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A Study of Resource Allocation on Farms Engaged in Swine Production in Southeastern South Dakota

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A STUDY OF RESOURCE ALLOCATION ON FARMS ENGAGED IN SWINE PRODUCTION IN SOUTHEASTERN SOUTH DAKOTA

BY

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This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree, but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Thesis Adviser Date

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CHAPTER I

INTRODUCTION

Problem Of The Study

This study was undertaken to compare alternative livestock programs on southeastern South Dakota farms. Variations in hog production have been emphasized since swine feeding accounts for much of the income generated within the community. In addition to amount of income, stability of income, risk, capital and labor requirements have been compared as limiting factors to be seriously considered. Diminishing numbers of farmers and new pork production methods have caused remaining farmers to reassess use of scarce inputs and new means of successful swine raising. Some questions which arise in the producers' minds presently include the following: How should the individual farmer of southeastern South Dakota allocate production resources to maximize his profits? What is the optimum size of hog enterprise to be organized? What is the optimum degree of specialization to be used under various hog production systems?

Importance Of The Problem

Technological change in agriculture has been rapid and has introduced new organizational patterns into farming. Changes have included increase in size, changes in enterprises and changes in relative importance of different enterprises.

The technology of pork production has changed greatly in the last two decades. Specialization and multiple farrowings are now common. Replacing the older production systems of spring litters are systems which farrow four or six sets of litters annually or some which farrow almost continuously. These new systems could produce this nation's pork on far less numbers of farms. Farms using multiple farrowings need not produce only hogs.

Many farmers are eager to adopt new methods of production which enable them to produce in greater quantity at constant or decreasing cost. Eagerness sometimes arises when competition is less than perfect since a temporary price advantage exists. However, such conditions are but temporary and fade when knowledge is easily obtained. The farm operator should depend on good management and expect near perfect competition. Nearly 200 years ago, Adam Smith warned that "the establishment of any new manufacture, of any new branch of commerce or of any new practice in agriculture is always a speculation from which the projector promises himself extraordinary profits".[1]

The farm manager must combine the elements of land, labor, capital and his own managerial skills into his entire business operations, balancing all resources, to obtain maximum returns. Gross neglect of these elements could result in the farm being unprofitable and ultimately a dissolution of his business. Competition forces

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1 Adam Smith, An Inquiry Into The Causes and Nature Of The Wealth Of Nations, George Routledge and Sons, Limited, (New York: E.P. Dutton and Company, 1913), p. 90.

the successful operator to weigh decisions carefully when applying scarce resources.

Risk and uncertainty must be considered in the decision making process. He should be reasonably certain that the cost of his resources will remain relatively unchanged and that he has access to sufficient resources to attain a satisfactory volume. The farmer must cope with the threat of future technological advances which may make his production system obsolete.

Management is important and should be evaluated during the organization. Felberg states "management is a critical resource in that the men and women in managerial positions decide how land, labor and capital are to be used".[2] Adequately measuring managerial abilities is a difficult task just as are other phases of the social sciences which present problems in measurement. The farmer has had inadequate tools to evaluate his managerial ability but may, by alert comparisons of other farmers and his own past experience plus written knowledge, make intelligent decisions. He is required to make assumptions of the future where cause and effect may turn the economic tide. His present tasks are little less when his resources are unlike those of his neighbors. Soils vary from farm to farm as do available labor and capital. His decision on organization of resources should be that of a rational and reasonable man, equipped with available information, considering each resource in perspective and acting accordingly.

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2 Ralph O. Felberg, "Potentials For Increasing Income From Business Management", Increasing Income From South Dakota Resources, Economics Pamphlet 121, South Dakota State University, Brookings, p. 49.

Marshall stated that

> as far as the knowledge and business enterprise of the producers reach, they in each case choose those factors of production which are best for their purpose; the sum of the supply prices of those factors which are used is, as a rule, less than the sum of the supply prices of any other set of factors which could be substituted for them; and whenever it appears to the producers that this is not the case, they will, as a rule, set to work to substitute the less expensive methods.[3]

A limited number of problems connected with commercial swine production has been considered in this thesis. However, much more research will be needed to explore fully the areas of optimum resource allocation.

Diseases pose a greater threat when numbers are increased, assuming constant managerial ability in line with past performance. However, it seems likely that an operator who expands his production considerably will be an individual who reads extensively, accepts suggestions readily and meets difficult situations as challenges, using his knowledge to effectively forestall troubles which could arise. Conditions contributing to problems do not remain constant for long. The operator either benefits from past experience and turns such experience into profitable knowledge, or (provided unlimited capital is originally made available) errs in judgement and action which places him in poor financial status. The ranks of commercial swine producers hold few individuals who are irresponsible.

Effecting a regular farrowing schedule may be a problem.

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3 Alfred Marshall, Principles of Economics, Eighth Edition, Macmillan and Company, Limited, (London, 1930) p. 341.

This can be met by (1) providing more boars per breeding period, (2) providing boars having sufficient age, (3) pen breeding and (4) making more gilts or sows available for breeding than are actually needed for farrowing. This is an area where an alert manager may improve his production and profit picture as he oversees the breeding and farrowing of succeeding sets of sows.

It is not implied that all chaos can be turned to order or that decisions must permanently stand because they were based upon scientific study. The scientific process becomes highly successful only when new knowledge is digested and absorbed into a present store of scientific matter. The successful farm operator will evaluate innovations rather completely and only if the technology fits his farm and farming program, will he use the advanced method of production. The farmer will in future time evaluate the decision made at an earlier period. The successful pork producer is looking for results of definite action conducive to growth and profit as a result of previously planned programs. The individual farmer taking into account a different production process expects changes in amount of capital required, different labor requirements and a change in the returns to his farming business.

Objectives Of The Study

The objective of this study was to compare specialized pork production methods with conventional methods to determine whether net returns to the southeastern South Dakota farmer could be increased by substituting a more specialized system. More specifically it attempts to outline the resource requirements needed to change to

a specialized system and indicate: (1) which reorganization plans are feasible for an individual farmer, (2) the importance of management in the success of a specialized production system, and (3) how southeastern South Dakota compares with other hog producing areas in the United States. The conventional farm organization will also be compared with the specialized single enterprise. The specific objectives here are to determine: (1) whether specialized hog farming has been or will be beneficial to the area farmers, (2) whether present hog production patterns are being replaced, and (3) the nature of basic problems facing the specialized hog producer.

Procedure

The study attempts to measure relative profitability of various hog systems which would be applicable to economic area 4B, southeastern South Dakota. The procedure used will be a budgetary approach contrasting conventional and specialized methods integrated into the farm organization.

Two synthetic units will be involved: (1) a 250-acre grain-livestock farm which will be set up with alternative livestock and cropping methods employing several degrees of specialization in hog production and (2) a 40-acre farm which farrow-finishes hogs. The latter will also have a budget proposed where feeder pigs would be purchased.

Net returns from the 250-acre farm business when 15 sows are farrowed in the spring and fall may be compared to a system which has two groups of 15 sows farrowing twice yearly. Farrowing would occur every three months. The third and most specialized budget of the 250-acre farm would have labor and capital expended on

15 sows farrowing every two months and no other livestock would be kept.

The 40-acre farm will have budgets prepared to evaluate returns when 40 sows are farrowed every month, and when purchasing 5000 feeder pigs annually. These two budgets for the specialized system will require all feed inputs to be purchased.

After setting up the hypothetical budgets the various components of the farm business, i.e., labor and capital will be studied in determining if a relative advantage exists by limiting production to one or two enterprises. The budgets are intended to provide realistic situations which are pertinent for the long run and the economic area under study. The projected prices, giving relationships of costs, returns and net income which were used in all the budgets were obtained from a recent farm planning book.[4] Rotations and yield estimates were obtained from the same source. The 250-acre farm has an average crop acreage comparable to that of all farms surveyed in 1964.[5]

Linear programming could have been used as an alternate method of study. However, such an approach would offer only further refinement of the five types of organization and specific resource choices as presented with the budgetary procedure. Since the degree of re-

4 W.G. Aanderud, Guidebook For Planning A Farm Or Ranch Business, Cooperative Extension Service, South Dakota State University, Brookings, Extension Circular 633, pp. 20-63.

5 Figures obtained by personal interview with Mr. Roy Potas, United States Statistical Reporting Service, Sioux Falls, South Dakota.

source availability and allocation varies widely from farm to farm in no predictable and definite pattern, it appeared that presenting five model production systems and budgets pertinent to each would aid the decision-making process.

Assumptions Relating To This Study

Before attempting analysis of proposed swine production systems, additional basic assumptions should be stated.

Feed consumption efficiency has been assumed uniform with all production systems. No significant differences in feed requirement levels have existed in experiments conducted to determine relative feed needs for pigs raised in confinement, or those produced by conventional methods. The confinement systems have shown a slight advantage in feed conversion, but have other higher offsetting costs.

The manager who makes a significant change in his production organization is assumed to possess managerial ability commensurate to the responsibilities of the system selected. Successful past performance has caused the operator to review his previous production methods and intensify production if more profitable.

It has been assumed that sufficient capital is available for the competent operator contemplating reorganizing his production system. The operator's present equity and previous performance enables him to obtain the additional capital from proper lending sources.

The national production of and prices received for hogs are assumed to be at equilibrium levels. Seasonal deviations in prices are anticipated.

The labor requirements assumed for each production system

represent equivalents of labor usage by progressive farmers, producing with similar facilities. Hired help is assumed available at prices indicated.

Review Of Literature

Since the problem in this study is primarily one of allocating production resources, the review of literature was limited to farm management.

Heady has considered the principles of production allocation.[6] He emphasized that a choice must be made regarding resource allocation, that choices result from substitutability of resources. Enterprises may be competitive, supplementary or complementary. The problem of resource allocation is to combine these resources in such a way as to maximize returns or minimize average unit costs.

He stated that the individual farmer has some choice in what type of product to produce as well as what resource inputs to use. The farmer's choice of enterprises is conditioned somewhat by price variability, the availability of resources and the nature of the costs incurred in production. Heady felt that an increase in farm size would not necessarily increase profit unless management can be increased in proportion to other resources. Management determines how production is to be adjusted and how resources will be used to meet uncertain conditions. Heady assumed that time produces uncertainty, i.e., planning for a single year or single transaction period

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6 Earl O. Heady, Economics Of Agricultural Production And Resource Use, (New York: Prentice Hall, Inc., 1952).

may be done with greater certainty than for enterprises of longer duration.

Heady, et al, studied the problems of limiting the number of farm enterprises and reported the results in a pamphlet on hog production in 1961.[7] Their purpose was to determine profit maximization under various organizational plans but he introduced land (two soil types) as an input having direct bearing on a decision concerning livestock organization. Their study included intensification of hog production but did not include specialized farmers. Several levels of management were assumed as were building facilities of various capacities and differing amounts of available capital. Livestock enterprises were varied and alternate plans analyzed by linear programming.

As capital was increased, the farm became more profitable with more hog production, but marginal return was only 5 per cent at a capital level of $11,522.[8] Seasonal deficiencies were noted, however, in the labor element at this capital level. They concluded that an intensified system of hog production did increase profits but demands made on the farmer for one scarce resource, labor, were such that maximization of profit would occur only if field work or crops were not neglected. Technological advancement might give different results now. Corn produced the greatest return on labor in-

7 Earl O. Heady, James R. Gibbons and George Irwin, Specialization And Pork Production Methods In Relation To Over-All Farm Resource Use And Integration, Research Bulletin 496 (Iowa State University, Ames, Iowa, October, 1961).

8 Ibid., p. 219.

vested and it was generally concluded that contractual or large scale production of hogs would not necessarily become dominant. Intensification of hog production in Iowa resulted in less labor available for corn production and lower total returns to the farm.

Boss and Pond reviewed the place of livestock in farm organization, reminding the reader that nearly two-thirds of the general farm income is derived from livestock.[9] They stated that merely adding or increasing a livestock venture to a farm business will not necessarily increase income on that farm but rather that management is the important tool to success. They pointed out that while a larger volume tended to lower average overhead costs, production efficiency must also be maintained or profits would fall. The size of farm often determines what type of livestock will be kept. Accessible markets and available capital are listed as considerations in choosing a livestock enterprise. "One should engage in livestock raising only when satisfied that the conditions prevailing in the area occupied are favorable for that type of business."[10]

Malone stated that "in nearly all areas, the more alert farmers already know the kind of livestock enterprises that fit their particular location".[11] Malone pointed out the importance of the margin over feed costs in hog production. In the long run this margin,

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9 Andrew Boss and George A. Pond, Modern Farm Management, Itasca Press (Webb Publishing Company, Saint Paul, 1947).

10 Ibid., p. 158.

11 Carl C. Malone, How To Make Your Farm Pay, (Iowa State College Press, Ames, Iowa, 1950) p. 173.

however, must cover fixed as well as variable costs. Malone felt that returns to labor per se is not a good criterion of profitability but that the income from the whole farm business should be a guide to efficient management. He cautioned that the livestock organization program be sound, that the size of the livestock business and risks be compatible with price conditions and management.

