FEASIBILITY ANALYSIS OF A COMMERCIAL SWINE OPERATION

by

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B. S., Kansas State University, 1965

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Agricultural Economics

Kansas State University
Manhattan, Kansas

1971

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 FINDINGS AND RECOMMENDATIONS

1.1 Financial Viability of Recommended Alternative

The financial viability of the project depends upon the construction of the facility at a reasonable cost, breeding programs to enhance feed efficiency, sound animal husbandry practices for marketing large litters to establish favorable operating margins and initial entry into the market when the hog cycle is in an upswing. At the locations considered, there is little opportunity for reduction of total annual feed grain costs by purchasing at lower harvest prices and storage until fed, as the storage facility construction costs and increased capital annual working capital requirements exceed the gain in feeding margins.

1.2 Relative Advantage of Alternate Locations

The location of a commercial swine operation may provide the producer with a competitive advantage and greatly enhance his operating margins. The alternative locations considered include Kansas, Alabama, Texas, Nebraska, Iowa and Indiana.

Kansas has a net advantage in the feeding margin of milo over all other states considered except Nebraska. Nebraska milo is only 20 percent of that state's total feed grain production, whereas milo is 65 percent of total Kansas feed grain production. Kansas milo is favorably priced in relation to Nebraska corn. Soybean oil meal is cheaper in Kansas than in any other of the states considered. Historically, Kansas producers have marketed larger litters than the corn belt states.

The market price received by producers is higher in Kansas when compared with the other states, with the exception of Indiana.

Kansas swine producers have a net operating margin over all other states when the combined factors are considered.

1.3 Relative Importance of the Hog Cycle

The price of hogs fluctuates with the volume of hogs marketed. This fluctuation is known as the hog cycle and is caused by large numbers of producers increasing or decreasing production and the time lag required for them to make the production adjustments.

Individual producers have no control over the cycle. However, the project management may use the cycle to a financial advantage by entering the market when the hog cycle is in an upswing in 1973.

1.4 Enhancing Feasibility Through Reduction of Estimated Capital Costs

The feasibility of the project is enhanced by reduction in the estimated capital cost of the physical facility.

The impact of the increased construction costs of a contractor-constructed, environmental-controlled finishing facility is not offset fully by lower labor costs when compared to the producer-constructed, open-lot facility.

Capital costs may be lowered approximately $45,000 by continuous farrowing rather than a 6-times-per-year farrowing program. The average savings of 10 cents per hundredweight of milo does not merit construction of a $92,000 grain storage facility.

1.5 Summary of Findings and Recommendations

The most promising alternative considered for a commercial hog production is a 600-sow continuous farrow-to-market operation located in Kansas. This operation would have a producer-constructed open-lot finishing facility and contractor-constructed farrowing and nursery houses. The economic potential of the project is greatly enhanced if the facility is constructed during the summer

and fall of 1972 and in full production by May, 1973.

Prior to actual investment in this project, financial investors and management must formulate a financial plan for project implementation. This plan should include:

A. Proposed equity investment by source of funds.[1]

B. Proposed sources, schedule and terms of loans for meeting balance of capital requirements.

C. Projected cash flow by sector under proposed financing plan.

D. Projected schedules of depreciation, interest and taxes.

E. Proforma balance sheets and operating statements.

F. Proforma source and applications of funds.

G. Summary of financial plan and recommendations for implementation.

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[1]Richard Phillips, Feasibility Analysis for Agricultural Projects, Ministry of Agriculture and Forestry, Republic of Korea, United States Agency for International Development, Agri Division, Dunlap and Associates, Inc., Seoul, Korea, 1970.

2.0 PURPOSE AND NATURE OF STUDY

This is a detailed study of the technical and economic feasibility of a commercial swine farrow-to-market operation. The study was designed to:

A. Establish the personnel, equipment, facilities and feed requirements.

B. Estimate production costs and product prices.

C. Assemble investment, revenue and operating cost data.

D. Conduct analysis of key facility alternatives.

E. Fit secular trend, annual and monthly hog cycle patterns and project hog prices and revenue and operating margins.

F. Determine annual fluctuations in the cost of milo inputs and the effect on operating margins.

G. Develop feed procurement costs and estimate hog price differences at alternate site locations.

H. Establish the effects of hog prices, feed efficiency, grain prices and litter size on net revenue.

I. Determine the relative economic feasibility of vaccination for T.G.E. vs. herd loss.

J. Establish the differentials in income produced by herd lease, internal replacement and outside purchase options.

K. Estimate the effects of alternate start up years, planning horizons and shifting in and out of production at high and low hog prices.

L. Evaluate the economic feasibility of marketing feeder pigs.

M. Establish at least one feasible alternative.

N. Assemble final estimates on capital costs and investment requirements, together with the development and replacement schedule to meet projected production volume requirements.

O. Conduct computer analyses of alternatives and select the most feasible alternative.

P. Summarize financial requirements and develop proforma financial statements for the recommended alternative.

It is intended that the completed report will be used by prospective investors as a guideline in deciding whether or not to proceed with this type of project and as a useful reference for operational planning and performance.

2.1 Methodology

A combination of statistical, mathematical and economic analysis is used in conjunction with current swine husbandry practices to complete the various steps of the feasibility study. A brief description of the methodology follows:

A. Projected hog prices were estimated by isolating the secular trend and determining annual and monthly fluctuations from the secular trend and developing a price projection mode (based on historical patterns).

B. Projected monthly milo prices were developed from historical patterns in annual average prices and monthly deviations from the average price.

C. Location analysis was made by determining feed costs and hog price differentials by state and the resulting effect on operating

margins for the commerical hog operation.

D. Projected rates of return and economic feasibility of alternatives were obtained by fitting mathematical time-flow equations to the projected schedules of investment, operating cost and net revenue.

E. Proforma financial statements under the recommended alternative were developed by applying standard accounting and budgeting techniques to the figures developed in the rate of return analysis.

2.2 Sources of Data

Several sources have been utilized for the various kinds of data needed in the study.

A. State data on prices of feed grains, soybean oil meal and market hogs were taken from periodical publications of the U. S. Department of Agriculture.

B. The estimated capital costs, life to replacement and repair and maintenance costs for facility and equipment were developed from information obtained from Mr. Don Knight and Mr. Earl Beck, representatives for commercial agricultural structure and feed companies, respectively.

C. The estimated swine production performance, feed efficiency, labor requirements and operating costs were developed from information obtained from Dr. Robert H. Hines, Associate Professor of Animal Science, Kansas State University, and Mr. Wendell Moyer, Extension Swine Specialist, Kansas State University, and from applicable publications from Land Grant Universities.

3.0 LOCATION ANALYSIS

3.1 Production Trends

The production of market hogs is slowly increasing with cyclic fluctuations which are discussed later in Chapter 5. This upward trend is evident from historical figures shown in the upper half of Table 5-4.

Iowa will continue to be the center of U. S. swine production as indicated by the forecasted 60.52 billion pounds in 1980. The corn belt area is expected to show a larger percentage increase in swine production than the states in the southeastern and southwestern United States.

3.2 Competitive Position

The major factor in the historically heavy concentration of swine production in the corn belt states is the significant advantage in corn prices and the surplus of grain relative to the states located south of the corn belt (Table 3-1).

However the development of a milo belt has presented some advantages for the milo producing states. The production of milo and corn is exhibited in Table 3-1. The small production of milo in Indiana, Iowa, and Alabama eliminates it as a significant feed source in those states. Corn is not a major feed grain in Texas. In the other states considered, both milo and corn are produced in significant quantities.

Milo prices are cheaper than corn in every state considered. In addition, the cost of producing 220 pounds of pork with milo is less in every state considered. Feed grain cost per pig was based on 3.5 feed efficiency[2] or price of grain x 642 pounds corn and 662 pounds milo. The

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[2]Derived from: (a) Swine Industry Day, 1968, Kansas State University, pp. 41,45,49,50; (b) Swine Industry Day, 1970, Kansas State University, p. 9; and (c) Swine Industry Day, 1971, Kansas State University, pp. 12,18.

larger quantity of milo was used as it is generally accepted among animal scientists that milo has 97% of the feeding value of corn.[3] Milo is the most advantageous feed source in Kansas, both from the standpoint of price ($.31/cwt., less than corn over the past five years) and availability.

Price comparisons of the most available feed grain source are presented in Table 3-2. Nebraska and Kansas milo compare favorably to feed grain sources of all other states (Table 3-3). Indiana and Iowa corn costs per pig are favorable to Nebraska corn but disadvantaged to milo.

Hog prices are generally higher in Indiana, followed by Kansas, then Iowa, Nebraska, Texas and finally Alabama (Table 3-5). The total gross revenue per 215 pound market hog is shown in Table 3-6. Indiana producers received an average of 64¢ per 215 pound market hog more than Kansas producers during the 1960-1970 period. The difference between the 220 pound figure used to compute feed costs and the 215 pound figure used for market revenue is the shrink incurred during transportation to market.

The net feeding margin advantages are shown in Table 3-7. Nebraska has an advantage in milo, its secondary feed grain, over all others; however, Kansas generally has the advantage in its primary feed grain milo over all others including Nebraska corn. In addition, Kansas has an advantage over the corn belt states in lower costs of soybean oil meal. This advantage ranges from 44¢ per pig in 1966 to 23¢ per pig in 1971 (Table 3-8). The figures in this table are based on 110 pounds soybean oil meal per 220 pound pig produced.

Kansas swine producers during the 1969-1971 period produced more pigs

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[3]Derived from 1968 Swine Industry Day, Kansas State University, p. 41.

per litter than the other states as shown in Table 3-9. The increase of litter size lowers production costs by approximately 40¢ per hundred weight. The full impact of litter size will be discussed in Chapter 6.

In conclusion, Kansas swine producers have a favorable competitive position when the combined effects of feed grain prices, soybean meal prices, market hog prices and conditions for larger litter size are considered.

