

# Missouri Hog Farmers: Factors Affecting Production Decisions

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## SUMMARY

Hog production in the United States has followed cyclical patterns. There has been much research conducted on tracing production cycles but little on why farmers increase or decrease hog production. Fifty Missouri hog farmers who were enrolled in the Missouri Mail-In-Record Program continuously from 1967 to 1973 and farrowing 10 or more litters in 1967 were surveyed early in 1975 to find why they changed their level of hog production. They were also asked their production plans for 1975, project plans for 1980 and 1985 and reasons for the changes.

From 1967 to 1973, 21 farms increased their farrowings by 10 per cent or more, 24 farms decreased farrowings by 10 per cent or more of which 10 had discontinued farrowing. On five farms the number of litters farrowed varied less than 10 per cent. The number of farms farrowing from one to 120 litters decreased from 42 to 29.

Farmers were asked why they increased or decreased production from one year to the next during the period 1967 to 1973. Important reasons for annual decreases were disease, labor, breeding problems, prices and the expansion of other enterprises. Annual production increases were influenced by new facilities, more labor available and a desire to increase income. By measuring unused capacity, it was found that 23 per cent of the production capacity in 1973 was unused. Also, approximately one-half the farmers planning an increase in litters farrowed from 1973 to 1975 reported enough capacity available in 1973 to meet the planned increase.

Fifteen of the producers said that by 1980 they would no longer farrow hogs and 21 expected to farrow 180 litters or less. Seven expect to farrow more than 180 litters by 1980—an increase from three in 1973. Seven farmers indicated their plans were indefinite and made no projections.

Farmers planning to expand production listed most often the following as problems in expansion: available labor, low or uncertain returns, high capital investment and high cost of production. Disease and pollution problems did not seem to be a major obstacle deterring expansion. Those planning no increase or a decrease in production listed, available labor, high capital investment, disease, management, age and expansion in other areas as reasons for their decision.

During the seven-year period, the total number of litters farrowed by this group remained relatively constant. However, average litters farrowed by those continuing in hog production increased from 76 in 1967, to 92 in 1973.

For the sample farms, capital invested, acres of cropland, total value of production and net farm income all increased during the study period.

Most farms (39) were organized as an individual proprietorship. Eight farms were operated as partnerships with three family-farm corporations. Average age for all farmers was 48 years. Family-farm corporations comprised 6 per cent of the farms but farrowed 14 per cent of the litters. Also, all corporation operators were under 35 years of age.

A central farrowing house along with some type of confinement nursery was used by a majority of the farmers. As the number of litters farrowed increased, the central house was used more frequently. For the nursery, confinement facilities were used more often as size increased. Confinement housing for finishing was reported on 36 farms while 14 reported the use of portable housing. Again, confinement facilities were used more often as size increased, with the larger operations utilizing enclosed confinement buildings. The breeding herd was primarily housed in portable houses.