Castle and Becker conclude there must be economic advantages to specialization since farms are tending to become less diversified.[12] Two reasons for this trend are given. First, it is difficult for a farmer to be a specialist in many areas -- management spread too thin is akin to no management. Second, specialization permits an increase in volume. This may increase profit if productivity can be maintained. Specialization may result in more efficient use of equipment for livestock production. Castle and Becker recommended only a few major enterprises to be the optimum situation on any one farm.

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12 Emery N. Castle and Manning H. Becker, Farm Business Management, (The Macmillan Company, New York, London, 1962).

CHAPTER II

NATURE AND PERTINENT CHARACTERISTICS OF SOUTHEASTERN SOUTH DAKOTA

The purpose of this chapter is to acquaint the reader with background information on the study area relating to this work. It also points out cause-result relationships pertinent to southeastern South Dakota, and how they have influenced livestock production systems.

Determinant Influences On Cropping Systems

Rainfall in the region averages 24-26 inches yearly but is subject to extreme variation. However, the rainfall pattern is more stable than in more western areas of South Dakota. This tends to favor a large acreage planted to corn, soybeans or other row crops.

Soils influence cropping systems more than rainfall within this area. Soils vary from very sandy to heavy clay. When the soil composition remains uniform into lower strata, the problem of erosion becomes compounded. A loose, light, easily-blown soil may produce half (or less) the crop produced by a darker, heavier soil with the same amount of rainfall. Different soil types are often noted within two or three miles of each other.

The surface structure of the soil may affect crop selection. Nearly level land may be tilled quite differently from hilly soils. The flash rains that occur in the area, may even do damage to gently undulating soils. Were all crops to be planted or cultivated in the direction of slope, much good top soil could be lost in a relatively short time. Some planting on the contour is now accepted and encouraged. However, because the slopes often change directions, contour

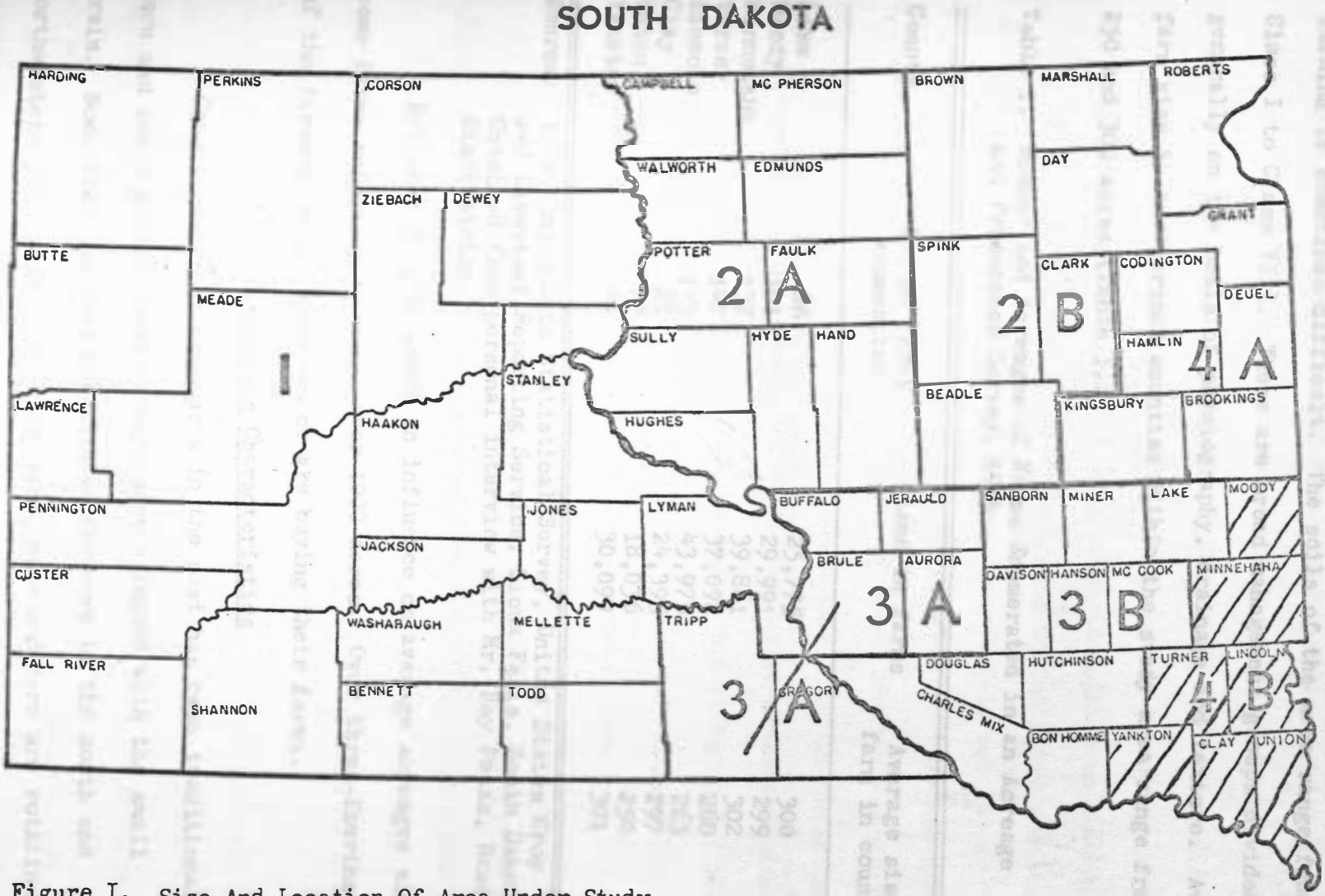

Figure I. Size And Location Of Area Under Study.

farming is sometimes difficult. The soils of the area range from Class I to Class VIII. These are broad management groups divided generally on the basis of physiography, drainage and texture. Average farm size in the various counties within the study area range from 250 and 300 acres (Table 1).

Table 1. Number and Acreages of Farms Enumerated in an Acreage and Production Survey, 1964

County	No. of farms enumerated	Land in farms	Average size farm in county
Lake	86	25,775	300
Moody	101	29,991	299
Minnehaha	132	39,861	302
Turner	142	37,092	260
Lincoln	165	43,975	265
Clay	82	24,395	297
Union	72	18,036	250
Yankton	99	30,099	301

Source: 1964 Sample Data Statistical Survey, United States Crop and Livestock Reporting Service, Sioux Falls, South Dakota. Obtained from personal interview with Mr. Roy Potas, Head Statistician.

Extremes in size exert an influence on average acreages since some farms reporting had well over 1000 acres. Over three-fourths of the farmers in the area own or are buying their farms.

Rotation Characteristics

Crop sequence for the area in the past has been traditionally corn and small grain. Some farmers seed a legume with the small grain. Some flax has been substituted for corn in the north and northwestern portions of the study area, oats and corn are rotational crops in the southeastern part with a rotation pattern of

wheat and corn in the west and southwestern portions of the area. Numerous alternate cropping plans have been noted in all areas of the study region and with the technological progress effected in farm machinery, farmers have tended to increase corn acreage in all counties. This has changed livestock production patterns somewhat.

It is not the purpose of this thesis to determine whether the changing cropping rotations are more beneficial, but rather to review how this affects livestock patterns to see if they are conducive to increased profit and whether increased row crop production and intensified hog production can be compatible. As an indication of increased row crop farming 3.3 million acres were planted within the state to corn in 1962; in 1963 the figure had risen to 3.7 million.[1] Soybeans acreage rose from 123,000 in 1962 to 151,000 in 1963.[2] Other grains made modest gains or showed losses.

Market Accessibility

Market accessibility is very good for all livestock production in area 4B. The central public markets at Sioux City, Iowa, and Sioux Falls, South Dakota, plus packer-buying stations in these cities and at Madison, South Dakota, provide livestock markets within 55 miles of any farm in the area.

Farm-to-market roads are being continually upgraded with Interstate Highway Number 29 serving as a major north-south trunk route and Interstate Highway Number 90 accommodating a large share of

1 South Dakota Agriculture, 1963, United States Crop and Livestock Reporting Service, p. 9.

2 Ibid., p. 18.

east-west traffic. There are other Federal and State highways which augment local or county roads.

Few, if any, farms lie far distant from good roads which are adequately maintained.

Livestock Production Methods

The present pattern of livestock production on most farms in southeastern South Dakota is an outgrowth of the past. The physical plant is of such nature that changing the production plan may take much effort. Remodeling of existing structures is often costly. Fitting converted units into a production system may result in re-setting fence lines and buying expensive equipment if efficiency is to be attained. The typical farrowing house was built to handle one farrowing yearly. It is usually at some distance from other buildings and may not be well integrated into an intensified plan of swine production. If the farm operator is inclined to increase production, he sometimes adapts a discarded horse barn as a sheltering unit for his production program. If the manager should be "lucky" and have rough shelter fitting his production plan, he usually finds it lacking in feed or water distribution or lacking in manure disposal facilities. Other buildings on the farmstead are often of little use: the poultry house is usually misplaced if it were to be used in an intensified swine program, the same is true of most machine or utility sheds as they were built with one purpose in mind. Some barns lend themselves to remodeling but costs may be prohibitive.

Most farmsteads in the area were built as needs for each building became obvious, as funds could be spared and, in some cases,

as farmers attempted to keep up with their neighbors. These farmsteads are not easily adapted to efficient production systems in agriculture. Present farm buildings tend to dictate the type of livestock produced. There is merit in using existing buildings but this may be overdone. In the long run it may be more profitable to build new buildings than to adapt the old. Opportunity cost should be the criterion for developing a farm plan in livestock production.

Present farm building set-ups tend to encourage a diversified (and often unorganized) program consisting of a small farm flock of chickens, a few milk cows and/or some beef stock and some sows. A few farmers also keep some sheep.

Some managers have rejected this traditional pattern of livestock diversification. Instead they concentrate on efficient production of one or two livestock enterprises.

Present Labor Situation

The lack of an adequate farm labor force may explain why changes may be needed in production plans. Whereas fifty years ago, a farm family commonly consisted of six or seven children, present families average two or three. Furthermore children of fifty years ago usually obtained their education from a nearby school and had time to perform farm chores before and after school. Many present farm children are not available for farm chores before and after school since two to four hours travel daily is spent on school buses.

The farm wife has also accepted a greatly changed role. Her freedom from housework permits her to accept leadership in community activities. She does the shopping and makes an occasional

trip to town after repairs. She is no longer the placid overseer of the farm laying flock. When she does participate in any farm chores, it tends to be a type of work in which she is considered an active partner.

The attitudes of hired men have changed drastically. Rare is the hired individual who will spend a hard day in the field and come home to a complete set of chores at night, cheerful as when he left in the morning.

The farm operator therefore may be left with perplexing situations. His time must be spent in decision making and record keeping but he also must perform many routine tasks if he feels that automation or semi-automation is beyond his means.

The typical farm operator of southeastern South Dakota is competitive. The free enterprise system has developed this degree of competitiveness; without it he would soon be relegated to work at some job with less responsibility. He is in his late forties or beyond and he definitely is more successful in some lines of work than others. Usually he enjoys a specific kind of work and he may find methods of increasing his volume while decreasing his costs, perhaps in unorthodox fashion. He has obtained a degree of efficiency somewhere in the farm organization and his job is determining where he is most efficient, what resources he will use, and when he will use them. Some farmers are becoming highly specialized, carrying efficiency to a point well beyond that of the average farmer.

Governmental programs in southeastern South Dakota may offer little relief to the diversified operator; they tend rather to favor

specialization -- even if they were not intended to have this effect.

The financial and labor requirements for different-sized hog ventures will be investigated in the next chapter.

CHAPTER III

PLAN A: REPRESENTATIVE 250 ACRE FARM BUSINESS ECONOMIC AREA 4B

In this chapter, the possibility of profits and efficient use of labor and capital on a synthetic 250-acre unit, which is representative or typical for economic area 4B, will be examined. Land, labor and capital requirements will be reviewed for livestock and cropping programs as organized on an average farm. Stability of income, possibility of risk, and growth potential will receive consideration as determinate factors in diversification.

Housing And Shelter Facilities

Farm buildings include a three-bedroom home, a 36-foot by 48-foot barn with hay loft and 10 stanchions along one side; an 18-foot by 40-foot farrowing house; a granary and a 7000-bushel corn crib; a 22-foot by 36-foot machine shed; and a 400-hen poultry house. The farm is fully modernized and the buildings placed in a rather advantageous manner.

Land Usage

Table 2 presents the major land use on an average 250-acre farm. About 34 per cent of the tillable acreage is planted to corn. Soybean acreage has been increasing and threatens to replace some of the oats, wheat and rye typically grown in the area. Hay crops are not widely used in a rotation scheme, probably reflecting the use of commercial fertilizers for soil improvement. Other crops (sorghum, sweet clover for seed, etc.) account for a small acreage. Participation in government feed grain programs is light, with less

Table 2. Farm Land Use on a Typical 250-Acre Farm

Crop	Acres reported	Per cent of total reported	Average acreage per farm
Corn	6134	34.0	85
Soybeans	2627	14.6	37
Small grain, all	2726	15.1	38
Hay, all	807	4.5	11
Sorghum and Grass silage	132	.7	3
Other crops (Sweet clover seed, etc.)	142	.8	14
Government program	972	5.4	25
Pasture	1764	9.8	31
Other land (Farmstead, groves, etc.)	2284	12.6	6
Not reported (Probably roads)	448	2.5	250
Total	18,036	100.0	

Source: Acreage and Production Survey, U.S. Crop and Livestock Reporting Service, 1964, Sioux Falls, South Dakota

than 20 per cent of the corn base acreage being left idle in the county. Ten per cent of the land is in pasture. This necessitates keeping some forage consuming animals or renting such land to a neighbor who has roughage consuming livestock. Over 12 per cent of the acreage reported was in "other land" i.e., farmsteads, groves, or non-tillable land. It appears that forage consuming animals would be desirable. Otherwise some alternate use might be substituted for crops grown on such acreage.

