

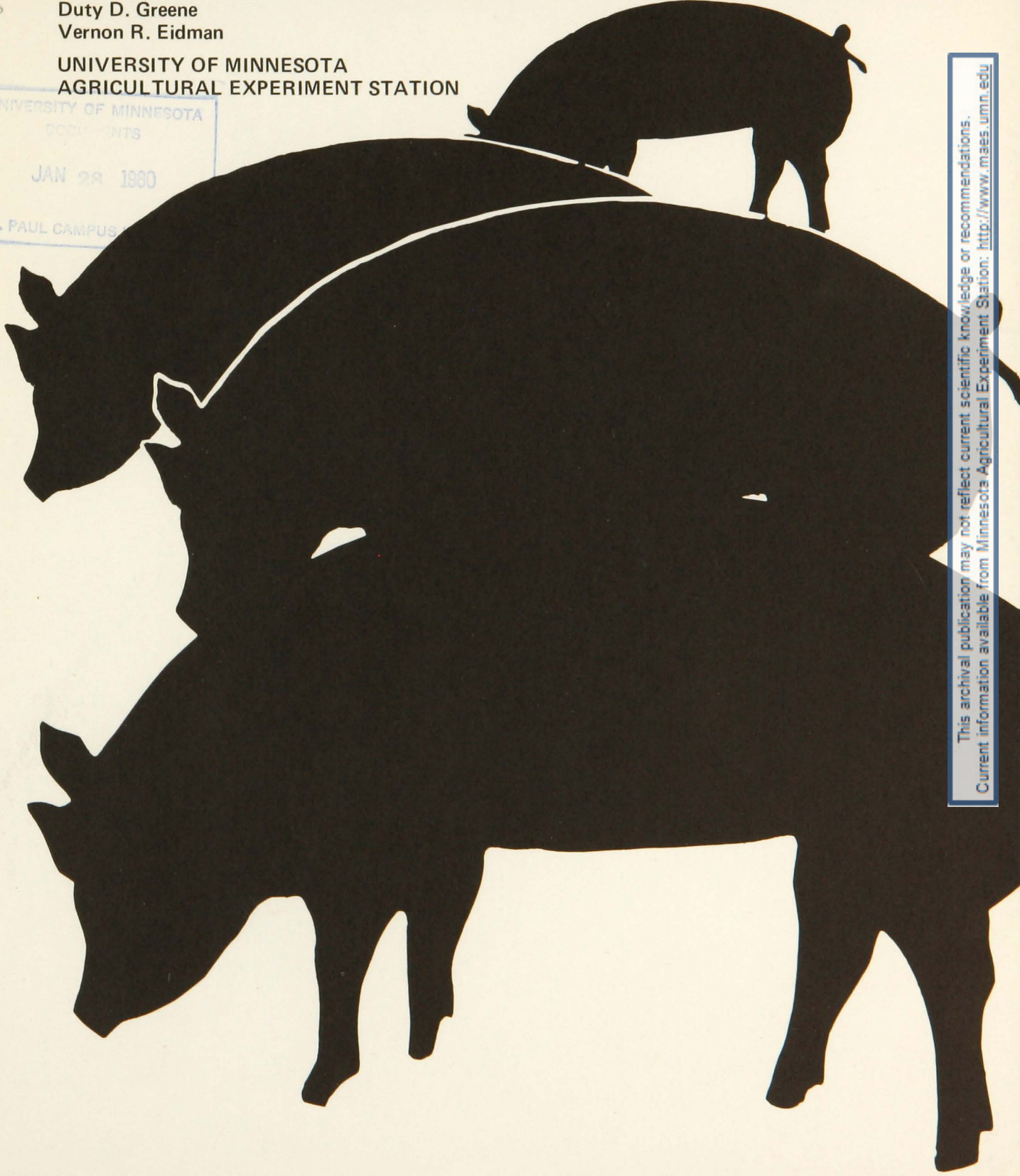
An Economic Analysis of Three Confinement Feeder Pig Production Systems

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UNIVERSITY OF MINNESOTA
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Foreword

This report is one in a series on the economic analysis of alternative swine production systems. The other reports of this series evaluate confinement farrow-to-finish production systems, confinement hog finishing systems, and a one and two-litter farrow-to-finish pasture system. This series of reports has been prepared under Minnesota Experiment Station Project MIN-14-025: "An Economic Analysis of Swine Production Systems in Minnesota."

This report describes and evaluates three feeder pig confinement systems by calculating annual enterprise budgets and monthly cash flows for each system and comparing the results. In addition to estimating the profitability and monthly capital requirements for each system, the financial computations are used to evaluate rental payments for hog farrowing facilities.

The authors acknowledge the contributions of several individuals associated with the University of Minnesota and thank them for their advice: Jerry Hawton and Steve Cornelius of the Department of Animal Science; Larry Jacobson of the Department of Agricultural Engineering; Paul Hasbargen, Boyd Buxton, and Rodney Kolb of the Department of Agricultural and Applied Economics; and Mervin Freeman, Area Extension Agent. These people provided helpful advice and comments of the analysis. Any errors and deficiencies remaining in this report are the responsibility of the authors.

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An Economic Analysis of Three Confinement Feeder Pig Production Systems

Introduction

The feeder pig production enterprise includes a breeding herd, the farrowing of pigs, and the marketing of eight-week-old feeder pigs weighing approximately 40 pounds (18.2 kgs.). A wide variation in the systems of producing feeder pigs exists. The number of litters produced per year and the level of capital investment in facilities are two basic determinants of the system's animal flow and the annual total production of feeder pigs. These two characteristics are used as the basis to define and differentiate the feeder pig systems analyzed in this report.

This report compares the capital and labor requirements, the profitability, and the cash flows of three feeder pig confinement systems commonly used in the upper midwestern United States. For purposes of comparison, each system is based on a farrowing house of 16 crates and a specific animal flow through the respective buildings. Each system assumes feeder pigs are sold at 40 pounds at 8 weeks of age. The three production systems compared in this report are:

1. **The four-litter low investment system producing 64 litters per year.** Farrowing occurs in February, June, August, and December. Five-week weaning is assumed with two groups of 16 sows (or 32 total sows).

2. **The six-litter medium investment system producing 96 litters per year.** Farrowing occurs every other month, beginning in January. Four-week weaning is assumed with three groups of 16 sows (or 48 total sows).

3. **The continuous farrowing high investment system producing 208 litters per year.** Farrowing is scheduled every fourth week resulting in 13 farrowings per year. Three-week weaning is assumed with six groups of 16 sows (or 96 total sows).

This report is written primarily for those Upper Midwest farmers analyzing the economic feasibility of either starting or expanding a feeder pig enterprise. It is also written for those producers who may have an opportunity to use existing facilities on another farm or rent out facilities that they own. The final section of this report develops a method to calculate a reasonable cash rent for the use of rented facilities.

Methods of analysis and assumptions

Annual enterprise budgets and monthly cash flows for each of the three feeder pig systems are developed sequentially and then compared in a summary table. The first section on each system presents a **production calendar** which outlines the timing of production activities and the animal flow through the buildings. The management production activities assumed in the production calendars are based on the studies of Bache and Foster (1976 a,b) and Christians (1976).

The total number of pigs produced yearly is determined by combining the production calendar with the assumed conception rates and the average number of pigs farrowed and weaned per litter (Table 1). These animal performance standards are based on the average figures of the 1977 annual swine reports of the Minnesota farm management associations.

Table 1. Performance standards for farrow-to-finish production.

Item	Standard
Conception rate*	Gilts — 80 percent, Sows — 90 percent
Live pigs farrowed/litter	Gilts — 8.2 2nd litter sows — 9.7 3rd and 4th litter sows — 10.2
Pigs weaned/litter	Gilts — 7.2 2nd litter sows — 8.2 3rd and 4th litter sows — 8.8
Gilts kept for replacement/group of 16 sows	7*

*When breeding during the summer months (June-August), the conception rate for gilts decreases to 70 percent and 80 percent for sows. The number of replacement gilts that are kept increases to nine when they are bred during these months.

In all three production systems sows are assumed to be culled gradually from the breeding stock with only a few kept for two years or four farrowings. Culled sows are replaced by gilts retained from good litters. These gilts are bred at 8 months of age and weighing at least 250 pounds (113.6 kgs.). An average of seven gilts per group of 16 litters is kept for sow replacements, except when the breeding period is scheduled during the summer months (June through August). Two extra gilts are retained for summer breeding because the conception rate is assumed to be lower during the hotter days of the year.

Boars are replaced annually in the four and six-litter systems with regular rotation by breed. Similarly, half of the boars are replaced yearly in the continuous farrowing system. This schedule of replacing females and boars avoids inbreeding, enhances the growth rates of the offspring due to crossbreeding, and prevents boars from becoming too large to be used on replacement gilts. The total number of hogs and breeding stock sold annually is summarized in the production calendar for each system.

The types of buildings chosen for a particular production system reflect the assumed farrowing intensity and level of capital investment. The designs of the buildings are based on the studies of Jacobson and Jordan (1976), Ryan (1971 a,b,c) and the Midwest Plan Service (1972). The **estimated investment costs** for the specified buildings, equipment, and machinery are based on average Upper Midwest 1978 turn-key prices (the price for delivery and construction of facilities ready for immediate use). Since all facilities listed are apparently eligible for the 10 percent investment tax credit under 1979 Internal Revenue Service regulations, the estimated investment costs for each production system are net of the investment tax credit. Actual investment costs may differ substantially among producers because of variations in suppliers' discounts, quality, and the use of one's own labor and materials.

The type of facilities and the animal flow affect feed requirements, energy and fuel use, and the required hours of labor. Monthly feed requirements are calculated by simulating the production process for each farrowing system and by using the appropriate feed rations. The daily amounts and the number of days each ration is fed during the animal's life differ for each production system because of the environmental difference in building systems. An extra pound of feed per day is assumed to be fed to each animal during the winter months (November through March) if the animal is housed outside (Table 2).

The feed ingredients of each ration are specified in the Appendix, Tables 20-23. These tables list the required percentages of feed ingredients for the rations fed to replacement gilts during the growing and finishing phases, to prebreeding gilts and sows, to boars, to sows during farrowing and lactation, and to the pigs up to 40 pounds.

The calculation of monthly energy and fuel use for the respective swine buildings are based on the simulated production calendar, the type of facilities, and the studies of Dale (1964 a,b), Jacobson and Jordan (1976), Ryan (1971 a,b,c), Albright (1975), McFate (1971), DeShazer and Teter (1974), and Hall (1976). A review of the engineering calculations used to estimate energy and fuel use in swine buildings is given in Appendix B.

Table 2. Swine rations and feed requirement standards.

Type of animal and feeding phase	Ration and amount per day
Replacement gilts	
Growing — 40 to 110 pounds (winter-outside)	Growing ration 4.3 pounds/day Growing ration 5.3 pounds/day
Finishing — 110 to 220 pounds (winter-outside)	Finishing ration 6.5 pounds/day Finishing ration 7.5 pounds/day
Gilts and sows prebreeding	
Summer in drylot or controlled environment	Prebreeding ration 4.2 pounds/day
(winter-outside)	Prebreeding ration 5.2 pounds/day
Gilts and sows — gestation	
Summer in drylot or controlled environment	Gestation ration 4.2 pounds/day Gestation ration 5.2 pounds/day
(winter-outside)	Farrowing ration 35 pounds/week Lactation ration 3 pounds plus 1 pound/nursing pig per day
— Farrowing	
— Lactation	
Pigs — Creep feed	Creep ration 5.0 pounds/week
Starter	Starter ration 1.8 pounds/day
Boars	Boar ration 6 pounds/day

The estimated labor hours per month are based on the simulated production calendar, the type of facilities, and the studies of Hinton (1968), Van Arsdall (1965), Kadlec, *et al.* (1966), James and Beneke (1974), and Sutton, *et al.* (1975). Labor hours are estimated by month for each farrowing system, but are not valued in the cost computations because most Upper Midwest producers normally use their own labor and the appropriate opportunity cost to assign varies widely.

Enterprise budgets (projected average annual costs and returns) are calculated for each system to summarize the assumptions and provide a measure of the system's profitability. The annual enterprise budget lists the quantity and value of each product sold as well as the quantity and value of each input used by the system during a one year period. The selling price of pigs and purchase cost of feed inputs used in this report are based on the average long-run prices projected in the "Minnesota Farm Planning Prices" (Department of Agricultural and Applied Economics, University of Minnesota, October, 1978).

In the calculation of receipts for the feeder pig systems, the average selling price of feeder pigs is assumed to be \$38 per head. This price is seasonally adjusted for each marketing month by an estimated monthly price index calculated from average monthly prices of feeder pigs sold in Little Falls, Minnesota, for 1968-77. These monthly prices, the monthly price indices, and their standard deviations are presented in the Appendix, Table 24. The prices received for culled females and boars on a hundredweight basis are listed in the receipts of the annual enterprise budgets.

Operating costs included in the enterprise budgets are the expenses which vary with the level of production. Feed is the largest component of operating costs. The costs of the two major feed ingredients,

corn and soybean meal (48.5 percent protein), are assumed to be \$2.10 per bushel and \$8.50 per cwt., respectively. The other feed ingredients used in the rations and their respective costs are listed in the enterprise budgets. All feed is assumed to be custom ground and mixed for \$3.50 per ton. Other operating expenses shown in the enterprise budgets are based on the average costs of the 1977 annual swine reports of the Minnesota farm management associations.

Ownership costs shown include interest, depreciation, insurance and taxes on the buildings, equipment, machinery, and the breeding herd assumed for each system. New buildings and concrete slabs are assumed to have a depreciable life of 15 years. Most of the equipment and renovated buildings have an eight-year depreciable life, as well as higher expense rates for repair and maintenance.

The sensitivity of net returns to changes in certain prices and production levels is tested using the results of the average annual enterprise budgets. The effect on the estimated net returns to labor and management of changes in the price of corn, soybean meal, and the price and quantity of feeder pigs sold are analyzed for each farrowing system.

The final section on each production system develops a **projected monthly cash flow budget** for the first and second years of operation. The monthly cash flow budget projects cash receipts, cash expenses, and the cash difference or current balance on a month-by-month basis throughout the planning period. Monthly cash flows are projected for each production system to estimate (1) the approximate amount of capital required by month during the start-up period, and (2) the total amount of outside capital required to initiate the enterprise. The projected cash flows for the first year include the estimated investment cost of the facilities and the monthly operating expenses. The projected cash flows for the second year reflect the monthly cash receipts and expenditures of the system in full operation with feeder pig sales occurring on a regular basis. Given the first two years of operation, the cash flow projections of the average year of operation are used to estimate each system's payback period (the number of years required for the enterprise to generate sufficient capital to repay the principal and interest on the investment).

The estimated enterprise budgets and cash flows provide a basis to compare the profitability and loan repayment capacity of the given production systems. The analysis also has significant implications for the producers who may be considering either expanding or renting existing swine facilities by providing estimates of the costs of various swine facilities. The final section of this report discusses how the estimated budgets can be used to develop rental agreements for the use of farrowing facilities.

The four-litter low investment feeder pig system

The four-litter system is especially well suited to the coordination of labor on farms with sizeable crop acreage as well as feeder pig production. Farrowings are intentionally scheduled to avoid the peak seasonal labor demands of planting and harvesting crops. This enterprise fits well on farms that have unused buildings which can be readily converted into functional swine buildings. The utilization of existing buildings and the scheduling of only four farrowings per year results in relatively low capital investment in facilities and breeding stock. However, the labor demands per litter produced for cleaning, bedding, and waste removal are relatively high for the low-investment facilities.

The production schedule assumed for an average year of operation for the four-litter system is shown in Figure 1. Thirty-two sows are divided into two groups (A and B) of 16 each. During the normal operating year, group A is bred in February and August and farrows in June and December. Group B is bred in October and April and farrows in February and August. Five-week weaning of eight pigs per litter is assumed for this system, resulting in 486 feeder pigs (7.6 pigs/litter) marketed annually after saving replacement gilts and accounting for death losses.

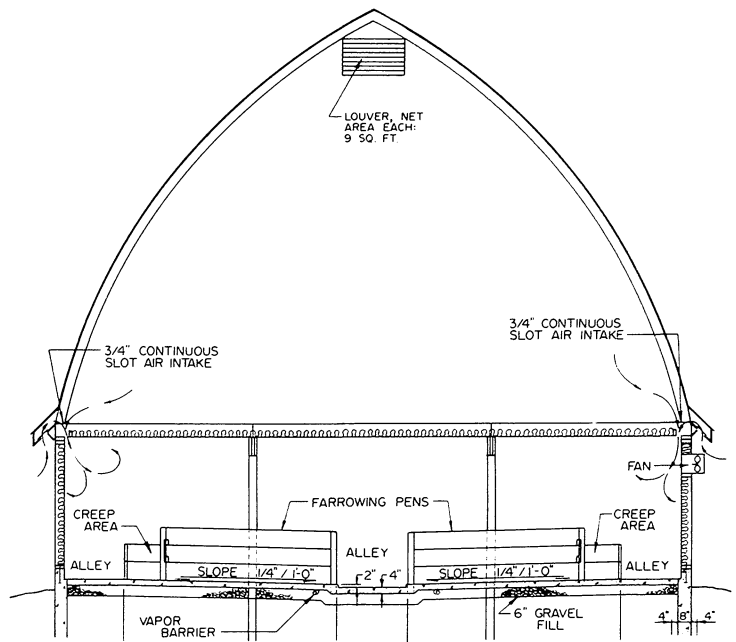
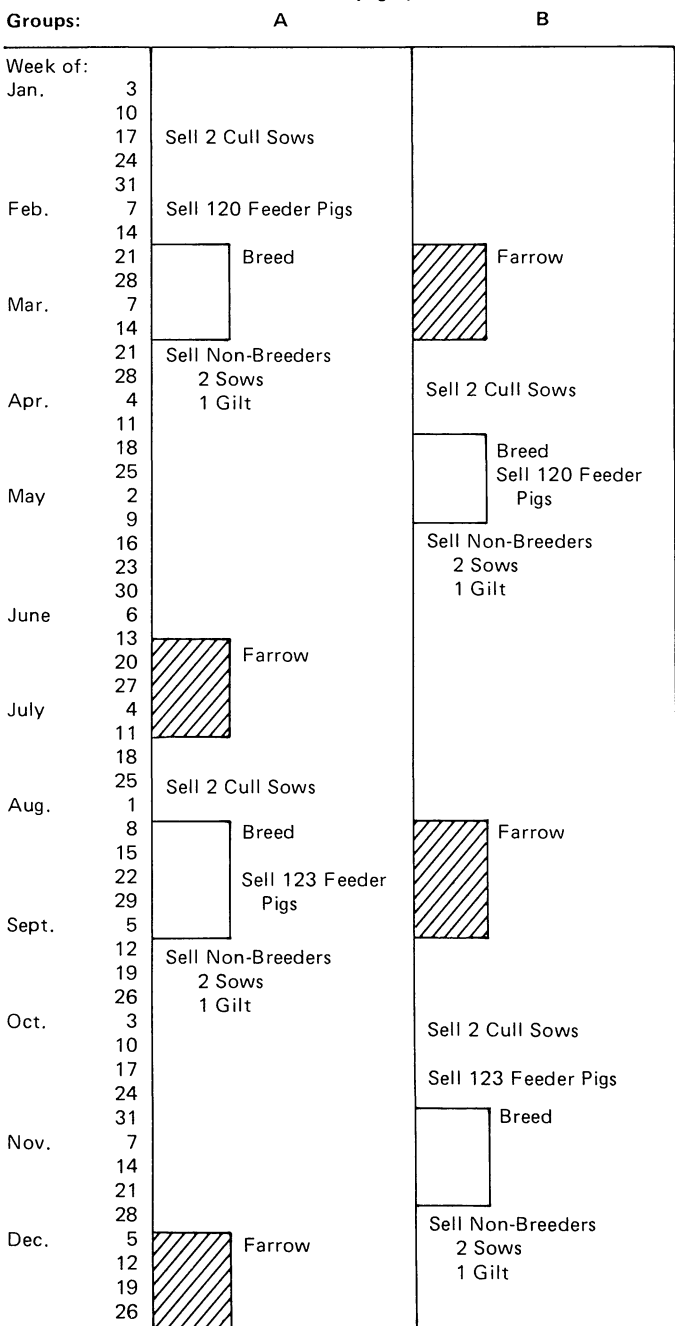
The farrowing schedule, the animal flow, and the assumed animal performance standards determine the facility dimensions and requirements. This low-investment system includes a remodeled dairy barn (36 feet x 80 feet) used for farrowing and nursery, and four portable buildings (10 feet x 14 feet) on permanent dirt lots for the breeding stock. Conventional manure scraping using a front end tractor scraper and loader and spreading it on the land is assumed for the waste disposal system. The list of facilities and their estimated costs for this low investment plan are shown in Table 3. The estimated costs are net of the investment tax credit and equal to \$34,714 or \$542 per litter produced annually.