## INTRODUCTION

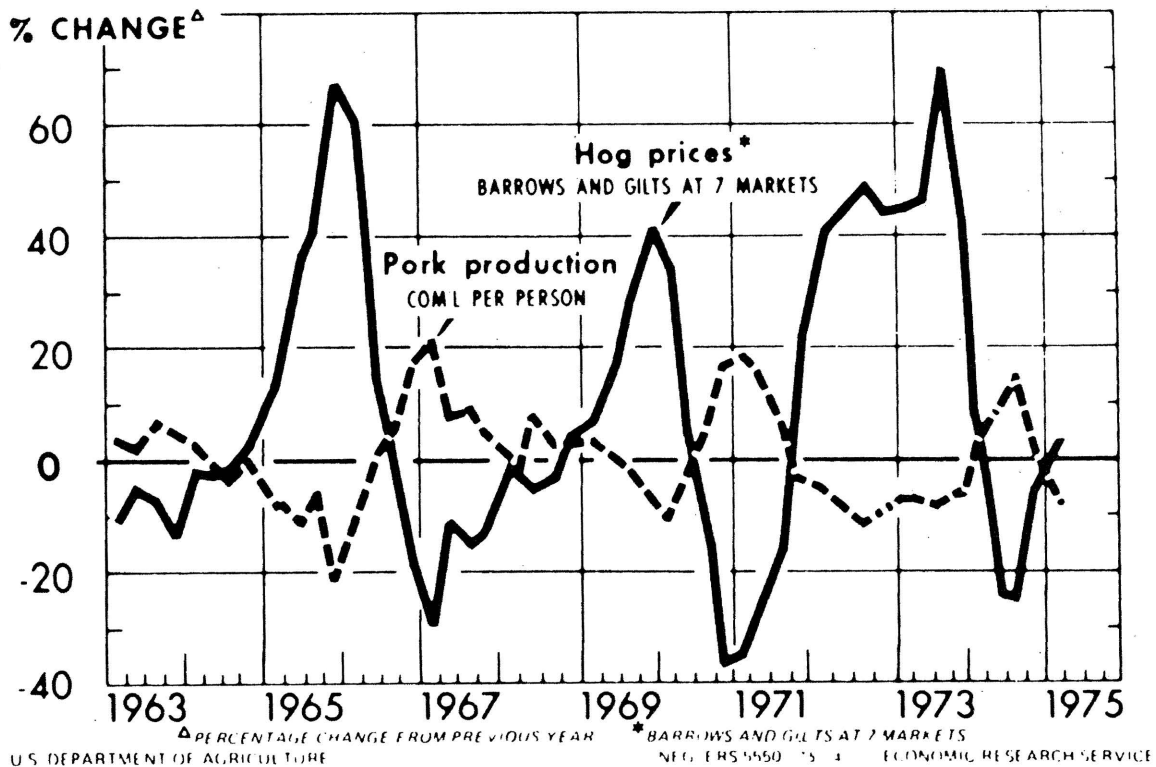
Hog production in the United States has followed a cyclical pattern. As shown in Figure 1, these cycles usually last from three to five years. During the cycle, high prices usually correlate with low production and low prices with high production. Over time, the price level has been a good indicator of net returns to the hog enterprise; 1974, however, was an exception. The cost of production has constantly increased but has varied much less from year to year than hog prices and pork production. Therefore, Figure 1 can quite easily be converted to show net returns to the enterprise. In a normal cycle, when prices are high returns are high and vice versa. Typical cycles include two or three profitable years followed by one or two unprofitable years.

Long-term average returns from the hog enterprise have been more favorable than for most other major livestock enterprises. A recent University of Illinois study showed the 10-year (1965-1974) average return above feed cost to be \$167 per litter (1). Total non-feed costs per litter were estimated to be about \$133 for the same period. Due to recent substantial nonfeed and feed cost increases, break-even returns above feed cost for hog production is projected to be about \$185 per litter. It is estimated that this level of returns will cover all production costs on the average hog farm.

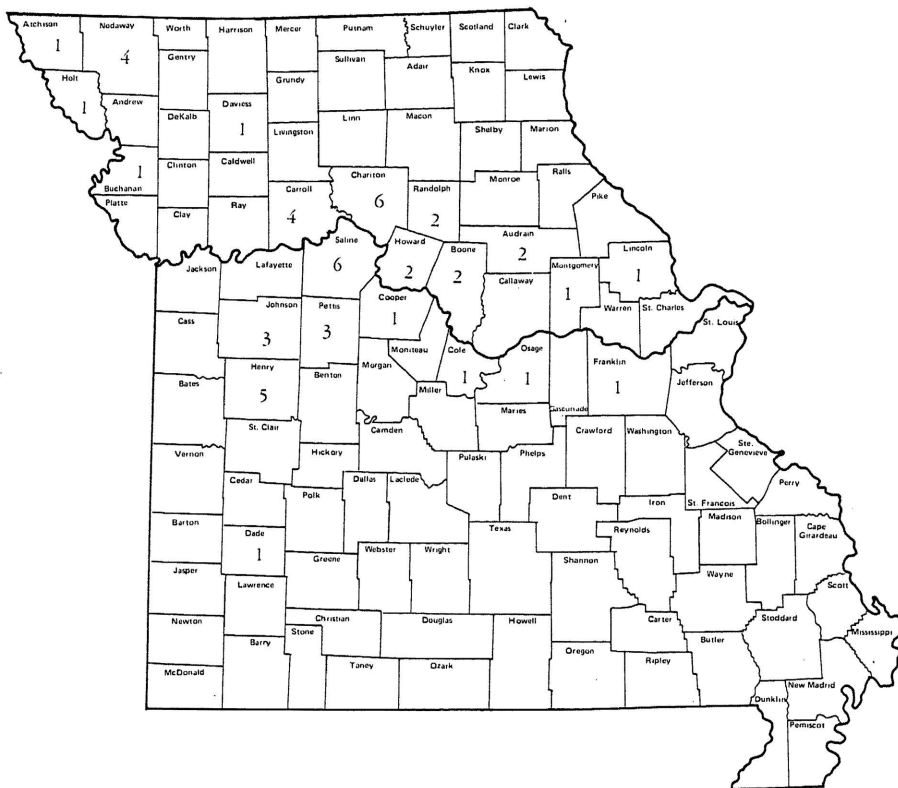
A recent University of Missouri study shows the economies of size in hog production (2). Another study has looked at large-scale hog production in the United States (3). However, little research has been done on studying why farmers increase or decrease hog production.