Table 3-1

Feed Grain Production (In Million Bushels)*

	Corn	Milo	Total Feed Grain
Indiana			
1969	950	1	951
1970	744	1	745
1971	1,022	2	1,024
Iowa			
1969	932	3	935
1970	859	2	861
1971	1,167	9	1,176
Nebraska			
1969	429	118	547
1970	367	76	443
1971	465	117	582
Kansas			
1969	91	182	273
1970	79	145	224
1971	110	219	319
Alabama			
1969	17	1	18
1970	12	1	13
1971	25	2	27
Texas			
1969	25	309	334
1970	32	329	361
1971	33	330	363
United States			
1969	4,582	747	5,329
1970	4,109	697	4,806
1971	5,399	892	6,291

Source: Crop Production, U.S.D.A.

*1971 (indicated)

Table 3-2

Annual Average Feed Grain Price Per Hundred Weight

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Ind. Corn	1.82	1.86	1.89	2.02	1.89	2.28	1.82	1.82		2.50	
Iowa Corn	1.93	1.95	1.86	1.98	1.89	2.21	1.82	1.83	1.89	2.33	
Neb. Milo	1.64	1.79	1.61	1.79	1.61	1.75	1.61	1.55	1.69	1.89	2.04
Kan. Milo	1.68	1.71	[illegible]	1.87	1.71	1.82	1.70	1.57	1.74	1.96	2.14
Ala. Corn	2.07	2.21	2.21	2.25	2.21	2.63	2.07	2.07		2.82	
Texas Milo	1.79	1.87	1.79	1.88	1.82	1.84	1.80	1.67		2.02	
Neb. Corn	1.96	1.98	1.95	2.14	2.04	2.21	1.87	1.96	1.89	2.28	2.41

Table 3-3

Feed Grain Cost Per Market Hog
662 lbs. Milo, 642 lbs. Corn Per 220 lb. Hog (In Dollars)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Ind. Corn	11.68	11.94	12.13	12.97	12.13	14.64	11.68	11.68		16.05	
Iowa Corn	12.32	12.52	11.94	12.71	12.13	14.19	11.68	11.74	12.13	14.95	
Neb. Milo	10.85	11.84	10.66	11.58	10.65	11.58	10.72	10.26	11.18	12.51	13.50
Kan. Milo	11.12	11.32	10.72	12.38	11.32	12.05	11.25	10.39	11.51	12.97	14.16
Ala. Corn	13.30	14.19	14.19	14.45	14.19	16.88	13.28	13.28		18.10	
Texas Milo	11.85	12.38	11.85	12.44	12.05	12.18	11.91	11.05		13.37	
Neb. Corn	12.85	12.71	12.52	13.74	13.09	14.19	12.00	12.58	12.13	14.63	15.47

Table 3-4

Feed Grain Cost Difference Per Market Hog (In Dollars)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Ind. Corn	.56	.62	1.41	.59	.81	2.59	.43	1.29		3.08	
Iowa Corn	1.20	1.20	1.22	.33	.81	2.14	.43	1.35	.62	1.98	
Neb. Milo	-.27	.52	-.06	-.80	-.67	.47	-.53	-.13	-.33	-.46	-.66
Kan. Milo					Base State						
Ala. Corn	2.18	2.87	3.47	2.07	2.87	4.83	2.03	2.89		5.13	
Texas Milo	.73	1.06	1.13	.06	.73	.13	.66	.66		.40	
Neb. Corn	1.73	1.39	1.80	1.36	1.77	2.17	.75	2.17	.62	1.66	1.31

Table 3-5

Average Hog Prices Per State

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Indiana	16.90	16.60	15.10	15.10	21.00	23.40	19.20	18.80		22.80	
Iowa	16.50	16.20	14.80	14.60	20.60	22.60	18.70	18.70	22.20	22.60	
Nebraska	16.50	16.10	14.80	14.60	20.40	22.50	18.50	18.40	22.20	22.60	17.00
Kansas	16.60	16.40	15.00	14.80	21.20	22.50	18.90	18.30	22.10	22.30	17.30
Alabama	16.40	16.20	14.80	14.60	19.40	22.40	18.30	17.00	20.80	22.20	
Texas	16.40	16.30	15.10	14.80	19.80	22.60	18.70	18.20	21.60	22.50	

Table 3-6

Price Advantage Per 215 lb. Market Hog

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Indiana	.64	.43	.21	.64	-.43	1.94	.64	1.07		1.07	
Iowa	-.21	-.43	-.43	-.43	-1.29	.21	-.43	.86	.21	.64	
Nebraska	-.21	-.64	-.43	-.43	-1.72		-.86	.21	.21		-.64
Kansas					Base State						
Alabama	-.43	-.43	-.43	-.43	-3.87	-.21	1.29	-1.29	-2.79	-.21	
Texas	-.43	-.21	.21		-3.01	.21	-.43	-.21	-1.07	.43	

Table 3-7

Net Revenue Per State Difference (Feed Grain Cost and Hog Revenue)
Market Hog Price Difference - Feed Grain Cost Difference

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Indiana	.08	-.19	-1.20	.05	-1.24	-.65	.21	-.22		-2.01	
Iowa	-1.41	-1.63	-1.65	-.76	-2.10	-1.93	-.86	-.49	-.41	-1.34	
(M) Nebraska	.06	-1.16	-.37	.37	-1.05	.47	-.33	.34	.54	.46	.02
Kansas					Base State						
Alabama	-2.61	-3.30	-3.90	-2.50	-6.74	-5.04	-3.32	-4.18		-5.34	
Texas	-1.16	-1.27	-.92	.06	-3.74	.08	-1.09	-.87		.03	
(C) Nebraska	-1.94	-2.03	-2.23	-1.79	-3.49	-2.17	-1.61	-1.96	-.41	-1.66	-1.95

Table 3-8

Annual Average Soybean Oil Meal Price Per Cwt. (In Dollars)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Kansas	4.10	4.19	4.50	4.50	4.51	5.06	4.99	4.93	4.92	5.31	5.36
Nebraska	4.48	4.54	4.86	4.82	4.89	5.46	5.27	5.18	5.16	5.58	5.57
Kansas Soybean Oil Meal Advantage Per Market Hog 110 lbs. Per 220 lb. Pig											
	[illegible]	[illegible]	[illegible]0	.35	.42	.44	.31	.27	.26	.29	.23
Kansas Net Advantage vs. Nebraska (Hog Price, Feed Grain Cost, Soybean Oil Meal)											
Kan. Milo vs. Neb. Milo	+.36	+1.55	+.77	-.02	+1.47	-.03	+.64	-.07	-.28	-.17	+.21
Kan. Milo vs. Neb. Corn	+2.36	+2.43	+2.63	+2.14	+3.91	+2.61	+1.92	+2.23	+.67	+1.95	+2.18

Source: Tables 3-2 through 3-8 were derived from Agricultural Prices, U.S.D.A., 1961-1971.

Table 3-9

Average Number of Pigs Per Litter Weaned

Period	December-May Farrowing		June-November Farrowing	
Year	1970	1971	1969	1970
Indiana	7.44	7.30	7.68	7.41
Iowa	7.34	7.01	7.17	7.05
Nebraska	7.37	7.29	7.44	7.01
Kansas	7.71	7.55	7.68	7.60
Alabama	7.40	7.40	7.30	7.50
Texas	7.30	7.30	7.40	7.50

Source: Hogs and Pigs, U.S.D.A., June 1971.

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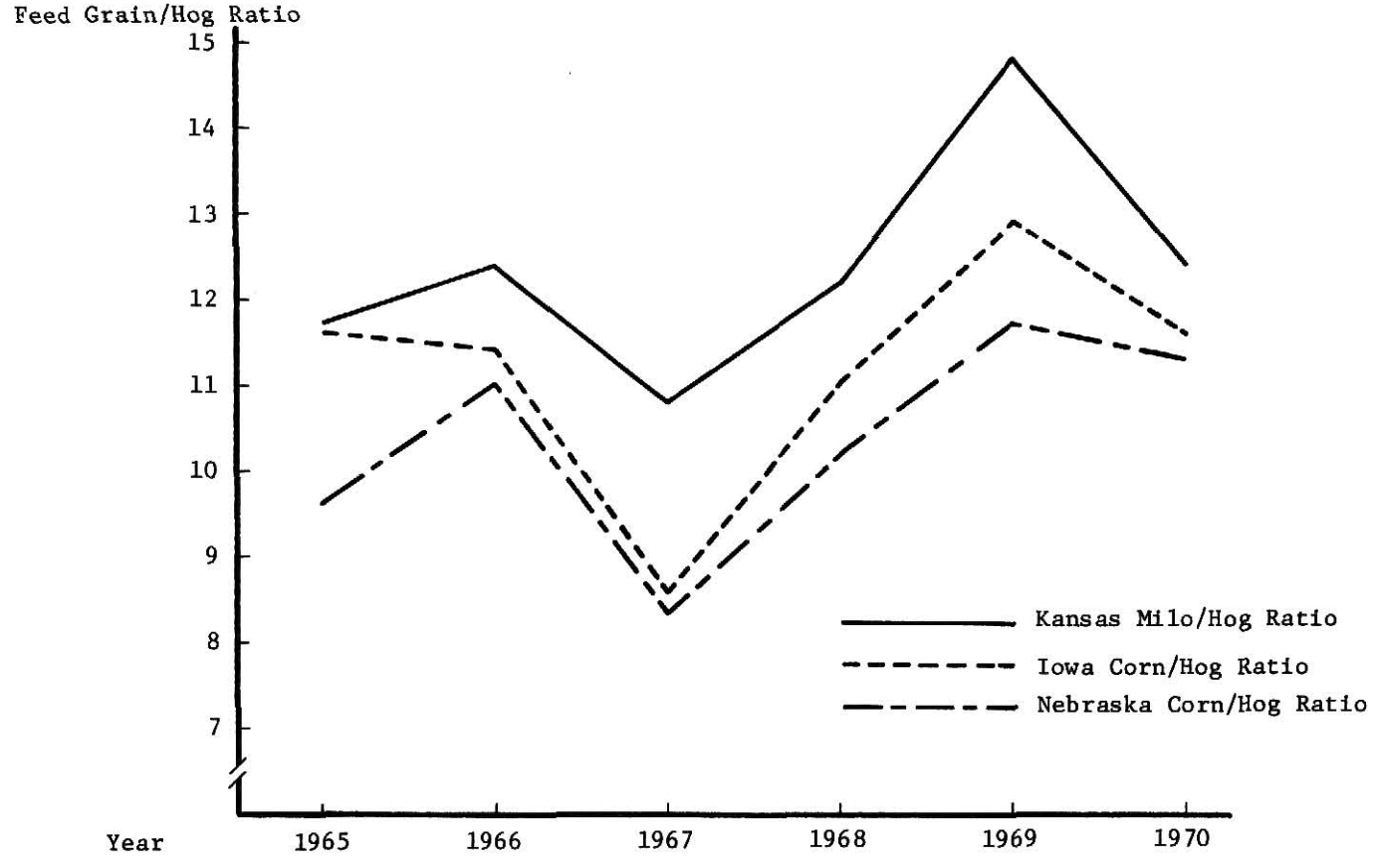

Figure 3-1. Comparative Feed Grain/Hog Ratios.

