Cooperative Extension agents across North Carolina, and small farms in North Carolina. For more detail regarding this budget, visit ncfarmschool.ces.ncsu.edu.

Fixed Costs

Common fixed costs for pastured poultry are raising pens (brooders), mobile chicken houses or “chicken tractors,” electric fencing, feeders, and other miscellaneous equipment used for more than one year. Each of the following cost categories involves capital investment: funds spent for things needed at the beginning of the project that will last longer than one year. The North Carolina Farm School budget estimates assume that most of these items will last 3 to 15 years.

Raising Pens (Brooders)

The costs of building small pens to raise chicks to larger sizes can vary widely. For example, a farm that has electricity available in an existing barn or outbuilding may be able to economically modify that space into a suitable raising pen. A purchase cost of \$100 for a pen suitable for brooding 75 to 100 chicks is assigned in the North Carolina Farm School budgets.

Mobile Pens/Houses/Chicken Tractors

Costs for mobile pastured poultry pens vary depending on available existing facilities, construction techniques, building materials, and type of bird produced. Some egg producers have elevated a small, existing chicken house onto a wagon chassis and built ramps for chickens to enter the house to lay eggs. Mobile pens closer to the ground, framed with wood and covered with galvanized wire or fencing panels, are also popular. Other producers may choose to invest more in fencing than buildings, using an existing barn for laying and then allowing birds free range in nearby fields (paddocks).

A chicken tractor in the “Joel Salatin” style can cost as little as \$300 for materials; that cost is assumed for the meat chicken budget. Layer houses require more space and adequate room for each hen to roost and lay. A well-designed mobile unit for layers, home-built from a converted storage unit, has an upfront cost of \$2,500.

Fencing

Portable, electric fencing systems are most commonly used to contain laying hens and deter terrestrial predators. Used around the mobile layer unit, such fencing allows birds room to explore as the layer house is moved among fresh pastures. It is prudent to invest in the proper electric fencing equipment, like poultry netting matched with the proper fence posts. In the sample budget, electric poultry netting costs \$150 per 100 linear feet of netting, plus a small solar fence charger for \$75. These should be purchased before chickens are brought to the farm.

Miscellaneous Fixed Costs

Feeders, waterers, and feed scoops are critical upfront purchases. For meat birds and layers, expect to spend \$80 to \$130 for a flock size of 70. Cold storage is another fixed expense. Processed meat birds require freezer space. The sample budget assumes you will sell all the meat birds raised before the next birds are processed in eight weeks. One 15 cu. ft. freezer for this purpose will cost \$500.

Annualized Fixed Cost

All the start-up purchases translate to an annualized fixed cost. This cost includes insurance, depreciation, interest, and taxes on the items required to run your operation. For cost considerations, the annualized fixed cost ranges from \$300 for pastured meat birds to more than \$530 for egg layers. The higher cost for layers is directly related to the increased space needed for roosting and laying space in their house.

Variable Costs

Variable costs are those incurred during active production, including purchase of birds, feed and health, marketing, labor, and processing.

Birds

Chicks for meat production usually cost less per bird than female chicks or ducklings intended for layers. Costs of chicks will vary according to the quantity and type; larger quantities can usually be purchased at a discount.

Production costs for broilers and other meat birds usually start with the purchase of chicks. For layers, the North Carolina Farm School budgets combine the chick purchase price with the cost of feed and brooding needed to bring the bird to laying maturity. The cost of buying the chicks and the brooding feed needed to bring them to laying age is estimated at almost \$8.75 per bird. That cost is divided by two and included in the layer production budget in Table 5-2 at \$4.36 per bird. Because the budget is annual and layers lay for 24 months, the prorated cost of purchasing and raising is distributed over two years.

Feed and Health

Feed is usually the largest cost category for producing livestock and poultry. Feed cost for meat birds is \$1,000 annually, \$333 per turn (time in which birds are kept) of 90 birds going to processing, or \$3.72 per bird. This is the largest expense category for meat birds on pasture. The greatest expense category for laying hens also is feed.