Commercial hog slaughter (including all classes of hogs) in March and April 1975 was 12.3 per cent and 7.4 per cent below commercial hog slaughter for the same respective months in 1974. Recent estimates have projected the June-August 1975 hog farrowings to be 16 per cent below a year earlier. Adjustments in hog production of these magnitudes have aroused interest as to why farmers alter production plans. To help answer that question, 50 Missouri hog farmers were surveyed by a mail questionnaire in early 1975 and asked their reasons for changing production plans during the past seven years and to project their plans into the future. The farmers surveyed were enrolled in the Missouri Mail-In Record Program continuously from 1967 through 1973 and were farrowing and finishing ten or more litters in 1967. The questionnaires were sent to area extension farm management specialists who were already working closely with the farmers. This technique resulted in a 100 per cent response. The number of sample farms and their location by county is shown in Figure 2.

**Figure 1. Changes in Hog Prices and Pork Production**



## Figure 2. Number of Sample Farms Listed by County



### HOG FARROWINGS 1967 TO 1973

#### Changes in Hog Farrowings

The Missouri Mail-In Record Program provided data on the number of litters farrowed on the survey farms each year during the period 1967 to 1973. Data in Table 1 shows the annual percentage fluctuations in litters farrowed. For example, farms producing from one to 60 litters in 1967 increased the number of litters farrowed by eight percent in 1968. These same farms increased farrowings by 12 per cent from 1968 to 1969. Annual percentage changes for all farms along with the 61 to 120 litter and over 120 litter size groups are also presented. The average percentage change in farrowings per year was 8.7 per cent for all farms, 10 per cent for those farrowing one to 60 litters, 4.8 per cent for those farrowing 61 to 120 litters, and 11.5 per cent for those farrowing over 120 litters. These percentages represent average changes per farm of 6.5, 3.9, 4.2, and 19.3 litters respectively. Even though the percentage changes for the one to 60 and over 120 litter size groups were quite similar, a substantially greater change in number of litters farrowed is represented by the larger size group.

**Table 1. Annual Percentage Changes in Litters Farrowed by Size Groups**

Size Groups (Litters) <sup>a</sup>	Percent Change from Previous Year (Litters) <sup>b</sup>						Average Change/Year (Litters)	Average Percent Change/Year
	1968	1969	1970	1971	1972	1973		
1-60	+8	+12	+21	-8	-10	-1	3.9	10.0
61-120	+6	-2	+4	0	-17	0	4.2	4.8
over 120	-10	-12	+14	0	+22	-11	19.3	11.5
All farms	0	-3	+11	-2	-3	-5	6.5	8.7

<sup>a</sup>Size groups were constructed according to the number of litters farrowed in 1967. Farms were not allowed to change size groups as they changed the number of litters farrowed.

<sup>b</sup>The sample size was not large enough to draw definite conclusions about the relative changes in the number of litters farrowed by farms in the respective size groups.

The change in litters farrowed from 1967 to 1973 is summarized in Table 2. Twenty-one farms increased farrowings by 10 per cent or more while 24 farms decreased farrowings by 10 per cent or more. Ten of these farms had discontinued their hog operation. The number of litters farrowed varied less than 10 per cent on five farms.

Data in Figure 3 shows the distribution of farms by size of hog enterprise for 1967 and 1973. Ten farms had discontinued the hog enterprise by the end of 1973; one in 1967, three in 1971, five in 1972 and one in 1973. Thus the majority of the farms that eliminated hog production did so in 1971 and 1972. The number of farms farrowing one to 120 litters decreased from 42 in 1967 to 29 in 1973. Farms farrowing over 120 litters increased from eight to eleven during the same period.

An interesting observation can be made by following the movement of farms, based on the number of litters farrowed, from 1967 to 1973. Data in Table 3 shows the 1967 distribution of the farms by size groups and allows one to trace the movement of each group of farms to their respective 1973 size group. For example, in 1967 there were 23 farms farrowing one to 60 litters. By 1973, five of these 23 farms had quit producing hogs, 13 remained in the one to 60 group and five had moved into the 61 to 120 size group.