Source: Agricultural Prices, U.S.D.A., 1965-1970.

4.0 SEASONAL FEED PRICES

4.1 Milo Seasonal Price Variation

Kansas producers enjoy a relative competitive advantage in feed grain prices. These feed grain prices fluctuate considerably as evidenced by lower prices during the harvest season, October and November, and higher prices later in the crop year, especially during the summer months June, July and August.

Predictable annual cycles are absent from milo price patterns. However, there is an upward trend in milo prices in Kansas (Table 3-2).

Seasonal price patterns for milo were computed by subtracting the actual monthly price from the annual average price for each year. The annual average was computed for a September through August year instead of a calendar year to reflect the volume of each crop year separately. The factors shown in Table 4-1 are based on a 12 year average (1960-1971) for each month. The actual price was used rather than a percentage index to reflect the actual magnitude of the monthly price change within a given crop year.

The impact of these variations is more apparent when considering the monthly cash flow output for milo involved for feeding the pigs produced by 600 sows. The variation involved is almost a thousand dollars, from $10,049 in October to $11,032 in July, based on an annual average price of $2.00/cwt.

The moving annual average milo price over the 12 year period indicates a projected average price for 1971 of $1.80/cwt. However, for this study the value of milo was conservatively placed at $2.00/cwt. The full impact of milo prices may be appreciated by observing the change in IRR produced by a

Table 4-1

Average Monthly Variation in Milo Prices in Cents/cwt.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1960	2	-5	-7	-4	-2	0	1	4	4	4	3	3
1961	-10	-17	-19	-16	-9	-4	-1	-1	7	17	23	26
1962	6	-10	-16	-4	-1	-1	1	0	1	2	4	2
1963	-6	-11	-13	-10	-5	0	2	4	5	8	11	10
1964	-3	-8	-7	-5	-3	-1	-1	0	4	7	8	11
1965	-12	-8	-5	-2	1	2	3	4	5	6	5	2
1966	5	-10	-10	-7	-5	-1	-2	-1	-2	0	10	19
1967	-6	-13	-13	-7	-3	-2	2	4	6	8	9	-2
1968	7	-10	-10	-7	-4	5	8	8	8	7	3	-9
1969	-15	-8	-8	-5	0	2	3	4	6	7	6	13
1970	2	3	3	0	-3	1	3	-1	-3	-5	-7	-1
1971	-12	-15	-15	-11	-8	-3	-1	+1	+11	+23	+25	
Cents Variation	-3.50	-10.25	-10.00	-6.50	-3.50	-.50	1.50	2.16	4.30	+7.00	8.30	6.70

change of 20¢ per hundred weight in milo prices (Table 4-2 and Analysis 1, 12, 13).

Table 4-2

Effect of Milo Prices on Return to Capital

Price of Milo/cwt.	Annual Return to Capital
$1.80	19.09%
2.00	15.69
2.20	12.54

4.2 Protein Supplements

Soybean oil meal was considered to be the primary source of protein for swine producers in Kansas, as the other competitively priced plant protein is cottonseed oil meal. The presence of gossypol in cottonseed oil meal, according to Morrison's Feeds and Feeding,[4] severely limits its applicability to commercial swine production, especially under self-feeding conditions.

Soybean oil meal is available in Kansas at a favorable price as discussed in Chapter 3. Seasonal fluctuations in soybean oil meal prices are not as predictable as feed grain prices, and exhibit more variation within any given month over a period of years. For this reason, no seasonal adjustment was made in the price of soybean oil meal. However, it should be noted that generally the prices from January through June are lower than the prices between July and December. For this study the average price of protein supplement was taken at $6.00 per hundred weight.

[4]Frank B. Morrison, Feeds and Feeding, Morrison Publishing Co., Clinton, Iowa, 1959, p. 477.

5.0 MARKET HOG PRICE PROJECTION

5.1 Effect of Market Hog Prices

The market price of hogs is one of the most critical factors in determining the feasibility of this project. This is shown by the change in the annual return to capital by different hog prices. Altering the average price by $1.00 changes the internal rate of return by approximately 5 percent. This is shown in Table 5-1.

Table 5-1

Price Effect on IRR

Price Deviation from Standard Annual Cyclic Price	Annual Return to Capital
- $2.00	5.10%
- $1.00	10.49%
- $0.50	13.52%
Standard Annual Cyclic Prices	15.69%
+ $0.50	18.07%
+ $1.00	20.19%
+ $2.00	24.62%

Source: Analysis of 600 sow farrow to market operation, C. R. Rayl, 1-7.

5.2 Historical Price and Volume Fluctuations

The large fluctuations in market hog prices shown in Table 5-2 are the result of sufficient numbers of producers moving in and out of hog production at the wrong time, magnifying the supply and demand inbalance. The historic marketings for 1960 through 1970 as shown in the top half of Table 5-4 display the volume fluctuations resulting from both the long term

secular trend and the hog cycle.

The effects of the hog cycle are built into the volume projection model used to fit the trends and develop the state by state projections shown in the lower portion of Table 5-4. The model is linear (exponent of 1.0) except for the cycle factors. The B values at the bottom of the table represent the average annual increase (or decrease) in millions of pounds of liveweight marketed before cycle adjustments.

The impact of the cyclic production patterns on market hog prices can be noted by comparing average annual prices and U. S. production in Table 5-3. Some imperfection may be noted in the comparison due in part to the secular trends in production and prices.

5.3 Isolating Price Factors

In order to study price movements, three different types of variations were isolated in market hog prices. They are (1) the long term secular trend, (2) annual cyclic fluctuations and (3) monthly price variations.

Isolation of the cyclic pattern from the secular trend was accomplished by computing an eight year moving average of Kansas City weekly quotations (Figure 5-1) for No. 1 and No. 2, 200-220 pound barrows and gilts. This weight and grade was used as representative of the market for the production anticipated for the project under study. The secular trend moves upward at a monthly rate of slightly greater than 3¢ per hundred weight, as shown in Figure 5-1.

In order to establish the repetitive annual cyclic fluctuations, the actual Kansas City weekly price was indexed to the monthly moving average. These calculations exhibit the close correlation of the annual cycles each four years as shown in Figures 5-2, 5-3, 5-4, 5-5. The weekly index for the

years 1963-1967-1971, 1964-1968, 1965-1969, and 1966-1970 closely fits the same pattern and confirms the four-year cycle in market hog prices.

The annual averages were computed on a November through October year rather than a calendar year in order to reflect the dominance of spring farrowings in cyclic production patterns. Normally falling prices recover or rising prices tend to reach peaks during these months.

The annual cyclic price adjustment factors were calculated by subtracting the average annual secular trend from the actual annual average price (Table 5-5). This procedure isolates the annual price change from the secular trend. For example in 1966 the average annual secular trend value was $17.79 and the actual average price for the same period was $25.29, so that $7.50 of the price is attributed to the annual cycle. This positive value correlates to the small number of marketings in Kansas for 1965 (Table 5-4).

The monthly price adjustment factors were isolated from the secular trend and the annual cycle by subtracting the actual annual price (Table 5-2) from the actual monthly average price (Table 5-2). The calculations and the resulting factors are shown in Table 5-5. For example, the actual price for December 1966 was $28.23 compared to the annual average price for the market year of $25.29, for a +$2.94 difference. Due to the similarity of the annual price fluctuations in the four-year patterns, an average of the same month within corresponding years was calculated to determine the average monthly price adjustment factors shown in Table 5-5. Following the above example, the December price adjustment factor for 1966 and 1970 is computed by averaging the monthly differentials for the two years to obtain +$2.94. One special case should be noted for the combination of 1963-1971 into a single factor

value. This was accomplished by subtracting the secular trend difference or $3.00 from 1971 prices to adjust for the long-term trend between the two years.

5.4 Projected Prices

All projected prices were based on the last computed monthly secular trend value of $20.80 for August 1971. This was to meet the condition of constant, current price levels without adjustment for inflation in all input and output prices used to obtain the investment and net benefit schedules for the internal rate of return analysis.

The monthly prices were projected by combining the monthly and annual cyclic price adjustment factors, and applying these to the base August 1971 secular trend value. Thus the prices used in the internal rate of return analysis are in constant 1971 dollars. The resulting monthly projected prices are shown in Table 5-6.

The mathematics involved in the projection can be illustrated as follows for December 1974:

> Secular trend value of $20.80 plus annual adjustment factor for 1966-1974 of +$7.50 plus monthly adjustment factor for December 1966-1970-1974 of +$2.86 results in a projected price of $31.16 for December 1974 (Table 5-6).

The market hog prices from Table 5-6 are used in computing revenue schedule in IRR 34 and subsequent analyses.

A graphic presentation of the projected cyclic market hog prices is given in Figure 5-6.