Annual budget for the average year of operation

The enterprise budget for the average year shown in Table 4 is based on the production calendar and the facilities specified above. The annual budget assumes that four groups of feeder pigs for a total of 486 pigs (7.6 pigs per litter) are sold during the year for \$18,853.66. These receipts plus \$2,514.50 from the sale of culled breeding stock provide a total revenue of \$21,368.16 (\$333.88 per litter).

The annual feed consumption includes 1,850.2 bushels of corn, 256.42 cwt. of soybean meal, and 6,065 pounds of other feed. This total of approximately 67.6 tons of feed for the year implies an

Figure 1. Production calendar for average year of operation for four-litter feeder pig system (32 sows).



Cross-section of old barn with two rows of farrowing pens.

average feed conversion rate of approximately 2,116 pounds of feed per litter produced (67.6 tons x 2,000 pounds/ton ÷ 64 litters). This feed conversion rate equals the average figure reported in the annual Minnesota farm management swine record summaries. Given the assumed prices for feed ingredients, the total cost of feed and its preparation is \$6,727.60 (\$105.11 per litter). Since nonfeed operating costs equal \$4,143.33 (\$64.75 per litter), total operating costs are \$10,870.93 (\$169.86 per litter). Income above operating cost without any charge for labor included is \$10,497.23 (\$164.02 per litter). The annual ownership costs of interest, depreciation, insurance, and taxes for facilities and breeding herd equal \$5,594.80 or \$87.42 per litter (based on the data presented in the Appendix, Table 25). Total operating and ownership costs are equal to \$16,465.73 (\$257.28 per litter).

Subtracting total costs shown from total receipts, the net returns to labor and management for the average year of operation for the four-litter system equal \$4,902.43 (\$76.60 per litter). A charge for the estimated monthly labor hours (bottom of Table 4) is not included in the operating costs. The estimated annual total is 944 hours or 14.8 hours per litter. Expected net returns per hour after paying all costs shown are \$5.19.

Sensitivity of net returns to changes in prices and quantities of pigs sold

The first sensitivity analysis using the budget for the normal operating year varies the prices of corn

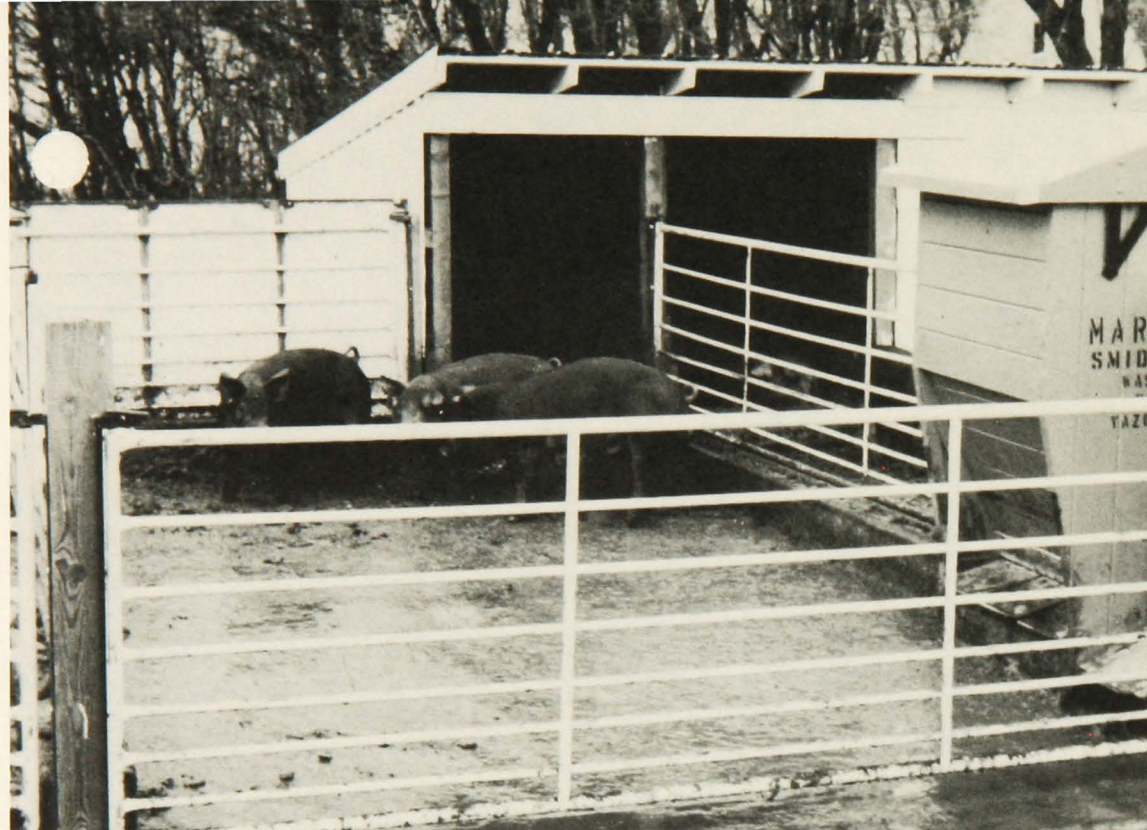


Table 3. Low-investment facilities for the 32-sow, 4-litter feeder pig system.

Item	Size and description	Units	Estimated cost per unit	Total cost
<u>Farrowing facilities — 16 farrowing pens in remodeled solid floor dairy barn¹</u>				
Building remodeling ²	36' x 46'	1,656 sq. ft.	\$ 6.00	\$ 9,936.00
Farrowing pens (includes feeders and waterers)	Wooden panels	16	90.00	1,440.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Heating	Space heater and heat lamps	—	—	550.00
Ventilation	3 fans	2,560 cfm ¹	—	195.00
Total				\$13,141.00
<u>Nursery area — remodeled solid floor dairy barn of 4 pens (12' x 12' — 144 pig capacity)¹</u>				
Building remodeling ²	36' x 34'	1,224 sq. ft.	\$ 5.00	\$ 6,120.00
Fencing and gates	Wood and wire mesh	168 ft.	5.25	882.00
Feeders	Stainless steel, 5 holes per side	2	85.00	170.00
Waterers	Nipple	4	12.00	48.00
Feed bin and delivery system	4.4 ton, augered	—	—	1,050.00
Heating	Space heater	1	350.00	350.00
Ventilation	3 fans	3,480 cfm ¹	—	245.00
Total				\$ 8,865.00
<u>Sow and boar pens — portable buildings on permanent dirt lots (32 sows, 14 gilts, 2 boars)</u>				
Shelters	10' x 14'	4 *	\$380.00	\$ 1,520.00
Concrete feeding slab	7' x 70'	490 sq. ft.	.70	343.00
Feeding fence	Wooden	70 ft.	2.50	175.00
Waterers	2 hole — frost proof	3	110.00	330.00
Fencing	Woven wire	220 ft.	6.00	1,320.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Total				\$ 4,708.00
<u>Equipment and machinery</u>				
Miscellaneous equipment (includes standby generator, high pressure sprayer, scales, incinerator, loading chute, hand tools, and instruments)				\$ 5,500.00
Front-end tractor scraper and loader				1,000.00
Manure spreader	95 bu. dry			1,500.00
Total				\$ 8,000.00
Total facilities investment				\$34,714.00
Investment per litter produced annually (64 litters)				\$ 542.41
Investment per pig sold yearly (486 pigs)				\$ 71.43

¹ Based on the designs and recommendations developed by Jacobson and Jordan (1976).

² Building includes plumbing, wiring, ventilation ducts, insulation, cement floor work, and labor.

Table 4. Average annual costs and returns for the 32-sow feeder pigs four-litter system for normal operating year.

Item	Head sold	Weight each	Unit	Price or cost/unit	Quantity	Value or cost	Cost per litter					
1. Gross receipts												
Feeder pigs	120	—	hd.	41.08	120	\$ 4,929.36						
Feeder pigs	120	—	hd.	43.47	120	5,216.64						
Feeder pigs	123	—	hd.	35.83	123	4,407.58						
Feeder pigs	123	—	hd.	34.96	123	4,300.08						
Gilts	4	2.9	cwt.	34.00	11.6	394.40						
Open sows	8	3.6	cwt.	32.00	28.8	921.60						
Cull sows	8	3.7	cwt.	30.00	29.6	888.00						
Boars	3	4.5	cwt.	23.00	13.5	310.50						
Total						<u>\$21,368.16</u>	\$333.88					
2. Operating costs												
Corn			bu.	2.10	1,850.20	3,885.42	} 105.11					
Soybean meal 48.5			cwt.	8.50	256.42	2,179.57						
Dical phosphate			lbs.	.13	1,777.90	231.13						
Ground limestone			lbs.	.03	1,637.90	49.14						
Salt			lbs.	.02	651.70	13.03						
Vitamins and trace minerals			lbs.	.03	651.70	19.55						
Rolled oats			lbs.	.07	747.60	52.33						
Wheat bran			lbs.	.05	224.00	11.20						
Dehydrated alfalfa meal			lbs.	.04	112.00	4.48						
Sugar (sucrose)			lbs.	.17	262.40	44.61						
Grinding and mixing			tons	3.50	67.60	236.60						
Insurance			dol.			350.00						
Veterinarian and medicine			dol.			444.00						
Electricity and fuel			dol.			365.00						
Bedding			tons	30.00	3.20	96.00	} 64.75					
Hauling and marketing			dol.			776.00						
Boars			hd.	380.00	3.	1,140.00						
Miscellaneous expense			dol.			240.00						
Tractors (fuel, lubrication, repairs)			dol.			35.53						
Machinery (fuel, lubrication, repairs)			dol.			7.69						
Equipment (fuel, lubrication, repairs)			dol.			440.53						
Interest on operating capital			dol.			249.12						
Total operating costs						<u>\$10,870.93</u>						
								169.86				
3. Income above operating costs						\$10,497.23	164.02					
4. Ownership costs												
Interest on livestock capital			dol.	.09	8,720.00	784.80	} 87.42					
Interest on equipment			dol.	.09	16,107.00	1,449.63						
Interest on machinery			dol.	.09	273.19	24.59						
Depreciation on equipment			dol.			3,090.15						
Depreciation on machinery			dol.			32.74						
Insurance, taxes on equipment, livestock, and machinery			dol.			212.89						
Total ownership costs						<u>\$ 5,594.80</u>						
5. Total costs shown						\$16,465.73	\$257.28					
6. Net returns above costs shown						\$ 4,902.43	\$ 76.60					
Remodeled barn — farrowing section with 16 crates												
Nursery section — 144 pig capacity												
Breeding herd facilities — 69 females (32 sows, 12 gilts) portable buildings on dirt lots												
Labor hours required by month:												
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
66	86	104	78	39	100	66	124	76	79	41	85	944

and soybean meal. Table 5 indicates the changes in net returns above costs shown as the price of corn changes by 20 cents per bushel and the price of soybean meal changes by 50 cents per cwt. The figures indicate that each 50 cent decrease (increase) in the price of soybean meal increases (decreases) net returns \$128, other things remaining the same. However, each 20 cent decrease (increase) in the price of corn increases (decreases) net returns \$370. To give an example, assume that the price of corn falls from \$2.10 to \$1.90 per bushel and the price of soybean meal rises from \$8.50 to \$9.00 per cwt. Table 5 shows that net returns increase \$242, resulting in net returns of \$5,144 (\$242 + 4,902).

Table 6 illustrates the effect on net returns when the price of feeder pigs is varied by \$2 per cwt. and the quantity of pigs sold is varied by 64 pigs or one pig per litter. The changes reflect both the variation in the receipts and the operating expenses that occur with an increase or decrease in the number of pigs produced. The annual budget indicates that net returns to labor and management are \$4,902 when 486 pigs (7.6 per litter) are sold at an average annual price of \$38.79 per head. Table 6 shows, for instance, that if the number of pigs sold increased from 7.6 to 8.6 pigs per litter and the price rose from \$38.79 to \$42.79 per cwt., net returns would increase by \$3,937 to a total of \$8,839 (\$3,937 + 4,902).

This sensitivity analysis indicates that with the production of one or more pigs per litter from 7.6 to 8.6 pigs per litter net returns increase by 41 percent. Also, a 10 percent increase in the price of feeder pigs from \$38.70 to \$42.67 increases net revenues approx-

imately 38 percent, while a 10 percent decrease in the prices of corn (from \$2.10 to \$1.89 per bushel) and soybean meal (from \$8.50 to \$7.65 per cwt.) increases net returns 7.9 percent and 4.4 percent respectively.

Cash flow projections for the first two years of operation

Projected monthly net cash flows are calculated for the first and second years of operation and are based on the production calendar shown in Figure 2 and a simplified plan of cash payments for facilities. The receipts from livestock sales are assumed to be received in the month of marketing. Similarly, operating expenses are paid in the same month as they are incurred. The cash payments for buildings are divided so that a third of the total is paid four months before the building is used (at the start of construction) and the remainder paid when the building is initially scheduled for use. Payments for equipment and machinery are made when a particular item of equipment or machinery is scheduled for initial use. The itemized input figures of monthly receipts and expenses for the first two years of operation are included in the Appendix, Table 26.

The monthly cash flow summaries for the first two years of operation are shown in Table 7. The first and second sections of each year's cash flow summary show total monthly receipts and expenses, respectively. The third section is the flow of funds summary. The first line of this section, cash balance beginning, indicates that a minimum monthly cash balance of \$1,000 is assumed to be kept on hand at the beginning of every month. Line 2, the cash difference between receipts and expenses, is added to line 1 to give the current cash balance at the end of each month (line 3). If expenditures are greater than receipts and borrowing is necessary, the amount borrowed is shown in line 4. If receipts are greater than expenditures and the difference is greater than the cash balance assumed, payments are made first on the interest accrued (line 6) at the specified interest rate (9 percent) and then on the loan principal (line 5). The cash balance at the end of the month (line 7) is at least equal to the assumed minimum cash balance. The fourth section is the current loan summary. The first, third, and fifth lines of this section show the accumulated borrowing, the accrued interest, and accumulated total debt (borrowing plus interest) carried over from the previous month of operation, respectively. The second, fourth, and sixth lines indicate the monthly accumulated borrowing, accrued interest, and accumulated total debt which the enterprise accrues during the given year.

For the four-litter feeder pig operation, the accumulated borrowing plus accrued interest reaches a

Table 5. Effect of changes of corn and soybean meal prices on net returns above costs shown for the 32-sow feeder pig four-litter system.

		Price of corn per bushel				
		\$1.70	\$1.90	\$2.10	\$2.30	\$2.50
		-----Change in net returns (\$)-----				
Price of soybean meal per cwt.	\$7.50	997.	626.	256.	-114.	-484.
	\$8.00	868.	498.	128.	-242.	-612.
	\$8.50	740.	370.	0	-370.	-740.
	\$9.00	612.	242.	-128.	-498.	-868.
	\$9.50	484.	114.	-256.	-626.	-997.

Table 6. Effect of changes of feeder pig price and pigs sold per litter on net returns above costs shown for the 32-sow feeder pig four-litter system.

		Price of feeder pigs per head				
		\$34.79	\$36.79	\$38.79	\$40.79	\$42.79
		-----Change in net returns (\$)-----				
Feeder pigs sold per litter	5.6	-5,930.	-4,958.	-3,986.	-3,014.	-2,042.
	6.6	-3,937.	-2,965.	-1,993.	-1,021.	-49.
	7.6	-1,944.	-972.	0	972.	1,944.
	8.6	49.	1,021.	1,993.	2,965.	3,937.
	9.6	2,042.	3,014.	3,986.	4,958.	5,930.

maximum debt of \$45,590 in January of the second year. Only two groups of feeder pigs are sold in the first year. At the end of the first year, the accrued interest is \$481 and the accumulated total debt is \$43,391. Total accumulated debt is reduced to \$36,435 at the end of the second year. Approximately \$12,137 is paid on the principal and \$3,684 is paid on interest charges, but additional borrowing of \$5,306 occurs during the year.

In reality, pig and input prices, as well as the number of pigs marketed, vary from year to year resulting in changes in the annual amount of cash available for interest and principal payments. How-

ever, to simplify the analysis, the prices and production figures for the third and subsequent years are assumed to equal those of the average year of operation (see Table 4). Given these assumptions, the payback period is approximately seven years providing no payments are made for either family or hired labor. Given the same assumptions of constant monthly production and prices, but deducting a labor charge of \$3.50 per hour on the estimated 944 hours required annually, extends the payback period to 12 years. If the labor charge is increased to \$6 per hour, the payback period increases to approximately 39 years.

Figure 2. Production calendar for first two years of operation for four-litter feeder pig system.