Of the 50 farms farrowing hogs in 1967, ten farms (20 per cent) were not farrowing any hogs in 1973. Nineteen farms or 38 per cent of the 50 did not change size groups from 1967 to 1973. Thus less than half the farms stayed in the same size group. Nine farms (18 per cent) continuing to farrow in 1973 moved to a smaller size group. The remaining 12 farms (24 per cent) moved to larger size groups.

### Reasons for Changes in Hog Farrowings

Farmers were asked to briefly state why they changed their level of hog production annually during the period 1967 to 1973. The following is a listing of the reasons and their frequency for decreasing hog production during the study period.

- 25 per cent - disease problems
- 16 per cent - labor problems
- 11 per cent - breeding problems
- 11 per cent - hog prices
- 11 per cent - expansion of other enterprises
- 7 per cent - financing
- 7 per cent - culled old sows
- 5 per cent - age of operator
- 7 per cent - miscellaneous

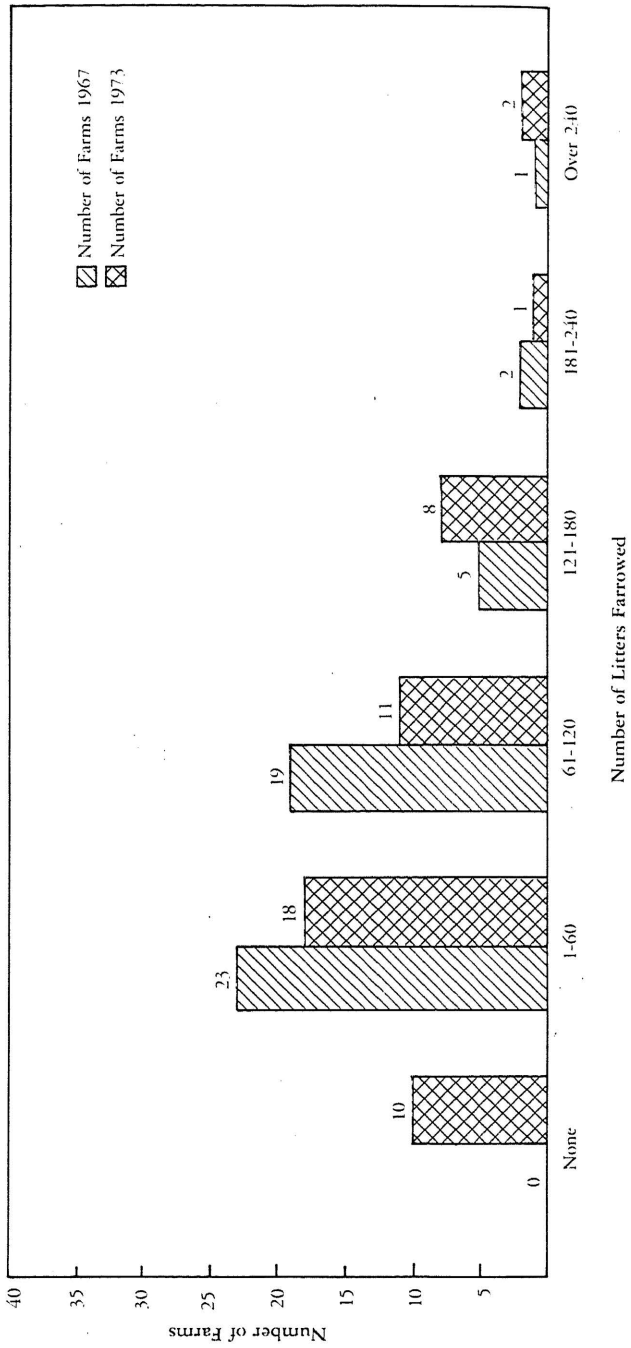
The two major factors that affected annual production changes were disease and lack of labor. Breeding problems, prices and expansion of other enterprises were also important. In many cases, breeding problems may be associated with disease problems.