Actual Kansas City Prices for #1-#2 200-220 Pound Barrows and Gilts

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1963	16.86	16.66	16.26	15.77	14.55	14.10	15.01	17.46	18.87	17.91	15.89	15.56
1964	14.64	14.50	15.26	15.27	14.97	14.48	15.09	16.13	17.64	17.23	16.97	15.62
1965	14.77	15.69	16.51	17.35	17.28	17.58	20.16	23.67	24.54	24.94	22.56	23.28
1966	24.37	28.23	28.48	28.44	25.37	22.80	23.81	25.45	25.36	26.12	23.34	21.70
1967	20.39	20.32	20.30	19.99	18.94	18.05	22.23	22.82	22.86	21.44	19.33	18.25
1968	17.72	17.94	18.80	19.70	19.42	19.36	19.51	20.70	22.12	20.05	19.63	18.28
1969	18.11	19.24	20.00	20.75	20.56	20.32	22.86	25.69	26.62	27.01	25.88	25.54
1970	26.22	27.80	28.11	28.83	26.57	24.67	24.91	25.33	26.13	22.89	20.48	18.37
1971	16.36	16.40	16.78	19.82	17.54	16.62	17.86	19.03	20.47	19.56		

Source: Livestock Meat Wool Market News, U.S.D.A., 1963-1971.

Table 5-3

Comparison of Market Prices and Market Volume
(Price in $ per Cwt., Marketings in Billion Pounds, Liveweight)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Price	15.49	16.70	16.48	15.08	14.86	21.10	22.86	18.89	18.40	22.82	21.88
Volume	25.1	25.4	26.0	27.3	27.4	26.9	24.6	25.4	27.6	28.3	27.2

Source: Agricultural Prices, U.S.D.A., 1960-1970; Livestock and Meat Statistics, U.S.D.A., 1960-1970.

TABLE 5-4. MARKETINGS OF HOGS IN SELECTED STATES, 1960-1970
AND PROJECTIONS TO 1980
(MILLION POUNDS, LIVE WEIGHT)

EXPONENT IS 1.00

		STATE							
YEAR	US TOTAL	IOWA	NEBRASKA	KANSAS	ALABAMA	LOUISIANA	OKLAHOMA	TEXAS	COMBINED
1960	18644	4477	870	383	254	48	128	251	25555
1961	16917	4448	935	423	245	38	123	253	25382
1962	19309	4529	983	482	236	35	134	249	25957
1963	20273	4765	1050	519	227	28	141	259	27262
1964	20318	4787	1093	528	224	26	123	263	27362
1965	20487	4451	979	467	214	21	134	201	26924
1966	17921	4628	1008	467	203	31	101	197	24563
1967	17965	5094	1146	557	240	40	124	254	25423
1968	19886	5131	1233	578	268	38	145	287	27566
1969	20423	5132	1266	649	298	36	134	319	28237
1970	19523	5104	1249	619	253	31	125	271	27182
1971	20813	5507	1367	682	272	33	133	292	29099
1972	20246	5420	1364	683	267	31	129	287	28427
1973	18967	5135	1310	660	252	29	121	272	26746
1974	19393	5309	1372	694	260	28	124	280	27460
1975	21295	5895	1542	784	288	31	135	311	30281
1976	20294	5679	1504	767	277	29	129	300	28979
1977	19763	5589	1497	766	271	28	125	295	28334
1978	20018	5721	1549	796	277	28	126	301	28816
1979	21334	6160	1685	868	297	29	135	325	30833
1980	20751	6052	1673	865	291	28	131	319	30210
A	19230.65	4347.85	853.94	385.83	226.26	37.25	125.80	233.71	
B	62.53	78.30	38.22	22.42	2.99	-0.46	0.19	3.91	
RSC	0.0212	0.8605	0.8425	0.7751	0.0963	0.0340	0.0022	0.1158	

SOURCE:

LIVESTOCK AND MEAT STATISTICS, U.S.D.A., 1960 TO 1970
PROJECTIONS FITTED BY LINEAR REGRESSION AFTER HOG CYCLE ADJUSTMENTS

Table 5-5

Monthly and Annual Price Projection Factors

	1963	1964	1965	1966	1967	1968	1969	1970	1971
Annual Actual Avg. Price	16.24	15.65	19.86	25.29	20.41	19.44	22.71	25.03	18.04
- Annual Trend	17.41	17.25	17.34	17.79	18.21	18.81	19.24	20.26	20.69
Annual Cycle Factor	-1.17	-1.60	+2.52	+7.50	+2.20	+.63	+3.47	+4.76	-2.65

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1964 Act. Mo. - Act. Ann. Avg.	-1.01	-1.15	-.39	-.38	-.68	-1.17	-.56	.48	1.99	1.58	1.32	-.03
1968 Act. Mo. - Act. Ann. Avg.	-1.72	-1.50	-.64	.26	-.02	-.08	.07	1.26	2.68	.61	.19	-1.16
Sum/2 Mo. Adj. Factor	-1.37	-1.32	-.52	-.06	-.35	-.63	-.24	+.87	+2.34	+1.10	.76	-.60
1965 Act. Mo. - Act. Ann. Avg.	-5.09	-4.17	-3.35	-2.51	-2.58	-2.28	+.30	3.81	4.68	5.08	2.70	3.42
1969 Act. Mo. - Act. Ann. Avg.	-4.60	-3.47	-2.71	-1.96	-2.15	-2.39	.15	2.98	3.91	4.30	3.17	2.83
Sum/2 Mo. Adj. Factor	-4.85	-3.82	-3.03	-2.24	-2.37	-2.34	+.23	+3.40	+4.30	+4.69	+2.94	+3.13

Table 5-5 (cont.)

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1966 Act. Mo. - Act. Ann. Avg.	-.92	2.94	3.19	3.15	.08	-2.49	-1.48	.16	.07	+.83	-1.95	-3.59
1970 Act. Mo. - Act. Ann. Avg.	+1.19	2.77	3.08	3.80	1.54	-.36	-.12	.30	1.10	-2.14	-4.55	-6.66
Sum/2 Mo. Adj. Factor	+.14	+2.86	+3.14	+3.48	+.81	-1.43	-.80	+.23	+.59	-.66	-3.25	-5.12
1963 Act. Mo. + 1971 Act. Mo. (-3.00)/2 - Adj. 1971 Ann. Avg.	-.59	-.67	-.68	+.60	-1.15	-1.84	-.77	1.04	2.47	1.53	.19	-.14
1967 Act. Mo. - Act. Ann. Avg.	-.02	-.09	-.11	-.42	-1.47	-2.36	1.82	2.41	2.45	1.03	-1.08	-2.16
Sum/2 Mo. Adj. Factor	-.31	-.38	-.40	+.09	-1.31	-2.10	+.53	1.73	2.46	1.28	-.45	-1.15

Source: Kansas City Weekly Prices (#1-#2, 200-220 Barrows and Gilts); Livestock Meat Wool Market News, U.S.D.A.

Table 5-6

Projected Market Hog Prices*

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Avg.
1972-80	17.83	17.88	18.68	19.14	18.85	18.57	18.96	20.07	21.54	20.30	19.96	18.60	19.20
1973-81	18.47	19.50	20.29	21.08	20.95	20.98	23.55	26.72	27.62	28.01	26.26	26.45	23.32
1974-82	28.44	31.16	31.44	31.78	29.11	26.87	27.50	28.53	28.89	27.64	25.05	23.18	28.30
1975-83	22.69	22.62	22.60	23.09	21.69	20.90	23.53	24.73	25.46	24.28	22.55	21.85	23.00
1976-84	20.06	20.11	20.91	21.37	21.08	20.80	21.19	22.30	23.77	22.53	22.19	20.83	21.42
1977-85	19.42	20.45	21.24	22.03	21.90	21.93	24.50	27.67	28.57	28.96	27.21	27.40	24.27
1978-86	25.70	28.42	28.70	29.04	26.37	24.13	24.76	25.79	26.15	24.90	22.31	20.44	25.56
1979-87	17.84	17.77	17.75	18.24	16.84	16.05	18.68	19.88	20.61	19.43	17.70	17.00	18.15
													Avg. 22.90

*Note: Secular base was $20.80.

