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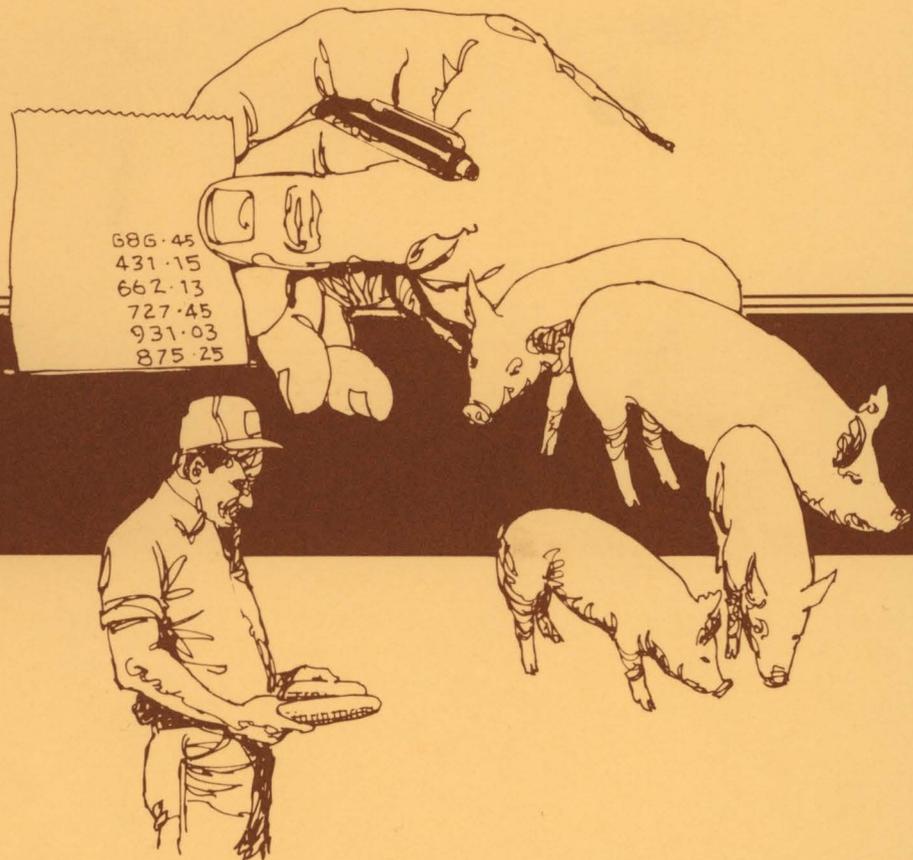
Department of Agricultural Economics  
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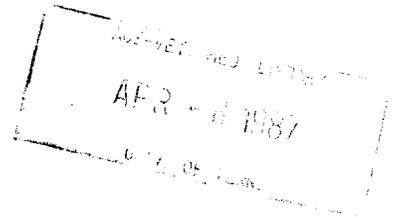
# Farrow-to-Finish Swine Production in Ten Counties of West Tennessee

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*William D. McBride and S. Darrell Mundy*



FARROW-TO-FINISH SWINE PRODUCTION  
IN TEN COUNTIES OF WEST TENNESSEE



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and

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## INTRODUCTION

The Tennessee swine industry, along with the U.S. swine industry, has undergone significant changes over the past several years in methods of hog production. In the 1950's, many small farms, all producing hogs in much the same way, characterized the swine industry. With the introduction of capital intensive, labor-saving technologies in the 1960's, drastic changes occurred in hog production. Fewer and larger operations utilizing these new technologies have become more characteristic of the swine industry today. Because of the cost advantages and increased labor efficiency provided by modern production systems, the trend toward fewer and larger operations will likely continue into the future [5].

Three common enterprises are farrow-to-feeder pig, feeder pig-to-finish, and farrow-to-finish operations. Each of the enterprises can be found on farms statewide. Tradition has been an important factor in determining location coupled with the physical and economic resource characteristics specific to many areas of the state. Differences in resource characteristics have tended to create comparative advantages for one swine enterprise over the others. For example, farm situations characteristic of many areas of central and eastern Tennessee have a limited amount of acreage suitable for corn production. The price of corn, the principal feed for hogs, is generally higher in these areas than in West Tennessee. Consequently, farrow-to-feeder pig production, which has a lower corn requirement than the other two enterprises, has been the predominant swine enterprise. In contrast, the larger amount

of available acreage for corn production in the western areas of Tennessee has promoted the development of the farrow-to-finish and feeder pig-to-finish enterprises. Corn is the major input in feeding hogs from feeder pig to slaughter weight. The larger, more economical supply of corn in West Tennessee has allowed farmers to realize profits from finishing hogs to market weights [1].