**Table 2. Changes in the Number of Litters Farrowed, 1967-73**

Changes from 1967 to 1973	Number of farms	Percent of farms
Increase 10% or more	21	42
Decrease 10% or more	24	48
Less than 10% change	5	10

**Figure 3. Distribution of Farms by Size of Hog Enterprise, 1967 and 1973**



**Table 3. Changes in Farrowings by Size Groups, 1967 to 1973<sup>a</sup>**

Size 1967 (Litters)	No. of Farms 1967	Number of Farms by Size - 1973 (Litters)					
		No Hogs	1-60	61-120	121-180	181-240	over 240
1-60	23	5	13	5	0	0	0
61-120	19	4	5	4	5	1	0
121-180	5	1	0	2	1	0	1
181-240	2	0	0	0	2	0	0
Over 240	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	50	10	18	11	8	1	2

<sup>a</sup>Numbers to the right of the shaded area represent farms moving to larger size groups by 1973. Numbers to the left of the shaded area represent farms moving to smaller size groups by 1973.

Reasons given for increasing the level of production from year to year are shown below with the frequency of each.

- 33 per cent - built new facilities
- 21 per cent - more labor became available
- 21 per cent - attempt to increase income
- 8 per cent - increased grain production
- 8 per cent - decreased other enterprises
- 5 per cent - improved prices
- 4 per cent - normal growth plans

Major factors affecting increases in annual hog production levels were the addition of new facilities, the addition of labor and the desire to increase income.

#### Unused Capacity

To measure unused capacity, farmers were asked to estimate how many litters they could have increased 1973 production without adding facilities. In 1973, seventy-seven per cent of the total production capacity for all farms was used. Twenty-three per cent of the sample farms' production capacity was not used. A comparison of planned expansion for 1975 with unused capacity in 1973 showed that approximately half the farms planning to increase hog production by 1975 already had the facilities. The other half would have to add facilities to expand.

## GROWTH PLANS

Farm operators surveyed were asked to project the number of litters they planned to farrow in 1975, 1980 and 1985. The data in Table 4 compares the projected number of litters with the number actually farrowed in 1967 and 1973.

**Table 4. Distribution of Farms by Size of Hog Enterprise 1967, 1973, 1975, 1980 and 1985**

Size of enterprise (litters)	Number of farms by year				
	1967	1973	1975	1980	1985
	Actual		Projected		
none	---	10	15	15	16
1-60	23	18	14	7	4
61-120	19	11	12	10	10
121-180	5	8	5	4	3
181-240	2	1	2	3	2
over 240	1	2	2	4	5
no response	---	---	---	7	10

By 1975, fifteen of the producers expected to have terminated their farrowing operation; ten of these were not raising hogs in 1973. The number expecting to farrow between one and 180 litters decreased from 47 in 1967 to 21 in 1980 and 17 in 1985. The number projecting farrowings of more than 240 litters increased from one farm in 1967 to five farms in 1985. Some operators indicated their farrowing plans were indefinite and they did not make projections for 1980 and 1985.

Farm operators who projected an increase in hog production above their 1973 level were asked: What factors do you feel might interfere most with expansion plans? The following is a listing of the responses and frequency:

- 25 per cent - lack of available labor
- 21 per cent - high capital investment, expensive building materials
- 19 per cent - low or uncertain returns, unprofitable
- 12 per cent - high cost of production, high feed costs
- 6 per cent - continued recession, lack of demand for pork
- 6 per cent - disease problems, herd health
- 5 per cent - opportunity to expand crop acreage
- 2 per cent - pollution, waste disposal problems
- 4 per cent - other miscellaneous factors

Concern about available labor and economic factors such as low or uncertain returns, high capital investment and high cost of production (77 per cent of the responses) were mentioned most often as problems that might interfere most with expansion plans. There appeared to be minor concern about disease and pollution problems.

Farm operators who projected no increase or a decrease in hog production plans compared to their 1973 level were asked: What are the major reasons for your decision? The following is a list of their responses and frequency.

- 22 per cent - lack of available labor
- 18 per cent - high capital investment, expensive building materials
- 11 per cent - disease problems, herd health
- 9 per cent - decided to expand other livestock enterprises
- 8 per cent - lack of management skill or qualified labor
- 8 per cent - operator's age or health
- 7 per cent - no desire to expand
- 7 per cent - increased acreage farmed
- 4 per cent - low or uncertain returns, unprofitable
- 4 per cent - already at full capacity
- 2 per cent - other miscellaneous reasons

Again, the concern for available labor and the high capital investment required for modern hog production were the major reasons for not planning to expand hog production. The need for skilled management and qualified labor was also recognized.

It is interesting to note that both the farmers who projected an increase and those projecting no increase or a decrease in hog production plans recognized basically the same reasons for their actions. Apparently, the farmers who projected an increase had a greater motivation and confidence level in their ability to deal with the problems. The decision to expand hog production is no doubt greatly influenced by personal goals and objectives.