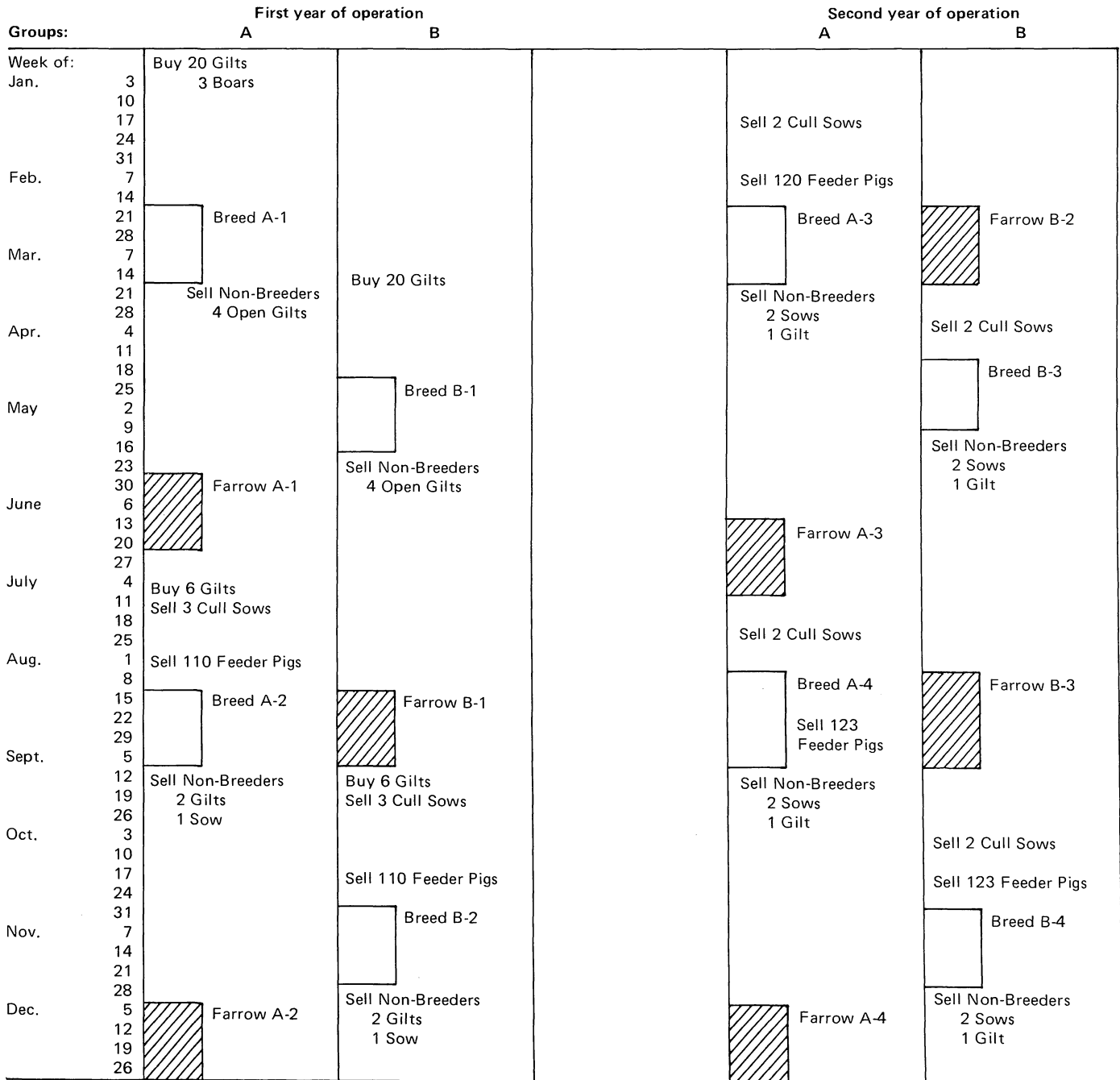


Table 7. Monthly cash flows for the 32-sow feeder pig four-litter system in first year of operation.

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
I. Cash receipts													
Total	0	0	394.	0	394.	0	Dollars 333.	3942.	645.	3846.	623.	0	10177.
II. Cash expenses													
Total	6120.	6029.	3997.	6054.	14739.	4860.	3253.	2204.	1778.	813.	470.	628.	50947.
III. Flow of funds summary													
1. Cash balance beginning	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
2. + Cash difference	-6120.	-6029.	-3603.	-6054.	-14345.	-4860.	-2920.	1738.	-1132.	3032.	153.	- 628.	-40769.
3. = Current cash balance	-5120.	-5029.	-2603.	-5054.	-13345.	-3860.	-1920.	2738.	- 132.	4032.	1153.	372.	
4. + Money borrowed	6120.	6029.	3603.	6054.	14345.	4860.	2920.	0	1132.	0	0	628.	45691.
5. - Payment on loan	0	0	0	0	0	0	0	411.	0	2371.	0	0	2782.
6. - Interest paid at 9 percent	0	0	0	0	0	0	0	1327.	0	661.	153.	0	2141.
7. = Cash balance ending	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
IV. Current loan summary													
1. - Loan out - Jan. 1													
2. Accumulated borrowing	6120.	12149.	15752.	21806.	36151.	41011.	43932.	43521.	44653.	42282.	42282.	42910.	
3. - Accrued interest - Jan. 1													
4. Accrued interest at 9 percent	0	46.	137.	255.	419.	690.	997.	0	326.	0	164.	481.	
5. - Accrued total debt - Jan. 1													
6. Accumulated total debt	6120.	12195.	15889.	22061.	36570.	41701.	44929.	43521.	44980.	42282.	42447.	43391.	
Monthly cash flows for the 32-sow feeder pigs four-litter system second year of operation.													
Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
I. Cash receipts													
Total	222.	4929.	329.	5439.	329.	0	Dollars 222.	4408.	551.	4300.	640.	0	21368.
II. Cash expenses													
Total	2099.	837.	876.	875.	405.	484.	1373.	951.	904.	762.	468.	818.	10852.
III. Flow of funds summary													
1. Cash balance beginning	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
2. + Cash difference	-1877.	4092.	- 547.	4564.	- 76.	- 484.	-1151.	3456.	- 353.	3538.	171.	- 818.	10516.
3. = Current cash balance	- 877.	5092.	453.	5564.	924.	516.	- 151.	4456.	647.	4538.	1171.	182.	
4. + Money borrowed	1877.	0	547.	0	76.	484.	1151.	0	353.	0	0	818.	5306.
5. - Payment on loan	0	2953.	0	3932.	0	0	0	2285.	0	2967.	0	0	12137.
6. - Interest paid at 9 percent	0	1139.	0	632.	0	0	0	1171.	0	571.	171.	0	3684.
7. = Cash balance ending	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
IV. Current loan summary													
1. \$42,910.00 Loan out - Jan. 1													
2. Accumulated borrowing	44787.	41834.	42380.	38449.	38524.	39008.	40159.	37874.	38227.	35260.	35260.	36077.	
3. \$481.00 Accrued interest - Jan. 1													
4. Accrued interest at 9 percent	803.	0	314.	0	288.	577.	870.	0	284.	0	93.	358.	
5. \$43,391.00 Accrued total debt - Jan 1													
6. Accumulated total debt	45590.	41834.	42694.	38449.	38813.	39585.	41029.	37874.	38511.	35260.	35353.	36435.	

The six-litter medium investment feeder pig system

The six-litter medium investment system takes a greater capital investment, more labor, better husbandry, and more financial management skill than the four-litter low investment system. Since farrowing is scheduled every other month, the management of daily activities is more demanding and must be followed more carefully to avoid disease problems and achieve high returns on the investment. On many farms this system requires hiring extra labor during the months of crop planting and harvesting.

The farrowing schedule for the six-litter system is illustrated in Figure 3. Forty-eight sows are divided into three groups of 16 each. Farrowings are scheduled for every other month beginning in January, resulting in 96 litters of hogs produced annually. Four-week weaning of 8.0 pigs per litter is assumed with 732 feeder pigs (7.6 per litter) sold annually.

The facilities and their respective costs for the medium investment plan are shown in Table 8. These facilities include a partially-slatted farrowing house (24 x 46 feet), a partially-slatted remodeled shed (20 x 36 feet) used as a nursery, and six portable buildings (10 x 14 feet) on permanent dirt lots for breeding stock. Manure storage pits, which are emptied semiannually with a vacuum liquid manure spreader, are assumed for the waste disposal system. The estimated costs are net of the investment tax credit and total \$44,169 or \$460 per litter.

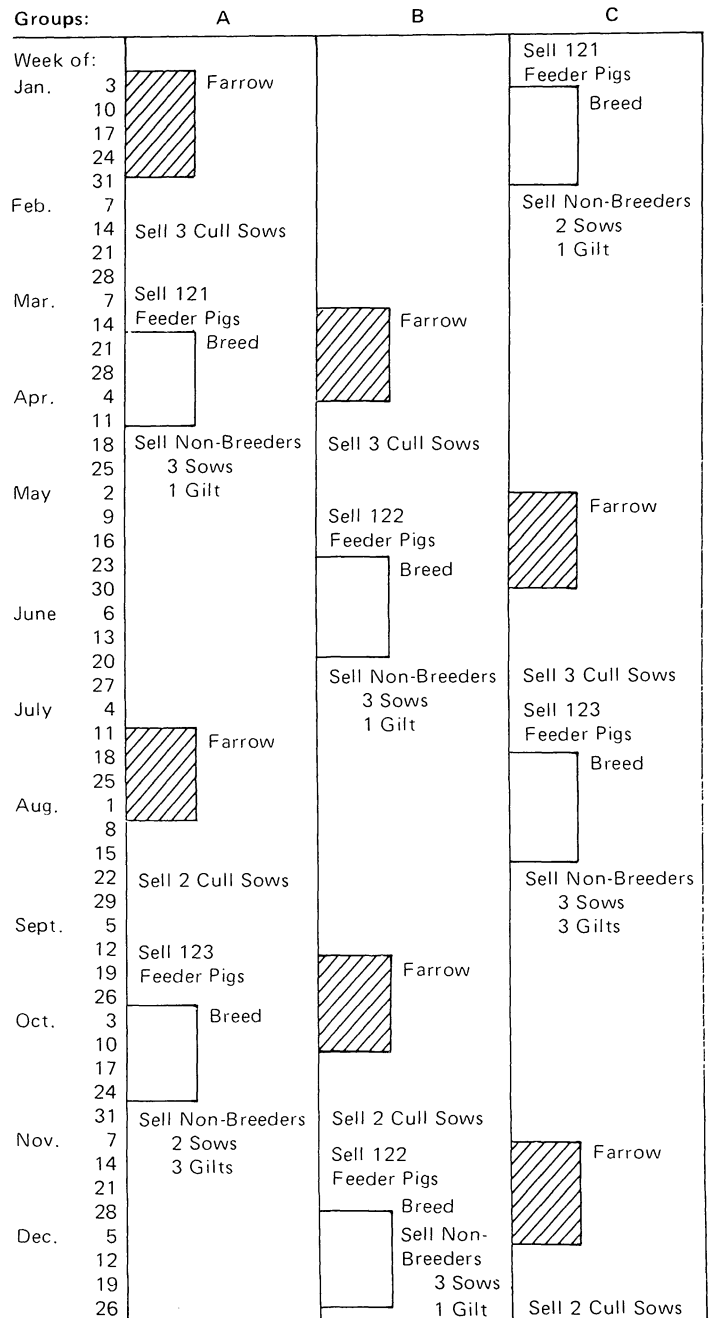
Annual budget for the average year of operation

The annual budget for the six-litter system in an average year of operation is shown in Table 9. A total of 732 feeder pigs (7.6 per litter) weighing 40 pounds per head are assumed to be marketed. The revenue earned from the sale of feeder pigs and culled breeding stock totals \$31,878.73 (\$332.07 per litter).

Feed cost totals \$10,065.19 (\$104.85 per litter) and is based on the consumption of 2,782.4 bushels of corn, 379.7 cwt. of soybean meal, and 9,108 pounds of other feed and a grinding-mixing charge. This feed consumption of 101.4 tons assumes an annual feed conversion rate of approximately 2,113 pounds of feed per litter produced during the average year (101.4 tons x 2,000 pounds/ton ÷ 96 litters). This feed conversion rate is approximately equal to that of the low-investment system. Non-feed operating expenses including interest on operating capital equal \$4,937 (\$51.42 per litter). Total operating expenses are \$15,002.18 (\$156.27 per litter), while income above operating costs without a charge for labor equals \$16,876.56 (\$175.80 per litter).

Ownership costs on facilities, livestock, and machinery total \$7,199.35 or, \$74.99 per litter (based

Figure 3. Production calendar for the average year of operation for the six-litter feeder pig system — 48 sows.



on the data presented in the Appendix, Table 27). Adding ownership costs and operating costs gives a total annual cost (less labor) of \$22,201.53 (\$231.26 per litter). The estimated hours of labor required annually for this system are 1,194 (12.4 hours per litter). A charge for the hours of labor has not been deducted from the net returns. Net returns to labor and management for the average year of operation for the six-litter system equal \$9,677.20 (\$100.81 per litter) or \$8.10 per hour.

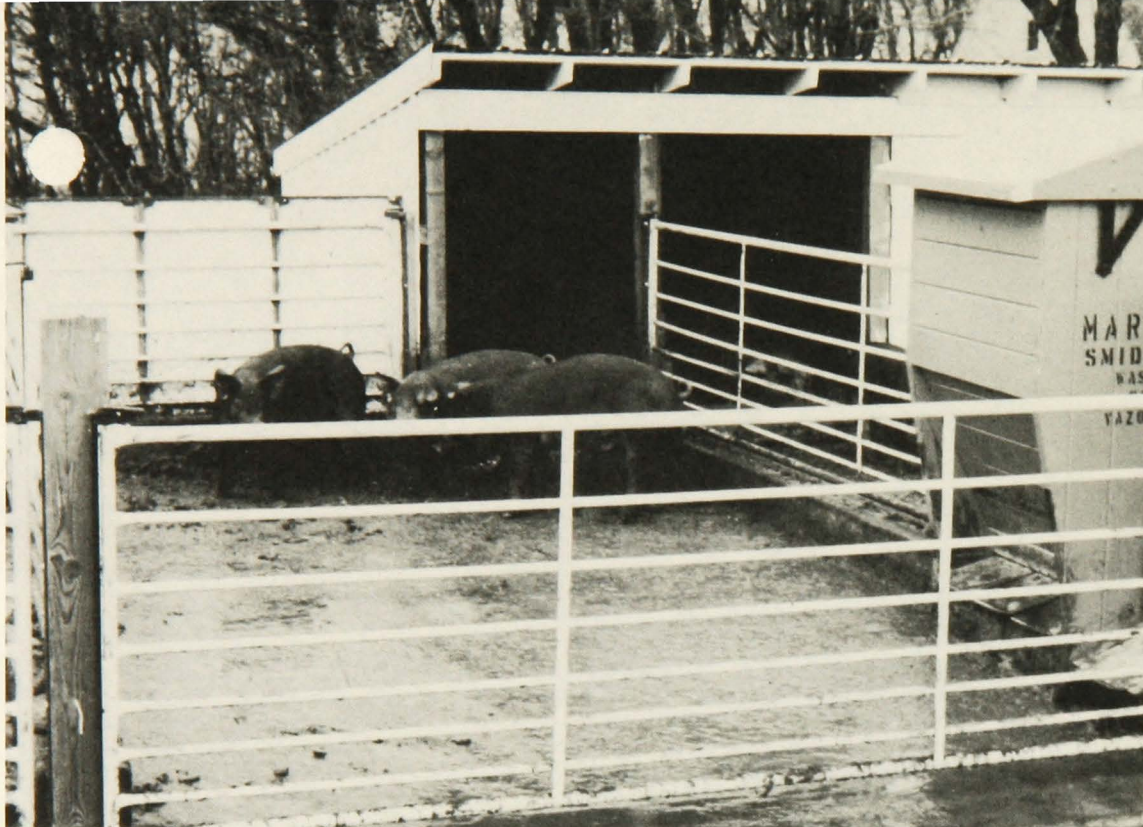


Table 3. Low-investment facilities for the 32-sow, 4-litter feeder pig system.

Item	Size and description	Units	Estimated cost per unit	Total cost
<u>Farrowing facilities – 16 farrowing pens in remodeled solid floor dairy barn¹</u>				
Building remodeling ²	36' x 46'	1,656 sq. ft.	\$ 6.00	\$ 9,936.00
Farrowing pens (includes feeders and waterers)	Wooden panels	16	90.00	1,440.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Heating	Space heater and heat lamps	—	—	550.00
Ventilation	3 fans	2,560 cfm ¹	—	195.00
Total				\$13,141.00
<u>Nursery area – remodeled solid floor dairy barn of 4 pens (12' x 12' – 144 pig capacity)¹</u>				
Building remodeling ²	36' x 34'	1,224 sq. ft.	\$ 5.00	\$ 6,120.00
Fencing and gates	Wood and wire mesh	168 ft.	5.25	882.00
Feeders	Stainless steel, 5 holes per side	2	85.00	170.00
Waterers	Nipple	4	12.00	48.00
Feed bin and delivery system	4.4 ton, augered	—	—	1,050.00
Heating	Space heater	1	350.00	350.00
Ventilation	3 fans	3,480 cfm ¹	—	245.00
Total				\$ 8,865.00
<u>Sow and boar pens – portable buildings on permanent dirt lots (32 sows, 14 gilts, 2 boars)</u>				
Shelters	10' x 14'	4	\$380.00	\$ 1,520.00
Concrete feeding slab	7' x 70'	490 sq. ft.	.70	343.00
Feeding fence	Wooden	70 ft.	2.50	175.00
Waterers	2 hole – frost proof	3	110.00	330.00
Fencing	Woven wire	220 ft.	6.00	1,320.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Total				\$ 4,708.00
<u>Equipment and machinery</u>				
Miscellaneous equipment (includes standby generator, high pressure sprayer, scales, incinerator, loading chute, hand tools, and instruments)				\$ 5,500.00
Front-end tractor scraper and loader				1,000.00
Manure spreader	95 bu. dry			1,500.00
Total				\$ 8,000.00
Total facilities investment				\$34,714.00
Investment per litter produced annually (64 litters)				\$ 542.41
Investment per pig sold yearly (486 pigs)				\$ 71.43

¹ Based on the designs and recommendations developed by Jacobson and Jordan (1976).

² Building includes plumbing, wiring, ventilation ducts, insulation, cement floor work, and labor.

Table 4. Average annual costs and returns for the 32-sow feeder pigs four-litter system for normal operating year.