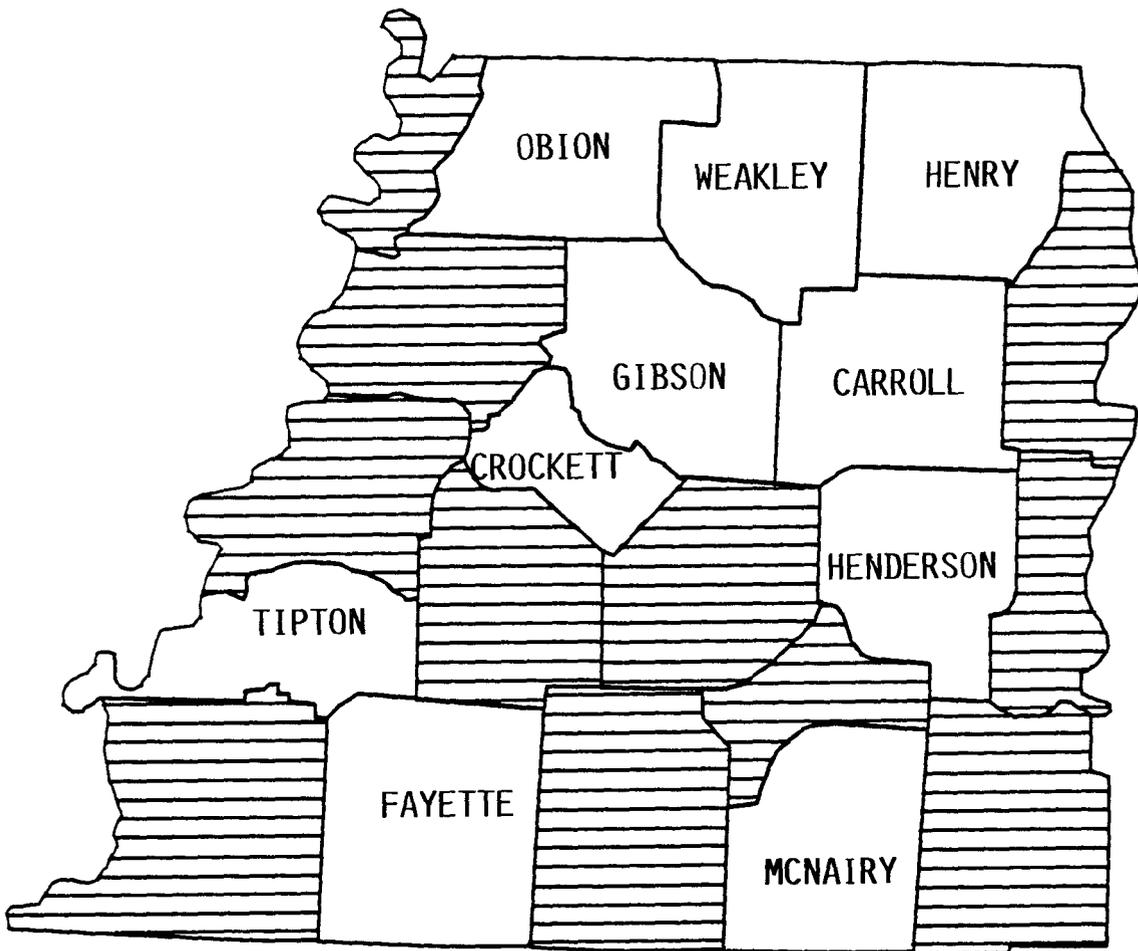
#### OBJECTIVE

The overall objective of this study was to describe the structure and characteristics of farrow-to-finish swine farms in ten counties of West Tennessee. Specifically, farrow-to-finish swine producers were examined to identify alternative systems of swine production, general swine herd characteristics, farm resource availabilities and use, and overall farm characteristics and organization.