Crop Equipment

The used machinery on this 250 acre farm is considered adequate. The farm has one three-plow and one two-plow tractor. Both are kept in good shape despite their age. The three-plow tractor has a propane burning engine. This farmer owns no combine since his neighbor does custom work and is available when crops are ready. A two-row mounted corn picker is owned by the operator, however, and consideration has been given to field shelling and drying to reduce labor needs. A late model $1\frac{1}{2}$-ton truck with a 14-foot box is also owned by this producer. The only off-farm labor done by this farmer consists of "return work" with his truck for his neighbors. Such work averages less than 15 hours in any month. This exchange of labor seems agreeable to all parties concerned and tends to lessen equipment costs. Rates used for exchange work follow customary rates within the community.

Managerial And Financial Aspects

The following budgets assume the operator is a good manager

and has a general livestock program. The amount of profit with this system, vulnerability to risks, and labor utilization will be the criteria in determining whether pork production should be intensified, and made the major source of income to the farm business.

The farm has a total real estate valuation of $58,315 reflecting an average of $203 per acre valuation in 1964.[1] The family consists of the operator (45), his wife (44), his son (15), in high school, and a daughter (11). The son contributes considerable labor during summer vacation months.

The owner-operator of this unit carries a real estate mortgage of $25,000 amortized over a 25 year period, with equal payments planned. The producer has attempted to maintain assets as double the liabilities in his business. Taxes are becoming burdensome and are approaching $5.00 per acre. The farm lies within a consolidated school district and personal property taxes are levied at 40 mills.

The family has considered good transportation a connecting link with the outside world. Their present car has a valuation of $2000, one half of which may be considered as invested in the farm business.

Average operating cash on hand was $1750. This has been considered a conservative sum since business plus family needs come from this source in addition to any funds for emergencies which may arise.

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1 Acreage and Production Survey 1964, United States Crop and Livestock Reporting Service, Sioux Falls, South Dakota, Mr. Roy Potas, in charge.

Table 3 has listed the estimated direct costs for the crops grown. The costs given include seed, repairs, fertilizer, weedicides and insecticides and cash costs of application of any chemicals. Interest on investment, taxes and depreciation are not included in the variable costs, however. Most figures were taken from "Ten Steps in Planning Your Farm Or Ranch Business".[2] Some figures that weren't completely appropriate were changed. Farm chemical costs were taken from personal records and the chemicals involved were for corn: Diazinon 14 G, and 2-4 D Ester; for soybeans: Amiben; for sorghum: 2-4 D Amine. Alfalfa was cut three times with a total yield of three tons per acre. Appendix Table 4 lists probable prices to be received for crops and livestock as taken from a recent publication.[3]

Present Livestock Production

The farm has 10 Holstein dairy cows, 20 feeder steers, 15 cross-bred sows farrowing twice yearly and 400 hens. The family operates as a unit but a shortage of labor is noted, especially in the spring rush season.

Total AUM's[4] obtained from forages suffice for 10 cows and

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2 Wallace G. Aanderud, "Ten Steps in Planning Your Farm Or Ranch Business", Extension Circular 632, Cooperative Extension Service, South Dakota State University, Brookings, p. 4.

3 Aanderud, "Guidebook For Planning A Farm Or Ranch Business", Extension Circular 633, Companion Publication to E.C. 632, Extension Service, South Dakota State University, Brookings, p. 32.

4 An animal unit is considered 1000 pounds live weight or roughly equivalent to the weight of a cow and small calf. One AUM of forage would maintain a unit for one month. L.A. Stoddart and A.D. Smith, Range Management, Second Edition (McGraw-Hill Book Company, New York, 1955), p. 2.

3 replacement heifers when hay and grain are fed in addition. All areas that may be grazed are utilized. Silage is fed in the spring and early in the fall.

The 20 feeder steers are usually purchased in November. The last steers gained over two pounds daily and graded "Good to Choice" when marketed. The dairy stock is being improved through artificial insemination. The Holstein cows averaged over 12,000 pounds of milk. This is sold on the manufactured milk market. Calves (except replacement heifers) are sold shortly after birth.

The 15 sows kept on this farm farrow twice yearly, usually in March and September. The sows, a three-way cross of Landrace, Chester White and Hampshire, are sold and replaced each year. The farrowing house is well built and usually temperatures are adequate. However, stress situations do occur and farrowing crates may be used to advantage. The operator keeps the sows' quarters reasonably clean and dry, farrowing an average litter of nine pigs and marketing an average litter of seven. The pigs have their needle teeth clipped shortly after birth. The newer oral medications to prevent anemia have been used by the operator. During colder farrowing periods, the sows have been given an antibiotic feed additive two weeks before farrowing. This seems to curb any scouring troubles with the young pigs. The pigs ordinarily are marketed within six months averaging 225 pounds. Replacement gilts for the herd are picked for growthiness, number of teats and other desirable physical features. Eighty per cent of the pigs sold grade number one.

The 400-hen laying flock is of hybrid stock. Five hundred sexed pullets are purchased annually in February and the potential layers housed in mid-August. The flock maintains a yearly laying average of 70-75 per cent. The farm wife and children do most of the daily work with the chickens. Her husband does the heavier work.

When resources are unlimited, marginal costs should equal marginal returns. If resources are limited, equi-marginal returns should be sought. "Simply stated, the principle of equi-marginal returns means that the last dollar spent on an enterprise or a fixed factor will yield a marginal return exactly equal to the last dollar earned from all other enterprises or other fixed factors."[5] Partial budgets are generally used to test equi-marginal returns.

Table 5 lists expenses, yields and sales of home grown feeds. Crop yields reported in Table 5 approximate the average yields for this area. All silage has been converted from wet to dry basis to summarize production and needs more accurately.[6] The yields of pasture and other land not in crops are estimates based on a dry hay equivalent. The 1.29 ton yield return for excellent pasture reflects a 5-year average for southeastern South Dakota.[7] Fallow acreage was assumed to be in a government program and returns reflect benefits

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5 Castle and Becker, op. cit., p. 57.

6 Wet basis X .333 = calculated to 85-90% dry material average of corn, grain silages, Frank B. Morrison, Feeds and Feeding, A Handbook For The Student and Stockman, 22nd Ed. (Morrison Publishing Co., Ithaca, New York, 1956), Appendix Table 1, p. 1038.

7 Joshua Robinson, TABLE 1A, Average Hay and Pasture Yields (dry basis) Per Acre By Crop Reporting Districts. Part II Reference Material For Part I Farm Plan, South Dakota State University, Brookings, p. 2.

of the 1964 crop season.

The cropping system for this 250-acre farm was assumed to be the same as the average for extreme southeastern South Dakota. This is roughly a 4-year rotation of corn, corn, soybeans, and small grain. Only 11 acres of hay are included. Presently, emphasis has been put on leveling out the requirements for labor, land and capital. The operator has been using minumum amounts of fertilizer, herbicides and insecticides as evidenced by his costs per acre on crops grown. Costs with this system are relatively low in relation to total return, because almost all of the feed grain and roughages is utilized by livestock on the farm. Table 6 reflects a deficit of 542 bushels of corn yearly.

Results Of Present Farm Production

Appendix Table 8 summarizes labor, equipment, building and operating capital requirements for the farm as a unit. It is an indicator of how the farmer's labor and capital needs of his present production system are utilized.

Over 3800 hours of labor were required. Almost all of this labor was furnished by the farmer, his wife and children. Some labor was secured by trading work as previously noted.

Sows were scheduled to farrow in January and July since these were slack periods. The cows freshened in late September or October. The steers were placed in the feed lot in November and sold by May. The farmer relied substantially on his son for additional labor during the planting season.

Livestock enterprises demanded nearly three times as much labor as did the crops. As presently organized, the livestock ventures did not return a profit proportionate to the cropping system but if total capital investment (land included) were considered, the livestock enterprises appear more favorable.

The labor required for dairy cows was high, demanding almost as many work hours as the next two highest livestock activities, hogs and the laying flock combined. Steers ranked low in labor requirements but net returns were not adequate to allow $1.50 per hour for the time required. A beef fattening enterprise of greater size might show greater returns.

Corn for grain and the silages ranked high in labor demand. Hay required much labor also. Soybeans required comparable labor requirements on an acre basis. These crops yielded a good return to the labor devoted to them, however.

Capital requirements for crop equipment were estimated using Robinsons' compilation.[8] The equipment costs were estimated to be one-half of new cost of equipment used in production of the respective crops.

The livestock equipment costs and building costs were estimated using realistic replacement figures. Equipment and building capital requirements are listed at one-half of original cost. Op-

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8 Joshua Robinson, Part II Farm Plan, Table II-A, p. 4, Investment of $23.34 per acre, crop machinery investment. Includes investment in farm share of automobile as well as tractors, trucks and motors, per crop acre.

erating capital for the various ventures is listed as an average for the year.

Analysis Of The Farm Plan With Diversification

The farm manager appears conservative when analysis is undertaken. Vulnerability to risk is small since the operator may reasonably expect to recover all direct costs, barring extreme adversity. Equity is sufficient to maintain a sound liquidity position for several years. Income over direct costs is sufficient to meet variable costs. However the conservative position is attained with some sacrifice in income over time. The stable income becomes a fixed income, i.e., the growth potential of this plan is small. The operator's efforts become weakened because many enterprises are involved. His diversification increases his per unit labor requirements. This farmer may have problems in obtaining and keeping hired labor if more labor would be needed. The operator soon needs to work out a partnership arrangement with his son, or reorganize the livestock organization so that he can meet extended emergency labor requirements. He should be able to upgrade his management and eventually realize a return to management. If labor costs are deducted under the present plan, nothing remains for management.

Since labor appears more limiting than capital for the operator, work requirements for the livestock operation demand further analysis. "Since labor is the main resource farmers sell, they should use it as efficiently as possible. More product from each

hour of work increases income."[9] The cows require most of the available labor. The laying flock has a labor expenditure of 600 hours, yet has an income over direct costs of $156. If all costs are included, it would appear more profitable to drop the farm flock. The steer feeding venture does not allow enough extra profit to warrant the investment involved. The swine production system requires approximately one-half the hours that are expended on the cows. Direct costs for hogs are high, reflecting large feed needs. Operating costs per dollar returns are high with cows due primarily to higher equipment, building and foundation stock costs. Direct costs offer a more favorable ratio to income over direct costs with cows than hogs. However, high total investment and costs and smaller gross return per dollar invested for the cows plus large labor requirements for the dairy enterprise places the cows in less favorable position overall relative to the hogs.

Since cropping returns are both higher per hour of labor and per dollar of variable capital investment the farmer is hesitant to reduce his cropping operations.

Further investigation will be attempted to determine if the net return to the farm can be increased by dropping some of the livestock enterprises or reorganizing the cropping program and concentrating labor, capital and management on one or two ventures.

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9 Earl O. Heady and Harald R. Jensen, Farm Management Economics, (Prentice-Hall Inc., Englewood Cliffs, N.J., 1958), p. 400.

CHAPTER IV

PLAN B: AN ALTERNATE LIVESTOCK AND CROPPING PROGRAM FOR THE 250-ACRE REPRESENTATIVE FARM

The purpose of this chapter is to make a comparative analysis of the physical and economic consequences of doubling the number of hogs produced on the representative farm while holding labor, management and buildings (with some remodeling) constant.

Proposed Reorganized Livestock And Crop Production

The move to increase hog production requires elimination of some other livestock enterprises on this farm. Therefore it was decided that the steer feeding enterprise would be replaced with a 20-cow beef herd, with calves sold in the fall. These cows would utilize the forage available from pasture, alfalfa and wasteland otherwise consumed by the dairy cows. The 10-cow dairy enterprise also would be omitted from the livestock program to improve labor availability and to free building facilities for increased swine production. The 400-hen laying flock would be discontinued for similar reasons.

Labor saved by reorganizing the livestock system would subsequently be applied toward more intensive cropping methods with corn acreage boosted to 140 acres and soybeans to 40 acres. (More extensive cropping programs might result in lower net income.) Oats would be used as a nurse crop for new alfalfa seeding only and would be cut for hay. Alfalfa would be increased to 20 acres to provide the hay needed for the livestock. There would be no change in amounts of pasture and other grazing acreages.

Corn would receive additional fertilizer. Supplementing the dry plow-down fertilizer would be 100 pounds of 11-55-0 applied at planting time as starter, plus 80 pounds of actual nitrogen anhydrous ammonia side-dressed before the corn is 15 inches tall. Only starter fertilizer would be used on the soybeans. Alfalfa would receive 100 pounds of 0-46-0 per acre applied in early spring since phosphate has increased legume yields considerably.