Item	Head sold	Weight each	Unit	Price or cost/unit	Quantity	Value or cost	Cost per litter					
1. Gross receipts												
Feeder pigs	120	—	hd.	41.08	120	\$ 4,929.36						
Feeder pigs	120	—	hd.	43.47	120	5,216.64						
Feeder pigs	123	—	hd.	35.83	123	4,407.58						
Feeder pigs	123	—	hd.	34.96	123	4,300.08						
Gilts	4	2.9	cwt.	34.00	11.6	394.40						
Open sows	8	3.6	cwt.	32.00	28.8	921.60						
Cull sows	8	3.7	cwt.	30.00	29.6	888.00						
Boars	3	4.5	cwt.	23.00	13.5	310.50						
Total						\$21,368.16	\$333.88					
2. Operating costs												
Corn			bu.	2.10	1,850.20	3,885.42	} 105.11					
Soybean meal 48.5			cwt.	8.50	256.42	2,179.57						
Dical phosphate			lbs.	.13	1,777.90	231.13						
Ground limestone			lbs.	.03	1,637.90	49.14						
Salt			lbs.	.02	651.70	13.03						
Vitamins and trace minerals			lbs.	.03	651.70	19.55						
Rolled oats			lbs.	.07	747.60	52.33						
Wheat bran			lbs.	.05	224.00	11.20						
Dehydrated alfalfa meal			lbs.	.04	112.00	4.48						
Sugar (sucrose)			lbs.	.17	262.40	44.61						
Grinding and mixing			tons	3.50	67.60	236.60						
Insurance			dol.			350.00						
Veterinarian and medicine			dol.			444.00						
Electricity and fuel			dol.			365.00						
Bedding			tons	30.00	3.20	96.00	} 64.75					
Hauling and marketing			dol.			776.00						
Boars			hd.	380.00	3.	1,140.00						
Miscellaneous expense			dol.			240.00						
Tractors (fuel, lubrication, repairs)			dol.			35.53						
Machinery (fuel, lubrication, repairs)			dol.			7.69						
Equipment (fuel, lubrication, repairs)			dol.			440.53						
Interest on operating capital			dol.			249.12						
Total operating costs						\$10,870.93						
								169.86				
3. Income above operating costs						\$10,497.23	164.02					
4. Ownership costs												
Interest on livestock capital			dol.	.09	8,720.00	784.80	} 87.42					
Interest on equipment			dol.	.09	16,107.00	1,449.63						
Interest on machinery			dol.	.09	273.19	24.59						
Depreciation on equipment			dol.			3,090.15						
Depreciation on machinery			dol.			32.74						
Insurance, taxes on equipment, livestock, and machinery			dol.			212.89						
Total ownership costs						\$ 5,594.80						
5. Total costs shown						\$16,465.73	\$257.28					
6. Net returns above costs shown						\$ 4,902.43	\$ 76.60					
Remodeled barn — farrowing section with 16 crates												
Nursery section — 144 pig capacity												
Breeding herd facilities — 69 females (32 sows, 12 gilts) portable buildings on dirt lots												
Labor hours required by month:												
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
66	86	104	78	39	100	66	124	76	79	41	85	944

and soybean meal. Table 5 indicates the changes in net returns above costs shown as the price of corn changes by 20 cents per bushel and the price of soybean meal changes by 50 cents per cwt. The figures indicate that each 50 cent decrease (increase) in the price of soybean meal increases (decreases) net returns \$128, other things remaining the same. However, each 20 cent decrease (increase) in the price of corn increases (decreases) net returns \$370. To give an example, assume that the price of corn falls from \$2.10 to \$1.90 per bushel and the price of soybean meal rises from \$8.50 to \$9.00 per cwt. Table 5 shows that net returns increase \$242, resulting in net returns of \$5,144 (\$242 + 4,902).

Table 6 illustrates the effect on net returns when the price of feeder pigs is varied by \$2 per cwt. and the quantity of pigs sold is varied by 64 pigs or one pig per litter. The changes reflect both the variation in the receipts and the operating expenses that occur with an increase or decrease in the number of pigs produced. The annual budget indicates that net returns to labor and management are \$4,902 when 486 pigs (7.6 per litter) are sold at an average annual price of \$38.79 per head. Table 6 shows, for instance, that if the number of pigs sold increased from 7.6 to 8.6 pigs per litter and the price rose from \$38.79 to \$42.79 per cwt., net returns would increase by \$3,937 to a total of \$8,839 (\$3,937 + 4,902).

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		Price of corn per bushel				
		\$1.70	\$1.90	\$2.10	\$2.30	\$2.50
		-----Change in net returns (\$)-----				
Price of soybean meal	\$7.50	997.	626.	256.	-114.	-484.
	\$8.00	868.	498.	128.	-242.	-612.
	\$8.50	740.	370.	0	-370.	-740.
	\$9.00	612.	242.	-128.	-498.	-868.
per cwt.	\$9.50	484.	114.	-256.	-626.	-997.

Table 6. Effect of changes of feeder pig price and pigs sold per litter on net returns above costs shown for the 32-sow feeder pig four-litter system.

		Price of feeder pigs per head				
		\$34.79	\$36.79	\$38.79	\$40.79	\$42.79
		-----Change in net returns (\$)-----				
Feeder pigs sold per litter	5.6	-5,930.	-4,958.	-3,986.	-3,014.	-2,042.
	6.6	-3,937.	-2,965.	-1,993.	-1,021.	-49.
	7.6	-1,944.	-972.	0	972.	1,944.
	8.6	49.	1,021.	1,993.	2,965.	3,937.
	9.6	2,042.	3,014.	3,986.	4,958.	5,930.

maximum debt of \$45,590 in January of the second year. Only two groups of feeder pigs are sold in the first year. At the end of the first year, the accrued interest is \$481 and the accumulated total debt is \$43,391. Total accumulated debt is reduced to \$36,435 at the end of the second year. Approximately \$12,137 is paid on the principal and \$3,684 is paid on interest charges, but additional borrowing of \$5,306 occurs during the year.

In reality, pig and input prices, as well as the number of pigs marketed, vary from year to year resulting in changes in the annual amount of cash available for interest and principal payments. How-

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Figure 2. Production calendar for first two years of operation for four-litter feeder pig system.

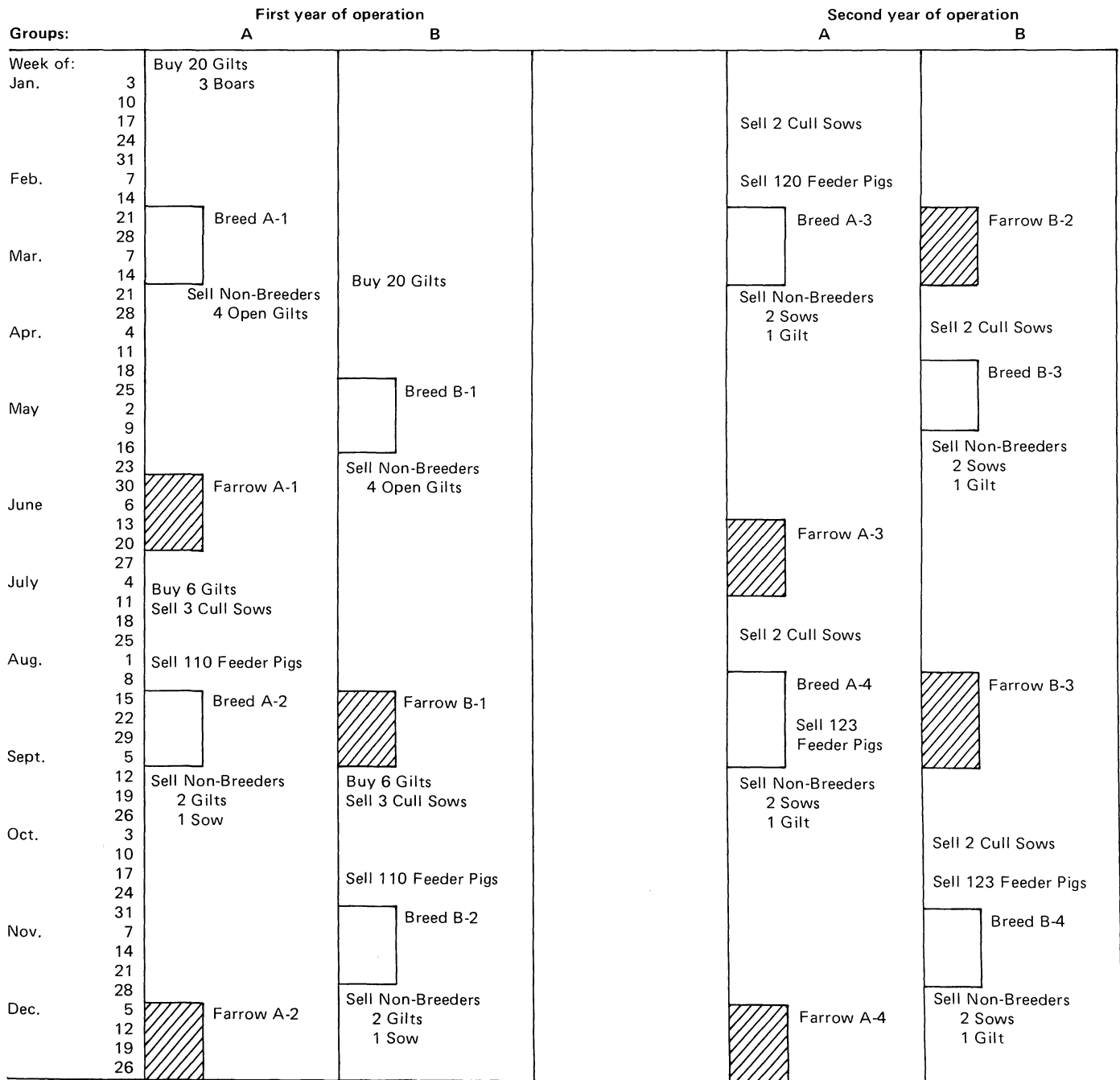


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Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
I. Cash receipts							Dollars						
Total	0	0	394.	0	394.	0	333.	3942.	645.	3846.	623.	0	10177.
II. Cash expenses													
Total	6120.	6029.	3997.	6054.	14739.	4860.	3253.	2204.	1778.	813.	470.	628.	50947.
III. Flow of funds summary							Dollars						
1. Cash balance beginning	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
2. + Cash difference	-6120.	-6029.	-3603.	-6054.	-14345.	-4860.	-2920.	1738.	-1132.	3032.	153.	- 628.	-40769.
3. = Current cash balance	-5120.	-5029.	-2603.	-5054.	-13345.	-3860.	-1920.	2738.	- 132.	4032.	1153.	372.	
4. + Money borrowed	6120.	6029.	3603.	6054.	14345.	4860.	2920.	0	1132.	0	0	628.	45691.
5. - Payment on loan	0	0	0	0	0	0	0	411.	0	2371.	0	0	2782.
6. - Interest paid at 9 percent	0	0	0	0	0	0	0	1327.	0	661.	153.	0	2141.
7. = Cash balance ending	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
IV. Current loan summary							Dollars						
1. - Loan out - Jan. 1													
2. Accumulated borrowing	6120.	12149.	15752.	21806.	36151.	41011.	43932.	43521.	44653.	42282.	42282.	42910.	
3. - Accrued interest - Jan. 1													
4. Accrued interest at 9 percent	0	46.	137.	255.	419.	690.	997.	0	326.	0	164.	481.	
5. - Accrued total debt - Jan. 1													
6. Accumulated total debt	6120.	12195.	15889.	22061.	36570.	41701.	44929.	43521.	44980.	42282.	42447.	43391.	

Monthly cash flows for the 32-sow feeder pigs four-litter system second year of operation.

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
I. Cash receipts							Dollars						
Total	222.	4929.	329.	5439.	329.	0	222.	4408.	551.	4300.	640.	0	21368.
II. Cash expenses													
Total	2099.	837.	876.	875.	405.	484.	1373.	951.	904.	762.	468.	818.	10852.
III. Flow of funds summary							Dollars						
1. Cash balance beginning	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
2. + Cash difference	-1877.	4092.	- 547.	4564.	- 76.	- 484.	-1151.	3456.	- 353.	3538.	171.	- 818.	10516.
3. = Current cash balance	- 877.	5092.	453.	5564.	924.	516.	- 151.	4456.	647.	4538.	1171.	182.	
4. + Money borrowed	1877.	0	547.	0	76.	484.	1151.	0	353.	0	0	818.	5306.
5. - Payment on loan	0	2953.	0	3932.	0	0	0	2285.	0	2967.	0	0	12137.
6. - Interest paid at 9 percent	0	1139.	0	632.	0	0	0	1171.	0	571.	171.	0	3684.
7. = Cash balance ending	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
IV. Current loan summary							Dollars						
1. \$42,910.00 Loan out - Jan. 1													
2. Accumulated borrowing	44787.	41834.	42380.	38449.	38524.	39008.	40159.	37874.	38227.	35260.	35260.	36077.	
3. \$481.00 Accrued interest - Jan. 1													
4. Accrued interest at 9 percent	803.	0	314.	0	288.	577.	870.	0	284.	0	93.	358.	
5. \$43,391.00 Accrued total debt - Jan 1													
6. Accumulated total debt	45590.	41834.	42694.	38449.	38813.	39585.	41029.	37874.	38511.	35260.	35353.	36435.	

The six-litter medium investment feeder pig system

The six-litter medium investment system takes a greater capital investment, more labor, better husbandry, and more financial management skill than the four-litter low investment system. Since farrowing is scheduled every other month, the management of daily activities is more demanding and must be followed more carefully to avoid disease problems and achieve high returns on the investment. On many farms this system requires hiring extra labor during the months of crop planting and harvesting.

The farrowing schedule for the six-litter system is illustrated in Figure 3. Forty-eight sows are divided into three groups of 16 each. Farrowings are scheduled for every other month beginning in January, resulting in 96 litters of hogs produced annually. Four-week weaning of 8.0 pigs per litter is assumed with 732 feeder pigs (7.6 per litter) sold annually.

The facilities and their respective costs for the medium investment plan are shown in Table 8. These facilities include a partially-slatted farrowing house (24 x 46 feet), a partially-slatted remodeled shed (20 x 36 feet) used as a nursery, and six portable buildings (10 x 14 feet) on permanent dirt lots for breeding stock. Manure storage pits, which are emptied semiannually with a vacuum liquid manure spreader, are assumed for the waste disposal system. The estimated costs are net of the investment tax credit and total \$44,169 or \$460 per litter.

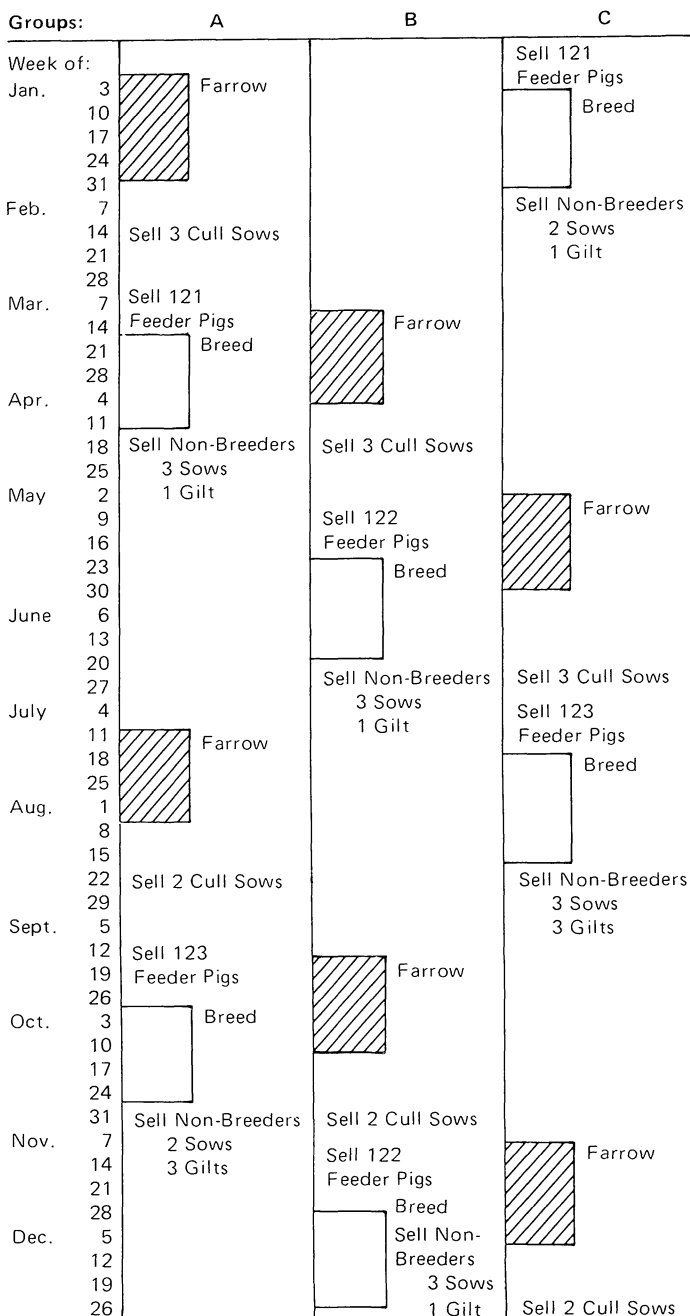
Annual budget for the average year of operation

The annual budget for the six-litter system in an average year of operation is shown in Table 9. A total of 732 feeder pigs (7.6 per litter) weighing 40 pounds per head are assumed to be marketed. The revenue earned from the sale of feeder pigs and culled breeding stock totals \$31,878.73 (\$332.07 per litter).

Feed cost totals \$10,065.19 (\$104.85 per litter) and is based on the consumption of 2,782.4 bushels of corn, 379.7 cwt. of soybean meal, and 9,108 pounds of other feed and a grinding-mixing charge. This feed consumption of 101.4 tons assumes an annual feed conversion rate of approximately 2,113 pounds of feed per litter produced during the average year (101.4 tons x 2,000 pounds/ton ÷ 96 litters). This feed conversion rate is approximately equal to that of the low-investment system. Non-feed operating expenses including interest on operating capital equal \$4,937 (\$51.42 per litter). Total operating expenses are \$15,002.18 (\$156.27 per litter), while income above operating costs without a charge for labor equals \$16,876.56 (\$175.80 per litter).

Ownership costs on facilities, livestock, and machinery total \$7,199.35 or, \$74.99 per litter (based

Figure 3. Production calendar for the average year of operation for the six-litter feeder pig system — 48 sows.



on the data presented in the Appendix, Table 27). Adding ownership costs and operating costs gives a total annual cost (less labor) of \$22,201.53 (\$231.26 per litter). The estimated hours of labor required annually for this system are 1,194 (12.4 hours per litter). A charge for the hours of labor has not been deducted from the net returns. Net returns to labor and management for the average year of operation for the six-litter system equal \$9,677.20 (\$100.81 per litter) or \$8.10 per hour.

Table 8. Medium investment facilities for 48-sow, 6-litter feeder pig production system.

Item	Size and Description	Units	Estimated cost per unit	Total Cost
<u>Farrowing facilities — 16 farrowing crates over partially slatted floor¹</u>				
Building with 6' manure pit ²	24' x 46'	1,104 sq. ft.	\$ 13.00	\$14,352.00
Farrowing crates (includes feeders and waterers)	metal	16	180.00	2,880.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Heating	space heater and heat lamps	—	—	550.00
Ventilation	3 fans	2,560 cfm ³	—	195.00
Total				<u>\$18,997.00</u>
<u>Nursery facilities — remodeled partially slatted nursery barn of 6 pens (6' x 17') 144 pig capacity¹</u>				
Building with 6' manure pit ²	20' x 36'	720 sq. ft.	\$ 8.00	\$ 5,760.00
Fencing and gates	concrete and steel tubing	120 ft.	6.50	780.00
Feeders	stainless steel, 5 holes per side	3	85.00	255.00
Waterers	nipple	6	12.00	72.00
Feed bin and delivery system	4.4 ton, augered	—	—	1,050.00
Heating	space heater	1	350.00	350.00
Ventilation	3 fans	3,480 cfm.	—	245.00
Total				<u>\$ 8,512.00</u>
<u>Sow and boar pens — portable buildings on permanent dirt lots (48 sows, 21 gilts, 3 boars)</u>				
Shelters (wood)	10' x 14'	6	\$380.00	\$ 2,280.00
Concrete feeding slab	7' x 100'	700 sq. ft.	.70	490.00
Feeding fence	wooden	100 ft.	2.50	250.00
Waterers	2 hole, frost-proof	4	110.00	440.00
Fencing	woven wire	280 ft.	6.00	1,680.00
Feed bin and delivery system	3 ton, augered	—	—	1,020.00
Total				<u>\$ 6,160.00</u>
<u>Equipment and Machinery</u>				
Miscellaneous equipment (includes stand-by generator, high pressure sprayer scales, incinerator, loading chute, etc.)				\$ 5,500.00
Liquid manure spreader	1,500 gal. vacuum	—	—	5,000.00
Total				<u>\$10,500.00</u>
Total facilities investment				<u>\$44,169.00</u>
Investment per litter produced annually (96 litters)				460.09
Investment per pig produced yearly (32 pigs)				60.34

¹ Based on the designs and recommendations developed by Jacobson and Jordan (1976).