#### PROCEDURE

In October of 1984, a mail survey of farrow-to-finish swine producers in ten counties of West Tennessee was conducted by the Department of Agricultural Economics and Rural Sociology at the University of Tennessee (Figure 1). The counties in the survey--Obion, Weakley, Gibson, Crockett, Tipton, Fayette, Henry, Carroll, Henderson and McNairy--were chosen because of the relative economic importance the production of slaughter hogs was to farmers in these counties as compared to other counties in West Tennessee [3]. Farmers who were asked to participate in the survey included all farmers on a list of

Figure 1. The Ten West Tennessee Counties in the Survey of Farrow-to-Finish Swine Farms, 1984



known farrow-to-finish swine producers in each county provided by the Agricultural Extension Leader of that county.

Each farmer received an initial mailing that included the questionnaire and a cover letter explaining the purpose and goals of the survey. Nonrespondents were reminded periodically by a postcard one week after the initial mailing, followed by a second mailing of the original questionnaire and a revised cover letter two weeks later. The initial mailing included 342 farmers, of which 206, or approximately 60 percent, completed and returned the questionnaire. Of the responding farmers, 124 produced slaughter hogs in a farrow-to-finish swine operation during 1984. A summary of the results obtained from the 124 farrow-to-finish swine farms is reported below along with general observations and conclusions.

#### SWINE HERD

Survey farms were distributed widely by sow herd size. Table 1 includes a breakdown of the herd size and the percentage of farms in each size category. The results indicate that just over 50 percent of the farms produced hogs with sow herds comprised of 50 sows or less per farm. Most of the other farms were evenly distributed among the categories between 51 and 200 sows per farm.

Average size of the sow herd was 82 sows per farm in the survey, an increase from 57 sows five years previously. During the period of 1979-84, major expansion had occurred on the farms. This expansion appeared to have reached a peak. Farmers, on the average, reported plans to maintain a herd size at 85 sows per farm in 1989. In addition,

Table 1. Sow Herd Size Distribution on Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Sows Per Farm (Number)	Percentage of Farms (Percent)
1-25	23.1
26-50	27.2
51-75	14.1
76-100	14.9
101-200	14.9
201-400	5.0
400 & up	0.8

the majority of the respondents reported attitudes that indicated they would continue with their existing system(s) with few alterations leading to major capital investment over the next five years. This result was not unexpected due to lower hog prices throughout the months in which the survey was conducted and through much of 1984 [2].

#### SWINE SYSTEMS

The farrow-to-finish swine enterprise was classified by four phases of production in the survey. Farmers were asked to categorize their system by the types of facilities used in each production phase. Facility type categories were designated by the level of required investment per animal. Facilities such as pasture lots and remodeled buildings require a relatively low investment per animal. In contrast,

the open-front and totally environment-controlled buildings have a much higher investment per animal. The percentage of farmers using a particular facility type in each phase of production and the mean capacity of a facility type in each production phase are reported in Tables 2 and 3, respectively.

From the survey, nearly 90 percent of the farmers used a central farrowing house while just over two-thirds used separate nursery facilities. All types of facilities for farrowing were widely used as shown in Table 2. Farmers using separate nursery facilities tended to

Table 2. Distribution Among Farms of Facility Type by Swine Production Phase for Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Facility Type	Production Phase			
	Breeding and Gestating	Farrowing	Nursery	Growing and Finishing
Pasture or Lots with Shelters	72.6	17.4	13.4	26.6
Remodeled Older Building	10.5	17.1	11.0	10.5
Modified Pole Barn	9.7	23.4	8.5	17.7
Open-Front with Curtain	20.2	20.7	26.8	46.0
Totally Environment Controlled	3.2	36.9	36.6	10.5

<sup>a</sup>Percentage of all farms. Percentages do not add to 100 percent because some farmers used more than one type of facility in a phase of production.

use a higher degree of confinement and environment control. About 63 percent of the farmers with separate nursery facilities utilized the higher investment confinement buildings--open-front with curtain and totally environment controlled. The majority of the farmers used some degree of confinement for growing and finishing hogs. An open-front building with a curtain for environment modification was used on 46 percent of the farms. Breeding and gestating sows and gilts on pasture or dirt lots was the most common method employed. Nearly 73 percent of the farmers utilized these relatively low-cost facilities. Comparison of the mean capacity for each facility type (Table 3) showed little difference in size among the facility types used in the breeding and gestating phase. Farmers using a central farrowing house tended to have