Only minor changes in crop machinery investments would be made. Those machines formerly used in small grain production would be sold and the proceeds invested in better four-row crop equipment. The grain drill and windrower would be sold and a better corn planter and cultivator would be purchased. Tractor horsepower is considered adequate. Eighty acres of corn-stalk ground are to be plowed in the fall and the soybean stubble will be disced in the spring preparatory to corn planting.

The barn would be remodeled to accommodate farrowing 15 additional sows with remaining space allocated as a growing-finishing unit equipped with a partially slotted floor. Likewise the poultry house would have installed a partially slotted floor to provide additional confinement housing for hogs. Slats in the barn are to be of concrete, those in the poultry house of wood. Other buildings are considered adequate to handle the sows during the breeding, gestation and weaning period. The beef cow herd would be housed in a newly erected reasonably priced pole structure with an open front to the south. It is assumed that the farmer will be able to furnish

the required labor except during the spring and summer seasons, thus insuring continuity of the farm program should the son decide to pursue formal education after high school. This labor arrangement is assumed to be satisfactory to the other members of the family.

Farm feed production is often considered a limit on the intensification of hog production or expansion of other livestock enterprises. However, the possibility of purchasing feed would allow a large herd to be produced on a small farm. While the acreage of general farms in increasing, the more specialized swine production units tend to appear on relatively small acreages. Acreage is not a primary element in herd size determination. The size of herd is increasing on most farms where pork production is taking place. Farm size (in acres) is less determinate for optimum returns than successfully combining management with scarce resources.

While feed usually represents 75 per cent of production costs, labor is an important input. Swine raising has much repetitive labor involved and the potential improvement in efficiency is rather high. "Efficient use of labor, buildings and equipment is probably more important to profits than planned farrowing---."[1]

Returns from marketings of differently organized swine production patterns show that timing of marketing is important, along with efficient use of inputs.

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1 A.G. Mueller and V.R. Eidman, Farmer Experiences With Selected Hog Producing Methods, Illinois Agricultural Economics, Urbana, January 1962, Vol. 2, No. 1, p. 4.

Brunk and Darrah have stated that

> usually, significant price adjustments occur as the flow of products to market varies. These adjustments make it possible for some producers and marketing organizations to vary their production and marketing pattern to benefit financially.[2]

Analysis Of Semi-Specialized Production

Analysis is imperative to determine which production system may be most desirable. Management is a very important element in pig production, yet perhaps the resource most neglected. "More than one farm adviser has pointed out a major failure of agriculture -- there is no time for management."[3] Management becomes the key to the success of any program. A manager with high efficiency may cope with adverse conditions and make a profit. The manager of low or mediocre efficiency might well have ideal resources and conducive environmental conditions but show a loss for a season. Many factors contribute to good management. Profit maximization principles should be emphasized as production per unit of input is analyzed. A labor return per man hour would not effectively evaluate the proposed pork production system. The production per unit of input has greater possibilities for studying reorganization plans. Such evaluation should be made for a sustained period of time; short term measurement may become invalid due to conditions beyond the control of the manager and may alter the profit picture.

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2 Max E. Brunk and L.B. Darrah, Marketing of Agricultural Products, The Ronald Press Company (New York, 1955), p. 204.

3 Chester Charles, "Hogs Are My Business", The Farm Quarterly, Summer, 1964, Vol. 19, No. 2, p. 55.

The farm with a semi-specialized hog system had a higher capital investment than the diversified farm. Remodeling of the building required $1085 of extra capital. More capital (principally for breeding stock) was required when fewer enterprises were involved. Income over direct costs was substantially higher with the semi-specialized system, but extra indirect costs tended to narrow the profit differences between the semi-specialized and diversified systems of production. Extra depreciation, interest and tax expenses were charged to the semi-specialized system.

The semi-specialized system was advantageous from the labor standpoint. With this plan $1.05 per hour was allocated for returns to labor but nothing remained as returns to management. Neither of these returns were reached with the diversified farm plan. With the diversified pattern of livestock production, labor required for each enterprise and for the farm as a unit was relatively high. This indicated that the workers involved were losing time between jobs and/or enterprises. Substantial economies of scale evidently cannot be successfully attained with extensive diversification. The management element improved the profit picture in the semi-specialized system in two ways: (1) it applied inputs where production of combined resources was high, and (2) it added more inputs to the farm business.

Risk elements were present with the more intensified systems of production and arose from within and without. More farrowings demanded regular breeding schedules. Disease problems were multiplied

when numbers are increased although not necessarily proportionately since more intensive production warrants greater investment in housing and equipment. These better facilities improve the operator's capabilities to handle the increased hazards.

Risk factors originating outside the production systems are also encountered. Fluctuating prices concern the operator who has limited credit. Obsolescence may be a risk for the farmer who tries different methods of production at the wrong time. The most successful innovators schedule their heaviest production when returns are high, i.e., they produce a great volume shortly after new methods have proven more profitable. Another apparent risk arises from shifts in or along demand curves since pork is one of many substitutable meat products. Pork products might either be sold at a lesser price or less sold at the same price. Either condition could arise where other meat products compete. Large changes in tastes or spending habits could affect demand for pork and pork products.

Summary

The reorganized swine production system as proposed for the synthetic farm has higher capital requirements, a need for better managerial ability and higher risks than the diversified farm plan reviewed in Chapter III. Risk seems to be greatest in the short run. Risks are minimized if a long term operation is planned, since all fixed costs become variable over time. Management, more than the business organization, determines the risk involved. Returns to labor are improved with the reorganized system, but not significantly

different from a diversified system in return to total inputs. This indicates the semi-specialized system might be better adapted for an established farmer with surplus capital or a sound line of credit who can add additional inputs and by so doing make use of his management potential more fully.

CHAPTER V

PLAN C: PROPOSED SPECIALIZED SWINE AND CROP ENTERPRISE ON A 250-ACRE REPRESENTATIVE FARM

Is intensified hog production compatible with specialized cropping methods and the family farm in general? Does commercial production fit the farm business without misallocation of resources? Will returns to capital be adequate to warrant making a large investment? These questions will be considered in this chapter. The purpose of this chapter is to analyze system C and compare it with A and B.

Plan C calls for 90 sows farrowing 180 litters of pigs per year. A multiple farrowing system would be used farrowing every two months. It is assumed that each sow will wean 7 pigs per litter for a yearly total of 1260 pigs. New buildings would be erected to handle the extra number of hogs. No other livestock enterprises would be attempted since labor and capital resource requirements with the hog system would be substantial.

Present And Projected Housing Needs

In plan B the farmer had the following housing for farrowing-finishing 420 pigs; (1) a 18 foot by 40 foot farrowing house, (2) a converted barn with an area 18 foot by 48 foot fitted for farrowing divided from a 864 square foot finishing area which has a 50 per cent slotted floor, and (3) a 24 foot by 30 foot converted chicken house, also having a 50 per cent slotted floor.

Needed are additional facilities to handle 15 more farrowing sows and 840 growing pigs. Therefore another 18 foot by 40 foot

hog house was added. Each of the three farrowing units would be used in sequence. Also added was a growing-finishing unit which has a capacity of 320 pigs at one time. Three sets of hogs could be marketed yearly from the new growing-finishing unit. The specifications for the finishing unit were adapted from a hog producer's actual operation and include; a pole structure, 20 foot by 80 foot, a concrete floor, 40 foot by 80 foot, and manure pit nine feet wide and extending the full length of the floor.[1] Two 24 foot feeders could be filled in eight minutes from holding bins by augers powered by electrical motors. Manure disposal is accomplished with a tractor-mounted loader pushing the refuse from the sloping concrete floor.

The new farrowing house includes adequate insulation and ventilation. Electrical heating tape installed in the concrete floor provides heat for young pigs. A 4-foot alley makes movement of sows easy. Feed is augered from overhead bins and deposited in chutes from which the operator meters feed into individual feeders with slide stops. Each 42-square foot pen has an automatic waterer.

A pole building, 24 foot by 36 foot and costing $600 is included as additional housing for breeding and gestating sows. This shelter is divided in the center; each side accommodating 15 sows. Shelter for these sows is minimal. The shed has no floor. Limited bedding is planned and feeding and watering facilities will

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1 Robert G. Suterand and Vernon E. Schneider, "A 320 Hog Finishing Unit For $4,336", Built on the Clarence and Joe Collings farm, Lafayette, Indiana, Successful Farming, September 1961, Vol. 59, No. 9, pp. 48-49.

be placed outdoors. It is expected that dung will be dropped outside, as the sows quickly learn to keep the sleeping quarters dry.

Changes Anticipated Resulting From Specialization

Cropping plans would be changed significantly. Increased needs for feed grain would place heavy priority on growing corn. Under this plan (C) two hundred acres of corn will be grown continuously. Soybean and alfalfa crops will be discontinued. The established pasture and wasteland can be rented to a neighbor for $750. Another used four-plow tractor will be purchased to facilitate the crop program. Field work can thus be done rapidly and at an opportune time. The operator would sell his mower, baler and other seldom used farm equipment items. The two-plow tractor would be utilized in yard work. Additional herbicides and fertilizer would add $14 per acre for costs of growing corn. This added fertilizer is assumed necessary to maintain soil fertility with continuous corn.

A labor requirement of 16 hours per sow with two litters is assumed. This would require 1440 hours of the farmer's time yearly. Corn production would demand 1320 hours of labor annually. Additional general farm labor is estimated to total 310 hours. The farmer would no longer exchange labor with his neighbor since the intensified systems of production would keep him fully occupied. Plan C calls for hiring 200 hours of unskilled hired labor during busy times.

Disadvantages Of Specialized Production

Marketing decisions may become more difficult with continuous

farrowings. With sows farrowing frequently, more sales will be at low prices. This means returns will depend upon an average of prices over time. Profits or losses would not be incurred because of correct or incorrect estimates of future prices. Both fixed and variable costs are incurred in swine production and combine to form total cost. Fixed costs per unit production are initially high and decline as units of production are increased. Variable costs which are low initially increase as resource factors become limiting. The result is a total cost curve resembling a U.

Marginal costs of additional units produced are computed by subtracting previous total costs from present or proposed total costs. This determines the cost of the last units produced and whether returns are sufficient to warrant the additional production, if all conditions remain equal. Since the factor of imperfect knowledge in production and marketing influences price and total revenue over several marketing periods, the manager should allow for uncertainty. It becomes necessary for the producer to recognize his marginal cost, i.e., what it will cost to produce the anticipated additional hogs and compare these with the costs of his present production. This is essential to the profit maximization endeavor. The swine producer may quite often, by adopting good marketing techniques, cover his variable costs over a low price period. Hog prices often fluctuate from week to week. These variations may be due to seasonality, numbers of hogs marketed, inclement weather, packer demand, and other factors. Packers buy live hogs in proportion to the orders they

receive for dressed meat, their storage facilities and present inventories.

Figure II indicates the average seasonal hog price trend, 1955-1965, and the average annual hog prices 1946-1965 received by South Dakota farmers.

With markets in close proximity to southeastern South Dakota hog producers, daily market quotations can be obtained quickly (usually by 10:00 A.M.) and the successful producer can market when conditions are favorable IF he has facilities to sort and load promptly. The producer should know what market (location and type) on which to sell, how to sell (grade and yield or liveweight) in addition to knowing when to sell.

