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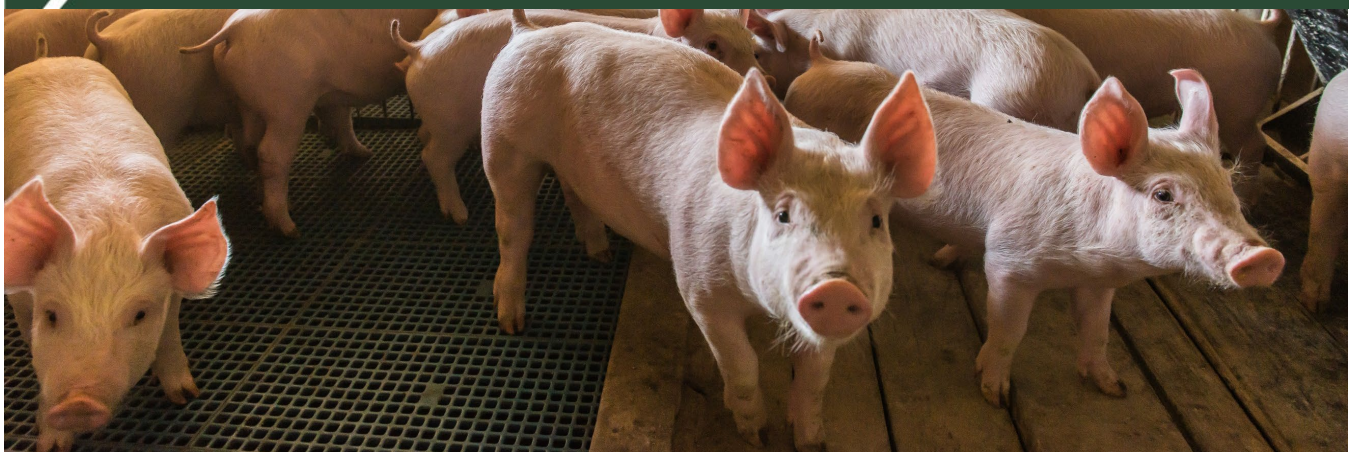

The DEMaND series helps individuals grow in their capacity to meet the complex needs and challenges of managing a successful farm business. Whether individuals represent the transition of generations, from an employee to owner, or are new to farming, the DEMaND series offers a fresh look at farm management.

Models for Raising Pigs for Pork

Independent Ownership vs. Contract Operations

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The purpose of this publication is to highlight the differences in cost and revenue structures for contract and independent finishers. For this publication, we assume some level of similarity in purpose for comparison, predominantly that individuals will be seeking to raise hogs from wean to market, and they focus on pork production. These assumptions will allow individuals considering this business model to evaluate their costs and responsibilities before moving forward with any chosen business model.

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Contract Finisher Model

Contract finishing is conducted through *cooperation* with a breeder. Contract finishers are producers who *source pigs* from a breeder and agree to raise those pigs for the breeder, *without owning the pigs*. Often, these contracts are facilitated through a large producer, commonly referred to as an *integrator*. Contracts with integrators can vary, however it is common in swine production that an integrator will support the contract finisher through the production process. A contract for finishing pigs might look like this:

Contractor owns/pays for:

- Daily care of pigs
- Facilities
- Housing (referred to as pig space)
- Manure management facility
- Daily care equipment (feeders, bins, waterers, penning, movement tools)
- Facility overhead (electricity, water, maintenance)

Integrator owns/pays for:

- Pigs
- Feed and Nutrition services
- Veterinary care
- Transportation of pigs to and from farm
- Technical support

Through a contract agreement, an individual enters into an agreement to take care of pigs for a fee. The integrator then owns those pigs and will choose where or when to sell them. This setup allows an individual producer to *share costs* of pig production with a larger owner of livestock (typically a breeder). Not all contracts are set up as above. However, this common contracting situation allows an individual to place upfront funding in infrastructure but reduces spending on items that frequently fluctuate in price, such as feed or hogs. Often these setups require that specific housing and facility criteria are also met. Which makes investigating contractual opportunities beneficial for producers seeking this type of pig production setup. Additionally, producers using a contract finishing situation may seek to keep manure rights. Accumulated manure can be sold as fertilizer or used for their own crop operations.

Independent Producer Model

For independent producers, the option to purchase feeder pigs from an auction is a common resource for raising finishing pigs. Purchasing pigs from an auction means that an independent producer *owns the pigs* from the start of production. Typically, the producer then also *owns all costs that go into growing the pig*. Depending on the facilities that a producer already owns, it may be costly to start up pig production using this method. However, if you already own adequate facilities for pigs, then the initial cost of pig production should be relatively low.