² Building includes plumbing, wiring, ventilation ducts, insulation, slats, pits, wash room, office space, and labor.

³ Based on the designs and recommendations developed by Ryan (1971a).

Appendix A

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Table 20. Growing and finishing rations for hogs and replacement gilts.

Feed ingredient	Ration	
	Growing — percent*	Finishing — percent*
Ground yellow corn ¹	80.5	86.6
Soybean meal solvent (48.5 percent protein) ²	17.0	10.7
Dicalcium phosphate	1.0	1.2
Ground limestone	0.9	0.9
Salt ³	0.3	0.3
Vitamin trace-mineral premix	0.3	0.3
Composition		
Protein (percent)	16.0	13.0
Calcium (percent)	.65	.5
Phosphorous (percent)	.50	.5

¹ Ground barley or milo can replace corn in all feed rations. Add 10 pounds/ton.

² If soybean meal (44 percent) is fed instead of the 48.5 percent, increase the amount of soybean meal (48.5 percent) and reduce the amount of corn by 12 percent.

³ The trace mineralized salt should contain at least .008 percent iodine.

* Based on feed rations recommended by Hawton and Meade (1973).

Table 21. Feeding rations for gilts and sows (prebreeding and gestation) and boars.

Feed ingredient	Gilts and sows*	Boars**
	percent	percent
Ground yellow corn ¹	80.1	80.3
Soybean meal, solvent 48.5 percent ¹	16.2	16.2
Dicalcium phosphate	1.4	1.2
Ground limestone	1.3	1.3
Salt ¹	0.5	0.5
Vitamin trace-mineral premix	0.5	0.5
Composition		
Protein	15.0	15.0
Calcium	.9	.8
Phosphorous	.6	.6

¹ See footnotes 1-3, Table 20.

* Based on feed rations recommended by Hawton and Meade (1972b).

** Based on feed rations recommended by Hawton and Christians (1973).

Table 22. Farrowing and lactation ration for gilts and sows.

Feed ingredient	Farrowing* percent	Lactation* percent
Ground yellow corn ¹	57.0	78.0
Soybean meal, solvent 48.5 percent ¹	15.0	18.5
Ground oats	10.0	—
Wheat bran	10.0	—
Dehydrated alfalfa meal	5.0	—
Dicalcium phosphate	1.0	1.3
Ground limestone	1.0	1.2
Salt ¹	0.5	0.5
Vitamin trace-mineral premix	0.5	0.5
Composition		
Protein (percent)	16.0	16.0
Calcium (percent)	.84	.80
Phosphorous (percent)	.59	.55

¹ See footnotes 1-3, Table 20.

* Based on feed rations recommended by Hawton and Meade (1975).

Table 23. Feeder pig rations.

Feed ingredient	Creep* percent	Starter* percent
Finely ground corn ¹	44.7	71.5
Soybean meal, solvent, 48.5 percent ¹	22.0	25.0
Rolled oats	20.0	—
Sugar (sucrose)	10.0	—
Dicalcium phosphate	1.3	1.3
Limestone	1.0	1.2
Trace mineralized salt ¹	0.5	0.5
Vitamin-antibiotic premix	0.5	0.5
Composition		
Protein	18.0	18.0
Calcium	.8	.8
Phosphorous	.6	.6

¹ See footnotes 1-3, Table 20.

* Based on feed rations recommended by Hawton and Meade (1972a).

Table 24. Average monthly feeder pig prices, Little Falls, Minnesota (\$/head).

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for Year	Standard Deviation	Coefficient of Variation
1968	14.25	15.12	16.45	16.28	15.60	14.45	13.94	14.35	15.31	13.66	13.13	13.66	14.68	1.07	.07
1969	12.44	13.88	16.23	17.28	17.55	17.74	18.00	18.21	19.03	19.97	19.99	23.38	17.81	2.85	.16
1970	24.72	25.44	26.91	24.34	21.50	18.50	16.44	14.25	13.44	11.72	9.84	9.87	18.08	6.34	.35
1971	10.30	12.71	13.94	13.78	14.22	12.62	11.93	12.32	12.47	14.73	14.40	16.03	13.29	1.52	.11
1972	20.75	22.25	22.25	23.25	23.00	22.00	23.00	22.00	23.00	23.00	22.50	23.75	22.56	.78	.03
1973	25.15	29.13	32.50	30.62	30.62	26.65	35.00	38.25	31.40	30.56	31.31	29.91	30.93	3.43	.11
1974	30.62	31.18	28.90	27.18	20.87	14.81	17.57	14.85	15.37	17.45	18.50	22.58	21.66	6.27	.29
1975	25.50	28.16	35.15	36.37	39.10	38.87	40.50	40.37	48.25	50.70	43.16	42.50	39.05	7.25	.19
1976	42.85	46.00	46.25	47.70	45.00	37.80	30.80	28.60	25.60	20.00	19.60	22.75	34.41	11.01	.32
1977	25.31	31.50	34.13	38.00	38.19	33.86	34.90	37.83	35.67	34.85	30.75	31.38	33.86	3.71	.11
Average for Month	23.19	25.54	27.27	27.48	26.57	23.73	24.21	24.10	23.95	23.66	22.32	23.58	24.63	1.67	.07
Standard deviation	9.58	10.14	10.23	10.82	10.92	9.96	10.22	11.20	11.56	11.98	10.09	9.45	9.18	10.17	
Seasonal index	98.3	108.1	114.9	114.4	109.6	96.9	97.2	94.3	93.8	92.0	87.5	92.9	100.00		.41

Table 25. Annual cost summary for equipment and livestock for 32-sow, four-litter feeder pig system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/ year	Total operating/ year	Years life
Remodeled barn	200.00	hd.	16,055.00	1,070.40	722.52	48.17	48.17	214.08	0	15.00	1,166.74	214.08	15.00
Farrowing house equipment	16.00	hd.	3,205.00	400.63	144.22	9.62	0	40.06	0	6.10	410.24	40.06	8.00
Nursery partly slatted equipment	144.00	hd.	2,745.00	343.13	123.52	8.24	0	34.31	0	3.40	351.36	34.31	8.00
Sow shelter and fence	72.00	hd.	4,708.00	588.50	211.86	14.12	14.12	117.70	0	12.00	616.75	117.70	8.00
Misc. production equipment	1.00		5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	1.00	hd.	160.00	0	14.00	.96	0	0	0	-0	.96	0	
Sow	1.00	hd.	200.00	0	18.00	1.20	0	0	0	-0	1.20	0	
Boar	1.00	hd.	400.00	0	36.00	2.40	0	0	0	-0	2.40	0	

Table 26. Monthly cash flows for the 32-sow feeder pig four-litter system for first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Dollars														
Cash receipts														
Feeder pigs	1.0	0	0	0	0	0	0	0	3942.	0	0	0	0	3942.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	3846.	0	0	3846.
Gilts	1.0	0	0	394.	0	394.	0	0	0	197.	0	197.	0	1183.
Open sows	1.0	0	0	0	0	0	0	0	0	115.	0	115.	0	230.
Cull sows	1.0	0	0	0	0	0	0	333.	0	333.	0	0	0	666.
Boars	1.0	0	0	0	0	0	0	0	0	0	0	311.	0	311.
Total		0	0	394.	0	394.	0	333.	3942.	645.	3846.	623.	0	10177.
Dollars														
Cash expenses														
Corn	1.0	127.	93.	156.	167.	149.	271.	361.	235.	374.	336.	222.	243.	2734.
Soybean meal 48.5	1.0	58.	43.	71.	76.	68.	159.	222.	121.	224.	182.	102.	123.	1449.
Dical phosphate	1.0	8.	5.	9.	10.	9.	16.	22.	14.	22.	20.	13.	14.	163.
Ground limestone	1.0	2.	1.	2.	2.	2.	4.	5.	3.	5.	4.	3.	3.	35.
Salt	1.0	0.	0.	1.	1.	0.	1.	1.	1.	1.	1.	1.	1.	9.
Vitamins — trace minerals	1.0	1.	0.	1.	1.	1.	1.	2.	1.	2.	2.	1.	1.	14.
Rolled oats	1.0	0	0	0	0	0	12.	0	10.	3.	0	0	13.	38.
Wheat bran	1.0	0	0	0	0	0	3.	0	3.	0	0	0	3.	8.
Dehydrated alfalfa meal	1.0	0	0	0	0	0	1.	0	1.	0	0	0	1.	3.
Sugar (sucrose)	1.0	0	0	0	0	0	10.	0	7.	3.	0	0	11.	31.
Grinding and mixing	1.0	7.	5.	9.	10.	9.	16.	22.	14.	23.	20.	13.	15.	165.
Insurance and taxes	1.0	0	0	0	0	0	0	478.	0	0	0	0	0	478.
Veterinarian and medicine	1.0	5.	5.	10.	10.	10.	51.	30.	51.	30.	30.	30.	51.	313.
Electricity and fuel	1.0	2.	2.	2.	2.	0	2.	18.	24.	17.	0	0	80.	149.
Bedding	1.0	48.	0	0	0	0	0	48.	0	0	0	0	0	96.
Hauling and marketing	1.0	0	0	15.	0	15.	0	14.	151.	27.	151.	18.	0	391.
Boars	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Gilts	1.0	3200.	0	3200.	0	0	0	960.	0	960.	0	0	0	8320.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Remodeled barn	1.0	0	5352.	0	0	10704.	0	0	0	0	0	0	0	16056.
Farrowing equipment	1.0	0	0	0	0	3205.	0	0	0	0	0	0	0	3205.
Nursery equipment	1.0	0	0	0	0	0	2745.	0	0	0	0	0	0	2745.
Sow quarters	1.0	0	0	0	4708.	0	0	0	0	0	0	0	0	4708.
Manure spreader	1.0	0	0	0	0	0	0	0	1500.	0	0	0	0	1500.
Manure loader	1.0	0	0	0	0	0	1000.	0	0	0	0	0	0	1000.
Miscellaneous equipment	1.0	1500.	500.	500.	1000.	500.	500.	1000.	0	0	0	0	0	5500.
Repairs and maintenance	1.0	0	0	0	46.	46.	46.	46.	46.	46.	46.	46.	46.	414.
Tractor (fuel, lubrication, repair)		0	0	0	0	0	0	3.	0	15.	0	0	0	18.
Machine (fuel, lubrication, repair)		0	0	0	0	0	0	0	0	4.	0	0	0	4.
Equipment (fuel, lubrication, repair)		2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	21.
Total		6120.	6029.	3997.	6054.	14739.	4860.	3253.	2204.	1778.	813.	470.	628.	50947.
Dollars														
Flow of funds summary														
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		-6120.	-6029.	-3603.	-6054.	-14345.	-4860.	-2920.	1738.	-1132.	3032.	153.	-628.	-40769.
= Current cash balance		-5120.	-5029.	-2603.	-5054.	-13345.	-3860.	-1920.	2738.	-132.	4032.	1153.	372.	
+ Money borrowed		6120.	6029.	3603.	6054.	14345.	4860.	2920.	0	1132.	0	0	628.	45691.
- Payment on loan		0	0	0	0	0	0	0	411.	0	2371.	0	0	2782.
- Interest paid at 9 percent		0	0	0	0	0	0	0	1327.	0	661.	153.	0	2141.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Dollars														
Current loan summary														
- Loan out — Jan. 1														
Accumulated borrowing		6120.	12149.	15752.	21806.	36151.	41011.	43932.	43521.	44653.	42282.	42282.	42910.	
- Accrued interest — Jan. 1														
Accrued interest at 9 percent		0	46.	137.	255.	419.	690.	997.	0	326.	0	164.	481.	
- Accrued total debt — Jan. 1														
Accumulated total debt		6120.	12195.	15889.	22061.	36570.	41701.	44929.	43521.	44980.	42282.	42447.	43392.	

Table 26 (continued). Monthly cash flows for the 32-sow feeder pig four-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts		Dollars												
Feeder pigs	1.0	0	4929.	0	0	0	0	0	0	0	0	0	0	4929.
Feeder pigs	1.0	0	0	0	5217.	0	0	0	0	0	0	0	0	5217.
Feeder pigs	1.0	0	0	0	0	0	0	0	4408.	0	0	0	0	4408.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	4300.	0	0	4300.
Gilts	1.0	0	0	99.	0	99.	0	0	0	99.	0	99.	0	394.
Open sows	1.0	0	0	230.	0	230.	0	0	0	230.	0	230.	0	922.
Cull sows	1.0	222.	0	0	222.	0	0	222.	0	222.	0	0	0	888.
Boars	1.0	0	0	0	0	0	0	0	0	0	0	311.	0	311.
Total		222.	4929.	329.	5439.	329.	0	222.	4408.	551.	4300.	640.	0	21368.
Cash expenses		Dollars												
Corn	1.0	419.	271.	405.	352.	193.	215.	394.	359.	395.	302.	224.	357.	3885.
Soybean meal 48.5	1.0	254.	146.	232.	211.	86.	108.	232.	212.	244.	163.	97.	194.	2180.
Dical phosphate	1.0	25.	16.	24.	21.	11.	13.	24.	22.	24.	18.	13.	21.	231.
Ground limestone	1.0	5.	4.	5.	4.	2.	3.	5.	5.	5.	4.	3.	4.	49.
Salt	1.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	13.
Vitamins — trace minerals	1.0	2.	1.	2.	2.	1.	1.	2.	2.	2.	1.	1.	2.	20.
Rolled oats	1.0	0	6.	8.	0	0	10.	3.	13.	0.	0	0	13.	52.
Wheat bran	1.0	0	2.	0	0	0	3.	0	3.	0	0	0	3.	11.
Dehydrated alfalfa meal	1.0	0	1.	0	0	0	1.	0	1.	0	0	0	1.	4.
Sugar (sucrose)	1.0	0	3.	8.	0	0	7.	4.	11.	1.	0	0	11.	45.
Grinding and mixing	1.0	26.	16.	25.	21.	11.	13.	24.	22.	24.	18.	13.	22.	237.
Insurance and taxes	1.0	0	0	0	0	0	0	517.	0	63.	0	0	0	580.
Veterinarian and medicine	1.0	30.	51.	30.	30.	30.	51.	30.	51.	30.	30.	30.	51.	444.
Electricity and fuel	1.0	78.	98.	46.	2.	0	2.	18.	24.	17.	0	0	80.	365.
Bedding	1.0	48.	0	0	0	0	0	48.	0	0	0	0	0	96.
Hauling and marketing	1.0	10.	164.	13.	174.	13.	0	10.	169.	23.	169.	31.	0	776.
Boars	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Tractor (fuel, lubrication, repairs)		3.	0	15.	0	0	0	3.	0	15.	0	0	0	36.
Machine (fuel, lubrication, repairs)		0	0	4.	0	0	0	0	0	4.	0	0	0	8.
Equipment (fuel, lubrication, repairs)		37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	441.
Total		2099.	837.	876.	875.	405.	484.	1373.	951.	904.	762.	468.	818.	10852.
Flow of funds summary		Dollars												
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		-1877.	4092.	-547.	4564.	-76.	-484.	-1151.	3456.	-353.	3538.	171.	-818.	10516
= Current cash balance		-877.	5092.	453.	5564.	924.	516.	-151.	4456.	647.	4538.	1171.	182.	
+ Money borrowed		1877.	0	547.	0	76.	484.	1151.	0	353.	0	0	818.	5306.
- Payment on loan		0	2953.	0	3932.	0	0	0	2285.	0	2967.	0	0	12137.
- Interest paid at 9 percent		0	1139.	0	632.	0	0	0	1171.	0	571.	171.	0	3684.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary		Dollars												
\$42,910.00 Loan out — Jan. 1														
Accumulated borrowing		44787.	41834.	42380.	38449.	38524.	39008.	40159.	37874.	38227.	35260.	35260.	36077.	
\$481.00 Accrued interest — Jan. 1														
Accrued interest at 9 percent		803.	0	314.	0	288.	577.	870.	0	284.	0	93.	358.	
\$43,391.00 Accrued total debt — Jan. 1														
Accumulated total debt		45590.	41834.	42694.	38449.	38813.	39585.	41029.	37874.	38511.	35260.	35353.	36435.	