## DESCRIPTION OF SAMPLE FARMS

### Financial and Production Trends

Financial and production trends that occurred on the sample farms during the seven-year period, 1967 to 1973, are shown in Table 5. Acres of cropland increased an average of 16 acres per farm per year while total capital invested increased \$28,776 per year. During the period, total value of production increased \$10,601 per year.

The average number of litters of hogs remained relatively constant with 76 and 74 litters per farm in 1967 and 1973 respectively. Ten farms were not raising hogs by 1973. However, the 40 farms that were still producing hogs in 1973 averaged 92 litters.

The beef cow enterprise increased from 39 to 68 cows per farm. A slight decline occurred in the feeder and stocker enterprise.

Net farm income, which is the return to unpaid labor, all capital invested and management, averaged \$33,916 per year for the seven year period while the

**Table 5. Selected Management and Production Factors, 50 Missouri Hog Survey Farms, 1967-1973<sup>a</sup>**

	1967	1973	Average <sup>b</sup>	Average Annual Change
Acres of cropland	399	513	469	16
Total capital invested	\$184,666	\$386,097	\$254,841	\$ 28,776
Value of crop production	25,839	61,804	36,006	4,138
Value of livestock production	11,111	49,279	21,168	5,453
Total value of production	38,788	112,993	59,133	10,601
Number of litters of hogs	76	74	77	
Number of beef cows	39	68	49	4
Number of stockers and feeders	90	82	90	-1
Net farm income <sup>d</sup>	\$16,043	\$74,602	\$33,916	
Return to labor and management	6,274	47,575	19,372	
Rate earned on investment, percent	6.04	17.40	9.87	

<sup>a</sup>Selected farms had a farrow-to-finish hog operation of ten litters or more in 1967 and maintained continuous useable records in the Missouri MIR program during the period 1967-1973.

<sup>b</sup>This represents the average per farm for the seven year period, 1967-1973.

<sup>c</sup>Average annual changes are positive changes (increases) unless indicated by a negative sign.

<sup>d</sup>Net farm income is the return to unpaid labor, all capital invested and management.

return to labor and management averaged \$19,372. The rate earned on the capital invested averaged 9.87 per cent.

### Type of Business Organization

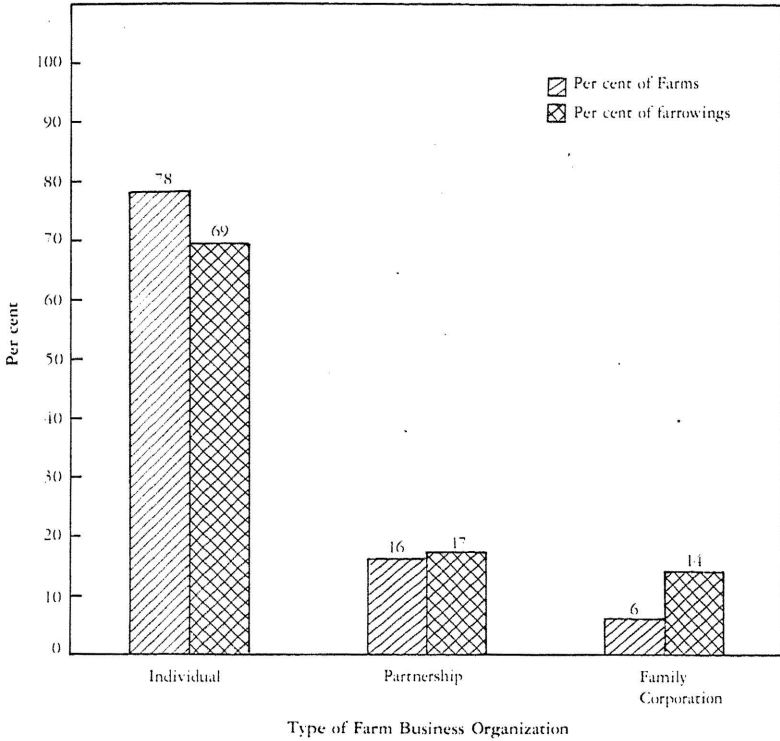
Individual proprietorship was the dominant form of business organization comprising 78 per cent of the survey farms. These farms produced 69 per cent of the total litters farrowed (Figure 4).

Eight farms (16 per cent) operated as partnerships with seven of them as father-son partnerships and one as a partnership of two brothers.

Three farms operated as family corporations in 1973. They represented six per cent of the farms and 14 per cent of the farrowings.

