



Pastured Pork for
Small Farms in
North Carolina

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This guide provides an overview of pastured pork production for small and beginning farmers in North Carolina, emphasizing planning considerations for a profitable pork enterprise. This publication is a starting reference for anyone interested in pastured pork production. Additional information is available via the internet resources presented throughout this publication, from local N.C. Cooperative Extension centers, and the North Carolina Farm School (ncfarmschool.ces.ncsu.edu).

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Introduction

Pigs are among the most popular meat animals raised by small and beginning farmers. Many different sizes and types of farms make for good pig production. With proper planning and management, small farmers can often adapt their farm's existing fields, woodlots, sheds, and other buildings for producing marketable pork.

North Carolina is second only to Iowa in total pork production in the U.S., where most pigs are raised in large commercial buildings for wholesale markets. But pigs may also be raised successfully in pastures and other outdoor settings, including woodlots, to produce pork to sell in direct market retail and related market channels. Direct marketing—the sale of farm products directly to the end consumer—is vital for profitable small-scale pork production. A successful pastured pork enterprise depends on consumers who are willing to pay a premium price for pork. The amount that consumers are willing to pay will vary by market and location.

In recent years, culinary experts have introduced new pork cuts in traditional U.S. and ethnic cuisines, featured the use of bacon and other cured meats, and introduced consumers to the concept of eating the “whole hog.”

This publication contains terminology about pastured pork; an overview of production systems and swine breed selection; insights about management, including care, health, nutrition, and husbandry; advice on processing and marketing; and sample budgets and economic estimates for production.

What is Pastured Pork?

Every business has its own vocabulary, including the business of raising pastured pork. Table 1 contains some terms applicable to pigs and pastured pork production.

Table 1. Basic Pig Terminology Applicable to Pastured Pork Production.

Term	Definition
barrow	Popular design for wooden pastured-pork shelters.
boar	Castrated male pig.
farrow	Raising pigs from birth to feeder pig size; the act of a sow giving birth.
farrow-to-finish	Raising pigs from birth to harvest (finish) size.
feeder pig	Weaned pig, usually about 50 pounds.
finish	To feed a pig to harvest (market) weight.
gilt	A female of any size that has not yet farrowed.
hoop house	A shelter, usually metal, or a metal frame covered by industrial-strength tarp. Pigs can be raised in a hoop house using a “deep bedding” system (with materials like straw or bedding hay) to minimize odors from decomposing manure. This deep bedding system is not common in North Carolina.
niche pork	Term used broadly in the pork industry to refer to pork with distinct characteristics like fat content and breed. Many pastured pigs fit within this definition.
organic pork	Pork harvested from pigs raised according to U.S. Department of Agriculture (USDA) National Organic Program guidelines.
pastured pork	Pork harvested from pigs raised with constant access to grass pasture or wooded lots.

Sources: NC State Extension's *Swine Exhibitors Project Guide* (content.ces.ncsu.edu/swine-exhibitors-project-guide-7-8-years-of-age)

PennState Extension's *Swine Production and Management Home Study Course* (extension.psu.edu/programs/courses/swine/basic-production/introduction-to-swine-production/vocabulary)

Pastured Pork Basics: Pork Production Systems and Breeds

Unlike conventional commercial production, in which pigs are confined to climate-controlled buildings, outdoor production systems provide the pigs with access to fenced pasture or woodlots. Pigs are rotated among pasture lots or fenced outdoor areas, with access to shelter in barns or other available buildings when necessary. Some pastured pork producers must maintain specific requirements for outdoor access to meet marketing requirements, such as organic certification. Other pastured pork producers adapt their

farm production system to satisfy their customers' stated preferences.

Many new pastured pork producers start by raising market pigs versus raising feeder pigs to harvest (market) weight. Producers generally use one of two systems: "feeder-to-finish," in which they purchase feeder pigs and finish them on pasture, and "farrow-to-finish," in which they raise pigs from birth to market weights. Each system has potential advantages and challenges for new farmers.

Site Selection

The type and location of the land intended for pasturing pigs are also important considerations.

Selecting a site for pastured pig production can present some challenges, especially when finishing pigs on the same pasture site from feeder to finishing size. Because pigs are active rooters, they can cause far greater disturbance to the ground than other livestock. In addition, manure from pastured pigs could have potentially adverse impacts on soil quality and on water quality, due to surface water runoff and nutrient leaching. Leaching is more likely where there is sandy soil or a high water table. A soil survey map and other resources from the USDA Natural Resources Conservation Service (NRCS) office (<https://www.nrcs.usda.gov/wps/portal/nrcs/site/nc/home/>) can help identify if leaching is an issue.

Avoid waterlogged conditions. Well-drained soils will help minimize erosion and mud. Large areas of highly erodible land (slopes of 5% or greater) should be avoided, if possible.

Pastured pigs can benefit from natural buffers from neighbors. In woodlot settings, it may be advantageous to design the pastured pig paddocks to include buffer strips of trees and other plants. It is also wise, from both site selection and disease management standpoints, to avoid establishing a pastured pork enterprise within 2 miles of other pig farms. Following are key considerations for site selection:

- Access to markets and feed resources.
- Size of the operation.
- Soil quality.
- Proximity to neighbors and their feelings toward pigs.
- Any environmentally sensitive areas nearby.
- Potential biosecurity risks from nearby hog operations.
- Proximity to water and other services (for example, electricity and roads).

Advantages and Disadvantages of Pastured Pork Production

Advantages to pastured pork production systems are lower start-up costs, compared to constructing dedicated buildings for farrowing. Producers farrowing pigs on pasture can also maintain their desired herd health standards and biosecurity from the time of farrowing until the pigs leave for market; there is less worry about pathogens or disease coming onto the farm through feeder pigs.