Table 27. Annual cost summary for equipment and livestock for 48-sow, six-litter feeder pig system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/year	Total operating/year	Years life
Farrowing house partly slatted	16.00	hd.	14,352.00	956.80	645.84	43.06	43.06	95.68	0	7.30	1,042.91	95.68	15.00
Farrowing house equipment	16.00	hd.	4,645.00	580.63	209.02	13.94	0	58.06	0	6.10	594.56	58.06	8.00
Nursery partly slatted	140.00	hd.	5,760.00	384.00	259.20	17.28	17.28	38.40	0	4.30	418.56	38.40	15.00
Nursery partly slatted equipment	140.00	hd.	2,752.00	344.00	123.84	8.26	0	34.40	0	3.40	352.26	34.40	8.00
Sow shelter and fence	72.00	hd.	6,160.00	770.00	277.20	18.48	18.48	154.00	0	12.00	806.96	154.00	8.00
Misc. production equipment	1.00		5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	21.00	hd.	160.00	0	14.40	.96	0	0	0		.96	0	
Sow	48.00	hd.	200.00	0	18.00	1.20	0	0	0		1.20	0	
Boar	3.00	hd.	400.00	0	36.00	2.40	0	0	0		2.40	0	

Table 28. Monthly cash flows for the 48-sow feeder pig six-litter system in first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
								Dollars						
Cash receipts														
Feeder pigs	1.0	0	0	0	0	0	0	0	0	4063.	0	0	0	4063.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	3757.	0	3757.
Gilts	1.0	0	0	0	394.	0	394.	0	592.	0	99.	0	99.	1578.
Open sows	1.0	0	0	0	0	0	0	0	0	0	346.	0	230.	576.
Cull sows	1.0	0	0	0	0	0	0	0	222.	0	222.	0	222.	666.
Boar	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		0	0	0	394.	0	394.	0	814.	4063.	666.	3757.	551.	10640.
								Dollars						
Cash expenses														
Corn	1.0	84.	101.	176.	159.	229.	227.	371.	398.	392.	466.	453.	496.	3553.
Soybean meal 48.5	1.0	39.	46.	81.	73.	105.	104.	205.	240.	215.	272.	233.	286.	1898.
Dical phosphate	1.0	5.	6.	11.	9.	14.	14.	23.	24.	23.	28.	26.	30.	213.
Limestone	1.0	1.	1.	2.	2.	3.	3.	5.	5.	5.	6.	6.	6.	46.
Sale	1.0	0.	0.	1.	1.	1.	1.	1.	1.	1.	2.	1.	2.	12.
Vitamins — trace minerals	1.0	0.	1.	1.	1.	1.	1.	2.	2.	2.	2.	2.	3.	18.
Rolled oats	1.0	0	0	0	0	0	0	12.	0	12.	0	12.	0	37.
Wheat bran	1.0	0	0	0	0	0	0	3.	0	3.	0	3.	0	8.
Dehydrated alfalfa meal	1.0	0	0	0	0	0	0	1.	0	1.	0	1.	0	3.
Sugar (sucrose)	1.0	0	0	0	0	0	0	10.	0	10.	0	10.	0	31.
Grinding and mixing	1.0	5.	6.	10.	9.	13.	13.	23.	25.	24.	28.	27.	30.	214.
Livestock insurance	1.0	0	0	0	0	0	0	450.	0	0	0	0	0	450.
Veterinarian and medicine	1.0	5.	10.	10.	20.	20.	30.	61.	41.	61.	41.	61.	41.	401.
Electricity and fuel	1.0	2.	2.	2.	2.	2.	16.	23.	17.	22.	13.	73.	66.	240.
Bedding	1.0	24.	0	0	0	0	0	24.	0	0	0	0	0	48.
Hauling and marketing	1.0	0	0	0	15.	0	15.	0	32.	147.	27.	147.	23.	406.
Young boar	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Gilts	1.0	3200.	0	3200.	0	3520.	0	960.	0	960.	0	960.	0	12800.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Farrowing house	1.0	0	0	6332.	0	0	12665.	0	0	0	0	0	0	18997.
Nursery	1.0	0	0	0	2837.	0	0	5675.	0	0	0	0	0	8512.
Sow quarters	1.0	6160.	0	0	0	0	0	0	0	0	0	0	0	6160.
Miscellaneous supply equipment	1.0	1500.	500.	500.	1000.	500.	500.	1000.	0	0	0	0	0	5500.
Manure spreader	1.0	0	0	0	0	0	0	0	0	5000.	0	0	0	5000.
Tractor (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	11.	0	0	11.
Machine (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	13.	0	0	13.
Equipment (fuel, lubrication, repairs)		27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	327.
Total		12213.	721.	10372.	4174.	4456.	13636.	8897.	833.	6926.	956.	2064.	1029.	66278.

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Flow of funds summary														
														Dollars
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.
+ Cash difference		-12213.	-721.	-10372.	-3780.	-4456.	-13242.	-8897.	-20.	-2863.	-290.	1694.	-478.	-55638.
= Current cash balance		-11213.	279.	-9372.	-2780.	-3456.	-12242.	-7897.	980.	-1863.	710.	2694.	522.	
+ Money borrowed		12213.	721.	10372.	3780.	4456.	13242.	8897.	20.	2863.	290.	0	478.	57332.
- Payment on loan		0	0	0	0	0	0	0	0	0	0	0	0	0
- Interest paid at 9 percent		0	0	0	0	0	0	0	0	0	0	1694.	0	1694.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary														
														Dollars
- Loan out - Jan. 1														
Accumulated borrowing		12213.	12934.	23306.	27086.	31542.	44784.	53681.	53700.	56563.	56853.	56853.	57331.	
- Accrued interest - Jan. 1														
Accrued interest at 9 percent		0	92.	189.	363.	567.	803.	1139.	1542.	1944.	2369.	1101.	1528.	
- Accrued total debt - Jan. 1														
Accumulated total debt		12213.	13025.	23495.	27449.	32108.	45587.	54820.	55242.	58507.	59222.	57954.	58859.	

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts														
														Dollars
Feeder pigs	1.0	4296.	0	0	0	0	0	0	0	0	0	0	0	4296.
Feeder pigs	1.0	0	0	5239.	0	0	0	0	0	0	0	0	0	5239.
Feeder pigs	1.0	0	0	0	0	4998.	0	0	0	0	0	0	0	4998.
Feeder pigs	1.0	0	0	0	0	0	0	4543.	0	0	0	0	0	4543.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	4384.	0	0	0	4384.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	4057.	0	4057.
Gilts	1.0	0	99.	0	99.	0	99.	0	296.	0	296.	0	99.	986.
Open sows	1.0	0	230.	0	230.	0	230.	0	230.	0	230.	0	230.	1382.
Cull sows	1.0	0	222.	0	222.	0	222.	0	222.	0	222.	0	222.	1332.
Boar	1.0	0	311.	0	0	0	0	0	0	0	0	0	0	311.
Total		4296.	862.	5239.	551.	4998.	551.	4543.	748.	4384.	748.	4057.	551.	31528.
Cash expenses														
														Dollars
Corn	1.0	513.	461.	479.	491.	453.	502.	421.	509.	442.	541.	486.	547.	5843.
Soybean meal 48.5	1.0	251.	271.	244.	290.	241.	294.	223.	293.	242.	305.	267.	306.	3227.
Dical phosphate	1.0	30.	27.	28.	29.	27.	30.	25.	30.	26.	32.	29.	32.	347.
Limestone	1.0	6.	6.	6.	6.	6.	6.	5.	6.	6.	7.	6.	7.	74.
Salt	1.0	2.	2.	2.	2.	2.	2.	1.	2.	1.	2.	2.	2.	19.
Vitamins - trace minerals	1.0	2.	2.	2.	3.	2.	3.	2.	3.	2.	3.	2.	3.	29.
Rolled oats	1.0	13.	0	13.	0	13.	0	13.	0	13.	0	13.	0	79.
Wheat bran	1.0	3.	0	3.	0	3.	0	3.	0	3.	0	3.	0	17.
Dehydrated alfalfa meal	1.0	1.	0	1.	0	1.	0	1.	0	1.	0	1.	0	7.
Sugar (sucrose)	1.0	11.	0	11.	0	11.	0	11.	0	11.	0	11.	0	68.
Grinding and mixing	1.0	31.	28.	29.	30.	28.	30.	26.	31.	27.	33.	30.	33.	355.
Insurance and taxes	1.0	0	0	0	0	0	0	653.	0	0	79.	0	0	732.
Veterinarian and medicine	1.0	61.	41.	61.	41.	61.	41.	61.	41.	61.	41.	61.	41.	613.
Electricity and fuel	1.0	91.	61.	77.	13.	18.	16.	23.	17.	22.	13.	73.	66.	490.
Bedding	1.0	24.	0	0	0	0	0	24.	0	0	0	0	0	48.
Hauling and marketing	1.0	158.	40.	162.	23.	163.	23.	169.	23.	167.	23.	169.	23.	1143.
Young boar	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Tractor (fuel, lubrication, repairs)		0	0	17.	0	0	0	0	0	0	17.	0	0	34.

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Machine (fuel, lubrication, repairs)		0	0	19.	0	0	0	0	0	0	19.	0	0	38.
Equipment (fuel, lubrication, repairs)		35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	415.
Total		2391.	994.	1209.	982.	1083.	1001.	1716.	1010.	1080.	1169.	1209.	1114.	14959.
Flow of funds summary								Dollars						
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		1904.	-132.	4030.	-431.	3915.	-450.	2827.	-262.	3304.	-421.	2848.	-563.	16569.
= Current cash balance		2904.	868.	5030.	569.	4915.	550.	3827.	738.	4304.	579.	3848.	437.	
+ Money borrowed		0	132.	0	431.	0	450.	0	262.	0	421.	0	563.	2259.
- Payment on loan		0	0	3115.	0	3097.	0	2048.	0	2551.	0	2128.	0	12939.
- Interest paid at 9 percent		1904.	0	915.	0	818.	0	779.	0	753.	0	720.	0	5889.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary								Dollars						
\$57,331.00 Loan out - Jan. 1														
Accumulated borrowing		57331.	57463.	54348.	54779.	51683.	52133.	50085.	50346.	47796.	48216.	46089.	46651.	
\$1,528.00 Accrued interest - Jan. 1														
Accrued interest at 9 percent		54.	484.	0	408.	0	388.	0	376.	0	358.	0	346.	
\$58,859.00 Accrued total debt - Jan. 1														
Accumulated total debt		57385.	57947.	54348.	55187.	51683.	52521.	50085.	50722.	47796.	48575.	46089.	46997.	

Table 29. Annual cost summary for equipment and livestock for continuous farrowing feeder pig production system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/year	Total operating/year	Years life
Farrowing house slatted	16.00	hd.	16,560.00	1,104.00	745.20	49.68	49.68	110.40	0	14.40	1,203.36	110.40	8.00
Farrowing house equipment	16.00	hd.	4,965.00	620.63	223.42	14.90	0	62.06	0	12.00	635.52	62.06	15.00
Nursery totally slatted equipment	280.00	hd.	10,488.00	699.20	471.96	31.46	31.46	69.92	0	8.80	762.13	69.92	15.00
Nursery totally slatted equipment	280.00	hd.	3,896.00	487.00	175.32	11.69	0	48.70	0	7.00	498.69	48.70	8.00
Gestation house totally slatted	150.00	hd.	25,992.00	1,732.80	1,169.64	77.98	77.98	173.28	0	4.40	1,888.75	173.28	15.00
Gestation house totally slatted equipment	150.00	hd.	7,168.00	896.00	322.56	21.50	0	89.60	0	12.00	917.50	89.60	8.00
Misc. production equipment	1.00		5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	1.00	hd.	160.00	0	14.40	.96	0	0	0		.96	0	
Sow	1.00	hd.	200.00	0	18.00	1.20	0	0	0		1.20	0	
Boar	1.00	hd.	400.00	0	36.00	2.40	0	0	0		1.40	0	

Table 22. Farrowing and lactation ration for gilts and sows.

Feed ingredient	Farrowing* percent	Lactation* percent
Ground yellow corn ¹	57.0	78.0
Soybean meal, solvent 48.5 percent ¹	15.0	18.5
Ground oats	10.0	—
Wheat bran	10.0	—
Dehydrated alfalfa meal	5.0	—
Dicalcium phosphate	1.0	1.3
Ground limestone	1.0	1.2
Salt ¹	0.5	0.5
Vitamin trace-mineral premix	0.5	0.5
Composition		
Protein (percent)	16.0	16.0
Calcium (percent)	.84	.80
Phosphorous (percent)	.59	.55

¹ See footnotes 1-3, Table 20.

* Based on feed rations recommended by Hawton and Meade (1975).

Table 23. Feeder pig rations.

Feed ingredient	Creep* percent	Starter* percent
Finely ground corn ¹	44.7	71.5
Soybean meal, solvent, 48.5 percent ¹	22.0	25.0
Rolled oats	20.0	—
Sugar (sucrose)	10.0	—
Dicalcium phosphate	1.3	1.3
Limestone	1.0	1.2
Trace mineralized salt ¹	0.5	0.5
Vitamin-antibiotic premix	0.5	0.5
Composition		
Protein	18.0	18.0
Calcium	.8	.8
Phosphorous	.6	.6

¹ See footnotes 1-3, Table 20.

* Based on feed rations recommended by Hawton and Meade (1972a).

Table 24. Average monthly feeder pig prices, Little Falls, Minnesota (\$/head).

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for Year	Standard Deviation	Coefficient of Variation
1968	14.25	15.12	16.45	16.28	15.60	14.45	13.94	14.35	15.31	13.66	13.13	13.66	14.68	1.07	.07
1969	12.44	13.88	16.23	17.28	17.55	17.74	18.00	18.21	19.03	19.97	19.99	23.38	17.81	2.85	.16
1970	24.72	25.44	26.91	24.34	21.50	18.50	16.44	14.25	13.44	11.72	9.84	9.87	18.08	6.34	.35
1971	10.30	12.71	13.94	13.78	14.22	12.62	11.93	12.32	12.47	14.73	14.40	16.03	13.29	1.52	.11
1972	20.75	22.25	22.25	23.25	23.00	22.00	23.00	22.00	23.00	23.00	22.50	23.75	22.56	.78	.03
1973	25.15	29.13	32.50	30.62	30.63	26.65	35.00	38.25	31.40	30.56	31.31	29.91	30.93	3.43	.11
1974	30.62	31.18	28.90	27.18	20.87	14.81	17.57	14.85	15.37	17.45	18.50	22.58	21.66	6.27	.29
1975	25.50	28.16	35.15	36.37	39.10	38.87	40.50	40.37	48.25	50.70	43.16	42.50	39.05	7.25	.19
1976	42.85	46.00	46.25	47.70	45.00	37.80	30.80	28.60	25.60	20.00	19.60	22.75	34.41	11.01	.32
1977	25.31	31.50	34.13	38.00	38.19	33.86	34.90	37.83	35.67	34.85	30.75	31.38	33.86	3.71	.11
Average for Month	23.19	25.54	27.27	27.48	26.57	23.73	24.21	24.10	23.95	23.66	22.32	23.58	24.63	1.67	.07
Standard deviation	9.58	10.14	10.23	10.82	10.92	9.96	10.22	11.20	11.56	11.98	10.09	9.45	9.18	10.17	
Seasonal index	98.3	108.1	114.9	114.4	109.6	96.9	97.2	94.3	93.8	92.0	87.5	92.9	100.00		.41

Table 25. Annual cost summary for equipment and livestock for 32-sow, four-litter feeder pig system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/ year	Total operating/ year	Years life
Remodeled barn	200.00	hd.	16,055.00	1,070.40	722.52	48.17	48.17	214.08	0	15.00	1,166.74	214.08	15.00
Farrowing house equipment	16.00	hd.	3,205.00	400.63	144.22	9.62	0	40.06	0	6.10	410.24	40.06	8.00
Nursery partly slatted equipment	144.00	hd.	2,745.00	343.13	123.52	8.24	0	34.31	0	3.40	351.36	34.31	8.00
Sow shelter and fence	72.00	hd.	4,708.00	588.50	211.86	14.12	14.12	117.70	0	12.00	616.75	117.70	8.00
Misc. production equipment	1.00		5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	1.00	hd.	160.00	0	14.00	.96	0	0	0	-0	.96	0	
Sow	1.00	hd.	200.00	0	18.00	1.20	0	0	0	-0	1.20	0	
Boar	1.00	hd.	400.00	0	36.00	2.40	0	0	0	-0	2.40	0	

Table 26. Monthly cash flows for the 32-sow feeder pig four-litter system for first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts														
Dollars														
Feeder pigs	1.0	0	0	0	0	0	0	0	3942.	0	0	0	0	3942.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	3846.	0	0	3846.
Gilts	1.0	0	0	394.	0	394.	0	0	0	197.	0	197.	0	1183.
Open sows	1.0	0	0	0	0	0	0	0	0	115.	0	115.	0	230.
Cull sows	1.0	0	0	0	0	0	0	333.	0	333.	0	0	0	666.
Boars	1.0	0	0	0	0	0	0	0	0	0	0	311.	0	311.
Total		0	0	394.	0	394.	0	333.	3942.	645.	3846.	623.	0	10177.
Cash expenses														
Dollars														
Corn	1.0	127.	93.	156.	167.	149.	271.	361.	235.	374.	336.	222.	243.	2734.
Soybean meal 48.5	1.0	58.	43.	71.	76.	68.	159.	222.	121.	224.	182.	102.	123.	1449.
Dical phosphate	1.0	8.	5.	9.	10.	9.	16.	22.	14.	22.	20.	13.	14.	163.
Ground limestone	1.0	2.	1.	2.	2.	2.	4.	5.	3.	5.	4.	3.	3.	35.
Salt	1.0	0.	0.	1.	1.	0.	1.	1.	1.	1.	1.	1.	1.	9.
Vitamins — trace minerals	1.0	1.	0.	1.	1.	1.	1.	2.	1.	2.	2.	1.	1.	14.
Rolled oats	1.0	0	0	0	0	0	12.	0	10.	3.	0	0	13.	38.
Wheat bran	1.0	0	0	0	0	0	3.	0	3.	0	0	0	3.	8.
Dehydrated alfalfa meal	1.0	0	0	0	0	0	1.	0	1.	0	0	0	1.	3.
Sugar (sucrose)	1.0	0	0	0	0	0	10.	0	7.	3.	0	0	11.	31.
Grinding and mixing	1.0	7.	5.	9.	10.	9.	16.	22.	14.	23.	20.	13.	15.	165.
Insurance and taxes	1.0	0	0	0	0	0	0	478.	0	0	0	0	0	478.
Veterinarian and medicine	1.0	5.	5.	10.	10.	10.	51.	30.	51.	30.	30.	30.	51.	313.
Electricity and fuel	1.0	2.	2.	2.	2.	0	2.	18.	24.	17.	0	0	80.	149.
Bedding	1.0	48.	0	0	0	0	0	48.	0	0	0	0	0	96.
Hauling and marketing	1.0	0	0	15.	0	15.	0	14.	151.	27.	151.	18.	0	391.
Boars	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Gilts	1.0	3200.	0	3200.	0	0	0	960.	0	960.	0	0	0	8320.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Remodeled barn	1.0	0	5352.	0	0	10704.	0	0	0	0	0	0	0	16056.
Farrowing equipment	1.0	0	0	0	0	3205.	0	0	0	0	0	0	0	3205.
Nursery equipment	1.0	0	0	0	0	0	2745.	0	0	0	0	0	0	2745.
Sow quarters	1.0	0	0	0	4708.	0	0	0	0	0	0	0	0	4708.
Manure spreader	1.0	0	0	0	0	0	0	0	1500.	0	0	0	0	1500.
Manure loader	1.0	0	0	0	0	0	1000.	0	0	0	0	0	0	1000.
Miscellaneous equipment	1.0	1500.	500.	500.	1000.	500.	500.	1000.	0	0	0	0	0	5500.
Repairs and maintenance	1.0	0	0	0	46.	46.	46.	46.	46.	46.	46.	46.	46.	414.
Tractor (fuel, lubrication, repair)		0	0	0	0	0	0	3.	0	15.	0	0	0	18.
Machine (fuel, lubrication, repair)		0	0	0	0	0	0	0	0	4.	0	0	0	4.
Equipment (fuel, lubrication, repair)		2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	21.
Total		6120.	6029.	3997.	6054.	14739.	4860.	3253.	2204.	1778.	813.	470.	628.	50947.
Flow of funds summary														
Dollars														
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		-6120.	-6029.	-3603.	-6054.	-14345.	-4860.	-2920.	1738.	-1132.	3032.	153.	-628.	-40769.
= Current cash balance		-5120.	-5029.	-2603.	-5054.	-13345.	-3860.	-1920.	2738.	-132.	4032.	1153.	372.	
+ Money borrowed		6120.	6029.	3603.	6054.	14345.	4860.	2920.	0	1132.	0	0	628.	45691.
- Payment on loan		0	0	0	0	0	0	0	411.	0	2371.	0	0	2782.
- Interest paid at 9 percent		0	0	0	0	0	0	0	1327.	0	661.	153.	0	2141.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary														
Dollars														
- Loan out — Jan. 1														
Accumulated borrowing		6120.	12149.	15752.	21806.	36151.	41011.	43932.	43521.	44653.	42282.	42282.	42910.	
- Accrued interest — Jan. 1														
Accrued interest at 9 percent		0	46.	137.	255.	419.	690.	997.	0	326.	0	164.	481.	
- Accrued total debt — Jan. 1														
Accumulated total debt		6120.	12195.	15889.	22061.	36570.	41701.	44929.	43521.	44980.	42282.	42447.	43392.	