Table 3. Mean Facility Capacity by Swine Production Phase on Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Facility Type	Production Phase			
	Breeding and Gestating (sows)	Farrowing (sows)	Nursery (pigs)	Growing and Finishing (hogs)
Pasture or Lots with Shelters	56.8	26.1	127.1	189.4
Remodeled Older Building	50.6	11.1	113.7	256.2
Modified Pole Barn	59.1	14.0	108.6	310.9
Open-Front with Curtain	68.1	22.5	253.8	627.9
Totally Environment Controlled	51.0	22.4	281.4	591.5

a greater capacity when higher investment facilities were utilized as compared to farmers who used the lower investment facilities. The general trend toward larger production capacities in the higher investment facilities was also evident in the nursery and finishing phases of production. On the average, farmers using separate nursery facilities had a much larger capacity in the two high-investment confinement buildings. The capacity to finish hogs was also much greater when high-investment confinement facilities were utilized as compared to the utilization of the low-investment confinement facilities. High-investment facilities were generally associated with high-intensity production operations.

Specialized equipment varied widely among the farms and depended on the type of facility. Farm corn mixed with purchased supplement, reported on 76 percent of the farms, was the most common method in which feed was handled. Nearly 75 percent of the farmers had portable grinder-mixer capabilities. Manure handling methods also varied with the type of facility. A flush system, found on nearly 63 percent of the farms, was most frequently reported for handling manure.

#### RESOURCE AVAILABILITIES AND ENTERPRISE USAGE

##### Land

The surveyed farmers were asked to report the amount of owned and rented acreage of various types that was available for farm purposes (Table 4). The majority of farmers produced row crops in addition to the swine enterprise. Approximately 80 percent of the farmers owned row

cropland and nearly 67 percent rented row cropland. Mean acreages were 203.9 and 355.6 for owned and rented row cropland, respectively.

Farms in West Tennessee typically have productive land similar in size to that reported in the survey.

Table 4. Use Types of Owned and Rented Land on Surveyed Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

	Percentage of Farms (Percent)	Mean Number of Acres (Acres)
<u>Owned</u>		
Row Cropland	79.8	203.9
Forage Land	46.0	71.8
Permanent Pasture	49.2	46.7
Woodland	62.9	95.7
<u>Rented</u>		
Row Cropland	66.9	355.6
Forage Cropland	16.1	45.5
Pasture	20.2	114.0

Other available land including owned forage and pastureland was found on 46 and 49 percent of the farms, respectively. Parts of West Tennessee have rolling hills more suited for pasture and forage production than for row crop enterprises. Hence, a large percentage of swine farms have considerable land acreage in pasture and forage enterprises.

### Labor

The amount of available labor is important to swine producers in determining the size and type of production system to use. Farmers in the survey utilized labor provided by many different sources. The alternative sources, the percentage of farmers using each source, and the mean number of hours provided by each labor source are presented in Table 5. Results indicated that owner-operator labor was employed on most farms (93.5 percent). More than 30 percent of the respondents hired full-time laborers which provided labor approximately equal to two man-equivalents. Part-time seasonal labor was employed on about one-

Table 5. Sources of Available Labor on Surveyed Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Labor Source	Percentage of Farms (Percent)	Mean Hours Per Unit of Time (Hours)
Owner-Operator	93.5	58.7 hours/week
Other Family Members—Year Round	53.2	37.4 hours/week
Other Family Members—Seasonal	21.8	259.7 hours/season
Full-time Hired	30.6	80.2 hours/week
Part-time Seasonal	33.1	312.6 hours/season
Custom Labor	10.5	144.1 hours/year

third of the farms. Many farmers who employed large amounts of seasonal labor were engaged in large-scale crop production in which peak labor requirements occur seasonally during the fall and spring. Family members provided a major source of labor at least part of the year on many of the farms.

### Resource Availability and the Swine Operation

Swine producers were asked to rank their available resources as to which most limited the size of the swine operation. Resources reported as most restrictive included investment capital and labor. The relative availability of these two resources likely influenced the type and size of swine operation that was used. Large investments are required in the more modern, high technology production systems and can substitute for the amount of labor needed.

Land for corn and for hog production were not perceived by the farmers as important restrictions. With intensive, confined swine production systems, land for hog space is typically not a limiting factor. Large available acreages for corn production on the surveyed farms indicated that farm-grown corn for swine feed was not limiting. These results were not unexpected for this area of Tennessee.