Antonides has stated that

> if the farmer is to receive the most from his production he must have some knowledge of how the marketing system works and the various marketing channels open to him. Much market information is available to the producer, but he must have an understanding of the system and analyze his own situation to it.[2]

Obtaining Additional Capital

Specialized swine production often requires borrowing additional capital. Obtaining borrowed capital involves good managerial skill in negotiating with lenders. Borrowing capital is best accomplished when the borrower understands lending procedures and the lender is familiar with the producers' business or with businesses of like

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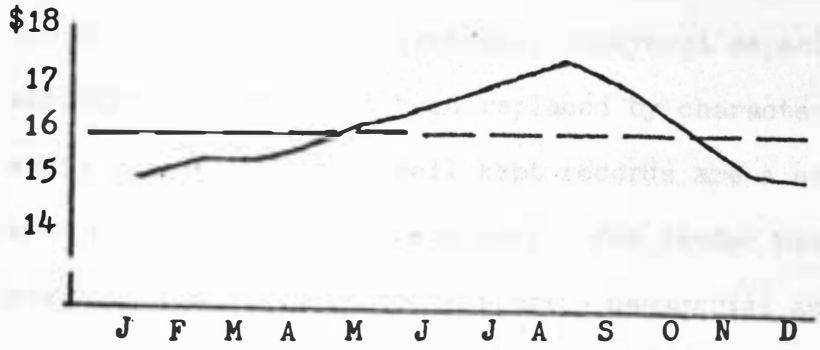
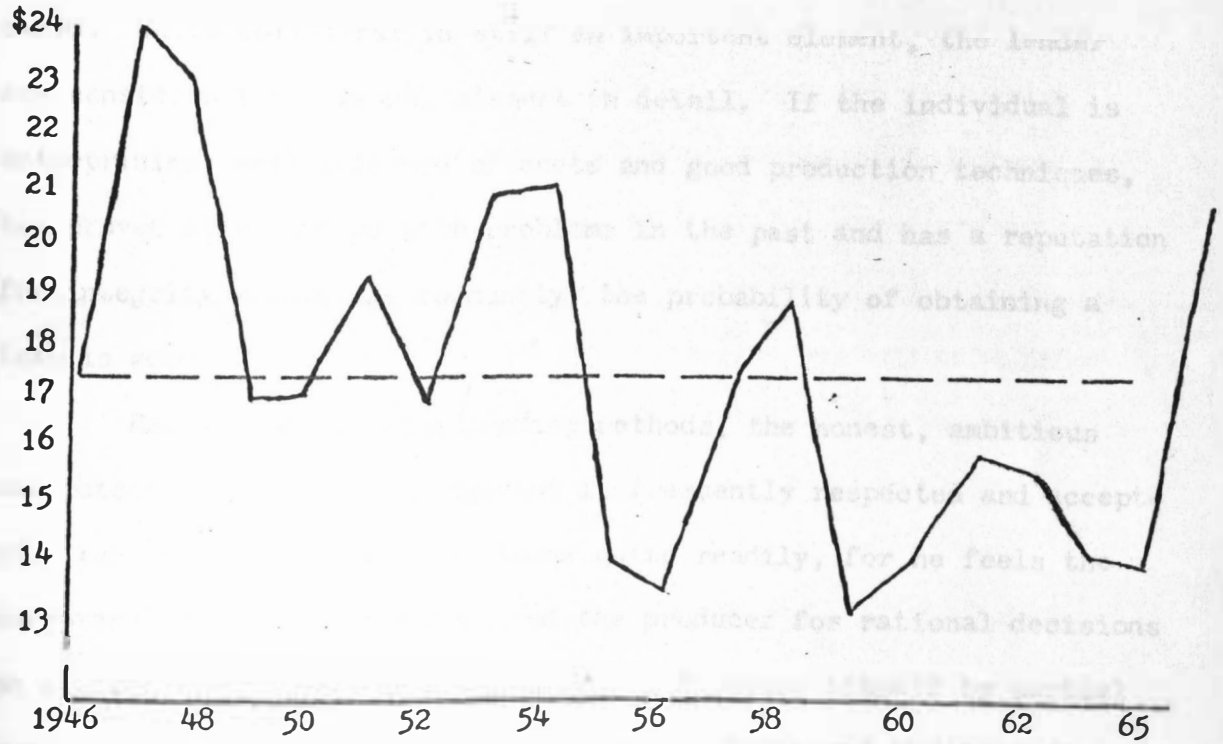
2 Robert J. Antonides, "Marketing Your Hogs At A Profit", Practical Hog Production For South Dakota Farmers, Cooperative Extension Service, South Dakota State University, Brookings, pp. 52-53.



Average seasonal hog price trend, 1955-1965.



Average yearly hog prices, 1946-1965.

Figure II. Seasonal and cyclical price patterns.
Source: Agricultural Prices In South Dakota, 1961, p. 36 and South Dakota Agriculture, 1965, p. 55.

nature. The three R's (returns, repayment capacity and risk bearing ability) have somewhat been replaced by character, capacity (management) and collateral. Well kept records are a necessity for a borrower when he applies for extra credit. The lender uses these records to evaluate the prospective borrower's managerial ability. Lending has traditionally been an impersonal dollar and cents transaction with a loan granted in proportion to the borrower's equity in assets owned. While collateral is still an important element, the lender now considers the personal element in detail. If the individual is enterprising, well informed of costs and good production techniques, has proven able to cope with problems in the past and has a reputation for integrity within his community, the probability of obtaining a loan is good.

Because of changing lending methods, the honest, ambitious and potential borrowers' judgement is frequently respected and accepted. The lender approves such loans quite readily, for he feels the borrowers' experience has prepared the producer for rational decisions on capital expansion. The operator should assure himself by partial budgeting that additional capital is needed for sound business expansion before he requests extra credit. If substituting capital for labor inputs appears profitable, he will seek additional finances. The producer should select (assuming he has a choice) a lending agency where the loan will be tailored to fit his needs and be useful in his production.

Credit needs to be obtained from a source charging a reasonable interest rate. The producer desires lending from a source that

has adequate capital for his operations and built in flexibilities of repayment schedules, should adverse conditions arise. The term of loan should be so timed that repayment coincides with the producers' income, with payments that can be reasonably met. The length of the loan period is important in determining its' success. The manager should avoid financing intermediate term credit needs with a short term loan. The producer should accumulate his borrowed capital from a single source, or from few sources if different types of credit are needed. Centralized borrowing aids the interchange of knowledge between producer and lender. The latter thus becomes more confident of his client and the producers' line of credit is made appreciably stronger. When and if additional credit is needed, it may be obtained more rapidly. One reporter, writing on a large production system said "9 out of 10 farmers anticipate expansion . . . but the credit needs become frightening".[3]

Summary Of Specialized Production

Intensified hog production has greater capital requirements than the plans previously studied. The owners' equity, percentage-wise to total capital invested, is somewhat less the more specialized his production organization becomes.

Crop operating capital is likewise higher than with previous systems studied. Realistically larger yields and returns would warrant placing additional inputs into the cropping system until

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3 Chester Charles, "Hired Money For Hogs", The Farm Quarterly, Spring, 1965, Vol. 20, No. 1, p. 73.

the operator's marginal costs are approached. The labor inputs for crops are not excessive, lending credence that profit maximization has not yet been reached. Crop equipment costs are moderate and most could be recovered, should the owner wish to liquidate these assets.

Investments made in specialized production facilities are of a very permanent nature, because such buildings and equipment have little use other than the functions for which they were first engineered. If the manager chooses to produce another type of livestock, or revert to diversification, he would encounter difficulty in utilizing his specialized equipment and buildings.

Vulnerability to risk is greater with highly specialized systems than those with modified specialization. The risk appears greater as the owners' equity and/or borrowing capacity is diminished or where unfavorable pricing conditions prevail over extended time in the market place. The period of unfavorable market returns will partially determine the soundness of an organizational plan at a known capital investment level. When the owner-operator is raising most of the feed used in his pork production and uses his labor also to care for the sows and pigs, it appears that he minimizes his risks.

Advantages and disadvantages are often counter-balanced in specialized production. Certain inputs, i.e., veterinary and electricity may be more costly with specialized systems but feed supplements purchased in large quantities usually may be obtained at a substantial discount. Disease control is more costly where herd

numbers are increased but by specializing his labor, the hog producer can wean and farrow more pigs per litter. It appears likely that regular multiple farrowings would have some pigs ready for rather poor markets, but the specialized producer with complete facilities should emphasize preparing pigs for high market periods.

Two risks are evident from which the specialized swine producer cannot protect himself. First, consumer tastes and buying habits could change the demand relationship between pork and other protein items. If the consumer curtails pork buying and purchases beef instead, managerial ability and the best production facilities could not overcome lowered returns. Second, if consumer purchases are curtailed involuntarily for long periods of time (such as 1930-1934), financial requirements to maintain specialized production would be burdensome for some farmers. Other farm products were also receiving low prices during that same period, but much livestock was being raised on roughages present on the farm and without the high capital investment of specialized housing and equipment. The manager practicing diversification may invest much more of his labor to obtain a desired level of income during low price periods. However this does not maintain the standard of living that the American farmer has lately experienced.

CHAPTER VI

PLAN D: INTENSIVE SPECIALIZED SWINE PRODUCTION ON A 40-ACRE FARM

The purpose of this chapter is to review the advantages and disadvantages inherent in an intensive production unit and compare results with organizational plans previously reviewed. Plan D as an alternate production system for swine is assumed to alter to a greater degree input volume, physical plant and methods heretofore not analyzed. Therefore the nature of business and personnel involved is also assumed to be not completely coincidental with plans previously studied.

Intensive specialization has been accepted by many operators who are planning a greater volume of production at constant or decreased costs per unit. On some farms, this planning has resulted in a production unit organized for a single livestock enterprise. No other vocational activity occurs other than the production of the livestock or livestock product. Such farms in southeastern South Dakota are generally small acreages with a building complex suited for hogs or poultry. To be successful such highly specialized units must have better-than-average management. New production methods that appear profitable are often farmer tested on such units.

The 40-acre farm used in this budgetary study is assumed to be located in Economic Area 4B and is served by a hard surfaced highway. It is assumed that only the house and granary remain of the original farmstead.

Present And Projected Housing

It is apparent that additional labor saving buildings and equipment facilities are needed to produce a volume of pigs considered adequate to maintain sufficient income levels.

The livestock enterprise assumed has 240 sows. This herd is assumed to be divided into six groups of 40 sows each. Each sow will farrow twice yearly. Six station tested boars are used for each 40-sow group. A total production of 3400 pigs annually is anticipated.

Breeding and gestating sows are housed on alfalfa pasture. Fifteen square feet of shelter is accorded each sow during this period. Four pole type buildings, each 26 foot by 36 foot have been erected. Each building is divided in the center and shelters 30 sows per side. All eight pens will not be occupied at one time, since 80 sows will be in the farrowing and nursery units. The operator utilizes such vacancies for removal of manure and disinfecting of the sow shelters.

The buildings are placed in a circular position and concrete is used for adjacent areas in front and to the side of each building.

Each set of sows has a different pasture area. Watering equipment consists of a large central tank and three waterers serving each set of sows and boars. Electricity is used extensively making the water system frost free. Two holding bins for feed are placed to the side of each building and feed is augered to self feeders from these bins daily, effecting a modified limited feeding system. The holding bins are refilled from a truck delivering bulk feed. The cost of the breeding-gestating shelters, concrete and equipment

is $7430.

The boars are moved to sets of sows on schedule. Sorting gates make these moves less laborious. Each boar is given hormones if needed to insure prompt settling of sows running with them.

Farrowing-Nursery Units

Two buildings, 28 foot by 100 foot are used for farrowing and for nursery housing. The nursery pens measure 10 feet wide by 12 feet. These pens are divided by temporary partitions to make two good farrowing stalls. Four days after farrowing, the initial farrowing equipment is removed and the resultant area allows the pigs to sleep (under heat lamps) near one end while the sow feeds at the other. After ten days, the central partitions are removed and two sows plus their litters occupy the basic nursery pen. These pens have an area three foot wide by ten foot long which serves as a creep feed area.

The walls and ceilings of the farrowing-nursery buildings are well insulated. Ventilation is obtained by three reversible fans in each unit. Radiant heat panels are embedded in the concrete giving additional warmth to young pigs. The floor is solid concrete except an area where feeders and waterers are kept. This area (near the alley) is two feet wide and extends the full length of the building. It has a slotted surface and manure pit beneath. Except for the creep areas the floor is sloped $\frac{1}{4}$ inch per foot toward the slotted area. The nursery units have permanent perimeters with two doors near the alley side. The construction cost of the two farrowing-nurs-

ery buildings with auxilary equipment is $22,400.

The pigs are weaned when five weeks old and are retained in the nursery area another 1½ weeks. This schedule allows for a time lapse when the farrowing-nursery units are idle, allowing the operator to completely disinfect the facilities and ready the buildings for the next group of sows. The operator places the next group of sows in farrowing units one or two days early; this aids the sows to become more accustomed to their new quarters.

The pigs are nearly two months old and weigh 65-75 pounds when transferred to the growing-finishing buildings.

Growing-Finishing Units

Each of the two finishing units is 96 foot long and 38 foot wide, has 36 pens and capacity for 485 pigs at one time. Each group of pigs is expected to occupy the finishing quarters approximately 3½ months. Fiberglass insulation and polyethlene vapor barrier materials are used extensively in the wall and ceiling construction. Masonite is used for internal wall and ceiling paneling. Ten roof-type fans driven by 1½ horse electric motors handle ventilation problems. Concrete slats cover 768 square foot of floor space.

Each finishing unit has two mechanized feeders. Feed is moved from two outside bulk bins to the feeders by use of augers. Feeding hoppers above each pen drop pre-determined amounts of feed on the solid section of the concrete floor. Pigs eat directly from the floor. The construction and equipment costs of these two finishing structures is $43,776. These buildings are considered totally con-

trolled environmental centers.

The total capital to organize and maintain production of 3400 market hogs yearly is $119,596 with the facilities suggested. This figure is minimal for no allowance is made for stress conditions which could lengthen the time period for any phase of production. It does not include the investment in land, dwelling and granary.

All feeds are assumed purchased, formulated and processed, from a local grain elevator. The feed is obtained in five-ton lots and delivered and deposited in holding bins near the point of consumption. Credit is assumed available for operating at capacity. The farm is located in an area usually having feed surpluses.

Three and three quarters pounds of feed are usually required to produce a pound of pork from weaning to market weight of 225 pounds. It is assumed that the operator will maintain efficiency by; (1) using tested boars having high heritability growth characteristics, (2) balancing the protein elements of corn and soybean meal, (3) using commercial feeds plus "rapid-growth" additives for feed intended for young pigs, and (4) using latest worming elements.

Labor needs for the specialized production unit are assumed to be 16 hours per sow with two litters or 4000 hours total time annually. Since the growing-finishing units are highly mechanized, the producer uses over 65 per cent of his labor on the sows and their pigs before the litters are two months old. Only 3.5 hours labor daily is considered necessary for the older hogs, overseeing the feeding process, checking for sicknesses and other incidental labor

items. These include disposal of manure waste (which is done at infrequent intervals) and all handling of hogs previous to marketing.

