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Organic Pork Production: A Two-litter Pasture Farrow-to-Finish Budget

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Abstract
The production of organic pigs and its profit potential depend on many factors. The main factors are the amount of feed required and price of feed. The amount of feed required is dependent on the genetics, management, and the health of pigs. Under organic regulations, pigs must be raised without synthetic parasite control and will probably develop parasites. This will slow the rate of gain, and increase required feed; thereby lowering feed efficiency. The price of organic feeds is higher than conventional feeds. Based on current organic feed prices and feed efficiency of approximately 4 lb feed/gain, the breakeven cost of production was calculated to be $55/cwt live.

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Summary

The production of organic pigs and its profit potential depend on many factors. The main factors are the amount of feed required and price of feed. The amount of feed required is dependent on the genetics, management, and the health of pigs. Under organic regulations, pigs must be raised without synthetic parasite control and will probably develop parasites. This will slow the rate of gain, and increase required feed; thereby lowering feed efficiency. The price of organic feeds is higher than conventional feeds. Based on current organic feed prices and feed efficiency of approximately 4 lb feed/gain, the breakeven cost of production was calculated to be $55/cwt live.

Introduction

During the 1990s more sophisticated specialty food niche markets have developed, particularly for organic foods. There is a rapidly growing demand for organic food, 20% growth annually (5). There has been a small market for organic meat in the United States that had been dampened by the fact that the USDA meat labeling regulations did not allow an organic label. To gain the full value of their product, farmers who wished to market organic livestock and meats had to go through export channels to reach organic markets in Japan and Europe. This situation changed with the introduction of the new government organic standards in 1999. The USDA now allows a label for organic meat. This recent development has prompted several packing plants and organic cooperatives to begin offering markets for organic meat, including organic pork. Currently, there are many producers evaluating economically viable models of pork production that sustain small-to moderate-sized family farming enterprises, including organic pork production. There is, however, a lack of information on potential returns and production costs for organic pork. This report outlines the management practices for farrow-to-finish swine production, herd health, and access to organic feeds to determine the cost of producing organic pork. A pasture system is used as the type of production system.

Production System

The production system is developed using a breeding herd of 50 sows farrowed twice per year in a pasture. Artificial insemination is used. Farrowing takes place in outdoor floorless huts. The producer grinds feed on the farm. Pigs are finished to approximately 250 lb.

Outdoor production requires more land space than traditional semi- or total confinement systems. To minimize land costs, the sows gestate and farrow, and the pigs are finished on marginal land that is not well suited for row crop production.

Management

Breeding and reproduction. The sows farrow in April and October. The farrowing schedule allows the producer the advantage of having two groups of pigs separated through the year. Many large confinement facilities follow all-in/all-out by building or site to provide pig separation. This outdoor organic system is an all-in/all-out system through time. Artificial insemination improves biosecurity by eliminating the disease risk of bringing new boars to the farm. This schedule also reduces fertility problems associated with seasons by avoiding the poorer breeding and conception coefficients during hot months of July and August. Also, farrowing twice per year instead of continuous farrowing simplifies pig flow and land use. Sows that farrow in early April will have their pigs weaned in May. The pigs are later moved to pasture for finishing. In October, the sows farrow again. By the time the April pigs reach market weight, the fall-born pigs are ready to go to the finishing area. If continuous farrowing or multiple farrowing times were implemented, the amount of land required would increase. Another advantage is the number of pigs marketed in a specific time frame. With 50 sows, multiple or continuous farrowing would mean small numbers of pigs marketed at any one time and an increase in marketing costs.

This system also can be integrated well with a row crop production system. For some, it may be necessary to produce their own organic corn and soybeans to guarantee that feed inputs are organically grown. Organic livestock production enhances and adds value to organic grain production within the farm.

Gestation. Gestating sows are on pasture in the summer. In late fall-winter, after the fall pigs have been weaned, the sows are allowed into cornfields to glean waste corn. An electric fence can be used to partition the pasture/cornfields into several paddocks. Sows graze an area, and then are moved to the next. This also helps distribute the gleaned corn through the winter. Feed requirements are reduced during the time sows glean waste

corn. It is assumed that gestating sows need 5 lb of feed per day. This report assumes that the sows will glean 2.5 lb of corn per day from the cornfield and 2.5 lb is needed as supplement. In practice, however, 3 lb will be supplemented per day. In cold weather, hogs need more energy for maintenance and the sows may not find enough waste corn every day. The daily amount can be changed depending on sow condition.