### Crop and Livestock Enterprises

Crop production on the surveyed farms included the enterprises most commonly found on farms in this area of Tennessee. Crop enterprises, percentage of farms producing a crop, and mean number of acres per farm for an enterprise are reported in Table 6. Corn and soybeans were produced on more farms than any other crops. Corn production is typical on swine farms and, in most cases, likely provides a more economical source of swine feed than purchased corn. Soybeans, the major cash grain crop for this area of the state, had the highest average acreage per farm among all the crops. Wheat and grain sorghum were produced by many farmers and likely provided a source of hog feed. While cotton

production was not widespread, cotton was an important enterprise for many farmers in Crockett, Tipton, and Fayette counties.

Table 6. Crop Enterprises on Surveyed Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Crop Enterprise	Percentage of Farms (Percent)	Mean Number of Acres Per Farm (Acres)
Corn	79.0	160.6
Soybeans	72.6	269.4
Wheat	56.5	163.9
Cotton	12.9	189.3
Grain Sorghum	33.9	106.0
Alfalfa Hay	5.6	45.0
Other Hay	19.4	42.4

In addition to farrow-to-finish swine, some farmers reported using a split-phase swine operation such as a farrow-to-feeder pig operation or a feeder pig-to-finish operation. Farrow-to-feeder pig production was reported on 26.6 percent of the farms while 17.7 percent of the respondents finished out purchased feeder pigs. Nearly 36 percent of the farmers had a beef cow-calf operation. An enterprise such as beef cow-calf production typically makes use of resources unused by the swine operation and/or major crop enterprises. The large number of farmers using this enterprise likely accounts for the hay production reported in Table 6.

## GENERAL FARM INFORMATION

Hog Sales and Total Farm Receipts

Hog production was the major source of annual income for the surveyed swine farmers. Table 7 presents percentage categories of total farm receipts obtained from hog sales and the percentage of farms in each category. Approximately one-third of the farmers reported that hog sales accounted for between 80 and 100 percent of total farm receipts.

Table 7. Percentage of Total Farm Receipts from Hog Sales on Surveyed Farrow-to-Finish Swine Farms, Ten Counties in West Tennessee, 1984

Percentage of Total Farm Receipts	Percentage of Farms
(Percent)	
80-100	33.9
60-79	19.5
40-59	23.7
20-39	10.2
0-19	12.7

Just over half of the farmers reported that hog sales provided more than 60 percent of total farm sales. In addition, more than 70 percent of the farmers had receipts from hog sales under \$100,000 annually. Sources of nonfarm income were limited with just over 70 percent of the farmers reporting less than \$10,000 annually. These results point out the importance of hog production on the surveyed farms and suggest that low

levels of farm income may prevail, especially when hog prices are relatively low.

#### Form of Business Organization

Table 8 includes a list of the existing business organizations on the surveyed swine farms and the percentage of farms in each organizational category. The majority of the farms, nearly 71 percent, were under individual ownership (sole proprietorship). Nearly all remaining farms were organized as some type of general partnership. The most common type of partnership was a father-son arrangement, found on 19.3

Table 8. Distribution of Surveyed Farrow-to-Finish Swine Farms by Form of Business Organization, Ten Counties in West Tennessee, 1984

Business Organization	Percentage of Farms (Percent)
Sole Proprietorship	70.7
General Partnership; Father-Son	19.3
General Partnership; Other Relative	8.4
Limited Partnership	0.8
Corporation; Family <sup>a</sup>	0.8

<sup>a</sup>No nonfamily corporations were found in the survey.

percent of the farms. Only a small percentage of farmers reported a corporate organization with less than one percent in a family corporation.

### Pork Production Costs

Total cost of producing 100 pounds of pork as perceived, estimated, and reported by the survey respondents varied widely and did not depend on the particular type of production system used. Table 9 presents the perceived total cost of producing 100 pounds of pork by cost categories and the distribution of swine farms by category. Over one-third of the farmers reported production costs between \$40.00 and \$45.00 per cwt. Another 45 percent reported production costs below \$40.00 per cwt. These conditions indicate that hog production may be perceived as profitable on 80 percent of all surveyed farms at hog prices at or above \$45.00 per cwt.