There are disadvantages of farrowing on pasture. Outdoor temperature extremes may limit the times for farrowing. Extreme temperatures could lead to higher mortality of baby pigs farrowed outside. Sows in some styles of farrowing huts may be more likely to lie down on baby pigs. Animal health is also different on pasture; for example, there is an increased potential for internal and external parasite pressure on pigs outdoors.

Based on production budget estimates developed for the North Carolina Farm School, a feeder-to-finish system is likely to have a greater chance of profitability on a small acreage than a farrow-to-finish system. Producers who start out with a feeder-to-finish system can incorporate changes over time, as they gain experience or discover new markets. Some producers, for example, have discovered ready markets for pigs lighter than traditional market weights for pig roasts and other special occasions. That type of market locally could make the farrow-to-finish enterprise more financially feasible.

Feeder-to-Finish and Farrow-to-Finish

Many producers start a pastured pork enterprise by purchasing feeder pigs (about 50 pounds) and feeding them until they reach market weight (about 250 pounds). This feeder-to-finish system has many benefits for the beginning pastured pork producer. This method reduces the health and mortality risks associated with farrowing and raising piglets. Buying feeder pigs enables a producer to avoid the costs, responsibility, and risks of caring for baby pigs, and managing the reproductive health of the sows and boars.

On the other hand, some producers and their customers may want pigs raised a certain way from birth, so they use the farrow-to-finish system. Pastured pork producers who raise their own feeder pigs can ensure certain production standards.

Swine Breeds and Purchasing Pigs

Table 2 provides a summary of major swine breeds grown in the U.S. and their characteristics. Not all pig

breeds grow in the same way. Some gain weight using less feed; others will produce a leaner carcass. Different breeds of pigs, and genetic variation within those breeds, can result in different carcass and meat characteristics.

Determining what the local market demands can guide the grower’s decision on what kind of pigs to purchase. Some customers may want large cuts of very lean pork. Other customers may want pork with more marbling — more intramuscular fat content. Still other customers may want pork from pigs fed a certain type of diet.

“Purebred” pigs are those that are pedigreed or certified to be a pure strain of an established breed of swine. Crossbred pigs are also frequently used in pastured pork systems. A crossbred pig has parentage of more than one pure breed; the production goal is to exploit favorable traits from each breed.

Crossbreeds used in commercial indoor operations may not be equally well suited for outdoors. When exploring parentage, choose crossbreeds that have been proven to thrive on pasture. They may have traits that make them more successful in open environments.

Many pastured pork producers are interested in heritage swine. Heritage swine are true genetic breeds that have a long history of being endangered or have recovered from endangered population status. Some heritage breeds

prove to be superior in pasture systems. Heritage breeds are more adaptable to outdoor production. Some people consider heritage breeds to have more flavorful cuts of meat, but it requires more time for them to reach market weight. Depending on time required to reach market, weight is of less concern. However, the availability of these breeds can be limited and thus potentially more expensive.

When deciding how much to pay for pigs, especially feeder pigs, beginning pastured pork producers should consider customer demand and how long it will take the animal to reach market weight.

Fencing, Shelter, Water, and Feeders

Assessing the farm’s current facilities and production system is key when deciding infrastructure needs. This section addresses the types of equipment used in a feeder-to-finish system.

Fencing

Rotation of pigs among fields (also called paddocks) is critical to maintain forage and soil health and to manage swine diseases. Electric fencing is the most common way to enclose and subdivide pastures for raising pigs.

A common fencing system for pigs raised on pasture or in woodlots is an established perimeter fence around

Table 2. Major Swine Breeds in the U.S.

Breed Category	Breed	Characteristics
Commercial White Breeds	Yorkshire	Often selected for maternal characteristics and large litter sizes. White breeds may sunburn in outdoor settings without shade.
	Landrace	
	Chester White	
	Large White	
Commercial Dark Breeds	Berkshire	Often superior growth rates; lean carcasses; feed efficiency. Dark breeds can get hotter in high temperatures. Duroc or reddish crossbred pigs sometimes preferred for pasture systems. Some genetic lines of these breeds may have more favorable maternal traits and other advantages in a pasture system.
	Duroc (reddish)	
	Hampshire (black with white belt)	
	Poland China	
	Spots	
Heritage Breeds	Gloucestershire Old Spots	Hardy breed; exceptionally flavored pork; good foragers.
	Hereford	Lean meat hog; well adapted to pasture production.
	Kunekune	Hardy; easy going; excellent forager; tend to root less.
	Large Black	Large, long-bodied black pig; hardy; even temperament.
	Tamworth	Good forager and rooter; does exceptionally well outdoors.
	Guinea	Compact, with adult weight of 150 to 200 pounds; known for excellent meat qualities.
	Red Wattles	Fast maturing; easy going; highly efficient foragers.

several smaller paddocks (subdivided fields) or lots. The perimeter fence may be an electric fence, a woven wire fence, or a combination of conventional and electric fencing.

A “pig proof” type of fence is imperative. Pigs are notorious rooters and able to escape from various types of enclosures. Pastured pork producers often install electrified wires inside woven wire or other fences to discourage rooting. Subdividing pasture with heavy-duty plastic poly fencing, similar to poultry netting, is common.

Shelter

Producers use a variety of shelters for pigs on pasture, such as modified existing barns or sheds. Shelters often may be made with materials available locally. Galvanized metal hoop-house style shelters are also popular. Shelters for pastured pigs must be weather-resistant and also able to withstand the abuse of heavy and curious pigs.

At a minimum, pigs will need some type of shelter for shade. However, shelters for shade must include good airflow. A pig will not want to find shade from the sun in an excessively warm, unventilated shelter. Because pigs have few sweat glands, they also need to have access to sprinklers or other ways to cool off during excessive heat. Some pastured pork producers will use shade cloth or other coverings to provide portable shade for pigs.