Farrowing and lactation. The management is similar to conventional outdoor farrowing systems with a few differences. Teeth are clipped and the pigs are given iron, either by injection or orally. Clearance for injectable iron for organic certification is unclear, however. Some pasture producers allow pigs to get iron from the soil. Pigs produced to meet organic standards cannot have their tails clipped. The lactation period is 5 weeks or 35 days to allow the pigs to grow as much as possible before weaning. This extended lactation time requires that sows must be in good body condition. Moreover, sows must have good lactation and mothering ability. For this report, a Hampshire or Duroc/Landrace cross is assumed for sows. The Landrace is known for lactation and mothering ability, and colored breeds like Hampshire or Duroc are known for durability in outdoor conditions. Sow feeding is discussed below. For the terminal side, Berkshire semen is used. The existing organic markets demand high meat quality. Meat from Berkshire-sired pigs exhibits higher pH, darker color, more intermuscular fat, and better water holding capacity than other pork.

This report assumes that sows are used for three parities with replacement gilts purchased. To maintain high biosecurity, a producer could raise their own replacement gilts, however. A simple isolation unit is required to isolate new breeding stock for 30–60 days prior to introduction to the herd.

Finishing. Following weaning, the pigs are placed on pasture that will consist of a mixture of cool-season grasses. These forages are assumed to provide no nutritional value to the pigs. All that is necessary is to maintain ground cover, so soil erosion and mud holes do not develop. This can be accomplished with an established sod. Rings in pig's snouts can be used to deter rooting.

Feeding

The weather variability and dynamic environment of outdoor production affect pig performance. This challenge is further compounded by organic regulations. According to these regulations, no synthetic growth hormones or promotants may be used. The feed must be 100% certified organic. This presents several challenges.

The main challenge is finding a protein source for the pigs. Currently, there is often not a reliable source for organic soybean meal. It may develop in the future as organic markets develop. Without this protein source, the producer must consider on-farm protein supplements.

On-farm protein sources used in this report are whole extruded or roasted soybean splits, oats, and high-quality alfalfa hay. Raw soybeans must be heated for use in pig feeds. This is done by extrusion or roasting, which costs about $1/bu and is included in the soybean price in the budgets. Organic food-grade tofu soybeans are a high-energy feed containing at least 42% crude protein and 6% fat. Oats are a highly palatable grain, high in fiber, low in energy, and contain 12% crude protein. Alfalfa hay is an excellent source of calcium and vitamin A, high in fiber and contains at least 17% crude protein.

The price of organic feedstuffs is higher than conventional feedstuffs. Organic soybeans are often four times the price of conventional soybeans. To lower the cost of feed, soybean splits can be used. These split soybeans can be obtained for about half the price of whole organic soybeans.

As the production of organic soybeans increases in the Midwest, the price may drop. Similarly, as organic meat markets develop the demand for organic feedstuffs will increase causing further price increases. The value of hay used in this report is the same as conventional hay. As organic meat markets develop, a premium for organic hay also may develop. In the short run, there may be increased price volatility. However, as the market develops production will adjust to reflect profit potential and market conditions.

Pig diets. Pig diets are divided into three phases. From weaning to 70 lb, the pigs are fed a nursery diet (21% CP) of soybeans (42% CP), corn (8% CP), and oats (12% CP). Small pigs do not use high fiber feedstuffs well. Therefore, no alfalfa (17% CP) and only a small amount of oats are used. As the pigs grow, they can effectively use more fibrous feedstuffs. Thus, a small amount of alfalfa is included along with corn, soybeans, and oats in the grower diet (17.8% CP) from 70–150 lb. In the finishing phase (150–250 lb) more alfalfa is added to the diet (14.5% CP). The ingredients and prices are shown in Table 1. The diets are shown in Table 2.