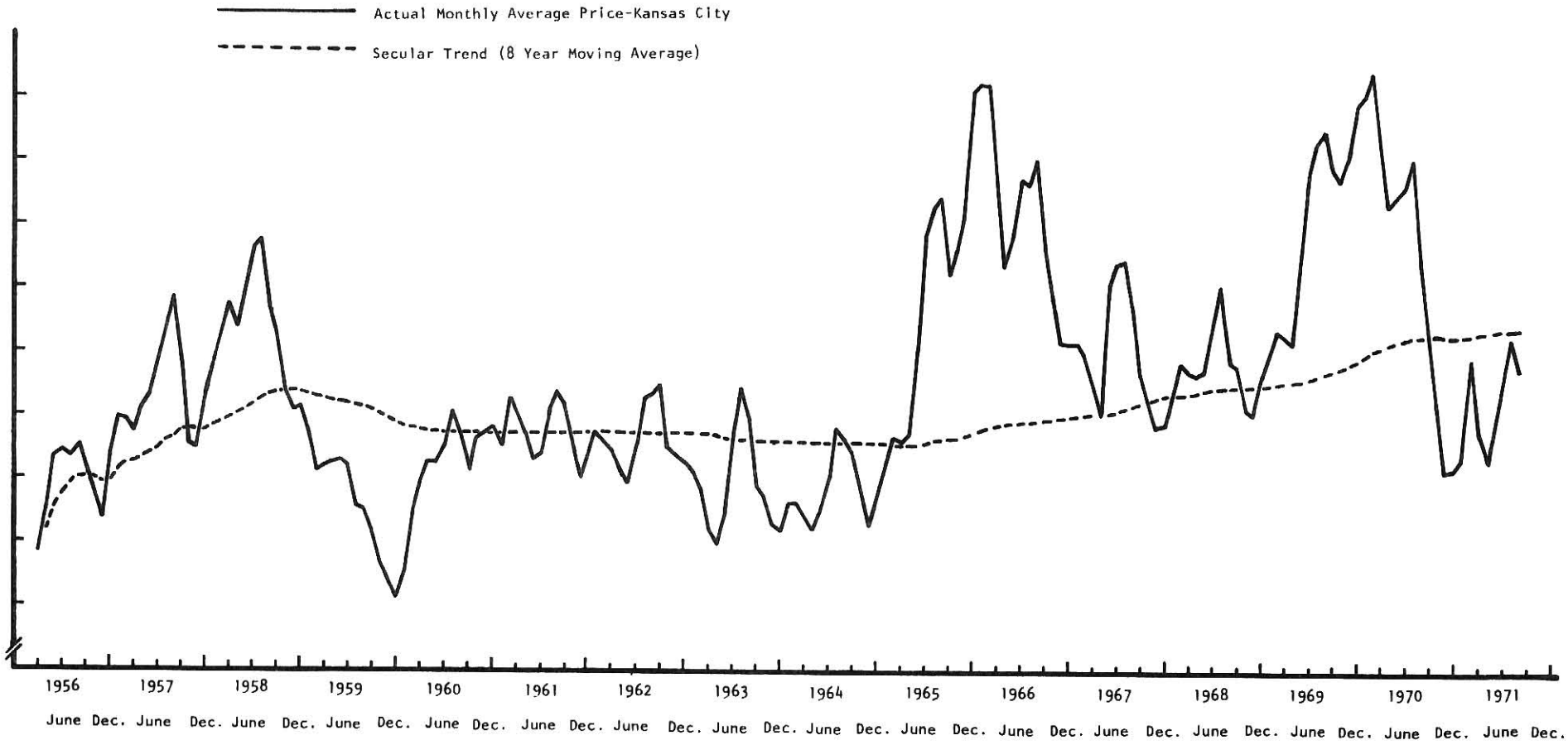

Figure 5-1. Historic Kansas City Market Hog Prices and the Secular Price Trend

Source: Livestock Meat Wool Market News, U.S.D.A., 1956-1971

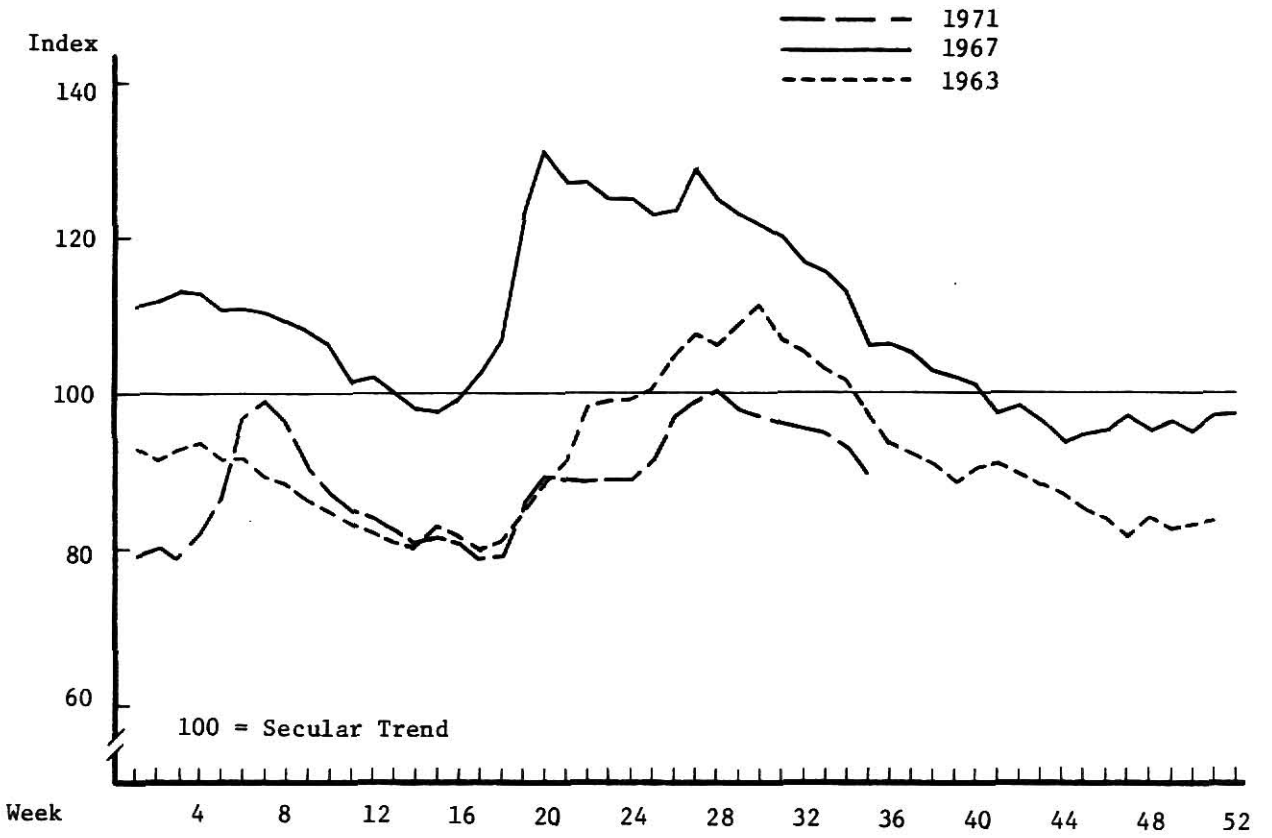

Figure 5-2. Historic Annual Cyclic Fluctuations in Hog Prices for the Kansas City Market. 1963-1967-1971.

Source: Livestock Meat Wool Market News, U.S.D.A., 1963, 1967, 1971.

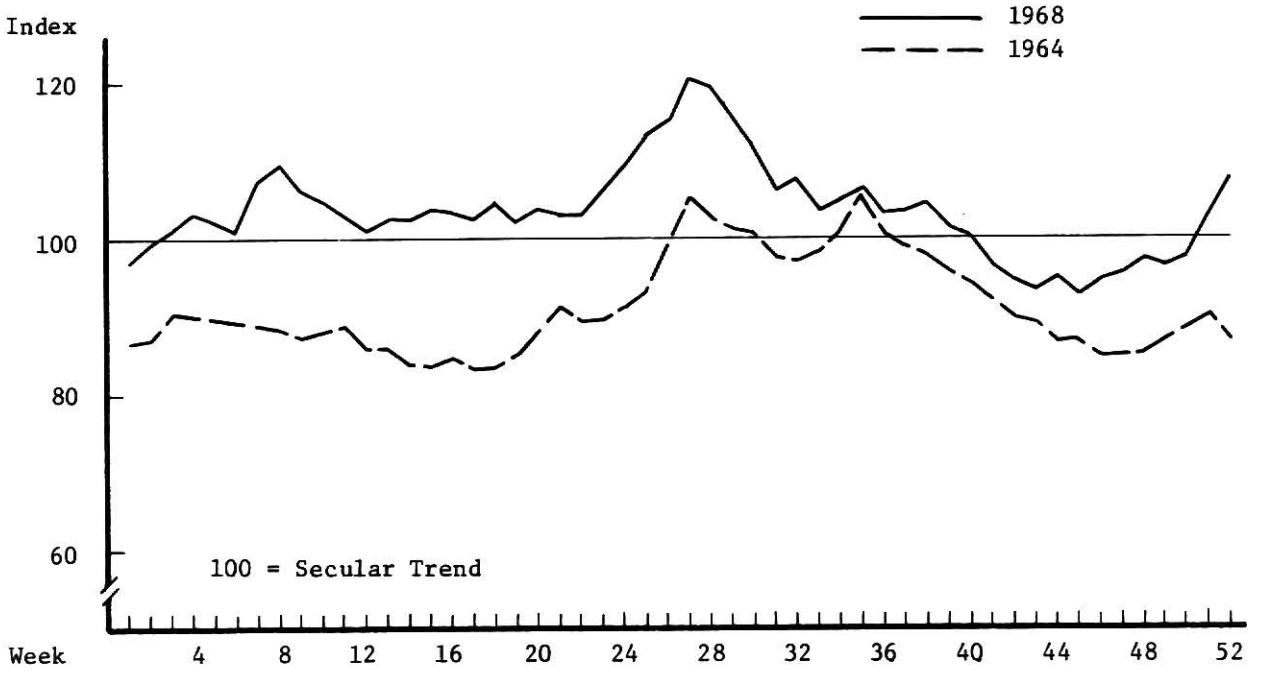

Figure 5-3. Historic Annual Cyclic Fluctuations in Hog Prices for the Kansas City Market. 1964-1968.

Source: Livestock Meat Wool Market News, U.S.D.A., 1964, 1968.