There are many different types of pork production facilities. Some producers in other parts of the U.S. use a hybrid production system with pasture farrowing with finishing pigs for market in buildings, giving the pigs outdoor access. Older, open-front buildings are options for finishing pigs. Use of such buildings depends on the owner’s preference and the preferences of pastured pork customers.

Farrowing shelters are necessary to keep pigs safe during the days after farrowing. Bedding and a barrier that keeps the piglets in the farrowing hut for a week to 10 days after farrowing are necessary. According to the Center for Environmental Farming Systems (CEFS), the farrowing hut should be insulated and provide at least 50 square feet of space for the sow and her pigs.

Water

Water is a vital nutrient for maintaining good swine health. Pigs always need access to clean drinking water. Pastured pigs also may need extra for cooling off during excessive heat.

Underground water lines are helpful, in that they can supply more than one drinking point per paddock. Automatic waterers provide constant fresh water to pigs on pasture. If a water line already exists to the field or pasture, adding a faucet or cattle waterer or investing in frost-free waterers may be advisable. Frost-free waterers are systems that will not freeze when temperatures dip below 32°F.

Hand watering, using troughs or other containers, may be feasible for very small numbers of swine. Maintenance can be time-intensive—troughs must be regularly refilled and kept clean to ensure swine health.

Feeders

With a few exceptions, pigs will self-feed without overeating. Pig feeders made of galvanized metal or other weather-resistant materials allow access to feed at all times. Feeders that can keep a large amount of feed dry should be available to pigs finishing on pasture. Feeders are rated based on size and the number of finishing pigs fed with a single feeder opening.

Some pastured pork operations will provide feed daily. This is frequently in farrowing operations in which sows in pastures have access to high-nutrition forages, like legumes, that require supplemental feeds. Avoid wasting feed, spoiling feed, and damaging pastures by not feeding on bare ground.

Placing hard-perforated platforms (big enough to have the whole animal’s body over it) under drinkers and feeders can help minimize muddy conditions that can also damage pasture.

This section was adapted from Outdoor Hog Production: Best Practices for Resource Conservation in the San Francisco Bay Area (cestanislaus.ucanr.edu/files/233215.pdf).

Pig Nutrition, Health, Care, and Husbandry

Pigs can feed on many different byproducts, including forages, but supplemental feeding is also necessary. A successful producer will carefully monitor and balance a pig’s diet to meet nutritional needs. Pastured systems offer both health benefits and challenges. Health concerns can arise during any given production season. Pasture management is also critical to successful pastured pig operations.

Pig Nutrition

Pigs on pasture may gain nutrition from foraging, but they also need balanced feeds to gain weight efficiently and stay healthy. Properly balancing protein and energy content in pig feed will ensure that the pigs will gain weight efficiently, helping minimize feeding costs.

A pig's diet requires special consideration of protein, which is composed of amino acids. A proper balance of amino acids is one of the most important aspects of swine nutrition. Pigs usually consume less feed per pound of gain when the feed contains the proper balance of amino acids. Lysine, methionine, threonine, and tryptophan are important amino acids in a finishing feed. For example, the percentage of lysine required for pigs to grow (less feed usage per pound of gain) decreases as pig weights increase.

The amount of feed pastured pigs eat will vary depending on pig maturity, breed, and the quality of pasture. Ideally, pigs purchased as 50-pound feeder pigs and marketed at 250 pounds eat an average of 3 to 4 pounds of feed per pound of gain. This means each pig will consume 750 to 1,000 pounds of feed from feeder to market size. Supplemental quality pasture forage could reduce this estimate. For breeding animals, sows on quality pasture often need about 2 pounds of feed per day, while bred gilts require about 3 pounds of feed. Lactating females have higher feed requirements, usually 2 to 3 pounds of feed per 100 pounds of body weight, or 6 to 8 pounds of feed per day for a 300-pound nursing sow with access to high-quality pasture.

Raising pigs with access to pasture can create variability in swine diets. Grass and forage in pastures contain variable nutritive value. High-protein forages like alfalfa and clover, for example, can contribute to pig nutrition needs.

Combining high-protein forages with grasses will create better pastures for pigs. Legume crops are one key source of high protein for pig diets. These legumes include alfalfa, clover (red, sweet, and ladino), and lespedeza. Perennial grasses contribute to plant diversity, soil stability, and soil health, which translates to pasture longevity.

Older hogs (larger than 250 pounds) typically gain the most nutritional benefits from foraging on pasture and in wooded areas. High-quality pastures are historically important for keeping sows. Pigs of feeder and finishing sizes (50 to 250 pounds) may get some nutrition from the pasture, but free access to a full-ration feed is important for growth and development of pasturing hogs headed to harvest.

Pigs are able to digest many types of feed. However, combinations of different feeds affect how the hog gains nutrition. Furthermore, as in humans, diet can also change the amount of fat accumulated within the pig's body. Exercise caution and consult a qualified swine nutritionist when considering novel or unusual feedstuffs as a major part of a swine diet. Producers should consider a swine's breed and genetics, which play a major role in a pig's response to varied diets.

The selected feeds must not only be economical, but also represent a balanced ration for the nutrient requirements of the pigs. Balanced nutrition also includes maintaining proper vitamin and mineral levels. Mineral supplementation, in particular, is often required in pasture production.

Table 3 is a balanced ration table with representative suggestions; pastured pigs will vary. Percentage requirements are for two important minerals, calcium (Ca) and phosphorus (P), and several important vitamins (A, D, E, and K). There are additional requirements, and these may be determined by consulting swine nutrition and feeding materials under Additional Resources.