The initial costs of starting an independent feeder to finish operation might include the following:

- Purchasing pigs
- Daily care of pigs (labor costs)
- Facilities
- Housing
- Manure management facility
- Daily care equipment (feeders, bins, waterers, penning, movement tools)
- Facility overhead (electricity, water, maintenance)
- Feed
- Veterinary care
- Transportation of pigs to and from farm
- Technical support
- Ventilation management
- Nutrition services
- Logistics of pig purchases/sales

This allows the producer to select from a variety of breeders who may offer a similar live pig, but in smaller numbers. The greatest issue with this approach is the idea of mixing groups of pigs on your home farm. This scenario is likely to increase production costs. There is a higher chance that more measures for veterinary intervention will be needed when pigs from multiple sources are mixed and possible infections are shared.

Costs Across Models

Variable costs are expenses that can vary based on the farm's production volume. They can also vary depending on the type of production model.

Purchasing Pigs

Contract Finisher: no costs. Often paid on a flat rate based on available space. For example, $0.11/pig space with an assumed 2,400 pig spaces available for contract.

Independent Producer: cost of pigs at auction, which fluctuates daily based on numerous parameters. For example, assume a purchase of 100 feeder pigs at $80/hd. Total cost in purchase: **$8,000**[1].

Daily Pig Care

In both cases these are labor costs, and this is the time that you *'pay' yourself* or *your employees*. The approximate time to care for a *healthy group of pigs* will take around *1-2 hours per day*. This is true for large groups of pigs and small groups of pigs, as it is common to have a more labor intensive set up for small groups of pigs. Larger operations that partner with integrators tend to have more machinery in the barn like motorized feed distribution and automated ventilation. These efficiencies significantly reduce the labor needs on a large contract

farm. This is important to keep in mind that this time estimate is based on a herd that is healthy. Extra time will be needed for specific tasks to *keep pigs healthy, facilities functioning and turnover of facilities* for new groups of pigs.

If *a group of pigs becomes ill or stressed*, multiple hours per day will be needed to maintain animal and herd health. Depending on the illness, stressor or other challenge facing your pigs or facility, it *can take 6-16 hours per day for the duration of the stressor*. Of course, this is dependent on numerous factors, but time is a factor that should be considered when caring for pigs and budgeting a business to pay bills.

Feed and Water

As stated previously, contract facilities (2,400 pigs assumed) will not pay for feed as this is generally supplied through the integrator. The contractor's main goals are to make sure feed and water get to the pigs. Neglecting to do so will hurt your pigs and your margins on a group of pigs by reducing the total number of pigs that make a full value pig or by delaying the time they get to market.

For an independent producer (100 pigs assumed), the complexity of the chosen diet can affect the amount of feed you need, the overall cost of diet, and the efficiency of pig growth. A pig's diet is based on balancing nutritional needs and maximizing feed intake for timely delivery to market (Table 1).

Table 1: Estimated Feed Intake from the National Research Council, Nutrient Requirements of Swine (2012)

Intake Reference, NRC 2012		Body weight range, lbs.				
		25-56	56-112	112-168	168-224	224-302
NE content of the diet	(kcal/lb.)	5,403	5,544	5,544	5,544	5,544
Estimated feed disappearance	Lbs./d	2.10	3.49	4.91	5.81	6.47
Body weight gain	Lbs./d	1.29	1.67	1.98	2.02	1.91
Body protein deposition	Lbs./d	—	0.28	0.32	0.31	0.27
Estimated CP%, complete ration		18	15-16	13-16	12-13.5	10-12
Estimated feed intake	Lbs./hd./d	2.2	4.1	5.7	6.8	7.5

Table 2: Summary and definition of headings from Table 1

NE Content of the Diet (kcal/lb.):	Indicator of how much energy (in calories) is in each pound of the pig's food. It is measured in kilocalories per pound (kcal/lb.). The energy in the food stays about the same for all weight ranges, but it is slightly higher in the heavier pigs.
Estimated Feed Disappearance (Lbs./d):	Indicator of how much food the pig eats every day, in pounds. As pigs grow, they eat more food each day.
Body Weight Gain (Lbs./d):	Indicator of how much weight the pig gains each day. Younger pigs gain weight faster. However, as they get bigger, the rate of weight gain slows down.