Table 26 (continued). Monthly cash flows for the 32-sow feeder pig four-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts		Dollars												
Feeder pigs	1.0	0	4929.	0	0	0	0	0	0	0	0	0	0	4929.
Feeder pigs	1.0	0	0	0	5217.	0	0	0	0	0	0	0	0	5217.
Feeder pigs	1.0	0	0	0	0	0	0	0	4408.	0	0	0	0	4408.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	4300.	0	0	4300.
Gilts	1.0	0	0	99.	0	99.	0	0	0	99.	0	99.	0	394.
Open sows	1.0	0	0	230.	0	230.	0	0	0	230.	0	230.	0	922.
Cull sows	1.0	222.	0	0	222.	0	0	222.	0	222.	0	0	0	888.
Boars	1.0	0	0	0	0	0	0	0	0	0	0	311.	0	311.
Total		222.	4929.	329.	5439.	329.	0	222.	4408.	551.	4300.	640.	0	21368.
Cash expenses		Dollars												
Corn	1.0	419.	271.	405.	352.	193.	215.	394.	359.	395.	302.	224.	357.	3885.
Soybean meal 48.5	1.0	254.	146.	232.	211.	86.	108.	232.	212.	244.	163.	97.	194.	2180.
Dical phosphate	1.0	25.	16.	24.	21.	11.	13.	24.	22.	24.	18.	13.	21.	231.
Ground limestone	1.0	5.	4.	5.	4.	2.	3.	5.	5.	5.	4.	3.	4.	49.
Salt	1.0	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	13.
Vitamins — trace minerals	1.0	2.	1.	2.	2.	1.	1.	2.	2.	2.	1.	1.	2.	20.
Rolled oats	1.0	0	6.	8.	0	0	10.	3.	13.	0	0	0	13.	52.
Wheat bran	1.0	0	2.	0	0	0	3.	0	3.	0	0	0	3.	11.
Dehydrated alfalfa meal	1.0	0	1.	0	0	0	1.	0	1.	0	0	0	1.	4.
Sugar (sucrose)	1.0	0	3.	8.	0	0	7.	4.	11.	1.	0	0	11.	45.
Grinding and mixing	1.0	26.	16.	25.	21.	11.	13.	24.	22.	24.	18.	13.	22.	237.
Insurance and taxes	1.0	0	0	0	0	0	0	517.	0	63.	0	0	0	580.
Veterinarian and medicine	1.0	30.	51.	30.	30.	30.	51.	30.	51.	30.	30.	30.	51.	444.
Electricity and fuel	1.0	78.	98.	46.	2.	0	2.	18.	24.	17.	0	0	80.	365.
Bedding	1.0	48.	0	0	0	0	0	48.	0	0	0	0	0	96.
Hauling and marketing	1.0	10.	164.	13.	174.	13.	0	10.	169.	23.	169.	31.	0	776.
Boars	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Tractor (fuel, lubrication, repairs)		3.	0	15.	0	0	0	3.	0	15.	0	0	0	36.
Machine (fuel, lubrication, repairs)		0	0	4.	0	0	0	0	0	4.	0	0	0	8.
Equipment (fuel, lubrication, repairs)		37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	441.
Total		2099.	837.	876.	875.	405.	484.	1373.	951.	904.	762.	468.	818.	10852.
Flow of funds summary		Dollars												
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		-1877.	4092.	-547.	4564.	-76.	-484.	-1151.	3456.	-353.	3538.	171.	-818.	10516
= Current cash balance		-877.	5092.	453.	5564.	924.	516.	-151.	4456.	647.	4538.	1171.	182.	
+ Money borrowed		1877.	0	547.	0	76.	484.	1151.	0	353.	0	0	818.	5306.
- Payment on loan		0	2953.	0	3932.	0	0	0	2285.	0	2967.	0	0	12137.
- Interest paid at 9 percent		0	1139.	0	632.	0	0	0	1171.	0	571.	171.	0	3684.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary		Dollars												
\$42,910.00 Loan out — Jan. 1														
Accumulated borrowing		44787.	41834.	42380.	38449.	38524.	39008.	40159.	37874.	38227.	35260.	35260.	36077.	
\$481.00 Accrued interest — Jan. 1														
Accrued interest at 9 percent		803.	0	314.	0	288.	577.	870.	0	284.	0	93.	358.	
\$43,391.00 Accrued total debt — Jan. 1														
Accumulated total debt		45590.	41834.	42694.	38449.	38813.	39585.	41029.	37874.	38511.	35260.	35353.	36435.	

Table 27. Annual cost summary for equipment and livestock for 48-sow, six-litter feeder pig system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/year	Total operating/year	Years life
Farrowing house partly slatted	16.00	hd.	14,352.00	956.80	645.84	43.06	43.06	95.68	0	7.30	1,042.91	95.68	15.00
Farrowing house equipment	16.00	hd.	4,645.00	580.63	209.02	13.94	0	58.06	0	6.10	594.56	58.06	8.00
Nursery partly slatted	140.00	hd.	5,760.00	384.00	259.20	17.28	17.28	38.40	0	4.30	418.56	38.40	15.00
Nursery partly slatted equipment	140.00	hd.	2,752.00	344.00	123.84	8.26	0	34.40	0	3.40	352.26	34.40	8.00
Sow shelter and fence	72.00	hd.	6,160.00	770.00	277.20	18.48	18.48	154.00	0	12.00	806.96	154.00	8.00
Misc. production equipment	1.00	Misc.	5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	21.00	hd.	160.00	0	14.40	.96	0	0	0		.96	0	
Sow	48.00	hd.	200.00	0	18.00	1.20	0	0	0		1.20	0	
Boar	3.00	hd.	400.00	0	36.00	2.40	0	0	0		2.40	0	

Table 28. Monthly cash flows for the 48-sow feeder pig six-litter system in first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts									Dollars					
Feeder pigs	1.0	0	0	0	0	0	0	0	0	4063.	0	0	0	4063.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	3757.	0	3757.
Gilts	1.0	0	0	0	394.	0	394.	0	592.	0	99.	0	99.	1578.
Open sows	1.0	0	0	0	0	0	0	0	0	0	346.	0	230.	576.
Cull sows	1.0	0	0	0	0	0	0	0	222.	0	222.	0	222.	666.
Boar	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		0	0	0	394.	0	394.	0	814.	4063.	666.	3757.	551.	10640.
Cash expenses									Dollars					
Corn	1.0	84.	101.	176.	159.	229.	227.	371.	398.	392.	466.	453.	496.	3553.
Soybean meal 48.5	1.0	39.	46.	81.	73.	105.	104.	205.	240.	215.	272.	233.	286.	1898.
Dical phosphate	1.0	5.	6.	11.	9.	14.	14.	23.	24.	23.	28.	26.	30.	213.
Limestone	1.0	1.	1.	2.	2.	3.	3.	5.	5.	5.	6.	6.	6.	46.
Sale	1.0	0.	0.	1.	1.	1.	1.	1.	1.	1.	2.	1.	2.	12.
Vitamins — trace minerals	1.0	0.	1.	1.	1.	1.	1.	2.	2.	2.	2.	2.	3.	18.
Rolled oats	1.0	0	0	0	0	0	0	12.	0	12.	0	12.	0	37.
Wheat bran	1.0	0	0	0	0	0	0	3.	0	3.	0	3.	0	8.
Dehydrated alfalfa meal	1.0	0	0	0	0	0	0	1.	0	1.	0	1.	0	3.
Sugar (sucrose)	1.0	0	0	0	0	0	0	10.	0	10.	0	10.	0	31.
Grinding and mixing	1.0	5.	6.	10.	9.	13.	13.	23.	25.	24.	28.	27.	30.	214.
Livestock insurance	1.0	0	0	0	0	0	0	450.	0	0	0	0	0	450.
Veterinarian and medicine	1.0	5.	10.	10.	20.	20.	30.	61.	41.	61.	41.	61.	41.	401.
Electricity and fuel	1.0	2.	2.	2.	2.	2.	16.	23.	17.	22.	13.	73.	66.	240.
Bedding	1.0	24.	0	0	0	0	0	24.	0	0	0	0	0	48.
Hauling and marketing	1.0	0	0	0	15.	0	15.	0	32.	147.	27.	147.	23.	406.
Young boar	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Gilts	1.0	3200.	0	3200.	0	3520.	0	960.	0	960.	0	960.	0	12800.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Farrowing house	1.0	0	0	6332.	0	0	12665.	0	0	0	0	0	0	18997.
Nursery	1.0	0	0	0	2837.	0	0	5675.	0	0	0	0	0	8512.
Sow quarters	1.0	6160.	0	0	0	0	0	0	0	0	0	0	0	6160.
Miscellaneous supply equipment	1.0	1500.	500.	500.	1000.	500.	500.	1000.	0	0	0	0	0	5500.
Manure spreader	1.0	0	0	0	0	0	0	0	0	5000.	0	0	0	5000.
Tractor (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	11.	0	0	11.
Machine (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	13.	0	0	13.
Equipment (fuel, lubrication, repairs)		27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	27.	327.
Total		12213.	721.	10372.	4174.	4456.	13636.	8897.	833.	6926.	956.	2064.	1029.	66278.

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Flow of funds summary									Dollars					
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		-12213.	-721.	-10372.	-3780.	-4456.	-13242.	-8897.	-20.	-2863.	-290.	1694.	-478.	-55638.
= Current cash balance		-11213.	279.	-9372.	-2780.	-3456.	-12242.	-7897.	980.	-1863.	710.	2694.	522.	
+ Money borrowed		12213.	721.	10372.	3780.	4456.	13242.	8897.	20.	2863.	290.	0	478.	57332.
- Payment on loan		0	0	0	0	0	0	0	0	0	0	0	0	0
- Interest paid at 9 percent		0	0	0	0	0	0	0	0	0	0	1694.	0	1694.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary									Dollars					
- Loan out - Jan. 1														
Accumulated borrowing		12213.	12934.	23306.	27086.	31542.	44784.	53681.	53700.	56563.	56853.	56853.	57331.	
- Accrued interest - Jan. 1														
Accrued interest at 9 percent		0	92.	169.	363.	567.	803.	1139.	1542.	1944.	2369.	1101.	1528.	
- Accrued total debt - Jan. 1														
Accumulated total debt		12213.	13025.	23495.	27449.	32108.	45587.	54820.	55242.	58507.	59222.	57954.	58859.	

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts									Dollars					
Feeder pigs	1.0	4296.	0	0	0	0	0	0	0	0	0	0	0	4296.
Feeder pigs	1.0	0	0	5239.	0	0	0	0	0	0	0	0	0	5239.
Feeder pigs	1.0	0	0	0	0	4998.	0	0	0	0	0	0	0	4998.
Feeder pigs	1.0	0	0	0	0	0	0	4543.	0	0	0	0	0	4543.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	4384.	0	0	0	4384.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	4057.	0	4057.
Gilts	1.0	0	99.	0	99.	0	99.	0	296.	0	296.	0	99.	986.
Open sows	1.0	0	230.	0	230.	0	230.	0	230.	0	230.	0	230.	1382.
Cull sows	1.0	0	222.	0	222.	0	222.	0	222.	0	222.	0	222.	1332.
Boar	1.0	0	311.	0	0	0	0	0	0	0	0	0	0	311.
Total		4296.	862.	5239.	551.	4998.	551.	4543.	748.	4384.	748.	4057.	551.	31528.
Cash expenses									Dollars					
Corn	1.0	513.	461.	479.	491.	453.	502.	421.	509.	442.	541.	486.	547.	5843.
Soybean meal 48.5	1.0	251.	271.	244.	290.	241.	294.	223.	293.	242.	305.	267.	306.	3227.
Dical phosphate	1.0	30.	27.	28.	29.	27.	30.	25.	30.	26.	32.	29.	32.	347.
Limestone	1.0	6.	6.	6.	6.	6.	6.	5.	6.	6.	7.	6.	7.	74.
Salt	1.0	2.	2.	2.	2.	2.	2.	1.	2.	1.	2.	2.	2.	19.
Vitamins - trace minerals	1.0	2.	2.	2.	3.	2.	3.	2.	3.	2.	3.	2.	3.	29.
Rolled oats	1.0	13.	0	13.	0	13.	0	13.	0	13.	0	13.	0	79.
Wheat bran	1.0	3.	0	3.	0	3.	0	3.	0	3.	0	3.	0	17.
Dehydrated alfalfa meal	1.0	1.	0	1.	0	1.	0	1.	0	1.	0	1.	0	7.
Sugar (sucrose)	1.0	11.	0	11.	0	11.	0	11.	0	11.	0	11.	0	68.
Grinding and mixing	1.0	31.	28.	29.	30.	28.	30.	26.	31.	27.	33.	30.	33.	355.
Insurance and taxes	1.0	0	0	0	0	0	0	653.	0	0	79.	0	0	732.
Veterinarian and medicine	1.0	61.	41.	61.	41.	61.	41.	61.	41.	61.	41.	61.	41.	613.
Electricity and fuel	1.0	91.	61.	77.	13.	18.	16.	23.	17.	22.	13.	73.	66.	490.
Bedding	1.0	24.	0	0	0	0	0	24.	0	0	0	0	0	48.
Hauling and marketing	1.0	158.	40.	162.	23.	163.	23.	169.	23.	167.	23.	169.	23.	1143.
Young boar	1.0	1140.	0	0	0	0	0	0	0	0	0	0	0	1140.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Tractor (fuel, lubrication, repairs)		0	0	17.	0	0	0	0	0	0	17.	0	0	34.

Table 28 (continued). Monthly cash flows for the 48-sow feeder pig six-litter system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Machine (fuel, lubrication, repairs)		0	0	19.	0	0	0	0	0	0	19.	0	0	38.
Equipment (fuel, lubrication, repairs)		35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	35.	415.
Total		2391.	994.	1209.	982.	1083.	1001.	1716.	1010.	1080.	1169.	1209.	1114.	14959.
Flow of funds summary														
														Dollars
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
+ Cash difference		1904.	-132.	4030.	-431.	3915.	-450.	2827.	-262.	3304.	-421.	2848.	-563.	16569.
= Current cash balance		2904.	868.	5030.	569.	4915.	550.	3827.	738.	4304.	579.	3848.	437.	
+ Money borrowed		0	132.	0	431.	0	450.	0	262.	0	421.	0	563.	2259.
- Payment on loan		0	0	3115.	0	3097.	0	2048.	0	2551.	0	2128.	0	12939.
- Interest paid at 9 percent		1904.	0	915.	0	818.	0	779.	0	753.	0	720.	0	5889.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary														Dollars
\$57,331.00 Loan out - Jan. 1														
Accumulated borrowing		57331.	57463.	54348.	54779.	51683.	52133.	50085.	50346.	47796.	48216.	46089.	46651.	
\$1,528.00 Accrued interest - Jan. 1														
Accrued interest at 9 percent		54.	484.	0	408.	0	388.	0	376.	0	358.	0	346.	
\$58,859.00 Accrued total debt - Jan. 1														
Accumulated total debt		57385.	57947.	54348.	55187.	51683.	52521.	50085.	50722.	47796.	48575.	46089.	46997.	

Table 29. Annual cost summary for equipment and livestock for continuous farrowing feeder pig production system.

Item	Size	Unit	List price	Depreciation	Interest	Insurance	Taxes	Repairs	Fuel and lubrication	Hours labor	Total ownership/ year	Total operating/ year	Years life
Farrowing house slatted	16.00	hd.	16,560.00	1,104.00	745.20	49.68	49.68	110.40	0	14.40	1,203.36	110.40	8.00
Farrowing house equipment	16.00	hd.	4,965.00	620.63	223.42	14.90	0	62.06	0	12.00	635.52	62.06	15.00
Nursery totally slatted equipment	280.00	hd.	10,488.00	699.20	471.96	31.46	31.46	69.92	0	8.80	762.13	69.92	15.00
Nursery totally slatted equipment	280.00	hd.	3,896.00	487.00	175.32	11.69	0	48.70	0	7.00	498.69	48.70	8.00
Gestation house totally slatted	150.00	hd.	25,992.00	1,732.80	1,169.64	77.98	77.98	173.28	0	4.40	1,888.75	173.28	15.00
Gestation house totally slatted equipment	150.00	hd.	7,168.00	896.00	322.56	21.50	0	89.60	0	12.00	917.50	89.60	8.00
Misc. production equipment	1.00		5,500.00	687.50	247.50	16.50	0	34.38	0	8.00	704.00	34.38	8.00
Gilt	1.00	hd.	160.00	0	14.40	.96	0	0	0		.96	0	
Sow	1.00	hd.	200.00	0	18.00	1.20	0	0	0		1.20	0	
Boar	1.00	hd.	400.00	0	36.00	2.40	0	0	0		1.40	0	

Table 30. Monthly cash flow per year for a 96-sow feeder pig continuous farrowing production system during first year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts		Dollars												
Feeder pigs	1.0	0	0	0	0	0	0	0	0	3921.	0	0	0	3921.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	3846.	0	0	3846.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	3658.	0	3658.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	0	3883.	3883.
Gilts	1.0	0	0	0	0	197.	197.	493.	296.	0	197.	197.	394.	1972.
Open sows	1.0	0	0	0	0	0	0	0	0	0	230.	230.	461.	922.
Cull sows	1.0	0	0	0	0	0	0	0	222.	222.	222.	222.	222.	1110.
Total		0	0	0	0	197.	197.	493.	518.	4143.	4495.	4307.	4960.	19311.
Cash expenses		Dollars												
Corn	1.0	0	94.	192.	258.	337.	430.	555.	694.	821.	920.	877.	950.	6128.
Soybean meal 48.5	1.0	0	43.	88.	118.	155.	197.	260.	380.	471.	522.	502.	530.	3266.
Supplementary feed	1.0	0	7.	15.	21.	27.	35.	65.	78.	88.	95.	78.	95.	605.
Grinding and mixing	1.0	0	6.	11.	15.	20.	25.	33.	42.	50.	56.	53.	58.	370.
Insurance and taxes	1.0	0	0	0	0	0	0	685.	0	0	78.	0	0	763.
Veterinarian and medicine	1.0	0	10.	20.	30.	45.	65.	94.	94.	94.	94.	94.	94.	734.
Electricity and fuel	1.0	0	1.	1.	1.	1.	1.	62.	62.	62.	71.	152.	157.	571.
Hauling and marketing (culls)	1.0	0	0	0	0	8.	8.	19.	21.	160.	177.	177.	194.	764.
Gilts	1.0	0	3200.	2560.	5760.	2880.	2880.	960.	960.	960.	960.	960.	960.	23040.
Boars	1.0	0	2280.	0	0	0	0	0	0	0	0	0	0	2280.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Gestation house	1.0	11053.	0	0	22107.	0	0	0	0	0	0	0	0	33160.
Farrowing house	1.0	0	0	7175.	0	0	14350.	0	0	0	0	0	0	21525.
Nursery	1.0	0	0	0	4795.	0	0	9589.	0	0	0	0	0	14384.
Miscellaneous supply equipment	1.0	2000.	1000.	500.	500.	500.	500.	500.	0	0	0	0	0	5500.
Manure spreader	1.0	0	0	0	0	0	0	0	0	5000.	0	0	0	5000.
Tractor (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	76.	0	0	76.
Machine (fuel, lubrication, repairs)		0	0	0	0	0	0	0	0	0	85.	0	0	85.
Equipment (fuel, lubrication, repairs)		40.	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.	40.	475.
Total		13113.	6701.	10621.	33665.	4032.	18550.	12881.	2392.	7766.	3195.	2952.	3098.	118964.
Flow of funds summary		Dollars												
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.
+ Cash difference		-13113.	-6701.	-10621.	-33665.	-3835.	-18353.	-12388.	-1874.	-3623.	1301.	1355.	1863.	-99654.
= Current cash balance		-12113.	-5701.	-9621.	-32665.	-2835.	-17353.	-11388.	-874.	-2623.	2301.	2355.	2863.	
+ Money borrowed		13113.	6701.	10621.	33665.	3835.	18353.	12388.	1874.	3623.	0	0	0	104173.
- Payment on loan		0	0	0	0	0	0	0	0	0	0	0	0	0
- Interest paid at 9 percent		0	0	0	0	0	0	0	0	0	1301.	1355.	1863.	4519.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary		Dollars												
- Loan out - Jan. 1														
Accumulated borrowing		13113.	19813.	30435.	64100.	67934.	86287.	98675.	100549.	104172.	104172.	104172.	104172.	
- Accrued interest - Jan. 1														
Accrued interest at 9 percent		0	98.	247.	475.	956.	1465.	2113.	2853.	3607.	3088.	2514.	1432.	
- Accrued total debt - Jan. 1														
Accumulated total debt		13113.	19912.	30682.	64575.	68890.	87752.	100788.	103401.	107779.	107259.	106686.	105604.	