Table 3. Balanced Ration Table with Suggestions for the Percent of Crude Protein and Percent of Total Lysine Contained in Swine Feed Rations.

Pig Size (lb)	% of Crude Protein	% of Total Lysine	Ca (%)	Total P (%)	Vit. A (iu)	Vit. D (iu)	Vit. E (iu)	Vit. K (mg)
50 – 80	17 – 18	0.9 – 1.05	0.6	0.23	1300	150	11	0.5
81 – 120	15 – 17	0.75 – 0.90	0.6	0.23	1300	150	11	0.5
121 – 200	13 – 15	0.65 – 0.80	0.5	0.15	1300	150	11	0.5
201 – harvest	12 – 13	0.55 – 0.75	0.5	0.15	1300	150	11	0.5

Sources: *Swine Care, Selection and Showmanship* (University of Missouri Extension)

extension.missouri.edu/publications/g2306

Animal Feeding and Nutrition (Jurgens et. al; Kendall Hunt Publishing)

Health

Extension educators and veterinary resources, as well as experienced pastured pork producers, are valuable resources for anticipating and addressing problems.

Establishing a farm relationship with a veterinarian is very important. Having an existing relationship with a veterinarian takes the guesswork out of whom to call in a health emergency. A local veterinarian may also help clients identify animal health risks unique to a particular geography or production setting.

Internal and External Parasites

The most frequent health challenge in pastured pig herds is internal parasites (worms). Parasites are vectors, or carriers, of specific swine diseases. Internal parasites can reduce weight gain, cause diarrhea and other gastrointestinal symptoms, result in poor animal appearance, and even affect carcass quality. Parasites that negatively affect pig health, such as roundworms and whipworms, can persist in pastures and woodlots.

Swine dewormers, often administered in feed or water, are widely available. Pastured pork producers often alternate different types of dewormers to control a broad spectrum of internal parasites.

Some production systems, like certified organic, may have limited options for dewormers and other swine medications. Producers should understand potential parasite pressure and the kinds of controls available for parasite treatment.

Because wild and domesticated animals are a source of internal parasites, proper fencing and other containment measures are especially important for managing the health of pastured pigs.

Rotating pastures is one of the best means of long-term management for internal parasites. NC State Extension recommendations for pastured pork production usually advocate a rotational plan to control parasites.

Pigs are also susceptible to external parasites. Lice and mites that cause scabies are some external parasites that can infect pigs raised outdoors. One of the best preventions for external parasites is to limit contact with any other infected pigs on the farm. Practicing basic biosecurity is a good parasite prevention tool, as it involves isolating new animals that come onto the farm before allowing them contact with other animals. Other biosecurity practices for pastured pork producers are

outlined in the APHIS publication *8 Essential Actions to Protect Pigs with Outdoor Access from Disease* (www.aphis.usda.gov/publications/animal_health/biosecurity-for-pigs-outdoor-access-infosheet.pdf).

Other Diseases

Diarrhea is one sign of pig disease. Some diseases are more prevalent in very young pigs. Diseases indicated by diarrhea in growing and finishing pigs include swine dysentery, proliferative ileitis, and salmonellosis. Another disease that may be of concern for pastured pork producers is erysipelas. Erysipelas is spread by infected spores harbored in the soil. Vaccinations can help manage erysipelas.

Temperature Management

Temperature extremes, especially heat, will affect the health of pastured pigs. For typical finishing pigs that are 150 pounds or heavier, heat stress starts when air temperatures reach 80°F. Providing access to water through sprinklers can help pigs keep cool. Shaded areas can also help pigs cope with heat; this is one reason why woodlots have been popular for pastured pork production in the South. Table 4 indicates the minimal amount of shade required for different sizes of pigs.

Table 4. Minimal Shade Required for Pastured Pigs

Animal Size	Minimum Shade
Less than 100 lb	4 sq. ft./pig
100 lb or more	6 sq. ft./pig
Sow	15 – 20 sq. ft./sow
Sow and litter	20 – 30 sq. ft./sow

Source: *Environmental Needs of the Pig*, Iowa Pork Industry Center (www.ipic.iastate.edu/publications/210.EnvironmentalPigNeeds.pdf)

Pasture Management

Rotating pigs among pastures is a good animal health practice. Pasture rotations also help control rooting damage, a significant farm management challenge for pastured pork production. Managing the pastures—maintaining good soil health and managing the forages growing there—is a crucial task.

Pasture Establishment

Just because a farm has an existing pasture does not mean the pasture is ready for hogs. Pigs generally need pastures rich in legumes to gain nutritional benefits. Existing pastures may not have adequate legume populations to provide the required nutrition for pigs. Furthermore, poorly managed pastures may be weedy or

lack the soil health or fertility needed to sustain forages beneficial to swine.

Many sources recommend periodically tilling and reseeding pastures. These activities can represent appropriate best practices for small farms with lower acreage. Even if the tillage and seeding have to be hired out, the expense of seeding an optimum forage mix may pay for itself in soil health improvements and pig nutrition benefits.

Some plants present in pastures and woodlots may be toxic to swine. New producers should survey the potential pastures for common North Carolina plants that are poisonous to swine.

Many grass-based livestock producers have a goal of reducing tillage and using no-till and other permaculture methods. These practices can be effective pasture management strategies, especially on farms with established and healthy pastures.

Annual Pastures

Pastured pork producers often add annual forages into the pasture mix. An annual forage is one that does not live beyond a single season. Pastured pork producers have used annual brassicas, particularly rape, as a high-protein annual pasture crop. Annual sudangrass, which thrives during hot weather, can provide forage for pigs when many other forages are dormant.

Beginning farmers may work with an Extension agent or other experienced professional to determine the right seeding rate and species mix for each farm and understand the basic techniques for establishing new pasture.