Annual feed cost for 66 birds is \$2,060, representing half of the total expenses for an egg operation. Because layers are on the farm full time and consume more feed than meat birds, they incur twice the cost—\$20 annually compared to \$10 annually for meat birds.

Feed budgets for both meat birds and layers include the cost of grit required for proper digestion and utilization of feed.

Medication and diagnostic costs for layers raised in a pastured poultry system are \$1 per bird, according to the North Carolina Farm School budget estimates. When layers are being kept for two years and represent significant income during that period, owners are more likely to invest greater expense for their health care.

The meat chicken budget does not include costs for medication. Farmers invest instead in proper feed and preventive care. Meat birds are on the farm for just eight to nine weeks. In such a short window, major health problems are unlikely, provided growers are working to prevent disease on their farm.

Marketing

Pastured poultry marketing costs include packaging (egg cartons); processing (harvest and refrigeration or freezing); transport (vehicle, cooler/freezer, and fuel expenses); and market access (for example, farmers market membership and weekly fees).

Marketing expenses tend to be higher for pastured meat bird production than for pastured layers due to the expense of an inspected poultry processor. However, when all labor costs and risk management practices are accounted for, producers with access to a processor often find the added expense of processing and packaging meat birds to be worthwhile. Inspected processing also provides potential food safety and risk management benefits.

The North Carolina Farm School budgets estimate marketing cost as a basic percentage of gross. This cost assumes local direct-to-consumer sales for part or all of the farm's production. Marketing costs are highly variable across different farms. Though we are not sure of a farm's exact marketing costs, we want to acknowledge there is a cost to marketing poultry. For poultry, this percentage is assumed to be 8%, based on conversations with agents and growers across North Carolina. However, marketing cost included in the budget is to be adjusted based on each grower's specific marketing cost. For the meat and layer budgets, the variable cost is roughly \$500 per year.

Labor

Pastured poultry enterprises usually rely on labor from the farm owner or operator. Properly valuing this labor helps the farmer to evaluate the actual returns from pastured poultry enterprises. Both meat and egg enterprises require daily labor. The amount of time needed changes according to birds' growth stage. More attention may be needed when layer chicks are in the brooder, for example. Labor needs increase again when egg collection begins. Labor is not included in the budgets, and all returns are assumed to be for the owner's time, use of land, and use of capital.

Processing

Processing costs vary based on how producers choose to process birds. As of 2020, there were no options within North Carolina for processing pastured poultry birds in a USDA-inspected facility. There are two approaches to take when considering cost to process. The layer budget assumes a flat cost of \$5 per bird to process hens that are no longer laying. This is roughly the annualized cost estimated per bird (in 2020) if a producer were to purchase and utilize all the needed equipment for processing birds on the farm. This cost also assumes the farm is raising meat birds to process several times throughout the year.

The second approach for estimating processing cost is in the meat chicken budget, which assumes rented equipment that may be available called "mobile processing units." These units are generally rented at a flat rate of \$200 for two days, but they do not include supplemental necessities such as ice and LP gas; these items have been included at \$36 and \$22 in annual costs, respectively.

Capital Variable Cost

The variable costs of capital are the costs of using, maintaining, and repairing the capital assets. For small-scale pastured poultry operations, this cost is minimal compared to the daily expense of running the farm. The budget includes \$30 to \$40 for either layer or meat operations.

Developing Your Own Budgets

The budgets provided in this publication were developed for the North Carolina Farm School using 2019 costs and returns. The budgets represent an example of the kinds of costs and returns that a pastured poultry enterprise might generate. However, every farm situation is different. A farm may already have some supplies or buildings that may be used for production, for

example, and the costs of buildings and fences may vary depending on the enterprise.

These sample budgets are available at the North Carolina Farm School website (ncfarmschool.ces.ncsu.edu) as downloadable spreadsheet files into which producers can input their own costs to evaluate potential returns.

Summary

Pastured poultry enterprises are popular with beginning farmers. Layers and broilers are the two main types of poultry operations. Lower start-up costs, compared to other animal enterprises, make small-scale poultry a potentially attractive use of capital. Many additional resources are available from NC State Extension and other professional organizations.