It is assumed that 800 hours of labor will be hired annually and utilized principally during farrowing and manure handling periods. An attendant is often present during farrowings for many sows. When a group of sows has become satisfactorily conditioned to their environment, they are checked less frequently.

It is assumed that the operator has incorporated several unique characteristics into this swine system. He has a contract with a veterinarian whereby visits are scheduled several times weekly to check the hogs, or confer with the manager concerning immediate problems. The vaccinating, castrating and any other routine veterinary work is done during these visits. The veterinarian is also subject to call for emergencies.

Another characteristic of this swine production system is that additional gilts or sows are retained for breeding purposes. This maintains all phases of the system operating at full capacity unless the operator chooses otherwise. It is assumed that all unneeded gilts or sows can be easily sold as bred animals, since the operator maintains strong bloodlines and healthy, vigorous individuals. The extra sows or gilts to be kept during breeding also have an additional advantage. This plan calls for stock held for breeding purposes to be carefully preselected. Animals with deficient bone structure, or animals which are overly aggressive in the feeding and resting areas will be eliminated. The undesirable animals will be placed on

the slaughter market immediately.

Evaluation Of Highly-Specialized Systems

With this type of production system, capital needs are relatively high. There is a heavy investment in buildings which have high rated depreciation. Rapid obsolescence in production methods (such as liquid feeding replacing direct floor feeding) may increase the depreciation rate used.

Labor and management returns under highly specialized production with normal conditions prevailing have greater profit potential than under more diversified enterprises. Potential profits appear greater with specialization because high level management inputs requires intensive production to utilize all the efficiencies of skilled experience. According to Tables 8 and 12 listed in the Appendix, the operator had a good return to investment with livestock production organized under the highly-specialized system. High management levels are not utilized efficiently with diversification.

Specialization has features which can compound difficulties, i.e., the factors that tend to raise efficiency with high management act in reverse to lower profits with an inept operator. The level of management must be matched to the degree of specialization if the production system is to be profitable for an extended time. The system chosen should so combine all resources to produce maximum profits.

The high investment specialized system seems appropriate for an operator moving toward greater volume and intensity of swine

production if he has sufficient capital and credit to weather several unfavorable years. He will not lower costs of production perceptibly but can increase production per man hour. This system may be best adapted where a long-term hog business is planned and no great need for flexibility exists. Bache and others point out that "the high investment system is likely to have the advantage where the type of land dictates a completely confined system and where capital is not moderately limited".[1]

1 David Bache, John E. Kadlec and W.H. Morris, "An Economic Comparison of Swine Growing-Finishing Facilities", Economic and Marketing Information for Indiana Farmers, Purdue University, Lafayette, Indiana, November, 1963, (reprint).

CHAPTER VII

PLAN E: SPECIALIZED SWINE PRODUCTION WITH PURCHASED FEEDER PIGS ON A 40-ACRE FARM

The purpose of this chapter is to analyze the possibilities and problems of purchasing rather than raising feeder pigs as outlined with Plan D in the previous chapter.

Reasons For Purchasing Feeder Pigs

In many areas, farmers are engaged in intensified hog production and buy feeder pigs which they raise to slaughter weight. Some farmers find the purchase of feeder pigs is more convenient and profitable than producing their own. Effecting a timely farrowing schedule requires considerable skill and some operators have purchased feeders to eliminate this difficulty. The creation of feeder pig cooperatives and pig marketing associations that buy feeders from reputable farmers who have clean herds and who resell these pigs in sorted lots to hog growers under a strict sanitation program has promoted the transfer of pigs from farrowing farms to finishing units. Feeder pig outlets usually guarantee liveability for a short time after delivery (ten days) and handle a large volume of pigs. The large supply of pigs available from some pig cooperatives and dealers often create a convenient purchasing situation for the farmers who feed the pigs to slaughter weight. The size of the pigs to be bought and time of purchase are determined by the hog raiser. The size of the pigs determines what they will cost because all intermediate pig marketers obtain a premium price per pound over the slaughter market price. There are several pricing formulas used, but the

pigs' weight is the primary basis of calculation.

Feeder Pig Marketing Techniques

Large numbers of feeder pigs are sold at auctions by the pound with the purchaser making a visual inspection of the animals offered for sale. Often the purchaser inspects sorted lots of feeder pigs available from private dealers before buying. More recently, some sales of pigs have been made by telephone. In such instances the buyer is given the option of refusing a percentage of the pigs on delivery, if they do not meet his expectations. It appears that this option is seldom necessary, for buyer and seller usually continue to transact business and both recognize their responsibilities and the advantages gained by a mutual trust in each other.

It is apparent that new methods of marketing feeder pigs have influenced more farmers to purchase pigs and eliminate the farrowing phase from their production. The operator who has difficulty producing pigs economically would be inclined to purchase feeder pigs instead.

Feeder Pigs For The Specialized System

Plan E assumes that the operator of the 40-acre farm is interested in knowing the probable effect on his income if he discontinued farrowing-finishing 3400 butcher hogs yearly and bought 5000 feeder pigs annually. His production system has sufficient capacity for either plan of production.

He is concerned primarily with the operating capital investment required, and returns to his labor and management as compared to his

present system of production. Secondary considerations would be the labor required and the risks he would accept by buying the feeders. It is assumed that high managerial capabilities are necessary for success with either production system. A quick capital turnover is anticipated with feeder pigs since they can be marketed three to five months after purchase. An additional $15,000 capital is assumed necessary for the pig unit since all growing stock must be purchased.

Labor requirements for an enterprise of this size is assumed to be 4000 hours per year or 80 hours per 100 pigs monthly. Labor costs could be cut if all finishing units had slotted floors. About 1000 hours of hired labor is required annually for this enterprise with present housing and equipment facilities.

Since prices paid for feeder pigs are determined by a supply-demand pattern and prices received for butcher hogs are influenced in like manner, management must be very efficient in timing purchases of new feeders. The operator must consider market price probabilities three to five months in the future. The cyclical and seasonal price patterns of market hogs should condition the price that an operator is willing to pay for feeders. Traditional seasonal price trends are especially important for they indicate periods of high and low slaughter market prices. Pigs purchased in April normally return higher market prices than pigs ready for market at other periods of the year. However, feeder pigs that are finished for, and marketed during favorable price periods usually cost more than pigs which are marketed during low price periods. Partial

budgeting can be advantageous in determining whether a group of pigs will be profitable and might indicate what price may be paid for feeders (assuming the owner knows his costs of production). If a producer of market hogs knows what his costs of production are, he can ascertain a break-even point for his operation. By considering projected market prices with the break-even point of present production, the operator can decide the maximum price which he may pay for feeders and the number of pigs to buy for a specific period.

Analysis

Total farm capital required for this plan is considerably more than the other plans studied. Direct costs are considerably higher than with the previous system where farrowing to finishing is incorporated into the same production system. The net return from the feeders is not proportionately profitable to the system having the farrowing included.

A further disadvantage could occur if the price of feeder pigs would rise significantly. If the purchase price of feeder pigs would be $3.00 more per head than budgeted the operator could barely meet yearly cash costs. This appears to be a narrow margin, assuming the large capital investment.

Labor requirements for the feeder pig to finish market hog system of production is somewhat more than the farrow to finish swine production with comparable incomes. This may be due in part to the specialized system being planned originally for a farrow to finish operation indicating relative inflexibility of specialized methods

of production after initial organization has been made. It may be assumed that all facilities can not be used as efficiently with the purchased pig to market hog system as the original system of farrowing-finishing.

Stresses placed on feeder pigs in transfer to a new environment may be a disadvantage. Lower feeding efficiencies could result and tail-biting or ear chewing might occur when pigs of different origins are placed together. Cannibalistic tendencies of pigs tend to increase with age and size, making it necessary to buy young feeder pigs. Caring for newly acquired stock should be done by (or under supervision of) a capable manager who has extensive knowledge of problematic areas and corrective measures previously employed to eliminate such obstacles.

The finishing of feeder pigs in a specialized system of confinement as studied can prove profitable for an operator who has sufficient capital at his disposal. The probabilities of success increase as the operator obtains additional knowledge about good sources of feeder pigs, types of feeders which may have growth advantages and methods of caring for new stock. Within a situation of sufficient capital and a large volume of pigs being fed, the alert operator may have an advantage when buying. If he purchases feeders often during the year and continues to do so for an extended period of time, his probabilities of purchasing feeders at reasonable prices appear certain during part of the period. This may well cause his average purchase price on feeder pigs to be favorable.

It is not the size of the proposed production that adds the element of risk, but rather the investment that this operator has made in his production unit. Many farm managers produce a significant volume of market hogs with much smaller investment in buildings and equipment and are consistently showing good returns to the labor and management which they invest. Table 9 in the Appendix illustrates the extensive operating capital required ($60,450). This is additional to the large investment in buildings and equipment ($70,000) (Table 11, Appendix). The total investment including land and homestead is $148,966 (Table 12, Appendix). Returns are 6.15 per cent to investment after owner's labor and a return to management have been deducted and this appears inadequate considering the transitory nature of the business.

CHAPTER VIII

AN ECONOMIC COMPARATIVE ANALYSIS OF FIVE PRODUCTION SYSTEMS

Many changes have been made in pork production in the past 20 years. New developments resulting in different production methods have increased the number of potential alternative choices of resource allocation for the operator. The operator needs increased amounts of information to make satisfactory decisions.

Five different hog production systems have been studied using budgetary methods that indicate returns which can be expected by an operator under the different systems. The returns can be best evaluated when one system is directly compared to another system.

For a selected farm, three hog systems employing degrees of confinement were integrated into a representative farm program. The other two budgets are included for organizing confinement swine production as the sole enterprise to be undertaken. These two budgets compare levels of return to each other, and to the three systems mentioned formerly.

Comparison Of Production Systems

Table 12 summarizes returns to capital, labor and management with the five systems of production under study. Returns to capital and owner's equity are listed as an absolute amount and also as percentages of total investment.

This analysis indicates that it is most profitable for a livestock grain farm to raise only hogs and corn. With an additional investment of $22,776, net income can be increased $2,408 or 40 per

cent more than the net income realized from a more diversified farm. The owner's equity with hog-corn production is reduced (57 per cent compared to 66 per cent previously), but his liquidity position is maintained since significant amounts of capital are invested in growing livestock which can be sold quickly, if desired.

Farms organized with two livestock enterprises and two major crop enterprises show less return to investment than a more specialized system of corn and hogs. More labor is substituted for capital with diversified systems; this is indicated by reduced returns to labor as enterprises become more numerous. Neither the diversified or semi-specialized systems have an income sufficient to provide a return to management. When the operator raises only hogs and corn with highly specialized methods, however, the return to management is $324 at the investment figure listed.

The completely specialized system as proposed in Chapter VI with a farrowing-finishing organization has all housing and equipment engaged in intensive production. This intensive operation allows the manager to make full use of his capabilities. Completely specialized production results in returns to investment six per cent greater than that resulting from completely diversified systems and indicate a return to management which approaches five figures.

These returns are not due to greatly reduced production costs (per unit direct costs remained basically unchanged), but are the result of good management in properly allocating resources to obtain optimum use of all inputs involved. Volume was increased by using

all housing almost continuously. Unused fixed assets increase total costs.

The farm organized solely for farrowing and finishing had a labor requirement greater than previous plans studied, but all labor can be adequately remunerated from returns. Allowances made for management are also drawn from returns to investment.

The investment figure with completely specialized organization is substantial. Increased borrowing to meet investment needs has reduced the operator's equity considerably, but a sizeable amount of capital is invested in livestock and feedstuffs, items which represent quick turn-over inventory. The manager's equity in fixed assets is little changed.

The manager would not normally benefit in changing from farrowing-finishing to the purchased pig system. With this type of production, capital needs are highest and per cent returns to investment least of any plan studied. Perhaps if specialized confinement feeding facilities for purchased pigs were organized from the ground up, results could be changed significantly. Converting from one highly specialized system of production to another usually creates problems of under-utilizing (and in some cases non-use of) specific buildings and equipment. Inflexibility accompanies specialization.

A manager should be reasonably sure that any expansion involving a large investment will be operated as planned for ten years or more. This requires adopting new production methods soon after

proven practical for the industry and the individual manager.

The manager with a high fixed investment, wishing to buy feeder pigs, has several disadvantages not encountered with a farrow to finish program. The stresses endured by the pigs resulting from transfer have been mentioned. Many farmers compete as purchasers of feeder pigs. Some managers feed smaller lots of pigs and may utilize surplus resources of labor and housing. Some buildings on farms may have a near zero valuation; they have been depreciated out and costs may be little more than taxes and nominal insurance charges. The use of low cost resources of physical plant and surplus labor found on many farms are some reasons why feeder pig prices fluctuate. If demand for feeder pigs becomes very strong with resulting higher prices, the low cost operator may withdraw from the pig market first, not because of economic strain, but by volition. It would appear wisest for the large scale swine producer to be able to sell and not buy feeder pigs during periods when feeder pig prices are at high levels. The large swine producer should be able to compete price-wise in the production of feeder pigs and/or market slaughter hogs accordingly as conditions suggest. His system should have sufficient flexibility to handle feeders either way, after he has farrowed them.