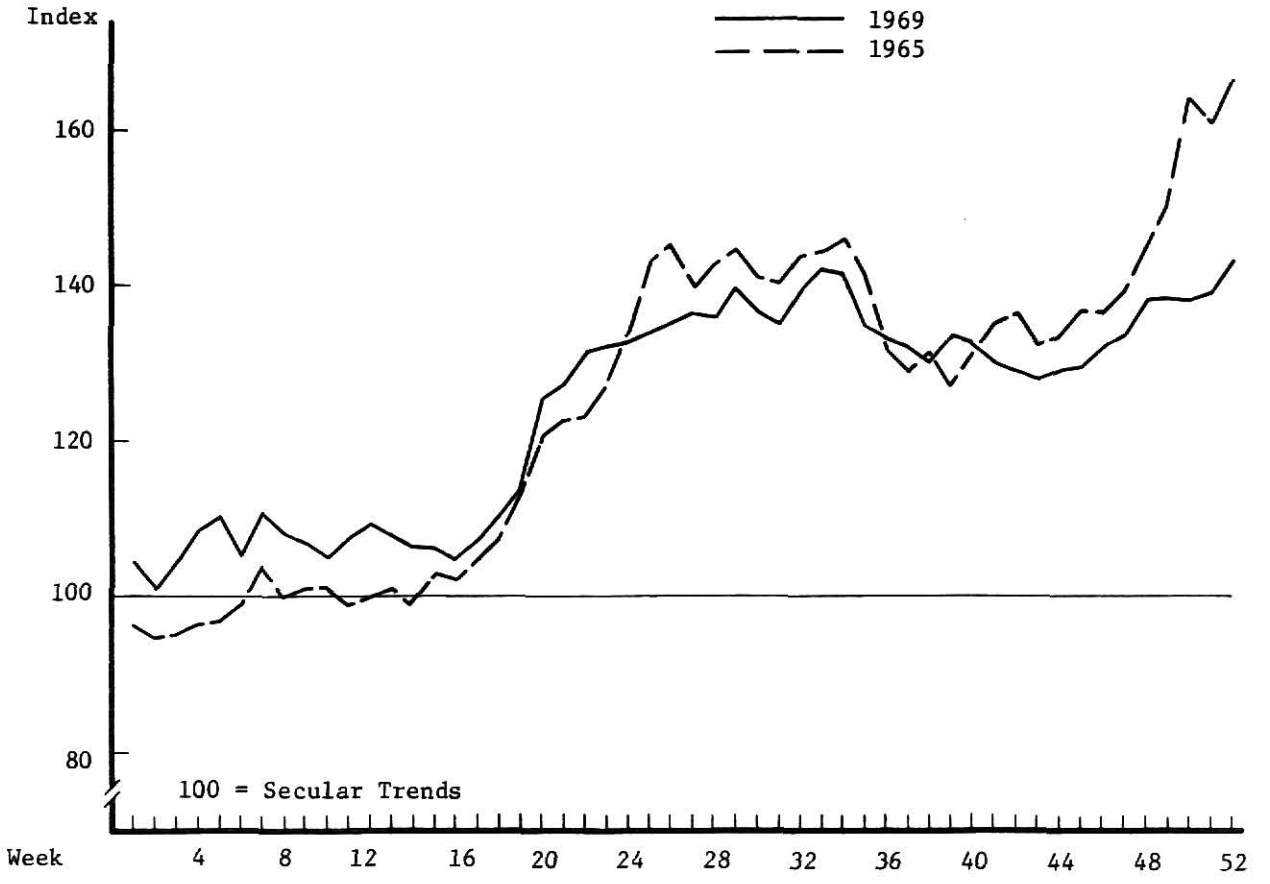

Figure 5-4. Historic Annual Cyclic Fluctuations in Hog Prices for the Kansas City Market. 1965-1969.

Source: Livestock Meat Wool Market News, U.S.D.A., 1965, 1969.

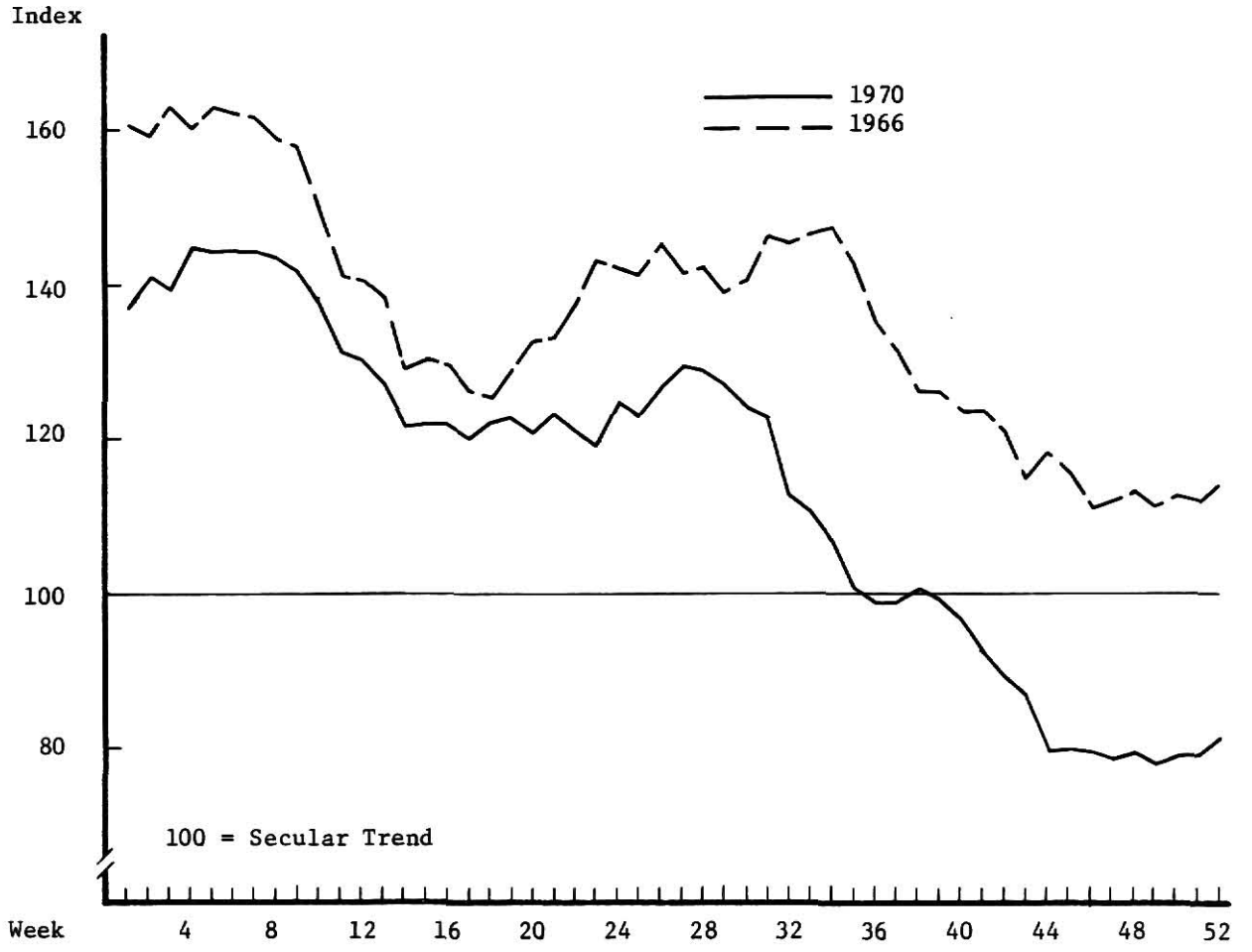

Figure 5-5. Historic Annual Cyclic Fluctuations in Hog Prices for the Kansas City Market. 1966-1970.

Source: Livestock Meat Wool Market News, U.S.D.A., 1966, 1970.

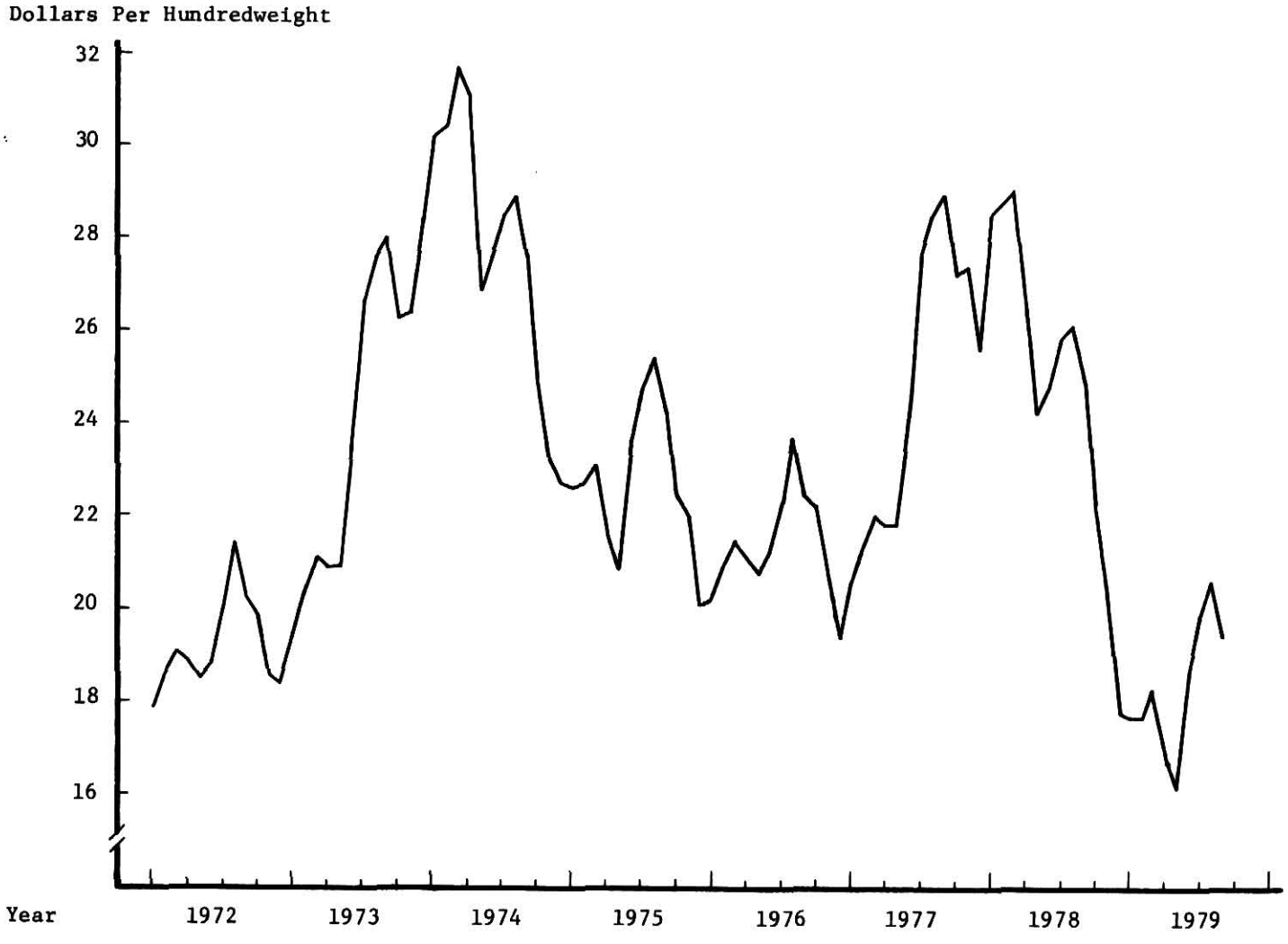

Figure 5-6. Projected Market Hog Prices for Kansas City

6.0 KEY VARIABLES OF PRELIMINARY ANALYSIS

6.1 Preliminary Analysis of Net Investment and Net Revenue Schedules

The projected cash flow and return on investment of the alternative programs depend upon a comparison of the projected schedule of capital investment and the projected schedule of net operating revenue for each alternative. The supporting figures for the annual schedules are presented in this chapter and the detailed monthly schedules will be presented in a subsequent chapter.