Individual proprietor farms that continued farrowing in 1973 average 82 litters; partnerships, 93 litters; and family corporations, 256 litters (Table 6). Thus there

**Figure 4. Per cent of Farms and Hogs Farrowed by Type of Business Organization, 1973**



**Table 6. Average Litters Farrowed Per Farm by Type of Business Organization**

Type of Business Organization	No. of Farms	Litters per farm that continued farrowing in 1973
Individual	39	82 <sup>a</sup>
Partnership	8	93 <sup>b</sup>
Father-Son	(7)	(101) <sup>b</sup>
Brothers	(1)	(44)
Family Corporation	3	256 <sup>b</sup>

<sup>a</sup> Eight farms in this group had discontinued farrowing in 1973.

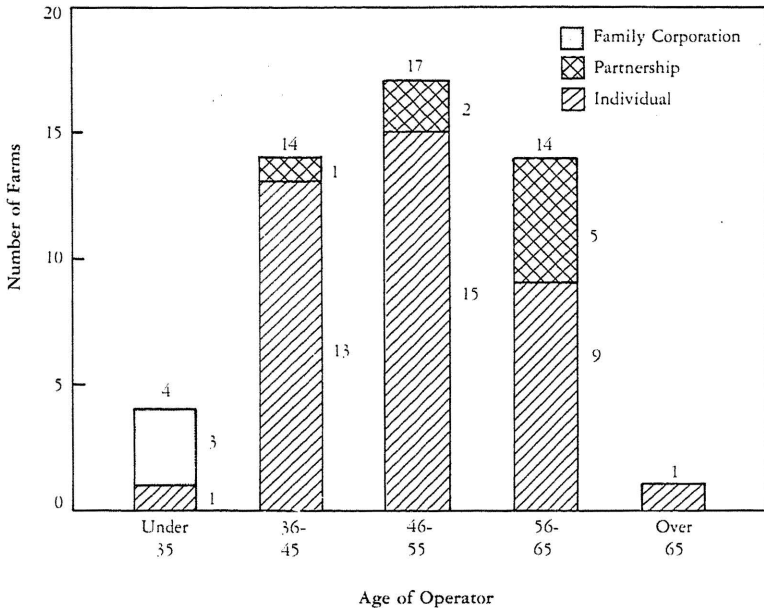
<sup>b</sup> One farm in this group had discontinued farrowing in 1973.

appears to be a trend toward incorporating the business as the size of operation increases.

### Age of Farm Operators

The average age of all farm operators in the survey was 48 years. Interestingly, three of the four operators under 35 years of age were operators of family corporations (Figure 5). Based on this observation there seems to be more interest in incorporation by the younger or possibly beginning hog farmers. This may indicate a trend, but the number of observations are too limited to draw conclusions. Twenty eight of the 39 individual proprietors were between 36 and 55 years of age. Five of the partnership operators were between 56 and 65 years of age. In reporting partnerships operators' ages, the age of the oldest partner was used. In most cases this was the father which would explain the higher percentage in the older age brackets. In the future when the son takes over the business this average age would decline.

**Figure 5. Age of Farm Operators and Type of Business Organization, 1973**



### Type of Hog Production Facilities

The type of hog production facilities used on the survey farms is shown in Table 7. A central farrowing house was used on 37 farms while 12 farms used individual houses for farrowing. All farmers using individual houses farrowed less than 180 litters—the majority less than 60 litters. Those farrowing in timber farrowed 60 litters or less.

Not all farms reported using a separate nursery facility. However, 24 farms indicated the use of some type of confinement nursery facility. Ten of these were enclosed confinement facilities with 70 per cent of them farrowing more than 60



# Table 7. Type of Hog Production Facilities, 1973

Type of Facility	Number of <sup>a/</sup> farms	Percent of <sup>b/</sup> farms
<u>Farrowing</u>		
Central house	37	74 } - 98
Individual houses	12	24
Timber	3	6
Other	3	6
<u>Nursery<sup>b/</sup></u>		
Enclosed confinement	10	20 } - 48
Open-front confinement	14	28
Portable houses	18	36
Other	1	2
<u>Finishing</u>		
Enclosed confinement	7	14 } 72
Open front confinement	29	58
Portable houses	14	28
Other	3	6
<u>Breeding Herd</u>		
Enclosed confinement	0	0 } - 16
Open-front confinement	8	16
Portable houses	33	66
Other	11	22
<u>Waste Handling System</u>		
Haul solid manure	32	64 } 36
Haul liquid manure from pit	7	14
Haul liquid manure from lagoon	4	8
Irrigate from lagoon	7	14
Other	5	10

<sup>a</sup>Some farms indicated more than one type of facility was used.