The budgets are based on very conservative feed efficiencies of 3, 4, and 5 lb of feed/lb liveweight gain for the three phases of production—nursery, grower, and finisher, respectively. The amount of feed was increased because of the effect of outdoor production (+.2 F/G) (2), parasite infestation (+.4 F/G) (7), no subtherapeutic antibiotics in feed (+.1 F/G) (1,6), and pig mortality, disease, and older weaning ages (+.3 F/G) (3). These are estimates and were conservatively assumed to be additive. Better feed efficiencies will result in lower feed costs. Also organically produced pigs may be slightly older at market because of a slower growth rate.

Sow diets. To maintain the body condition of the sows during lactation, a diet of corn, oats, and soybeans is fed ad libitum. During the summer, when the sows are on pasture, they will be fed 5 lb/day of a diet of corn, oats, soybeans, and alfalfa. The amount of soybeans is kept to a minimum, and alfalfa is increased for sows. During the winter the soybeans and corn are removed from the diet and the sows are fed 3 lb/day. Sow diets are shown in Table 2.

Herd Health

Herd health is critical for successful pork production. In organic pork production, the restrictions on medications magnify this challenge. Effectively managing herd health can be a key to successful production. Disease risks may be greater due to limited choices. Efforts must be made to keep pigs healthy and minimize pig stress. A good biosecurity program can dramatically lower disease risk. The operation should be isolated and restrict visitors. With artificial insemination, diseases brought in by the boar will not occur. Disease risk could be further reduced by buying maternal semen and retaining gilts for breeding rather than purchasing gilts. With two farrowings per year, pigs of different age groups are not commingled. This represents a type of all in/all out management that lowers the risk of disease transmission between age groups.

Because sows are not sold to organic markets, they can be treated with medications until the third trimester of pregnancy. Sows receive standard vaccines, and ivermectin, which is an injectable internal and external parasite control agent.

Parasites and other challenges. When pigs are placed on pasture, parasites become a risk because soil usually contains worm eggs. Most producers use a dewormer to control parasites. Organic regulations stipulate that no chemical medications, including dewormers, can be used. This presents a challenge to pig production. Producers should investigate organic products that help control parasites. Untreated pigs will probably develop parasites as they grow. Keeping the sows parasite-free helps minimize the risk. Parasites of chief concern are internal worms and mange. Due to these infestations, feed efficiency will be poorer.

Production Costs and Returns

Costs. Costs are shown in Table 3. The variable costs in this budget are feed, health, breeding, bedding, repairs, marketing, fuel, utilities, and replacement gilt costs. They are calculated on a per-litter basis. The health costs are the costs of vaccines and wormers for the sows. The breeding costs are two doses of semen at $6 each plus $1 for supplies. Bedding is calculated at one bale of straw per pig at $2 per bale. Repair costs are calculated as 10% of the fixed costs. Marketing and fuel and utility costs are standard and taken from Larson et al. (4). Interest on variable costs is 9% annually with an interest charge for four months. The total variable costs per litter are $980.46 (Table 3).

The costs to produce organic pigs in a pasture farrowing situation is higher than conventional production. The primary cost is feed. Feed accounts for nearly 85% of the total costs. This is due to the increased cost of organic feeds, poorer feed efficiency and low fixed costs. Producers should try to improve feed efficiency.

The fixed costs used in this budget are from Larson et al. (4). The cost of land is calculated by taking the estimated rent value of marginal land ($90/acre). The system uses .3 acre per litter. Interest on fixed costs is 9% annual interest rate for 6 months. The total fixed cost per litter is $43.61. (Table 3). Thus the total costs of production are $1,024.07 per litter.

Income. Income is shown in Table 4. Income is generated by selling cull sows and market hogs. The sows are culled after three parities. Sow price of $20/cwt is used. Cull sows weigh 400 lb. The cull sow value, allotted to each litter, is $26.40. Six of 7.5 pigs in the litter are sold to organic markets. The price is $70/cwt, and the market weight is 250 lb generating $1,050 per litter. The remaining 1.5 pigs/litter (20%) are lightweights. This is due to a number of factors, but the main cause is parasites. After the organic hogs are sold, the remaining pigs are wormed and marketed at 240 lb. These hogs will be sold to traditional markets for $25/cwt. This sale generates $90 per litter. The total income per litter is $1,166.40.