Body Protein Deposition (Lbs./d):	Indicator of how much protein the pig is adding to its body each day. It starts being important when pigs are about 56 lbs. and slows down as they grow.
Estimated Crude Protein % (Complete Ration):	Indicator of how much protein is in the pig's food, measured as a percentage. Pigs need more protein when they are younger to help them grow. Protein percentage in their food is higher for smaller pigs and goes down as they grow.
Estimated Feed Intake (Lbs./hd./d):	Indicator of the total amount of food a pig eats each day, in pounds. Intake increases as the pig gets bigger, since they need more food to maintain their weight and support growth.

Table 1 is an example based on the National Research Council's Nutrient Requirements of Swine (2012). It provides insights into pig feeding and growth patterns at various stages of development. The *NE content of the diet* should remain consistent, with a slight increase for heavier pigs. As pigs grow, their *estimated feed disappearance* also increases. This is because they require more food to support their growing bodies. *Body weight gain* is highest in the younger pigs but gradually slows down as they get older and heavier. Similarly, *body protein deposition*, the amount of protein added daily to the body is more significant in the younger pigs and decreases as they grow. The *estimated crude protein percentage* in their food is highest when pigs are small and decrease as they get larger, reflecting their changing nutritional needs. Finally, the *estimated feed intake* indicates increased body weight, as larger pigs need more food to sustain their growth and health. For more information on these topics, review definitions in Table 2.

To calculate the cost of feed that you need for the size of your pig operation, first find the cost of your feed ingredients. If you are feeding ingredients that you have grown, plus complete nutrient additive, the cost of your feed is the mix of those ingredients. An example feed mix may look like: 60% corn, 30% soybean, 5% concentrate, and 5% mineral. The cost of your diet is the total mixed ration cost for one ton or 2000 lbs. Determining a cost per lb. of complete ration will allow you to decide the cost of feed for your pigs per day.

Based on this estimate, pigs will eat approximately 5.5 lbs. per day through the duration of the feeder to finish phase. For 100 pigs, this would be 550 lbs. of feed per day. If your feeder-to-finish term is 11 weeks (70 days), then you will have a total feed needed of 38,500 lbs. (19.3 tons) in total feed. Assuming your feed costs $0.06/lb., you can have a total feed cost over the duration of finishing at $2,310. This is an important cost to your pig operation, as pigs will grow faster on nutritionally balanced feed (Table 1). Growth rate, or speed at which pigs reach market weight, can drastically help your feed and facility costs, regardless of the size of your operation.

Veterinary Care

Veterinary care for the contract producer is typically covered by the integrator, however specifics would depend on the contract that is negotiated. Independent producers must cover this cost on their own. Veterinary costs cover vaccinations, preventative actions such as biosecurity and sanitation, worming medications and finally, veterinary calls, visits and treatments (commonly antibiotics). Veterinary visits increase if an illness does rear its ugly head in your herd. The best way to keep costs to a minimum in veterinary areas is to be sure to pay for and apply preventative measures. Preventative measures can include vaccinations for common disease threats in your area, boot washes and sanitizer, worming medication, and space for an isolation unit when bringing in new pigs.

A hidden cost of poorly applied veterinary care is mortality and morbidity. Typical morbidity and mortality rates are lower in smaller groups of pigs. This is primarily based on the ability of the producer to select the best pigs at purchasing. Also important is the ability of the producer to spend more time per day with each pig, if they choose to

do so. In the worst groups of pigs, as in often sick and needing exceptional amounts of veterinary care, death rates can easily be 25-30% or up to 100% mortality depending on the illness. However, even in the best groups of pigs, expect to have a mortality rate of up to 3% because of natural, non-disease related issues. A mortality rate of 0-2% is considered excellent in groups of pigs at 2,500, with 3-6% expected, as pigs placed are not necessarily the only best pigs from a group. In larger systems, efforts are made to reduce mortality and morbidity rates as the cost of veterinary care rises very quickly in large groups.

Transportation and Technical Support

Contract finishers are supported by the resources of the integrator. Typically, a company representative works with the producer to ensure pigs are being taken care of and possibly some facility maintenance. Representatives primarily help provide access to nutritionists, veterinarians, and transportation. Particularly the arrangement of shipping pigs to a harvest facility at marketing. Removal of pigs for marketing generally takes place in three waves, with 30% of pigs shipped first, about 30-50% of pigs shipped next, and a third shipment of pigs to empty the barn. The contractor is often responsible for gathering a team of people, paid or volunteer, to help load a truck with pigs at the time of shipment.