Key variables in the net operating revenue schedules are the projections of market hog and sow salvage revenues, feed grain, supplement and other production costs for the market hogs and the breeding herd and the overhead and administrative costs. Depreciation and interest are reflected automatically in the cash flow feasibility analysis, and need not be entered separately.

Selection of the promising and realistic alternatives for detailed analysis is an important step for any productive feasibility study. This is accomplished during this portion of the study by isolating the most critical factors and determining their effects on the annual return to capital.

6.2 Selection of Critical Alternative Factors for Detailed Study

The alternatives selected for detailed study are believed to be realistic and technically sound from the standpoint of market hog prices, facility design and cost, breeding herd requirements and replacement schedules, feed grain and associated production costs and established practices in the swine production industry.

The overall plan of operation for this section of the analysis is a

600-sow specialized farrow-to-market operation. This project would utilize a contract-constructed, modern 200-sow farrowing facility, a 2,000 pig contracted-constructed nursery, and one of three finishing facility options. The basic finishing facility alternatives are:

1. Alternative 1 is a finishing facility for 4,000 head, producer-constructed, partial slats, foggers and fans, at a total cost of $35 per head.
2. Alternative 8 is an open lot finishing facility for 4,000 head, temporary type buildings, foggers, feeders and waters on concrete, at a total cost of $15 per head.
3. Alternative 9 is a 4,000-head finishing facility, environment controlled, fully slatted, turn key and contract-constructed, the total cost of which is $45 per head.

The production flow pattern is six times per year farrowing with the sow and litter occupying the farrowing house four weeks. The pigs then enter the nursery unit for four weeks and the sow is rebred after 21 days. The pigs are transferred to the finishing facility at approximately 45 to 50 pounds, where they are fed to a market weight of 220 pounds. Feed would be purchased as required and the farm would have a 60-day feed storage capacity.

The planning horizon is 10 years for the basic model. Equipment expected to last only five years is re-entered in the investment schedule at estimated replacement cost. The hog cycle has a regular 8 year fluctuation pattern and ten years enables the project to take advantage of three high price periods as previously discussed in Chapter 5. Other options were tested in this study.

The project should be located within 50 miles of two or more packing

facilities or a major market. The entry of this project into the market would not significantly affect the overall market structure.

6.3 Facility Investment

The major facility investment includes the farrowing house, nursery, finishing house, gestation facility, feed mill, land, and equipment. The construction of this investment for facilities is shown in Table 6-1. The projected facility investment and replacement schedule is shown in the first column of Table 6-9.

6.4 Breeding Herd Investment

The investment in the breeding herd is shown in Table 6-2. The improvement of the herd is an important factor in the success of the operation. Boars and gilts should be selected from proven purebred herds. The projected investment in breeding herd is shown in the second column of Table 6-9.

6.5 Projected Volume and Sales Revenue

The projected total annual volume varies only with respect to litter size and method of replacing breeding stock. Renting the breeding herd eliminates the sow salvage revenue. The total volume is projected as follows:

Pigs Per Litter	Purchase of Breeding Stock	Replace from within the Herd
7.5	9,000	8,780
8.0	9,600	9,380
8.5	10,200	9,980

The litter size marketed was varied from 7.5 to 8.5 because 7.5 represents the average Kansas litter size (Table 3-9). However, it is believed that this project has above average facilities and management and thus would obtain

a higher litter size marketed than average. Commercial operators within the state are obtaining 8.0 to 8.5 pigs per litter. The herd would be replaced at the rate of 220 sows and 10 boars per year.

The projected sales revenue is directly correlated with market hog prices. The market hog price used in this portion of the study was developed from a price prediction model by Dr. Richard Phillips (Table 6-4). The price projection model was built from annual cycle factors and the regression equation.[5] The sales revenue for market hogs was based on a market weight of 215 pounds. The price of sows was $3/cwt. less and the boar price $10/cwt. less than market hog prices. The market weights were calculated at 550 and 700 pounds, respectively.

The projected total sales revenue from market hogs and herd salvage is shown in columns 4 and 5 of Table 6-9. This table reflects the revenue from 9,600 pigs marketed annually, or an average of 8.0 per litter.

6.6 Projected Production Costs

The projected costs for expenses other than labor, management and other overhead are shown in two separate columns of Table 6-9; these are labeled herd production costs and market hog production costs. Major expense items in this classification include feed grain, protein supplement, health and utilities. Construction of the estimated total production costs is shown in Tables 6-6 and 6-7.

6.7 Projected Overhead Costs

The projected annual overhead costs are shown in the last column of Table 6-9.

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[5]Richard Phillips and Larry D. Bedford,"Market Potentials for Golden Sun Hog and Cattle Feeds," Oct., 1968, Section 3-6 to 3-12, Agri Research Division of Dunlap and Associates, Manhattan, Kansas.

The major expenses in this classification include management salaries, labor costs, insurance, taxes and professional and legal services. Construction of overhead cost is shown in Table 6-8.

6.8 Projected Working Capital

The major outlays for working capital include inventories and cash to cover production expenses. The six times per year farrowing generates a 60-day capital requirement to meet the above requirements. The construction of this requirement is shown in Table 6-3.

6.9 Adjustment in Annual Revenue and Cost for Specific Alternatives

Adjustments have been made in the projected annual operating revenues and costs presented in the previous tables to reflect conditions applicable under certain specific alternatives considered.

The market price of hogs was altered to reflect the impact of price on revenue over the life of the project. The change in the revenue stream is reflected in Table 6-10 and is a summation of the revenue generated from the sale of market hogs and herd salvage revenue.

The method of breeding stock replacement alters the revenue stream. Marketing the entire pig crop and purchasing gilts produces the highest revenue; less revenue may be expected when replacing the breeding herd from the gilts produced by the project or by renting the herd and losing the salvage revenue. The projected total revenues generated by each method are shown in Table 6-11.

Average litter size variations have a large impact on the market hog revenue. This projected impact on market hog revenue is shown in Table 6-12.

Labor costs are projected to increase by $2,000 annually for the open lot finishing facility. This amount was derived from a housing study by H. W.

Jones, Purdue University. This increase was included when computing overhead costs for alternative 8.

Adjustments have been made in the annual projected market hog production costs to reflect feed efficiency. Feed efficiencies of 3.0, 3.5 and 4.0 were considered and the respective annual production costs were $183,000, $223,000 and $252,000 for alternatives 12, 1 and 13, respectively.

Grain price changes were considered and adjustments were made in market hog production costs and breeding herd costs. Raising or lowering the price of grain by $.20 per hundredweight in alternatives 1, 12, 13 changed the production costs by $2,000 annually for the breeding herd and $12,000 for the market hogs.

Several other alternatives require minor adjustments which are discussed in a subsequent chapter. These adjustments are apparent from the individual internal rate of return analysis for the specific alternatives.

Table 6-1

Facilities Description and Investment

Farrowing House		
200 sow, turn-key, contract constructed, thrive center type. $650/sow		$130,000
Nursery		
2,000 pig, turn-key, contract constructed, thrive center type. $30/pig		60,000
Finishing Facility		
Analysis 9 4,000 head, environment controlled, fully slatted, turn-key, contract constructed. $45/head		180,000
Analysis 1 4,000 head, farmer built, partial slats, foggers, fans. $35/head		140,000
Analysis 8 4,000 head, open lot, 100 sq. ft./pig, temporary type buildings, foggers, feeders and waters on concrete.		60,000
Gestation Facility		
600 animal, 80 sq. ft. lot, 24 sq. ft. housing. $70/sow		42,000
Feed Mill		
15 ton capacity		25,000
Equipment		
Tractor	$3,000	
Feed wagon	2,000	
Pig trailer	500	
Incidentals	1,500	
Pickup	3,000	10,000
Trailer House		6,000

Table 6-1 (cont.)

Water System (two wells)		6,000
Land		
Option 1 and 9	80 acres at $250/acre	20,000
Option 8	100 acres at $250/acre	25,000

Table 6-2

Breeding Herd Investment and Replacement Schedule

Herd Input	
600 sows at $100 per sow	$60,000
20 boars at $300 per boar	6,000
	$66,000
Replacement Schedule (annual cost)	
Sows each 3 years 33% per year	
Boars each 2 years 50% per year	
Ten percent overhead for non-breeders, etc.	29,000

Table 6-3

Working Capital Requirements

Working capital required is for 60 days under the 6 times per year farrowing system of 1/6 of column 6 (herd variable cost), column 7 (market hog variable cost), and column 8 (fixed costs).	$50,000

Table 6-4

Market Hog Revenue

Market prices of slaughter hogs based on a projection model accounting for the cyclic fluctuations in hog prices.

Year	Price per Cwt.
1971	17.37
1972	19.80
1973	24.32
1974	21.54
1975	16.68
1976	19.46
1977	20.50
1978	19.98
Average	19.94

Market weights were 220 lbs. per pig less a five pound shrink or 215 lbs.

Market hog numbers were based on 8.0 pigs marketed per litter unless otherwise noted.

Table 6-5

Herd Salvage Revenue

Sow price based on market hog price less $3.00 per cwt. Boar price based on market hog price less than $10 per cwt.

Salvage weight - 550 pounds - except last year of program when entire herd salvaged at 450 pounds.

Salvaged numbers based on replacement schedule of breeding herd.

Table 6-6

Herd Production Costs

Feed Consumption

Sow annual feed consumption was calculated at 1680 lbs. grain, 420 lbs. - 36% supplement, and boar annual feed consumption at 1600 plus 400 lbs. - 36% supplement. Ingredients cost is $200 per cwt. milo and $120 per ton for supplement.

Herd health costs were calculated at $1.50 per animal unit.