Profitability. Returns are shown in Table 4. The system generates $186 per litter of income over variable costs. Labor has been compiled with management. The return to labor and management on a per litter basis is $142/litter or $18.97 per pig. Profitability will improve if the number of light pigs sold as conventional pigs is reduced. Selling pigs to a conventional market is a major loss when feeding organic diets.

If the income and costs are allocated on a per-pig basis, the pigs marketed organically are very profitable. An organic pig generates $175. Production costs are $137 per pig. The return per organic pig is $38. However, the operation loses money on the lights sold on the conventional market, which decreases the profit per pig to $19.

The breakeven cost of producing organic pigs for the assumptions in this budget is about $55/cwt (Table 3). If organic feed prices decreased to scenario 1 (Table 5), the breakeven cost of production decreases to about $44/cwt., a 25% reduction (Table 5). If feed efficiency improves to secnario B and feed prices are unchanged, the breakeven cost of production decreases to about $51/cwt., an 8% reduction (Table 5). If both changes occur, lower feed prices and better feed efficiency, the breakeven is $41/cwt, a 30% reduction. The cost of production is very sensitive to feed price and feed efficiency, particularly feed price.

Conclusion

Based on the stated organic feed prices and assumptions, the breakeven cost of producing organic pigs in a pasture system is $55/cwt live. Organic pork production presents

some unique challenges. The higher price of organic feedstuffs, marketing, on-farm protein sources, pig health, and parasite control are major factors affecting pig performance and the breakeven cost of production on organic pork farms. However, based on the projections of this budget, a producer will be rewarded for managing these challenges.

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Table 1. Organic feed costs for organic pork production.

Ingredient	Price	$ per lb
Soybean splits, extruded	$ 10.00/bu	0.17
Corn	$4.00/bu	0.07
Oats	$3.00/bu	0.09
Alfalfa	$125.00/ton	0.06
Calcium carbonate	$.10/lb	0.10
Dical	$.20/lb	0.20
Salt	$.15/lb	0.15
Mineral/vit	$.50/lb	0.50

Table 2. Organic diets and costs for organic pork production.

Nursery Diet 21% CP[1,2]	Amount (lb)	Cost	
Soybeans	408.9	68.15	
Corn	442.0	31.57	
Oats	221.0	20.72	
Alfalfa	0.0	-0-	
Calcium carbonate	9.9	0.99	
Dical	13.3	2.66	
Salt	5.5	0.83	
Mineral/vit	5.5	2.75	
Total	1,106.10	127.67	per litter

[1]Pigs under 30 lb are fed 10 lb of nursing diet as creep feed.
[2] Fed 30–70 lb 40 lb gain F/G = 3, 8.5 pigs/litter.

Grower Diet 17.8% CP[2]	Amount (lb)	Cost	
Soybeans	640.0	106.67	
Corn	1,100.8	91.43	
Oats	640.0	60.00	
Alfalfa	128.0	8.00	
Calcium carbonate	20.5	2.05	
Dical	17.9	3.58	
Salt	6.4	0.96	
Mineral/vit	6.4	3.20	
Total/litter	2,560.0	275.89	per litter

[2] Fed 70–150 lb. 80 lb. gain F/G = 4, 8 pigs/litter.

Finish Diet 14.5% CP[3]	Amount (lb)	Cost	
Soybeans	562.5	93.75	
Corn	2,193.8	156.70	
Oats	562.5	52.73	
Alfalfa	375.0	23.44	
Calcium carbonate	22.5	2.25	
Dical	15.0	3.00	
Salt	9.4	1.40	
Mineral/vit	9.4	4.69	
Total/litter	3,750.1	337.96	per litter

[3] Fed 150–250 lb. 100 lb gain F/G = 5, 7.5 pigs/litter

Lactation Diet 16.5% CP[4]	Amount (lb)	Cost	
Soybeans	90.0	15.00	
Corn	190.8	13.63	
Oats	112.5	10.55	
Alfalfa	45.0	2.80	
Calcium carbonate	2.3	0.23	
Dical	5.9	1.17	
Salt	1.8	0.27	
Mineral/vit	1.8	0.90	
Total/litter	450.1	44.55	per litter

[4] 75 days @ 12 lb/day.