Stocking Rate

Maintaining the appropriate number of pigs for the land area will help keep pastures healthy and may even reduce the need for frequent reseeding and other pasture renovations.

When considering stocking rate, producers should assess the ability of the site to sustain ground cover, estimate nutrient load from urine and feces, and predict the size and development of the pigs that will be pastured.

The stocking rate will depend on the weight and size of pigs you are putting on pasture. Suggested stocking rates are eight to twelve head for gestating sows. An acre of healthy pasture could support six to eight sows with their litters of piglets.

A great resource to consider in stocking rate is *Conservation Practices in Outdoor Hog Production Systems: Findings and Recommendations from the Center for Environmental Farming Systems* (cefs.ncsu.edu/wp-content/uploads/stelprdb1075576.pdf?x47549). This publication explains nutrient load and ground cover with mature pigs that is applicable to farrow-to-feeder or feeder-to-finish operations.

To minimize potential crowding, new growers may wish to start with a lower stocking rate per acre. As the producer acquires more pasture management skills and knowledge, stocking rates may be increased and thus facilitate more profits.

For more details on pasture management, consult NC State Extension personnel or talk to experienced pastured pork producers.

Marketing and Processing Pastured Pork

Even with a sound production plan and outstanding animal husbandry practices, a pastured pork enterprise cannot be sustainable without a good market. This section describes important considerations for marketing and processing pastured pork.

Marketing

Costs of Production

Economists define *demand* as the amount that consumers are willing to pay for particular goods or services. Producers must gauge local demand for pastured pork. If customers will not pay more than the cost of raising and marketing the hogs, the enterprise will not succeed.

The only sure way to determine the production cost is to work through the budget estimate according to the production assumptions unique to each farm (Tables 6 and 7). A detailed outline of an enterprise budget is in the North Carolina Farm School budgets (ncfarmschool.ces.ncsu.edu/small-scale-budgets).

Small producers of pastured pork will incur a significantly higher cost of production than the large indoor pig farms that raise the pork sold by most food retailers. As a result, most pastured pork producers will need to either charge a higher retail price or capture a larger part of the “food dollar” (by selling directly to the customer, not resellers) or a combination of both. Direct market

channels are the various ways through which consumers receive products directly from farmers.

To help estimate revenues, you can break out the quantity and prices for different cuts from a market hog. Table 5 is a worksheet developed by Derek Washburn of NC State Extension to help pork producers calculate potential sales values of a typical market hog. An electronic version of small-scale budgets can be found at the North Carolina Farm School website (ncfarmschool.ces.ncsu.edu/small-scale-budgets).

Direct Market Channels

- Producers must understand the types of direct market channels and how they work. Market channels frequently used to sell pastured pork in North Carolina direct to consumers include:
 - Farmers markets
 - Community supported agriculture (CSA)
 - Direct delivery from the farm or processor
 - On-farm market or farm stand

Customers that typically rely on wholesale food brokers may also directly purchase local pork from farmers at a wholesale discount. These market channels include:

- Foodservice (chefs and restaurants)
- Grocery stores
- Specialty food retailers (including caterers and farmers market vendors)

Local Customers

Producers must identify local customers and their willingness to pay. Ask any successful farm entrepreneur, “Do you remember who your first customers were?” and the answer is often: “Family and friends.” Acquaintances

are often some of the first customers for direct farm marketers.

- Doing simple market research — asking potential customers questions about the products they are interested in — can significantly influence the success of your operation. Sample questions include:
 - Are you interested in buying cuts of pork or buying in bulk (like half a hog)?
 - Is it important to you that pigs have access to the outdoors?
 - Why are you willing to pay a premium for pastured pork?
 - Are you interested in cured pork products (for example, bacon or ham)?
 - Where would you like to be able to purchase pastured pork products?

Marketing Costs

Producers often underestimate the costs of marketing farm products. Marketing costs may include farmers market registration or membership fees, the market stall fee, and the costs of transporting meat to the market.

Marketing costs can also include business cards; logos and graphic design fees; and websites and other online advertising. Website hosting and design fees can range from a few dollars to a few thousand dollars, depending on the business needs. Many small farms choose to do their own website design and online marketing or use a modestly priced service. There are even web services focused on small farms. Before investing in marketing, consider visiting with other producers to find out what services have been worthwhile.

Table 5. Local Pork Sales Estimator, Return Per Hog Bone-In.

Cut	% of Total Weight	Lb per Cut	Price (\$)	Total (\$)
Hams (fresh)	20.0	28.0	8.50	2.38
Fresh picnic (shoulder)	9.3	13.0	8.50	110.50
Loin (tenderloin, chops, rib chops)	16.4	23.0	11.50	264.50
Boston butt	6.4	9.0	8.50	76.50
Bacon (fresh side)	16.4	23	9.50	218.50
Spare ribs	4.3	6.0	9.00	54.00
Trim	6.4	9.0	7.00	63.00
Back fat (lard)	16.4	23		
Jowl	2.1	3.0	7.00	21.00
Feet	2.1	3.0		

NOTE: The assumptions listed above of retail cuts yield varies due to (but not limited to) breed, fat-to-muscle ratio, cutting order, age, and length of time.

Processing

Harvesting and processing the pig into marketable cuts of meat are among the largest production costs for pastured pork producers. Curing meat may also be an additional processing expense. Two major factors for a producer's decisions on processing are regulations and availability of processors.

Processing Regulations

Pork processed for sale in North Carolina is legally certified in facilities that are inspected by the North Carolina Department of Agriculture & Consumer Services (NCDA&CS) or the USDA. Meat processed in state-inspected facilities can be sold only in North Carolina, while meat processed by a federally inspected facility may be sold across state lines.