Independent producers will need to either cover the cost, labor or equipment needs for transporting pigs to the market. In a group of 100 pigs, it is assumed that not all 100 pigs will reach market weight at the same time. If a similar growth rate is observed in a large group, we can assume that 30% (or 30 pigs) will be ready to market at one time for a producer with 100 pigs. This will take a large trailer to transport to market; depending on the producer's available resources, it may require hiring a trailer and driver. Again, the producer will be responsible for gathering a team of people, paid or volunteer, to help load a truck with pigs at the time of shipment.

Housing & Facilities

Facilities are dependent on the size of the operation, existing buildings and land, existing ownership of buildings or land, and goals of your swine operation.

Contract Finisher: In this situation, integrators typically own multiple sows, resulting in large groups of pigs that are available for raising. Let us assume a feeder to finish facility for an integrator could be asked to raise 2,400 pigs. These pigs are sourced from a nursery, which is where the pigs are sent after weaning to gain some weight and obtain specialized daily care. Feeder pigs are typically sent to a finisher between 40-60 lbs., or 8-12 weeks of age.

Figure 1. Outdoor pig pen with shelter, water, and feeder. Photo by Casey Zangaro, Michigan State University Extension.

Independent Producer: In this situation, independent producers will typically purchase pigs from an auction, broker or private seller. Pigs purchased will need to be transported, which again is producer-supplied. Selection of the pigs can be improved in this instance as the producer has the option to choose each pig purchased. Sticking with the purchase model above, let us assume 100 pigs were purchased, and the best 100 were chosen from multiple facilities. All pigs were between 40-60 lbs. or 8-12 weeks of age.

Housing: Physical Space, Feed and Water

Housing for pigs needs to consider how much physical, feed access and water access space each individual pig needs in a day (Figure 1). Physical space for housing requirements should also consider how heat generated by pigs will be utilized or removed via airflow from the barn. Finally, modern pig housing very often considers the

space taken up by technology or design that aids management. Design management can often include how manure is handled.

With many aspects to consider in housing for swine, having a thorough understanding of needs in a pig barn before building or retrofitting a facility is key to properly housing pigs. Before starting a discussion around housing needs and construction or remodeling, it is recommended you review the following article on stocking density: https://porkgateway.org/resource/space-allocation-decisions-for-nursery-and-grow-finish-facilities/. The content of the article will aid in figuring out how much space you need to house your pigs, based on pig and group size.

Housing: Construction Costs

Contract Finisher: As mentioned above, the contractor is responsible for the costs of the facilities. Estimated average costs for a 2,400 head facility may be over $700,000. Costs may include construction, excavation, water, electricity hookup and permitting. In addition, there are costs for feeding equipment, such as feeder, nipple waterer, carts and scoops. To properly estimate costs and build a facility, integrators may ask you to hire a specific agricultural construction company to do the work to the standards of the integrator. That company can provide the best estimates on final costs, but you should plan for a financial loan of considerable size and a building that will last 20-30 years.

Independent Producer: Independent producers very often already have a barn on their property that can be retrofitted to support pigs. Referring to our assumptions from earlier, an independent operator often targets commodity hog production and not a specialty market that requires pasture access or specialized housing. According to Lynn Kime of Penn State University (https://extension.psu.edu/swine-production), it will cost an independent producer between $10,000 and $20,000 to retrofit an existing barn. It is expected with fewer pigs and existing facilities that independent producers can expect a lower start up facilities cost. If an independent producer wants to rear larger groups of pigs, build a brand-new facility, or incorporate technology, then they can expect a startup cost similar to a contract operator. Again, consulting with an agricultural construction company will provide the most accurate estimate.

Housing: Manure Management

Manure management can be a large or a small cost, depending on your building setup. With large groups of pigs typically raised by a contractor, massive amounts of manure will be generated. Daily, even hourly, management of manure is necessary in a group of 2,400 pigs, which is why facilities are designed specifically for larger number of pigs. In specifically designed facilities, manure can be moved away from the pigs in a readily, nearly automatic, fashion. Rapid removal of manure in a contract facility is commonly managed by slats in the floor that allow manure to drop into a storage vat. These vats are then drained, commonly through pumping into hauling equipment, and distribution of manure onto crop fields as fertilizer.

Figure 2. Outdoor mobile pen with straw bedding. Photo by Casey Zangaro, Michigan State University Extension.

Manure, however, may be a money-making endeavor, based on the contract that is negotiated with the integrator. If a contractor owns generated manure, then the situation is similar to an independent producer. Manure then may be sold to crop producers for fertilizer. Be sure to consider the cost of equipment needed to haul such great amounts of manure. If a contractor does not have the rights to manure, then the integrator will oversee removal and any income gain from manure.