Gestation Diet Summer 12.5% CP[5]	**Amount (lb)**	**Cost**	
Soybeans	50.8	8.46	
Corn	400.9	28.64	
Oats	145.0	13.59	
Alfalfa	108.7	6.79	
Calcium carbonate	2.9	0.29	
Dical	10.9	2.17	
Salt	2.9	0.44	
Mineral/vit	2.9	1.45	
Total/litter	725.0	61.83	per litter

[5] 145 days @ 5 lb/day.

Gestation Diet Winter 11.0% CP[6]	**Amount (lb)**	**Cost**	
Oats	261.0	24.47	
Alfalfa	152.3	9.51	
Calcium carbonate	4.4	0.44	
Dical	8.7	1.74	
Salt	4.4	0.65	
Mineral/vit	4.4	2.18	
Total/litter	435.2	38.99	per litter

[6] 145 days @ 3 lb/day.

Feed costs per litter

Sow feed costs 44.55 + ((61.83+38.99)/2) =	$ 94.96
Finish pig feed costs	$ 741.51
Total feed costs per litter	$ 836.47

Table 3. Organic pork production cost summary.

Variable Costs	Finish feed costs/litter	$ 741.51	
	Sow feed costs/litter	$ 94.96	
	Total feed costs/litter	$ 836.47	
	Health costs/litter	$ 2.75	
	Breeding costs/litter	$ 13.00	
	Bedding costs/litter	$ 15.00	
	Repairs costs/litter (10% of fixed costs)	$ 2.56	
	Marketing costs/litter[1]	$ 13.80	
	Fuel/utility costs/litter[1]	$ 10.00	
	Replacement gilt costs/litter ($175.00 ÷ 3 litters)	$ 58.33	
	Sub total	$ 951.91	
	Interest on variable costs (9% - 4 months)	$ 28.55	
	Total variable costs/litter		$980.46
Fixed Costs	Fixed costs/litter[1]	$ 26.59	
	Land costs/litter	$ 15.75	
	Sub total	$ 42.34	
	Interest on fixed costs (4.5%)	$ 1.27	
	Total fixed costs/litter		$ 43.61
Total costs of production/litter			$ 1,024.07
Cost of production per pig (7.5)			$136.54
Overall breakeven cost/cwt (2.48)			$55.05

[1] From ASL-R1501, *Two litter outdoor farrowing system budget*; B. Larson, M. Honeyman, J. Kliebenstein, 1997.

Table 4. Organic pork production income summary.

	# of Hogs Sold	Price/ cwt	Weight at Market (lb)	Gross Income Per Hog	Income Per Litter
Hogs sold to organic market	6	$ 70	250	$ 175	$ 1,050.00
Light pigs sold conventionally	1.5	$ 25	240	$ 60	$ 90.00
Cull sow income/litter	.33	$20	400	$80	$ 26.40
Total income per litter					$ 1,166.40
Income over variable costs (less $980.46)					$185.94
Total costs					$1,024.07
Return to labor & management	Per litter				$142.33
	Per pig (7.5)				$18.97

Table 5. The effects of feed efficiency and feed costs on breakeven cost for organic pig production.

Feed Cost Scenarios

	#1	**#2**	#3
Soybeans (bu)	$8	**$10**	$12
Corn (bu)	$3	**$4**	$5
Oats (bu)	$2	**$3**	$4
Alfalfa (ton)	$100	**$125**	$150

Feed Efficiency Scenarios, lb feed/lb live gain

	A	B	C	D
Weight Range				
30–70	2	2.5	**3**	3.5
70–150	3	3.5	**4**	4.5
150–250	4	4.5	**5**	5.5

Breakeven Cost/cwt Live – Organic Pig Production

	Feed Efficiency Scenarios			
	A	B	C	D
Feed Cost Scenarios				
1	37.47	40.70	44.13	47.16
2	46.41	50.63	**55.05**	59.04
3	55.38	60.55	63.64	70.93