Table 9. Distribution of Surveyed Farrow-to-Finish Swine Farms by Categories of Total Cost of Producing 100 Pounds of Pork, Ten Counties in West Tennessee, 1984

Total Cost of Production (Dollars Per Cwt.)	Percentage of Farms (Percent)
Below 30.00	9.5
30.00-34.99	11.2
35.00-39.99	24.2
40.00-44.99	35.3
45.00-50.00	19.8

### Level of Managerial Skills

Farrow-to-finish swine production requires a broad range of managerial skills. The degree of required skills varies depending on the

size, level of intensity, and technology usage. The surveyed farmers rated their skills as being higher in animal husbandry and production scheduling and lower in buying and selling, mechanical work, and supervising labor. Skills to maintain farm equipment and facilities and to supervise labor become more important managerial attributes as size of operation and level of technology increases.

### Equity Capital

The ability of farm operators to generate sufficient farm income to repay indebtedness has become important in recent years. Over-extending their ability to manage credit has been the downfall of many farmers recently. The surveyed farmers were asked to estimate the percentage of the sale price that could be retained above all debts if the farm business was sold. Just over one-fourth of the farmers reported that between 50 and 75 percent of the sale price could be retained. Nearly 34 percent of the farmers could retain above 75 percent while nearly 40 percent reported less than 50 percent of the sale price could be retained. Farmers with less than 50 percent equity likely have incurred large debt loads relative to their ability to repay borrowed funds.

### ADDITIONAL OBSERVATIONS AND CONCLUSIONS

The results of this survey of farrow-to-finish swine producers in the ten counties suggest that the industry in West Tennessee is comprised of a wide range of small to large volume producers. Because the list of producers used in the survey was obtained from County

Extension Leaders, an original hypothesis was that the survey may include only the larger, more technically advanced producers who in general are more likely to be in contact with extension personnel. However, the wide distribution in size and type of swine production systems found among the respondents indicated a broad representation of farrow-to-finish swine production units in the survey.

A wide range in facility type was found on the surveyed farms. Many of the smaller swine operations used pasture or modified confinement facilities. Although not reported in the survey, in general, such facilities historically have been converted to alternative uses when profit potential in swine production fell below acceptable levels. When profits rose to acceptable levels, facilities were reconverted to swine production. Such flexibility in production by these "in-and-outers" has historically been a major cause of the varied supply response in hog production and, therefore, the hog cycle [5]. In general, the larger producers tended to use a much higher level of confinement and environment control in their hog operations. The large initial investments required in many of the highly specialized swine production units suggest that these farmers have made long term commitments to swine production. With larger producers making up an ever growing share of total hog production and the economies of size available to these producers, the supply response will likely become more stable, thus, creating a dampening of hog price variations [4].

While in recent years the number of highly specialized swine farms has grown significantly, results of the survey, as well as other studies

[5], indicate that hog production primarily occurs in multienterprise farming operations. In addition to the swine enterprise, many farmers have productive land bases capable of supporting medium-to large-scale crop production. Corn production, found on the majority of the surveyed farms, provides the principal feed input for swine production. With depressed corn prices in recent years, many farmers have likely found greater profit potential through feeding corn to hogs rather than marketing directly.

Farrow-to-finish swine production provided a significant portion of total annual income for the surveyed farmers. More than one-third of the farmers reported that hog sales accounted for 80 to 100 percent of total annual farm receipts. This finding suggests that methods to improve efficiency, increase prices received, and reduce costs of production will have a major impact for improving the income situation on swine farms.

Hog production costs reported on the surveyed farms indicated that approximately 80 percent of the farmers produced hogs at costs below \$45.00 per cwt. Average annual prices received by Tennessee farmers during 1983 and 1984 were \$46.30 and \$47.87 per cwt., respectively, with the monthly price range for this two-year period between \$37.56 and \$56.29 per cwt. [2]. These cost and price conditions suggest that 20 percent of the surveyed producers had costs above \$45.00 per cwt. which were near or above gross returns. It is likely that profit potential during this period was limited for producers in this group. However, profit potential did exist for approximately 80 percent of the swine

producers during this period if prices received by the individual producer were at or near the annual averages. For producers using systems primarily dependent on spring farrowings and fall marketings, profit potentials were much more limited due to the lower prices observed during the fall seasons of this two-year period. Conditions such as these point out one marketing advantage producers may attain using high-intensity production schedules where hogs are sold continually over the year.

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