Table 30 (continued). Monthly cash flow per year for a 96-sow feeder pig continuous farrowing production system in second year of operation.

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash receipts		Dollars												
Feeder pigs	1.0	4109.	0	0	0	0	0	0	0	0	0	0	0	4109.
Feeder pigs	1.0	0	4519.	0	0	0	0	0	0	0	0	0	0	4519.
Feeder pigs	1.0	0	0	5239.	0	0	0	0	0	0	0	0	0	5239.
Feeder pigs	1.0	0	0	0	5217.	0	0	0	0	0	0	0	0	5217.
Feeder pigs	1.0	0	0	0	0	7497.	0	0	0	0	0	0	0	7497.
Feeder pigs	1.0	0	0	0	0	0	6702.	0	0	0	0	0	0	6702.
Feeder pigs	1.0	0	0	0	0	0	0	4469.	0	0	0	0	0	4469.
Feeder pigs	1.0	0	0	0	0	0	0	0	4372.	0	0	0	0	4372.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	4349.	0	0	0	4349.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	4265.	0	0	4265.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	4057.	0	4057.
Feeder pigs	1.0	0	0	0	0	0	0	0	0	0	0	0	4307.	4307.
Gilts	1.0	197.	197.	197.	197.	197.	197.	197.	197.	394.	394.	197.	394.	2958.
Open sows	1.0	230.	230.	230.	230.	230.	230.	230.	230.	230.	230.	230.	461.	2995.
Cull sows	1.0	222.	222.	222.	222.	444.	222.	222.	222.	222.	222.	222.	444.	3108.
Boars	1.0	414.	0	0	0	0	0	0	0	0	0	0	0	414.
Total		5173.	5168.	5889.	5866.	8368.	7351.	5119.	5021.	5195.	5112.	4706.	5606.	68575.
Cash expenses		Dollars												
Corn	1.0	882.	925.	997.	959.	974.	949.	988.	971.	973.	1013.	973.	973.	11578.
Soybean meal 48.5	1.0	483.	513.	562.	540.	550.	531.	559.	533.	544.	569.	553.	542.	6479.
Supplementary feed	1.0	84.	93.	103.	95.	97.	100.	100.	99.	97.	105.	96.	98.	1168.
Grinding and mixing	1.0	53.	56.	61.	58.	60.	58.	60.	59.	59.	62.	60.	59.	704.
Insurance and taxes	1.0	0	0	0	0	0	0	900.	0	0	160.	0	0	1060.
Veterinarian and medicine	1.0	94.	94.	94.	94.	94.	94.	94.	94.	94.	94.	94.	94.	1128.
Electricity and fuel	1.0	159.	144.	155.	55.	61.	65.	62.	62.	62.	71.	152.	157.	1205.
Hauling and marketing (pigs)	1.0	167.	167.	167.	167.	251.	251.	167.	167.	167.	167.	167.	167.	2173.
Hauling and marketing (culls)	1.0	50.	26.	26.	26.	36.	26.	26.	26.	34.	34.	26.	53.	390.
Boars	1.0	1520.	0	0	0	0	0	0	0	0	0	0	0	1520.
Miscellaneous expense	1.0	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	240.
Tractor (fuel, lubrication, repairs)		0	0	0	76.	0	0	0	0	0	76.	0	0	152.
Machine (fuel, lubrication, repairs)		0	0	0	85.	0	0	0	0	0	85.	0	0	169.
Equipment (fuel, lubrication, repairs)		49.	49.	49.	49.	49.	49.	49.	49.	49.	49.	49.	49.	588.
Total		3561.	2087.	2233.	2224.	2191.	2144.	3026.	2080.	2099.	2505.	2191.	2212.	28553.
Flow of funds summary		Dollars												
Cash balance beginning		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	40022.
+ Cash difference		1611.	3081.	3656.	3642.	6177.	5208.	2093.	2941.	3096.	2607.	2515.	3394.	
= Current cash balance		2611.	4081.	4656.	4642.	7177.	6208.	3093.	3941.	4096.	3607.	3515.	4394.	
+ Money borrowed		0	0	0	0	0	0	0	0	0	0	0	0	0
- Payment on loan		0	1698.	2887.	2895.	5452.	4523.	1443.	2302.	2474.	2003.	1927.	2820.	30424.
- Interest paid at 9 percent		1611.	1383.	769.	747.	725.	684.	650.	640.	622.	604.	589.	574.	9598.
= Cash balance ending		1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	1000.	
Current loan summary		Dollars												
\$104,172.00 Loan out - Jan. 1														
Accumulated borrowing		104172.	102474.	99587.	96692.	91240.	86717.	85274.	82973.	80499.	78496.	76569.	73749.	
\$1,432.00 Accrued interest - Jan. 1														
Accrued interest at 9 percent		602.	0	0	0	0	0	0	0	0	0	0	0	
\$105,604.00 Accrued total debt - Jan. 1														
Accumulated total debt		104774.	102474.	99587.	96692.	91240.	86717.	85274.	82973.	80499.	78496.	76569.	73749.	



Appendix B

Heating fuel calculations for farrowing and nursery buildings

Consumption of heating fuel used in the farrowing house and nursery were based on the following assumptions and calculations:

1. Average monthly temperatures (Minneapolis)

Month	F ^o	Month	F ^o
January	12	July	—
February	16	August	—
March	23	September	59
April	44	October	49
May	56	November	31
June	—	December	18

2. Farrowing house: 16 crates, solid floor (46 x 24 x 8 feet).

A. Average insulation resistance (R-factor) of 15 in the wall and 23 in the ceiling.

B. Inside temperature is maintained at a base of 70°F during farrowing with localized heat on the newborn pigs of 90°F provided by 250-watt infrared heat lamps.

C. Air flow (cfm) required to remove one pound of water vapor per hour at various outside temperatures is given in Figure 7. One 340-pound sow and her 4-week-old

Table 31 shows the estimated monthly use of energy for the three farrow-to-finish production systems. The gallons of LP gas used for heating the farrowing house and nursery and the kilowatt hours (KWH) of electricity used in all the buildings are estimated by month. The electricity estimates are divided into the categories of: (1) lighting and heat lamps, (2) ventilation, and (3) miscellaneous, which includes the electricity used for the feed delivery and waste disposal systems.

The estimates of monthly LP gas consumption are based on the engineering calculations shown in Dale (1964). An example of these calculations for the LP gas consumption in the farrowing barn of the four-litter system in February follows:

Table 31. Energy use during average year of operation for three farrow-to-finish systems.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Four-litter													
Heating gallons of LP gas	150	187	70	0	0	0	0	0	0	0	0	145	552
Lighting and heat lamp KWH	125	200	125	0	0	175	75	175	90	0	0	200	1165
Ventilation KWH	300	350	300	0	0	400	350	400	300	0	0	350	2750
Miscellaneous KWH	75	75	75	50	0	75	75	75	75	50	0	75	700

Facilities: Remodeled dairy barn (36' x 70') for farrowing (16 crates) and nursery: (144 head capacity) 150,000 BTU-forced-air furnace. Portable buildings on permanent dirt lots for breeding stock. Open-front shed with outside concrete run (280 head capacity).

Six-litter

Heating gallons of LP gas	175	110	140	0	0	0	0	0	0	0	130	120	675
Lighting and heat lamps KWH	200	120	200	100	115	75	110	70	115	100	200	130	1535
Ventilation KWH	300	280	300	200	300	300	440	320	400	200	300	300	3640
Miscellaneous KWH	75	75	75	75	75	75	75	75	75	75	75	75	900

Facilities: Partially-slatted farrowing house; 75,000 BTU forced-air furnace (16 crates). Partially-slatted nursery barn; 75,000 BTU forced-air furnace (144 head capacity). Portable buildings on permanent dirt lots for breeding stock. Modified open-front finishing house (280 head capacity).

Continuous

Heating gallons of LP gas	280	255	270	0	0	0	0	0	0	30	260	275	1370
Lighting and heat lamps KWH	400	350	400	390	380	365	360	360	380	390	390	400	4565
Ventilation KWH	1000	900	1000	1000	1100	1200	1300	1300	1200	1100	1000	1000	13100
Miscellaneous KWH	100	100	100	100	100	100	100	100	100	100	100	100	1200

Facilities: Partially-slatted farrowing house over full size pit; 75,000 BTU forced air furnace (16 crates). Fully-slatted nursery barn; 80,000 BTU forced air furnace (280 head capacity). Fully-slatted gestation house (144 head capacity). Fully-slatted finishing house (440 head capacity).

Figure 7. Air flow required to remove one pound of water vapor per hour.

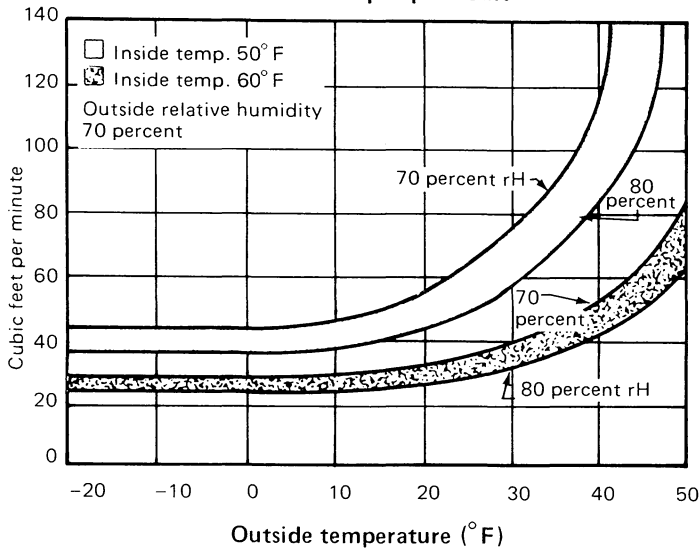
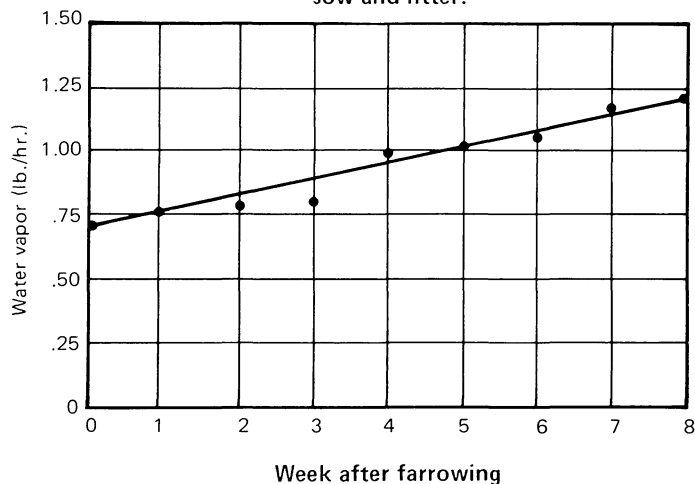


Figure 8. Moisture production of 340-pound sow and litter.



litter produce one pound of water vapor per hour (Figure 8). Therefore, for 16 sows when it is 60°F inside with a relative humidity of 70 percent and 16°F outside at a relative humidity of 70 percent, a minimum of 512 cfm (32 cfm x 16 sows) is required. Ventilation requirements in a totally slatted floor would be approximately two-thirds the requirements computed above.

D. Calculation of the amount of heat (BTUs/hour) lost to the minimum required air flow:

$$Q_m = \frac{\text{cfm}}{\text{cu. ft./lbs.}} \times C_p \times \Delta T \times \text{minutes/hour}$$

Where: Q_m = heat lost to minimum air flow
cfm = minimum air flow required (512 cfm)

cu. ft./lbs. = cu. ft. of air per pound of dry air (13)

C_p = heat required to raise a lb. of air 1°F (.24)

ΔT = difference between inside and outside temperature (for February: 70 - 16 = 54)

For February: $Q_m = \frac{512}{13} \times .24 \times 54 \times 60 = 30,625 \text{ BTUs/hour}$

E. Calculation of heat loss (BTUs/hour) by conduction through walls and ceilings.

$$Q_c = \frac{A}{R} \Delta T$$

Where:

Q_c = heat loss by conduction

A = area of wall (1,120 sq. ft.) and ceiling (1,104 sq. ft.)

R = average insulation resistance of walls (15) and ceiling (23)

ΔT = difference between inside and outside temperature (54°)

For February: $Q_c = \left[\frac{1120}{15} + \frac{1104}{23} \right] 54 = 6,624 \text{ BTUs/hour}$

F. Total heat loss:

$$Q_t = Q_m + Q_c$$

$$Q_t = 30,625 + 6,624 = 37,249 \text{ BTUs/hour}$$

G. A 340-pound sow and a 4-week-old litter will produce approximately 1,050 BTUs/hour of dry, usable heat (see Figure 9). Therefore, let Q_a equal the BTUs/hour produced by the total number of sows:

$$Q_a = 16 \text{ sows} \times 1,050 \text{ BTUs/hour/sow} = 16,800 \text{ BTUs/hour}$$

H. Necessary supplementary heat (BTUs/hour).

$$Q_s = Q_t - Q_a = 37,249 - 16,800 = 20,449 \text{ BTUs/hour}$$

I. The heat output of LP gas is 1.36 gallons per 100,000 BTUs of heat at 80 percent efficiency. Therefore, the estimated gallons of LP gas consumed for the month of February assuming that all 16 crates are filled for the entire month is:

$$\begin{aligned} \text{Gallons LP Gas (Feb.)} &= \frac{1.36 \text{ gals.}}{100,000 \text{ BTUs}} \times 20,449 \text{ BTUs/hour} \\ &\quad \times 24 \text{ hours/day} \times 28 \text{ days/month} \\ &= 187 \text{ gallons/month} \end{aligned}$$

J. Given that the price of LP gas is \$.40 per gallon, the total cost of LP gas is:

$$\text{Cost} = 187 \text{ gallons} \times \$.40/\text{gallon} = \$74.80$$

H. Approximately \$25 of additional cost is assumed to cover the cost of electricity for fans, lighting, heat lamps, etc.

3. Nursery: 4 pens, solid floor (36 x 34 x 8 feet)
 - A. Same insulation R-values as assumed above (15 in walls and 23 in ceiling).
 - B. Inside temperature maintained at 70°.
 - C. Air flow (cfm) required in nursery assumed to be 3 cfm per pig.
 - D. Heat production of 30-pound pig is assumed to be 100 BTUs/hour/pig (Figure 10).
 - E. Same calculations as those used for the farrowing house.

Figure 9. Heat production of 340-pound sow and litter at 60°.

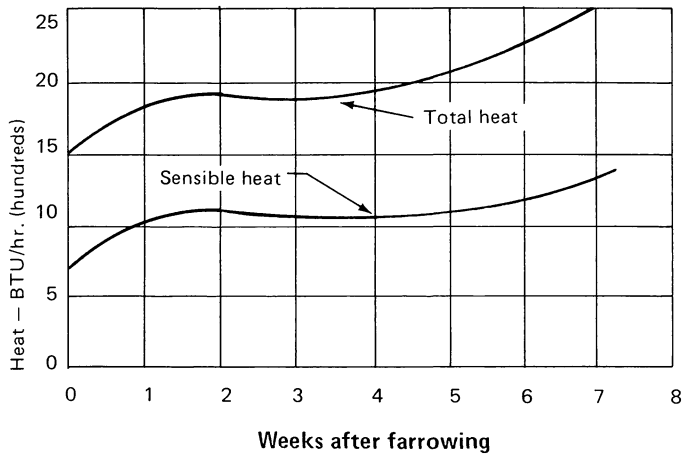
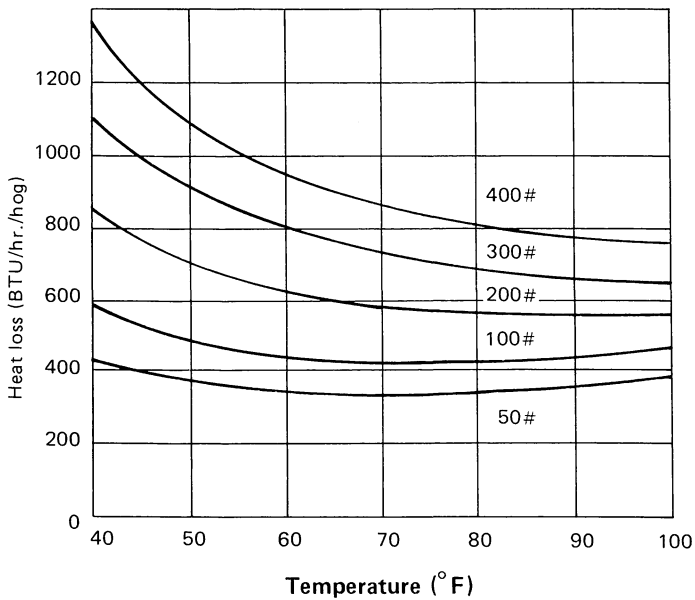


Figure 10. Heat loss from swine.



A. C. Dale, "Hog House Ventilation," *National Hog Farmer*, Swine Information Service, Bulletin number F21, October, 1964.