The swine producer who feeds purchased stock has delegated part of the swine growing procedure to someone else. He is paying for the resources used in producing the pigs and the profit accruing to the pig producer. The purchaser also bears other hidden costs

charged by the pig dealer, although the seller formally pays the fee.

An advantage for a farrowing-finishing organization is the tax savings gained by listing sales of parent stock as capital gains. Animals held for breeding purposes and retained on the farm for twelve months usually qualify for capital gains and may be eligible for taxation on 50 per cent of sales value. Such savings are substantial and influence some managers to sell their sows every year. However, the operator who purchases feeders may have an advantage tax-wise when state personal property tax assessments are made.

Concerning Comparative Advantage

Some managers are interested in determining whether a comparative advantage exists for southeastern South Dakota pork producers. One publication has stated that a comparative advantage exists where "... a particular product tends to be produced in the area or location where the factors used in its production give the largest returns as compared with other products or in other competing areas."[1] Black et al clarify further by commenting that this principle should be put "... in terms of competing areas specializing in one product." "... that product in which its ratio of advantage is the greatest."[2] Average yearly prices paid for corn and hogs both nationally and for the state are given for the period 1954-64 in Table 7. The national

1 John D. Black, et al, Farm Management, (New York: The Macmillan Co., 1947), p. 14.

2 Ibid., p. 229.

average price for corn was $0.09 per bushel higher than the South Dakota average price, while hogs marketed at eight central markets obtained prices $0.50 per hundred pounds more than the state price. If hogs require 14.4 bushels of corn per slaughter animal from breeding to farrowing-finishing,[3] a slight advantage exists for the South Dakota farmer who markets his homegrown corn through swine farrowed on his farm. His corn input per hog is valued $1.29 less than national average prices and his hogs command $1.12 each less than the national average received. He therefore has a minute advantage in this resource with the conditions as stated. However, if the swine producer purchases his corn, the price differential between national and state average narrows by the amount of the grain dealers' commission. If 11 bushels of corn are needed to feed a purchased pig to 225 pounds market weight, the South Dakota producer has corn costs $.66 less than in other areas (assuming $0.03 per bushel commission grain dealers charge) but the market value of his hogs are $0.90 less per head. Ofcourse, hog producers in other regions buying all feed inputs would have a grain dealers' commission charge also which would raise costs in that area. Other feedstuffs have a similar price between South Dakota and other areas in the nation. Land is more reasonably priced in the pork production area of South Dakota than in some other swine production regions of the United States. Other resource inputs i.e., veterinary, electricity and hired labor are obtained at nearly

3 LaVerne J. Kortan, "50 Litter Production System", South Dakota State College (Now SDSU), Brookings, 1963, p. 6. (Mimeographed).

similar costs in all areas. Environmentally controlled confinement housing removes weather as a contributing influence of advantage or disadvantage. Much additional research would be needed to determine if a significant comparative advantage exists for South Dakota pork producers. With national population tending to migrate westward, and larger consumer markets forming nearer South Dakota than previously, it can be more positively asserted that southeastern South Dakota pork producers have no comparative disadvantage. (It is assumed that our crop yield potential increases will equal proportionally to crop potential expectations of other areas.)

Specialization And Risk

Risk has been mentioned as a deterrent to specialization. However, one researcher, in earlier work, concluded that all cash costs incurred by specialization of pork production could have been met by prices received for market hogs in 23 of 25 years studied.[4] He assumed that the labor required for the production system proposed would be furnished by the operator and the grain required would be grown on the farm. Opportunity cost received little attention since it was assumed that labor devoted to corn and hog raising returned optimum income. Since confinement methods of pork production were not generally in use during 1951, that writer did not study in detail the results of increasing capital in the production system selected.

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4 Clarence A. Hustrulid, "An Economic Study of Specialized Swine Possibilities in Southeastern South Dakota", (Unpublished Master's Thesis), South Dakota State College (Now SDSU), Brookings, 1951, p. 58.

Risk as a result of specialization has probably been over-emphasized. It is true that poor market conditions, diseases or unfavorable conditions may cause specialized hog production (or any specialized operation) to have very poor returns during intermittent periods, but this holds true for the short run only. Prices paid for farm products of similar nature tend to deviate in similar fashion -- although in an irregular pattern for the short term period. The consumers' ability to choose substitutes in products of like nature (due to mass communication and advertising) causes pork prices to be tied to other meat and protein products. For instance, significant changes in the price of beef affect pork prices, assuming proportionate amounts of each product are supplied. The price of fowl, eggs and fish are likewise correlated with beef and pork prices assuming that amounts supplied are normal. Since this close interrelationship of prices between like products exists, the diversified operator may find the products from his various enterprises being similarly marketed at depressed prices; likewise if conditions are conducive, all prices received may be favorable. The degree of price variation between products will be greatest in the short run, since all enterprises have had unprofitable returns at times and unfavorable production conditions. The operator with too many enterprises usually has a unique opportunity cost. He may be making his operation more stable regarding returns, but loses income when specialized production results in greater volume and returns. He loses greater efficiencies gained by specializations.

The degree of production specialization undertaken should be a direct result of all resources (management included) which are at the manager's disposal. Since high specialization is most often accomplished by substituting capital for labor, the operator's financial position and his decision (in using capital) are of great importance. If capital was nearly non-limiting and if the type of production chosen returned, (after all costs) returns equal to capital invested elsewhere, the enterprise could be limited in growth possibilities only by the management factor. Since farm management can and does delegate responsibilities to competent help, most production units might be significantly enlarged. Diminishing returns would indicate the extent of expansion.

Farm management is central in organizing and planning activities. The degree of management used and the success of the farm program are closely related over a long term period.

An intelligent young farmer considering his limited capital resources, likely will invest in two or three stable enterprises which are complementary to each other and use many hours of his own labor, building up a sound equity in his business.

It would be equally wise for the middle-aged, adequately capitalized manager to invest in the highly specialized system if he has had a successful past record in pork production.

Future Prospects For Pork Producers

Semi-diversified farm incomes need not be threatened by developments in swine production methods. There are several factors

that favor the farm organized as a family unit and a business with the two closely interrelated. Most farm managers of the future will be in agriculture by choice and not because alternate employment is lacking. Basically, these operators and their families have value judgements on the benefits of rural living. The human factor may determine that a relatively independent rural life is more desirable than a potentially higher income in another vocation.

Maximum profit from the farm business may not be the goal of every producer. This is not to infer that many relatively independent farmers will refuse new methods. Eventually superior production methods are adopted by almost all managers when proven advantageous. The small producer, by choosing a lower than optimum income level, need not necessarily be inefficient. Indeed, he may be a low cost producer, but voluntarily limit the use and amounts of resources at his disposal.

Many farmers may, in the future, continue a modified pattern of diversification. Advantages of specialization will, however, cause a great majority of managers to adopt new cropping methods or employ different methods of livestock production in conformance with the dynamic changes which have taken place in agriculture the last 20 years.

There are several reasons why large scale commercialized production units will not become dominant in hog raising in the near future.

Most farmers are conservative and hesitate to organize a large

production system. Other managers may surmise they have greater abilities than presently utilized and would enlarge their production system if their management abilities could be more adequately evaluated. Adequately evaluating management resources is no easy task as demonstrated by a recent Interstate Management Survey.[5]

Some farm operators in southeastern South Dakota do not own the farms they operate. Since capital improvements result in added taxation with the landlords receiving little return from such improvements, it seems unlikely that many tenants will produce hogs in large numbers.

The production of swine on highly intensified, commercialized farms at present does not exceed 10 per cent of total marketed numbers. It is unlikely that these farms will increase production greatly for prospects of diminishing returns might make significant expansion unprofitable. Management at some point becomes limited, if capital has not formerly become limited.

If confinement methods might be accepted and employed widely, numbers of hogs raised could change appreciably. Such intensely specialized methods will not be used exclusively on all farms in the near future for reasons stated earlier, however. Other reasons why the family farm is not threatened by commercialization include: some farmers will discontinue swine production and devote their time to enterprises for which they are better qualified; the individual manager

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5 A Study Of Managerial Processes Of Midwestern Farmers: ed, Glen L. Johnson, et. al., (Ames: Iowa State University, 1961).

continuing hog production will increase volume to gain greater efficiencies than those presently attained; he will change his methods of production, modify them or improvise new innovations to make a type of production fit his particular situation.

Whereas the heavily populated areas of the United States were located formerly along the Eastern sea-board, population is now shifting westward and this shift in population appears advantageous for the southeastern South Dakota farmer. As consumer markets develop nearer the point of production, transportation costs should lessen and the reduced rates benefit the producer.[6] Dirks has commented that "South Dakota . . . has a good potential for increased hog production. Available feed supplies and production capacity would permit at least a 50% increase in hog production over the next 10 years."[7] Whereas the consumption of pork per person has recently declined slightly, a rapidly increasing population will consume greater amounts of pork and pork products each year. Forecasters of projected consumer needs for pork are decidely optimistic in their predictions. "Dean Earl Butz, Purdue looks for a 51% increase in pork consumption in 20 years. He thinks profit margins will be wider . . . for the

6 In 1949, agriculture transportation costs were $3.6 billion. Nearly $1.9 billion went to railroads, almost $1.7 billion to motor trucks. The figure now is much higher for both carriers. R.L. Kohls, Marketing of Agricultural Products, (New York: The Macmillan Co., 1955), p. 147.

7 Harlan Dirks, "Potentials For Increasing Income From Livestock", Increasing Income From South Dakota Resources, Economics Pamphlet 121, (South Dakota State University, Brookings, 1964), p. 40.

efficient manager who can get capital for the adjustment."[8] Braun, commenting on marketing, emphasized that "only a meager beginning has been made in merchandising pork by producers . . ."[9]

8 Dick Braun, "Yes, There's A Future In Hogs", Farm Journal, (Vol. 82, December, 1958), p. 32.

9 Ibid., p. 32.

CHAPTER IX

SUMMARY AND CONCLUSIONS

This study was undertaken to determine how resources available to southeastern South Dakota farmers could be reorganized to improve efficiency of a farm business.

It is not implied that organizing production plans with swine as the primary income can be the only favorable choice available. Indeed, greater efficiency in beef, sheep or other livestock enterprises may be attained by concentrating in those lines of production best suited to the farm and farmer. The results of this study indicate that (1) a farmer usually cannot be regarded as most efficient when producing under an absolute diversified organization plan and (2) a farmer likely will find complete specialization less than optimum.

Research has revealed that success of organizational patterns hinges more on management than any other resource input. The human element so necessary in successfully planning production output cannot be treated lightly. The individual producer must implement his decision once a choice is made. Restated, an organizational planning choice appears as a series of choices, i.e., in activating a plan, a producer accepts further responsibility regarding conditions which occur. A choice therefore does not remain static for long. Agricultural production is so organized that output may not be stopped or started by push button. Livestock production demands much supervision and the continued effort of a manager is necessary for success.

Several factors determine how effective management will be. Primarily, the age of the operator and amount of experience gained are qualifying features for successful manager status. To what degree such qualifications are employed rests with individual producers and his choice of plan and returns are correlated with the personal application of his conscientious efforts.

The study showed that no one plan could be prescribed as best for all southeastern South Dakota farms. However, in investigating organizational policies, it became apparent that few farmers presently have livestock organizational plans that offer optimum returns. It appears some farmers are investing labor unwisely or spending many hours of time with small regard to returns for that input. A return for management is seldom recognized or desired by many farmers. This disregard of a return to management results in production on many farms continuing under unprofitable conditions. General impression indicates a farmer is caught on a production treadmill of costs versus returns in mounting momentum. Because unit margins are narrow, the farmer must produce more units and these added units of production may depress prices. Much of the difficulty has stemmed from the vast unused potential present in farming. Hurried along by technological advancements and a strong consumer demand following World War II, farm production has been stimulated to new records and marginal farmers have been migrating to cities. This migration has not lessened volume of production. Further research should be attempted to determine (if possible) what production

potential is still unused and available to good farm operators.

Capital requirements rise as farmers use less labor and more equipment. Greater management skills must be implemented as more capital resources are utilized in a farm production plan or it will not remain successful. Size per se only determines how quickly or slowly a farm enterprise will prosper or deteriorate. This study has indicated only small differences in production costs exist between larger units and those units less specialized. Efficient management on a smaller unit appears superior to slip-shod efforts with a larger unit.

Risk as a deterrent to specialization has received study from many scholars with conflicting opinions resulting. Risk should be observed as a relative consideration, i.e., what is risky for one producer need not necessarily be for another producer. For a select few, risk through specialization may be entirely improbable. For others, the risk factor may be so great, specialization may be out of the question.

Stability of income was investigated within this study. It appears that stability of income increases as the amount of income decreases. Instead of looking for stable income patterns, it may be wiser to regard the producers' attitude toward a stable income. Some producers may prefer erratic yearly incomes if this results in higher average income for the long run.

Need For Further Study

Several areas should be investigated in greater detail.