<sup>b</sup>Some farms reported they did not use a separate nursery facility.

litters. Eighteen farms used portable houses for a nursery—of which the majority farrowed 60 litters or less. As size of operation increases, there was a definite trend toward confinement nurseries.

For finishing there was also a pronounced trend toward confinement as size of operation increases—with the larger farms tending to use enclosed confinement. Seven farms reported the use of an enclosed confinement building while 29 farms used an open-front confinement building. Seventy-two per cent of the farms finishing in enclosed confinement farrowed more than 120 litters while 83 per cent finishing in open front confinement farrowed 120 litters or less. Portable houses were used on 14 farms for finishing—72 per cent of these farms farrowed 60 litters or less.

The predominant housing for the breeding herd was the portable house. Eight farms reported keeping the breeding herd in open-front confinement buildings while none of the farms used enclosed confinement facilities. This shows a marked tendency to keep the breeding herd off concrete and out of closely confined quarters. Breeding and other problems may have influenced this decision.

The most commonly reported waste handling system was to haul solid manure which was reported by 32 farms. Eighty-four per cent of these farms farrowed 120 litters or less. Seven farms handled liquid manure from pits while four farms

hauled from a lagoon. Seven farms indicated that manure was spread by irrigation from a lagoon. The majority of the farms using the latter three methods of waste disposal farrowed more than 120 litters.

## IMPLICATIONS FOR MISSOURI HOG PRODUCERS

During the seven year period (1967-1973) of this study of 50 hog farms, 20 per cent of them (10) dropped the hog enterprise. In spite of these 10 farms deciding to discontinue the hog business, the remaining 40 farms increased production enough that the total number of litters farrowed remained relatively constant. This trend of fewer farms producing more hogs closely follows the Missouri Census of Agriculture report for 1964 and 1969 which showed 41,876 farms farrowing 715,806 litters in 1964 and 34,843 farms farrowing 806,461 litters in 1969. If this production trend continues—i.e., more hogs on fewer farms, it will have some important implications for the hog industry in Missouri.

First, with larger production units, adequate financing will become increasingly important. As the study points out, confinement production facilities tend to be adopted by the larger units. And with escalated building costs (that probably will increase further) the housing alone for these larger units will represent investments of \$60,000, \$80,000 and even \$100,000 or more. With this amount of investment in facilities the producer has committed himself to producing hogs for a long period of time—even when hog prices are low.

Second, if the trend of producing more hogs on fewer farms continues, a more inflexible production system may develop that will be less sensitive to price fluctuations. The result could be a more even production pattern that tends to reduce the annual variations in both production and price. Large commercial hog operations may be slow to adjust production significantly when the enterprise is the major or only source of income and when large cash flow commitments must be met.

Third, the study revealed that hog producers, who plan to decrease or increase production, recognize the problem of securing qualified employees with the expertise to manage—or at least make some management contributions. Some of the larger units are already turning to full-time hired managers to operate the hog enterprise. Thus a new labor dimension is added—the need for the business to pay wage rates which are competitive with other agri-businesses. This is an important consideration for large producers. The fixed labor situation can become another compelling reason—in some situations—to operate the enterprise at full capacity in bad years as well as good.

Fourth, the problem of pollution control and waste disposal becomes greater as the size of the hog enterprise increases. Large numbers of hogs raised in confinement create odor and waste disposal situations that were unheard of a few years ago. Relatively large capital investments may be required to comply with current and future waste management regulations. The investments will increase production costs and add a relatively new dimension to the hog business.

Finally, the producer who expands his hog enterprise rapidly and makes large capital investments, may have a cash flow situation much different than he has encountered before, particularly in the short run. Potential cash flow problems may develop because of the need to service debts created by the large capital investments and because on many large scale hog operations cash costs will make up a

relatively larger share of total production costs. This will be particularly true for those operations that hire major labor and management inputs. When hog returns are unfavorable the producer may have difficulty generating adequate cash flows for production expenses, debt servicing and family living expenses. For example, records from the University of Missouri Mail-In Record Program show the average producer who farrowed and finished hogs in 1971 and 1974 had a very low return for labor and management. Producers who had committed themselves to large debt repayments in those years from anticipated hog profits could have had a serious short run cash flow problem.

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