Additional Resources

ATTRA Sustainable Agriculture Program

The online versions of the resources listed here were available free as of August 2019; the ATTRA website also offers additional pasture poultry publications at low cost.

- Poultry Basics Tipsheet
attra.ncat.org/attra-pub-summaries?pub=477
- Pastured Poultry: Egg Production
attra.ncat.org/attra-pub-summaries?pub=498
- Pastured-Raised Poultry Nutrition
attra.ncat.org/attra-pub-summaries?pub=333
- Pastured Poultry Nutrition and Forages
attra.ncat.org/attra-pub-summaries?pub=452
- Pastured Poultry: An HPI Case Study Booklet
attra.ncat.org/attra-pub-summaries?pub=227

A Small-Scale Agriculture Alternative: Poultry (Virginia Cooperative Extension)

www.pubs.ext.vt.edu/content/dam/pubs_ext_vt.edu/2902/2902-1099/2902-1099_pdf.pdf

Biosecurity Basics Tipsheet for Pastured Poultry (ATTRA Sustainable Agriculture Program)

attra.ncat.org/attra-pub-summaries?pub=610

Choosing the Best Poultry Breed for your Small Farm (University of Maryland Extension)

extension.umd.edu/resource/choosing-best-poultry-breed-your-small-farm-fs-987

Composting Dead Birds from Small and Backyard Flocks (University of Kentucky Extension)

poultry.extension.org/articles/poultry-management/composting-dead-birds-from-small-and-backyard-flocks

Economic and Demographic Factors Affecting the Propensity to Consume Specialty Eggs in the United States (Texas A&M University)

ageconsearch.umn.edu/record/266560/files/Branch%20and%20Dharmasena--US%20Specialty%20Eggs%20Market--SAEA%202018.pdf

Feeds and Feeding for Small-scale Egg-production Enterprises (Kentucky Cooperative Extension)

www2.ca.uky.edu/agcomm/pubs/ASC/ASC233/ASC233.pdf

How Much Will My Chickens Eat? (Kentucky Cooperative Extension)

www2.ca.uky.edu/agcomm/pubs/ASC/ASC191/ASC191.pdf

Introduction to Developing a Free-Range Poultry Enterprise (University of Maryland Extension)

extension.umd.edu/sites/extension.umd.edu/files/docs/locations/frederick_county/Ag%20Pubs%20A%20Supplement%20to%20Free%20Range%20Poultry.pdf

Management Requirements for Meat Bird Flocks (Virginia Cooperative Extension)

www.pubs.ext.vt.edu/content/dam/pubs_ext_vt.edu/2902/2902-1083/2902-1083_pdf.pdf

Molting and Other Causes of Feather Loss in Small Poultry Flocks (Kansas State University Agriculture Experiment Station and Cooperative Extension Service)

poultry.extension.org/articles/poultry-management/composting-dead-birds-from-small-and-backyard-flocks

Pastured Poultry Profile (Agricultural Marketing Resource Center)

www.agmrc.org/commodities-products/livestock/poultry/pastured-poultry-profile

Poultry Breeds for the Small Farm (University of Arkansas Cooperative Extension)

www.uaex.edu/publications/pdf/fsa-8012.pdf

Profitable Poultry: Raising Birds on Pasture (Sustainable Agriculture Research and Education)

www.sare.org/wp-content/uploads/Profitable-Poultry.pdf

Small and Backyard Poultry: Poultry Health (Poultry Extension website)
poultry.extension.org/articles/poultry-health

Small Flock Series: Brooding and Growing Chicks (University of Missouri Extension)
extension.missouri.edu/media/wysiwyg/Extensiondata/Pub/pdf/agguides/poultry/g08351.pdf

Small-Scale Egg Production (Organic and Non-Organic) (PennState Extension)
extension.psu.edu/small-scale-egg-production-organic-and-non-organic

Small-Scale Poultry Housing (Virginia Cooperative Extension)
www.pubs.ext.vt.edu/2902/2902-1092/2902-1092.html

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