Besides being processed at an inspected facility, meat sold in North Carolina must be packaged and labeled in accordance with state regulations. Packaging and labeling guidelines can be found at the NCDA&CS Meat and Poultry Inspection Division website (www.ncagr.gov/MeatPoultry/labels.htm).

Any farmer who receives, stores, transports, or sells state or federally inspected meat must be registered with the NCDA&CS as a meat and poultry handler. Instructions for how to register as a meat and poultry handler in North Carolina are found at the NCDA&CS Meat and Poultry Inspection Division website (www.ncagr.gov/MeatPoultry/meathandlers.htm).

Availability of Processors

Finding a processor to kill pigs raised on a small farm and cut and package the pork can be a challenge. There may be few processors nearby, depending on the farm's location. Another limitation may be a processor's willingness to harvest a small number of animals. To ensure efficient use of their facilities and labor, many processors require a minimum number of pigs to be processed in a single day.

The NCDA&CS Meat and Poultry Inspection Division maintains a directory of state-inspected and federally inspected plants that process pigs in North Carolina

(www.ncagr.gov/meatpoultry/index.htm). Locating a processor is only the first step in producing a viable, consumer-ready product. Conduct a survey of local meat processing options that investigates the costs of processing and the processor's experience. Some questions to ask prospective processors include:

- Do you serve clients that want to process pigs?
- How far in advance must I schedule processing?
- Do you require a minimum number of pigs to be processed at a time?
- What are your costs for processing?
- Do you offer value-added options (for example, curing) and what are those costs?
- May I visit your facility to see how animals are housed, handled, and killed? (This information may be important to you and your customers.)
- Can you provide names of other farmers who have had pigs processed at your plant?
- Are you willing to sit down with me and go over my cut sheet (specifications for how the pig is processed and packaged)?

Identification Required to Transport Swine

North Carolina state law requires that all live swine transported on public roadways have an official form of identification approved by the State Veterinarian. Failure to properly identify transported swine can result in substantial fines. For small producers, the North Carolina Department of Agriculture & Consumer Services (NCDA&CS) issues Brite ear tags to identify swine for transport. The NCDA&CS also issues official tattoos and ear notch numbers for swine transport. Other types of identification meeting the requirement are 840 series tags, PIN tags, and microchips. A swine producer must have a Premises Identification Number to be issued the required identification. More information is available at the NCFarmID website (www.ncagr.gov/vet/ncfarmid/faq.htm).

Production Budgets and Profitability for Pastured Pork Farming

How much will it cost to raise pigs on pasture? The answer will vary from farm to farm, depending on its existing utilities and fencing. This section summarizes the North Carolina Farm School pastured pork budget estimates for a feeder-to-finish operation. These budgets are available as downloadable spreadsheets at the North Carolina Farm School website (ncfarmschool.ces.ncsu.edu). The budgets include a set of realistic but general assumptions. Studying these budgets, and adapting them to the production assumptions for a specific farm, can help new farmers decide whether pastured pork production will likely be profitable. This discussion covers both fixed costs (capital investments) and capital variable (production) costs for an enterprise. The following budget explanation applies to Tables 6 and 7.

Capital Investment (Fixed Costs)

Capital investments, or fixed costs, are expenses needed for the enterprise that will not change with the quantity of production. For example, a fence for 1 acre will cost the same whether there are two pigs or twelve pigs. Since fixed costs are mostly start-up costs for capital equipment and infrastructure, they are capital expenses.

The North Carolina Farm School budgets assume that the new pastured pork producer is starting from scratch. Production assumed is for five pigs.

Though capital investments are one-time, upfront costs, you can allocate an annual cost to them spread over years of use — this is known as depreciation. The numbers under the budget's capital expense tab in the "NCFS Outdoor Hogs Feeder-to-Finish" worksheet include a total only for the depreciated expense. The following sections include the upfront cost, a final summary of those costs, and then a total annualized cost back to the farm incurred from the upfront expenses.

Water

The largest capital expense for pastured livestock is usually the cost of installing or sourcing water. The budget does not account for installation of water-delivery infrastructure; it is assumed you have access to water and a way to fill up troughs. Troughs are relatively inexpensive. The budget includes one water trough at a cost of \$100.

Fencing

Fencing is another significant cost. The North Carolina Farm School budgets assume a cost of \$1.00 to \$1.55 per linear foot for fencing and T-post alone. Additional associated costs include corners, gates, and fence chargers. Fencing for 1 acre is about \$950, not including labor cost for installation.

Feeders

A good-quality hog feeder needs to be large enough to supply all the pigs feeding. It also needs to be weatherproof so that moisture will not spoil feed. Spoiled feed can result in less weight gain and cause serious health problems. The budget assumes one \$250 feeder.

Shelter

Durable shelters can be purchased or made from materials available on the farm. A small mobile unit may be an option for the farmer finishing out a small number of feeder pigs. Durability and ventilation are very important when selecting a shelter. Follow guidelines for adequate square footage for different sizes of pigs.

The budget assumes \$250 dollars for an animal shelter large enough to provide shade and housing for five feeder pigs and equipped with an initial supply of bedding and straw.

Freezer

Freezers can be expensive, and the budget includes the cost for one basic 15 cu.ft. chest freezer at \$500. Five market weight hogs will produce 700 pounds of meat that must be sold immediately or stored. The assumption is that not all of the meat will be stored. The freezer holds 40 pounds of cut meat per cubic foot, so the example freezer has a 600-pound capacity.

Summary of Fixed Costs

Note: Though a quarter-ton truck is included in the budget as a farm vehicle for fixed cost, we assume someone getting started will already have a vehicle to use for the operation and not need to make this purchase upfront. In the budget, it is included as a portion of cost-use—meaning that though you already own it, you use it for the farm a portion of the time and so that needs to be considered.