The psychological drives which motivate the producer to act as he does deserve more study. Why will a few producers continue their farming operations on a marginal basis, though superior methods are readily available? What factors (beside profit) cause a farmer to do as he does when he decides to reorganize his production plans? Why does a successful farmer continue to produce after he has accumulated assets far in excess of his retirement years or what causes him to hold agricultural assets when his capital could be invested elsewhere with greater return?

Other questions posed are: what causes the individual producer to accept a given risk level, or what causes farmers to sacrifice stability of income for greater income potential?

It is apparent that economic and psychological elements overlap as conditioners when producers choose the methods employed in their business. The social and physical sciences should merge for more effective research for resolving present problems.

More study should be attemped (perhaps in a time series problem) to indicate trends of differing livestock production and potential demand for all types of meat. It would appear wise to evaluate future consumer use before beginning complete specialization. Only with ample information can a producer determine an intelligent organizational pattern that will be successful, prosperous and enduring.

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APPENDIX

Table 3. Estimation Of Direct Costs Per Acre For Growing And Harvesting Crops As Used In Analysis a/

Item	Corn	Oats	Soybeans	Grain Sorghum	Summer Fallow	Corn Silage	Alfalfa Hay
1. Value of seed	$ 2.20	$2.60	$ 3.00	$1.20	$ --	$ 2.20	$ --
2. Repairs and service	1.90	1.20	1.60	1.70	1.50	2.50	5.00
3. Fuel, oil, and grease	2.85	1.50	2.20	2.05	1.50	3.40	4.60
4. Hauling and other expenses	1.40	1.25	.65	.80	--	2.50	--
5. Farm Chemical costs b/	7.65	.75	2.55	1.00	--	7.35	--
Total direct costs	$16.00	$7.30	$10.00	$6.75	$3.00 c/	$17.95	$9.60 d/

Source: Extension Circular 633, pp. 8-9.

a/ Does not include interest on investment, taxes and depreciation.
b/ Includes cash cost of fertilizer, weedicides, and insecticides, and/or cash cost of application.
c/ Includes three trips over fallowed ground to maintain weed free condition.
d/ Does not include cost of seed.

Table 4. Prices Used To Budget Enterprise Costs And Returns

Item		Unit	Price
Corn		bushel	$ 1.00
Rye		"	.90
Oats		"	.55
Soybeans		"	2.20
Grain sorghum		cwt.	1.50
Alfalfa hay		ton	16.00
Mixed tame hay		"	14.00
Native hay		"	12.00
Corn silage		"	6.50
Sorghum silage		"	6.00
Pasture for grazing		AUM	3.00
Feeder steers	(450# Good - Choice)	cwt.	25.00
Slaughter steers	(1050# - 1150# Choice)	"	22.00
Slaughter steers	(1000# - 1100# Good)	"	21.00
Slaughter heifers	(850# - 950# Choice)	"	21.00
Cull cows		"	15.00
Dairy calves		"	20.00
Feeder pigs	(40 lb.)	head	10.00
Slaughter hogs	(230 lb.)	cwt.	15.00
Sows	(400 lb.)	"	13.00
Fluid milk for bottling		cwt.	4.20
Manufacturing milk		"	2.90
Eggs (current receipts)		doz.	.25
Eggs (quality controlled)		"	.30
Hens		lb.	.08
Pullets (purchased ready to lay)		bird	1.75
Sexed chicks (purchased)		chick	.40

Source: Extension Circular 633, p. 32.

Table 5. Average Cash Costs And Yields From Present Cropping Programs On A Synthetic 250-Acre Farm

Crop	Number of Acres	Yields				Costs	
		Acre		Total		Acre	Total
		Bu.	Ton a/	Bu.	Ton a/		
1. Corn							
Grain	75	55	--	4125	--	$16.00	$1200
Silage	10	--	3	--	30	17.95	180
2. Soybeans	37	20	--	740	--	10.00	370
3. Small Grain (Oats)	38	50	--	1900	--	7.30	277
4. Hay (Alfalfa)	11	--	3	--	33	9.60	106
5. Sorghum Grass Silage	3	--	3	--	9	17.95	54
6. Pasture and Other Land b/	62	--	.8	--	49	--	--
7. Fallow	14	--	--	--	--	3.00	42
Totals	250	xx	xx	6765	121	xxxxxx	$2229

a/ All silage, hay and pasture yields calculated on dry ton basis, alfalfa equivalent.
b/ Average yield from .31 for wasteland to 1.29 ton dry material on established pasture.

Table 6. Cumulative Needs For Farm Produced Feed, Gross Income, Direct Costs And Income Over Direct Costs For The Livestock Program, Plan A

Livestock enterprise	Livestock Numbers		Farm Feed Needs				Income Over Direct Costs		
	Producing unit	Number of units	Total AUM's	Hay ton	Corn bu.	Oats bu.	Gross income a/	Direct costs b/	Cash income
1. Dairy cows 12,000 lbs. milk	1 cow	10	70	70	400	300	$ 4,080	$ 2,450	$1,630
2. Dairy heifers	800 lb replmt	3	21	21	42	55	--	260	--
3. Hogs, 30 litters	1 sow & 2 litters	15	--	7	2625	525	7,140	5,130	2,010
4. Laying flock	100 hens	4	--	--	400	225	1,752	1,596	156
5. Yearling feeder steers	1 head	20	--	14	1200	--	5,000	4,680	320
Totals	xxxx	xx	91	112	4667	1105	$17,972	$14,116	$3,856

a/ Includes sales of culls and calves.
b/ Includes all incidental costs of production except depreciation, interest, repairs, taxes, insurance of pertinent buildings and livestock equipment.

Table 7. Prices Received For Corn And Hogs, 1954-1964

Year	Corn		Hogs	
	National Average a/	South Dakota c/	8 Major Markets d/	South Dakota f/
1954	$1.43	$1.33	$21.60	$20.70
1955	1.35	1.35	15.00	14.40
1956	1.29	1.18	14.40	13.70
1957	1.11	.92	17.80	17.40
1958	1.12	1.02	19.60	19.00
1959	1.03 b/	.96	14.10 e/	13.50
1960	1.04	.87	15.30	14.90
1961	1.00	.97	16.60	16.10
1962	1.08	1.01	16.30	15.90
1963	1.10	.98	14.90	14.60
1964	1.14	1.10	15.30	14.40
Average Price	$1.15	$1.06	$16.40	$15.90

a/ U.S., Department of Agriculture, Agricultural Statistics, (Washington Government Printing Office, 1965) Table 40, p. 30.
b/ 1959 figure obtained from 1960 Edition, Table 39, p. 30.
c/ South Dakota Agriculture 1965 and Agricultural Prices in South Dakota, 1961, South Dakota Crop and Livestock Reporting Service, Sioux Falls, pp. 54 and 16, Respectively. Season average price computed by weighting mid-month prices by monthly marketing.
d/ U.S., Department of Agriculture, Agricultural Statistics, 1965, Table 479, p. 326, (Markets are Chicago, St. Louis, Kansas City, Omaha, South Saint Joseph, Sioux City, Saint Paul and Indianapolis.)
e/ 1954 National Average Price From 1960 Edition, Table 480, p. 332.
f/ South Dakota Agriculture, 1965, pp. 54-55 and Agricultural Prices In South Dakota, 1961, p. 36.

Prices are calendar year monthly prices weighted by monthly marketing.

Table 8. Plan D: Farrowing-Finishing 3400 Butcher Hogs Yearly
40-Acre Farm

I. Receipts				
Butcher Hogs (3160 x 215 x .15)				$104,280
Sows (240 x 400 x .13)				12,480
Minus death loss				- 710
Gross Sales				$116,050
II. Operating Costs				
Corn	42,000	bushel @	1.00	$ 42,000
Oats	8,400	bushel @	.55	4,620
Creep ration	96,000	pounds @	.03	2,880
Alfalfa hay	120	ton @	16.00	1,920
Pasture	480	AUM's @	3.00	1,440
Supplement	42,000	pounds @	.05	21,000
Mineral & Salt	3,240	@	.03	972
Breeding charge				780
Veterinary & drugs				2,970
Equip., buildings and repairs				1,500
Taxes & Insurance				900
Miscellaneous expense				3,382
Total Direct Costs				$ 84,394
III. Income Over Direct Costs				$ 31,976
IV. Operating Capital Requirements For 240 Sows And Six Boars				
			Average	Total
Sow and 1/25 boar (1 x $60)			$ 60	$ 14,400
Grain and forage (.3 x $217)			65	52,080
Other direct costs (.5 x $122)			61	29,280
Livestock Capital			$186	$ 95,760

Table 9. Plan E: Growing And Finishing 5000 Purchased Feeder Pigs 40 To 225 Pounds (40-Acre Farm)

I. Receipts	
Butcher Hogs (5000 x 225 x .15)	$168,750.
Minus Death Loss @1.5 percent	- 2,530.
Gross Sales	$166,220.
II. Operating costs	
Feeder Pigs 5000 @ $10.00 Per Pig	$ 50,000.
Corn 55,000 Bushel @ $1.00	55,000.
Hay 10 Ton @ $16.00	160.
Supplement 250 Ton @ $100.00	25,000.
Mineral & Salt 4000 Pounds @ $0.03	1,200.
Veterinary and Drugs ($1.00 Per Pig)	5,000.
Equipment and Building Repairs ($0.30 Per Pig)	1,500.
Taxes and Insurance (1 percent Gross Sales)	1,662.
Miscellaneous (1.5 percent Gross Sales)	2,493.
Total Direct Costs	$142,015.
III. Income over direct costs	$ 24,205.
IV. Average operating capital requirements	
Feeder pigs (.5 x $50,000)	$ 25,000.
Grain and supplement (.3 x $56,500)	16,950.
Other direct costs (.5 x $37,000)	18,500.
Total Average Operating Capital Required	$ 60,450.

Table 10. Incomes From All Plans Budgeted And Overhead Pertaining To Each

	Plan A	Plan B	Plan C	Plan D	Plan E
From crops	$ 7,258	$ 8,890	$ 8,750	$ --	$ --
From livestock	3,856	4,430	12,100	31,976	24,205
Total Income Over Costs	$11,114	$13,320	$20,850	$31,976	$24,205
Fixed Costs					
All taxes	$ 950	$ 950	$ 1,015	$ 1,327	$ 1,327
Other farm costs (Relatively fixed)	1,542	2,550	6,580	1,800	500
Interest Paid					
Real estate	$ 1,250	$ 1,250	$ 1,750	$ 2,000	$ 2,000
Chattel	140	420	630	2,450	3,500
Labor Hired	$ --	$ --	$ --	$ 1,200	$ 1,500
Depreciation					
Buildings	$ 416	$ 470	$ 880	$ 3,007	$ 3,007
Crop machinery	638	610	780	--	--
Livestock equipment	231	589	836	2,204	2,204
Interest Allocated To Operators Equity	$ 3,206	$ 3,223	$ 3,430	$ 3,918	$ 3,880
Total Fixed Costs	$ 8,373	$10,128	$15,921	$17,906	$17,918
Returns for labor and management	$ 2,741	$ 3,192	$ 4,929	$14,070	$ 8,287

Table 11. Capital Inputs, Various Livestock And Cropping Organizations For Various Plans

	Plan A	Plan B	Plan C	Plan D	Plan E
Value of land	$ 50,000	$ 50,000	$ 50,000	$ 10,000	$ 10,000
Value of buildings	8,315	9,400	17,600	60,000	60,000
Crop inventory	2,229	4,420	6,000	--	--
Breeding and fattening stock	11,459	11,690	16,740	46,080	60,000
Crop machinery	6,385	6,600	7,800	--	--
Livestock equipment	1,926	4,910	4,950	18,364	18,364
Total Investment	$ 80,314	$ 87,020	$103,090	$134,596	$148,966
Total Borrowed Capital	$ 27,000	$ 31,000	$ 44,000	$ 75,000	$ 90,000
Assets to liabilty ratio	2.9:1	2.8:1	2.3:1	1.8:1	1.7:1

Table 12. Summary Of Capital Investment, Borrowed Capital, Operator's Equity, Adjusted Net Income And Returns To Capital, Labor And Management For Various Livestock And Cropping Plans

Item	Plan A Diversified	Plan B Semi Specialized	Plan C Highly Specialized	Plan D Completely Specialized	Plan E Specialized Feeding
Capital Investment	$80,314	$87,020	$103,090	$134,596	$148,966
Borrowed Capital	27,000	31,000	44,000	75,000	90,000
Owner's Equity (in dollars)	53,314	56,020	59,090	59,596	58,966
Percentage of total capital	(66%)	(64%)	(57%)	(44%)	(40%)
Adjusted Incomes a/	11,114	13,320	20,850	31,976	24,205
Percent return to investment b/	(7.41%)	(7.36%)	(8.12%)	(13.4%)	(6.15%)
Returns to labor	2,745	3,192	4,605	4,800	4,500
Hours required	(3,822)	(2,938)	(3,050)	(3,200)	(3,000)
Labor per hour	0.72	1.05	1.50	1.50	1.50
Returns to Management c/			324	9,270	1,787

a/ Returns to investment only.
b/ Before labor and management costs have been calculated.
c/ Residual returns to management after labor has been remunerated at $1.50 per hour or actual labor returns, whichever is greatest.