Independent producers with smaller numbers (100 pigs) will typically use facilities that were not specifically designed for pigs. The lack of specific design affects how manure is managed. In these cases, it is often necessary to use bedding to keep livestock dry and to insulate from the heat conduction of the flooring/ground (Figure 2). The cost of bedding (straw, corn fodder, or other) should be considered as well as the cost of removal from the barn. Added costs may also exist for disposal, composting, or application of manure as fertilizer.

It is recommended that producers interested in raising pigs should have some knowledge of manure management. A great starting article can be found here: https://extension.psu.edu/programs/nutrient-management/manure

Housing: Facility Overhead and Daily Care Equipment

Facility maintenance, daily tools (panels, carts, syringes, refrigerator, maintenance tools), taxes or rent, electricity, water (if you pay for it), and many other factors play into care of your pigs and all are facility dependent. If you are raising a large group of pigs on a contract, then your facility will likely be highly automated and mechanized to help effectively care for your pigs. Many of these facilities also have office equipment, computers, showers, washer/dryers, chutes for upkeep, large bins, mechanized feed distribution and mechanized ventilation. *These are all costs to the producer as they do not go with the pigs at the end of a turn.* Many of the items listed (and more) can be included in upfront costs to get started. However, other equipment may need to be replaced with new groups of pigs or as needed when broken. In addition, the use of mechanized equipment requires maintenance to be performed on a regular basis to keep them working. If these automated systems go down, it is imperative that they are fixed as soon as possible. Out of feed events or malfunctioning ventilation systems stress pigs, or worse, even in a few short hours.

Smaller groups of pigs cared for by an independent producer will also need maintenance. However, a general reduction in mechanized systems allows for different types of maintenance and sometimes less sensitive to emergency malfunctions.

The Payout

The final income from these different sections varies. While the contractor shares costs with the integrator, they are still likely to place a large portion of upfront capital into the facility and will often be paid only on pig space. The number of pig spaces is determined when pigs are placed as feeders. However, the poor performance of a turn that could be linked back to poor daily pig care may cost the contractor if loss of pigs is too high. Regardless, assuming the turn is healthy, the pay for growing a group of 2,400 pigs from feeder to market is often $0.11/pig space/day. Assuming pigs reach market weight in 70 days, this final payout would look like $18,480 for one group of pigs, or $7.70 per pig.

For the independent producer, they have shouldered the cost of producing pigs over this turn. Provided that a fair market value (assumed $80/CWT) is paid for all pigs sold, and pigs are raised to 280lbs, the return on a group of 100 pigs would look like $14,400, or $114.00 per pig when the initial purchase price is deducted from estimated revenue.

In both situations, the input costs will determine profits and management of pigs will influence those input costs. Remember that the contract operation does not pay a significant portion of variable costs, even though they are paying for the facilities. While the independent operator is being paid for the sale of the whole pig, they are also paying all the costs of rearing that pig to the market.

We hope this overview and guide is useful to individuals seeking to enter into pig production. It is common for new individuals to believe that they must start with their own herd, however there are advantages and disadvantages in independent ownership. Similarly, while there are advantages and disadvantages in contract finishing, this is another option that individuals do not often consider when looking to start their journey in pig production.

Reference

[1] See Feeder Pig Report: USDA NW_LS255 Report on https://www.ams.usda.gov/mnreports/nw_ls255.txt

Resources

Livestock Budget Estimator for Swine Independent Producers, Michigan State University
https://www.canr.msu.edu/resources/livestock-budget-estimator-swine-simple
A budget planning and decision tool for swine producers. Includes calculators for pig space and feeder needs.

Livestock Budget Estimator for Swine Contract Finishers, Michigan State University
https://www.canr.msu.edu/resources/livestock-budget-estimator-swine-contract-grower-simple
A budget planning and decision tool for swine producers. Includes calculators for pig space and feeder needs.

Swine Education and Research, Penn State University
https://animalscience.psu.edu/about/facilities/swine
The swine farm keeps a herd of 65 sows and produces over 1,400 pigs a year to support teaching, extension, research, and the local community with market hogs and pork.

Swine Nutrition Resources, Kansas State University
https://www.asi.k-state.edu/extension/swine/
The Kansas State University Swine Extension program takes practical swine nutrition research and works with producers to facilitate rapid adoption of technology by the industry. The program also works with producers in environmental management of swine facilities.