The total estimated capital cost to establish a basic pasture and facilities to raise five pigs equals \$2,010. These overhead costs are incurred even if you do not make any sales.

If the operation remains running and these upfront, fixed-cost capital items distribute over their useful life,

including the truck, it translates roughly to an annualized \$650. This is not direct cash cost in the operation of the farm but rather the cost to pay the owner back for the listed upfront purchases.

There may be cost savings not represented in our example, of course. Having existing buildings and fencing (though they may need to be modified or upgraded) can reduce the capital cost.

Capital Variable Costs

Variable costs are costs that change with the quantity of production. For example, twelve pigs will eat much more feed than two pigs.

Pigs

The cost of the pigs is the largest variable cost. The cost assigned for the purchase of a feeder pig is \$75. Feeder pigs may range from \$1 to \$2 per pound, and sometimes more, depending on the source, breed, and weight.

Feed and Medication

Feed is the largest variable cost category when producing pastured pork. Feed costs will vary with current grain costs, feed rations (daily amount and type of food given), and the source of feed. Feed costs will also vary according to the rate of weight gain and feed efficiency — how much feed is consumed per pound of gain. Feed efficiency changes with temperature and other variables, including available forage.

The North Carolina Farm School pastured pork budget assumes a feed cost of \$267 per pig, based on five pigs finished in a pasture or woodlot environment. The figure is based on a high-quality complete feed with added supplement and minerals. Medication added another \$5 per head to the variable costs.

Bedding, Overseeding, and Animal Protection

A half ton of bedding straw under the mobile shelter where feeder pigs are at first confined will cost about \$25.

Overseeding pastures or woodlots in preparation for raising pigs is included at a cost of \$75 per acre.

Some producers use protection animals; the practice is highly variable depending on local predator pressure. As pigs gain weight and become larger, protection also becomes less important. No cost is included in the budget for protection animals, but the category is included for consideration.

Processing

Processing is the next greatest cost of pastured pork production after feed. Like feed costs, processing costs can vary by location and facility. Processing costs also vary according to the amount of value-added processing (for example, curing or smoking) provided.

Most processors separate the processing fees from the kill fee. The North Carolina Farm School budgets assume a kill fee of \$50 per hog and processing at \$1.20 per pound of cuts, for a total of \$178 per hog.

Marketing

Marketing local meat is expensive; the budget includes marketing cost as 10% of gross in addition to the cost of processing. Marketing cost also includes transporting animals to the processor at \$50 per head. Marketing expenses may differ based on your specific marketing channels and customer needs. Selling at a farmers market has costs such as membership and rental fees, paid labor to operate a sales booth, mileage cost, tables, chairs, signage, branding items, and coolers. Selling to restaurants has costs such as mileage and labor hours to stock restaurant storage systems. Selling wholesale may require stocking of grocery store shelves. Further, vendor discounts may be necessary to allow for product markup margins. Our budget assumes a general wholesale markdown of 20 percent. Total cost for marketing at 10 percent of gross revenue is \$531.

Electricity

Freezers holding the pork for sale require electricity, and so do fences. Since the budget includes solar fence chargers, only the electricity for a freezer is included. A 15 cu.ft. freezer uses about \$90 in electricity annually.

Seed/Pasture Maintenance

Allowance for pasture reseeding and renovation is in the pastured pork budget. A \$75 cost per acre for overseeding is estimated.

Labor Costs

Labor costs have not been included in our budget. As you are starting out, it is important to track how much labor is required and how you spend your time. Labor is highly variable on each farm. It may take a half day to get the pastures ready for pigs and set up shelter. Checking the pigs' condition daily and making sure water troughs are clean may take only 15 minutes. The budget assumes that someone hauls your pigs to market, but you may have to work hard to get them loaded if they are not willing to get on a trailer. Figure on one day to get pigs on the farm and settled and one day to get them off the farm (including making arrangements at the processor).

You might estimate 60 to 80 hours of total labor. With the cost and returns projected in the budget and 80 hours of labor, the owner would receive roughly the U.S. minimum wage, \$7.25 an hour as of 2020.

Table 6. General Hog Feeder-to-finish Assumptions.

Variable	Value
Purchased Hogs/Batch Size	5
Mortality Percentage	5.00%
Purchase Weight	50
Finishing Weight, Live Weight	250
Batches per Year	1
Percent Sold Retail	70%
% of Live Weight as Bone-in Cuts	56%
% of Live Weight as Carcass (hanging weight)	72%
Fenced Acreage	1
Total Feed Per Hog, lb	860.54
Feed Conversion ¹	3.44
Hanging Weight in lb, Carcass	180

¹Live weight of the animal divided by the amount of feed the animal consumes to get to its finish weight. It is a measure of efficiency of feed to final body weight.

Summary

Pastured pork has great appeal for small and beginning farmers. Pigs that are well cared for can produce a product desired by local consumers, and pigs raised in woodlots and on pasture can complement other farm production practices. Farmers should understand animal husbandry to increase the probability of producing quality pork. A plan for processing and marketing the pastured pork is essential. To ensure their farm's profitability, potential producers should develop a detailed cost estimate prior to beginning production and know the prices that customers will pay for pork.

Additional Resources

American Berkshire Association americanberkshire.com

Center for Environmental Farming Systems Alternative Swine Unit (NC State) cefs.ncsu.edu/field-research/alternative-swine-unit

Certified Pedigreed Swine breed information: Chester White, Poland China, Spots, and Hereford (Certified Pedigree Swine) cpsswine.com

Common Health Concerns and Diseases for Pastured Pigs (The Livestock Conservancy) livestockconservancy.org/index.php/heritage/internal/Common-Health-Concerns-and-Diseases-for-Pastured-Pigs

Deworming Suggestions for Pigs Raised in Dirt Lot Facilities (University of Florida IFAS Extension) ufdc.ufl.edu/IR00003757/00001

Feeding for Niche Swine Production (Pork Information Gateway) porkgateway.org/resource/feeding-for-niche-swine-production

Forages for Swine (University of Missouri Extension) extension2.missouri.edu/G2360

Guide to Marketing Channel Selection: How to Sell Through Wholesale and Direct Marketing Channels (Cornell Cooperative Extension) ecommons.cornell.edu/handle/1813/40260

Heritage Breed Associations List (The Livestock Conservancy) livestockconservancy.org/index.php/heritage/internal/pigs-rabbits-sheep-turkeys-international-organizations#Pigs

Major Commercial Swine Breeds (National Pork Board) www.pork.org/facts/pig-farming/major-swine-breeds

National Swine Nutrition Guide (Pork Information Gateway) porkgateway.org/wp-content/uploads/2015/07/national-swine-nutrition-guide-preface-acknowledgements-and-table-of-contents1.pdf (PDF, 998 KB)

Niche Production (Iowa Pork Industry Center) www.ipic.iastate.edu/niche.html

Outdoor Hog Production: Pastured Pig Production in California Oak Woodlands (Academia) www.academia.edu/35401734/Outdoor-Hog-Production-Pastured-Pig-Production-in-California-Oak-Woodlands-1

Profitable Pork: Strategies for Hog Producers (Sustainable Agriculture Research and Education) www.sare.org/Learning-Center/Bulletins/Profitable-Pork

Raising Small Groups of Pigs (PennState Extension) extension.psu.edu/raising-small-groups-of-pigs

Table 7. Outdoor Hogs Feeder-to-Finish Production Budget.

Budget Category	Budget Item	Unit	Quantity Per Batch	Cost	Per Batch	Per Hog	Total Annual
Gross Income	Hogs Sold, Retail (cuts)	Hogs Sold	3.30	\$7.47/lb	\$3,451.80	\$1,046.00	\$3,451.80
	Hogs Sold, Wholesale (live weight)	Hogs Sold	1.40	\$3.75/lb	\$1,312.50	\$937.50	\$1,312.50
	Total				\$4,764.30	\$1,013.68	\$4,764.30
Variable Costs	Purchase Piglets	per pig	5.00	\$75.00	\$375.00	\$79.79	\$375.00
	Complete Feed, Grower ¹	lb	4195	\$0.30	\$1,258.54	\$267.77	\$1,258.54
	Vaccination and Antibiotics ²	\$ per pig	4.70	\$5.00	\$23.50	\$5.00	\$23.50
	Bedding ³	tons bedding	0.50	\$50.00	\$25.00	\$5.32	\$25.00
	Overseeding	\$ / Acre	5.00	\$75.00	\$375.00	\$79.79	\$375.00
	Protection Animal	Annual Cost	0.00	\$200.00	\$0.00	\$0.00	\$0.00
	Electricity	monthly	12.00	\$7.50	\$90.00	\$19.15	\$90.00
	Kill Fee	cost/head	4.70	\$50.00	\$235.00	\$50.00	\$235.00
	Processing Cost ⁴	per lb/ cuts	700.00	\$1.20	\$840.00	\$178.72	\$840.00
	Marketing Cost	of gross	1.00	8%	\$381.14	\$81.09	\$381.14
	Capital Variable Cost	from cap. exp.	1.00		\$159.38	\$33.91	\$159.38
	Total Variable Cost				\$3,762.56	\$800.54	\$3,762.56
Returns Over Variable Cost							
					\$1,001.74	\$213.14	\$1,001.74
Fixed Costs	Capital Fixed Cost	from cap. exp.	1.00		\$226.66	\$47.72	\$226.66
Total Fixed Cost							
					\$226.66	\$47.72	\$226.66
Total Cost							
					\$3,989.21	\$848.26	\$3,989.21
Returns to Land, Capital, and Unpaid Labor							
					\$775.09	\$165.42	\$775.09
Break Even Bone-In Cuts \$/per lb							\$6.06
Break Even Carcass \$/per lb							\$4.71
Break Even Live Weight \$/per lb							\$3.39
Break Even lb per Hog							113.5

¹In this budget we have tied feed to body weight based on % of body weight consumed each day and daily gain; this can be changed based on the "Feed Estimator" tab.

²Biosecurity guidelines, as well as cost of managing disease in pigs, can be found at projects.ncsu.edu/project/swine_extension/publications/factsheets/818s.htm.

³Straw is included for young pigs newly purchased; they will need to be protected under shelter and then slowly introduced to the larger area.

⁴We assume processing cost is wrapped and packaged; it does not include specialty items, for example, sausage or bacon.

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.

Raising Woods-Grazed Pigs on New Farms (Michigan State University Extension) www.canr.msu.edu/news/raising-woods-grazed-pigs-on-new-farms

The Livestock Conservancy's Quick Reference Guide to Heritage Pigs livestockconservancy.org/images/uploads/docs/PigChart2020.pdf (PDF, 155 KB)

Swine Breeds Database (Oklahoma State University) afs.okstate.edu/breeds/swine

Tipsheet: Organic Pig Production (ATTRA) attra.ncat.org/attra-pub/download.php?id=530

Swine Nutrition Guide (NC State Extension) projects.ncsu.edu/project/swine_extension/nutrition/nutritionguide/default.htm

How to Choose a Meat Processor That's Right for You (video) (Center for Environmental Farming Systems) cefs.ncsu.edu/resources/how-to-choose-a-meat-processor-thats-right-for-you

Swine Production (PennState Extension) extension.psu.edu/swine-production

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