Table 6-7

Market Hog Production Costs

Feed Costs

Feed consumption per cwt. pork marketed was based on a feed efficiency of 3.5 from birth to market.

Pre-starter consumption - 5 lbs. pre-starter at $9.50 cwt. Starter consumption - 25-50 lbs. 40 lbs. milo and 12 lbs. supplement. Market consumption - 50 -220 lbs. 602 lbs. milo and 98 lbs. supplement.

Health Costs

Birth to 50 lbs.	
1. Vaccinations for iron, etc.	21¢
2. Worming	5¢
3. Medication	50¢
50 lbs. to market	
1. Medication	20¢
2. Worming	5¢
	96¢ per pig

Utilities Costs

Electrical power, heat, fuel, water and telephone $1.25 per pig

Table 6-8

Overhead Costs

Labor and Management	
Labor - two men at $6,500 each	$13,000
Manager at $12,000	12,000
Taxes at the rate of $1 per $100 capital invested	5,000
Veterinary, legal fees, accounting fees and insurance	2,000
	$32,000

Table 6-9

Cash Flow Tables for the Basic 600-Sow Farrow-to-Market Operation
(in thousands of dollars)

Year	Facilities	Breeding Herd	Working Capital	Market Hog Sales Revenue	Herd Salvage Revenue	Herd Prod. Costs	Market Prod. Costs	Over-head Costs
1972	445	66						
1973	5	29	50	502	23	41	223	32
1974	5	29		445	20	41	223	32
1975	5	29		344	15	41	223	32
1976	5	29		402	18	41	223	32
1977	97	29		423	19	41	223	32
1978	5	29		412	19	41	223	32
1979	5	29		359	16	41	223	32
1980	5	29		408	18	41	223	32
1981	5	29		502	23	41	223	32
1982	5	29		445	48	41	223	32
1983	-86*		-50**					

* Salvage value of the project.
** Investment credit for working capital.

Source: Calculated from Tables 6-1 through 6-8.

Table 6-10

Projected Total Annual Revenue for Market Hog Price Alternatives 1, 2; 3, 4, 5, 6, 7
(in thousands of dollars)

Year	Alternative	Deviation per hundredweight from standard projected price Table 6-4						
		-$2.00	-$1.00	-$0.50	Standard	+$0.50	+$1.00	+$2.00
		2	3	4	1	5	6	7
1973		481	503	515	525	535	547	568
1974		421	443	454	465	475	486	508
1975		315	338	359	359	370	381	400
1976		376	398	420	420	430	440	461
1977		399	420	442	442	452	463	483
1978		388	410	421	431	441	452	473
1979		331	353	364	375	384	395	416
1980		383	405	416	426	437	447	468
1981		481	503	515	525	535	546	566
1982		447	470	482	493	503	515	578

Table 6-11

Projected Total Revenue for Breeding Herd Replacement Alternatives 1, 19, 33
(in thousands of dollars)

Year / Alternative	Purchase Herd 1	Replace Internally 33	Rent Herd 19
1973	525	513	502
1974	465	455	445
1975	359	351	344
1976	420	411	402
1977	442	432	423
1978	431	422	412
1979	375	367	359
1980	426	417	408
1981	525	513	502
1982	493	483	445

Table 6-12

Projected Market Hog Revenue for Alternative Litter Sizes 1, 14, 15
(in thousands of dollars)

Year / Alternative / Litter Size Marketed	7.5 14	8.0 1	8.5 15
1973	471	502	533
1974	417	445	472
1975	322	344	366
1976	377	402	427
1977	397	423	450
1978	387	412	438
1979	336	359	387
1980	383	408	434
1981	471	502	533
1982	417	445	472

7.0 PROJECTED CASH FLOW AND RETURN ON INVESTMENT

7.1 Internal Rate of Return

The projected cash flow for each of the alternatives is simultaneously affected by capital costs for facilities, equipment and breeding herd, the operating capital requirements, the construction schedule and projected annual net revenue. The projected cash flow is used to measure the return on investment for each of the alternatives.

The principle measure of economic potential used in this study is the internal rate of return or IRR. The IRR is a measure of the potential return to capital investment in a project based on the time flow of money into and out of the project and is the return which equates the present value of the investment schedule to the present value of the schedule of net benefits.

The IRR is calculated on the basis of total investment and the total net earnings for the project before interest payments. Thus it is a measure of return to capital invested regardless of source. For any alternative which has an IRR above the market rate of interest, a profitable payout schedule can be formulated for the project. The higher the IRR in relation to the market rate of interest, the more profitable the project.

The IRR formula solves for i in the formula:

$$I_o + I_1 \left(\frac{1}{1+i}\right) + I_2 \left(\frac{1}{(1+i)^2}\right) + \ldots + I_n \left(\frac{1}{(1+i)^n}\right) =$$

$$B_o + B_1 \left(\frac{1}{(1+i)}\right) + B_2 \left(\frac{1}{(1+i)^2}\right) + \ldots + B_n \left(\frac{1}{(1+i)^n}\right) \quad \text{, where}$$

I = Investment and B = Benefit.

There are a number of rules which were followed in developing capital investment and net benefit schedules for the internal rate of return analysis:

1. The length of planning period encompassed the useful life of project facilities.
2. Total capital investment for facilities, breeding herd and working capital were entered as investments.
3. Equipment of shorter life than the planning period was re-entered at its original cost when replaced. Credit was taken for salvage value of facilities during the last year of the project.
4. No interest, depreciation nor income tax was included. The IRR calculates economic potential as a return to total capital investment. Re-entry of replaced equipment in the schedule preempts the need for calculating depreciation. IRR gives the total return to capital independently of how the return is divided between the owners and society as a whole.
5. Only direct annual benefits were included and were entered annually (monthly in the monthly model).
6. All prices were maintained at a constant level except where changes are noted.
7. Investments and net benefits figures were entered in $1,000 units in the annual model and in dollars in the monthly model.
8. Investment credits were entered when capital was removed reflecting salvage facilities and freeing of working capital.
9. The investment schedule and net benefit schedule were aligned to the same year (or month in the monthly model).

A special computer program using the above formula is used to compute

the IRR for the specific alternatives.

The program provides the full-discounted benefit-cost (or net revenue-total investment) ratios at alternative interest rates, and the present value of the surplus (or deficit) of net revenue over investment at these interest rates. The reconstruction of discounted values (present value factor) is provided in the program print-out.

7.2 General Design of the Sensitive Analysis of Various Alternatives

This portion of the study is designed to test the sensitivity of the IRR for various alternatives. Each alternative is designed to compare an individual factor of economic importance to commercial swine production.

The basic model from which other alternatives were formulated is a 600-sow farrow-to-market operation with a $35 per pig finishing facility (Table 6-1), litter size of 8.0, standard hog price prediction (Table 6-4), feed grain price of $2.00 per hundredweight and feed efficiency of 3.5.

The projected net investment and net benefits schedules for the basic model, Alternative 1, is shown in Table 6-9.

7.3 Estimated Capital Cost for Facilities and Equipment

The capital cost estimates for the facility and equipment alternatives are summarized below:

1. The total estimated capital cost for the facility with a producer constructed finishing facility costing $35 per pig capacity is $445,000, Alternative 1.
2. The total estimated capital cost for the facility with a producer constructed temporary type finishing facility costing $15 per pig capacity is $370,000, Alternative 8.

3. The total capital cost for facilities with contract construction of the finishing facility costing $45 per pig capacity is $485,000, Alternative 9.

The projected total annual capital cost for facilities and breeding herd is shown in the first column of Analysis 1 to 33. The breeding herd costs explain why there are entries for every year in the investment schedule. These figures reflect the estimated capital costs and the useful life of the facilities taken as five years for equipment and 15 years for buildings. The replacement cost at the end of useful life of equipment is re-entered into the cash flow at the year of replacement.

This is the reason for the relatively large capital cost in 1977. The depreciated value of buildings and equipment as well as the land value at the end of the project is credited to the cash flow by entering an investment credit at the termination of the project.

The estimated schedule for working capital requirements is shown in the second column of Analysis 1 to 33. The schedule includes the original working capital input and any annual changes to take care of variations in operating requirements. The construction of this capital requirement is shown in Table 6-3. Credit is taken for the entire working capital fund at the end of the planning period.

The schedule of total capital investment in Analysis 1 to 33 represents the sum of the investment schedule for facilities and the schedule of working capital requirements. To obtain the cumulative total requirement over the planning period, the credit figures shown for the last year in the planning period should be added back to the investment shown on the total line in the tables.

7.4 Projected Annual Net Revenue

The projected schedules of operating revenue, operating expenses, and net revenue before depreciation, interest, and income tax are shown in the center section of Analysis 1 to 33.

The total revenue schedule for each alternative represents total sales of market hogs and breeding stock salvage sales. The figures are taken from Tables 6-10 to 6-12. The schedules of total operating expense for each alternative are taken from Tables 6-6 to 6-9 and from Section 6-9. The net revenue schedules in Analysis 1 to 33 are the total revenue figures minus the corresponding total operating cost figures.

The net revenue figures are before depreciation, interest and income tax. Depreciation is excluded to eliminate double accounting because the full original investment and replacement costs are entered to the cash flow in the investment schedule. Interest is excluded in order to reflect accurately the earning power of total investment in the alternative as shown at the top of the table as annual return to capital. Income tax is excluded to reflect the gross power of investment directly, regardless of how the earnings may be divided. Alternatives with the highest gross earning power before taxes may be expected to have the highest earning power on equity capital after payment of income taxes and interest.

The year-to-year fluctuations in annual net revenue in Analysis 1 to 33 are the result of the impact of the hog cycle discussed in Chapter 5. It will be noted that the years 1973 and 1981 will be unusually good years and 1975 will be an unusually bad year for swine producers. These fluctuations (see Figure 5-6) are a part of the economic risk involved in swine production and must be taken into account in the capital investment planning of any swine operation.

7.5 Projected Annual Cash Flow

The year-by-year net cash flow is not shown as such in Analysis 1 to 33. The cash flow is the year-by-year net revenue schedule minus the year-by-year total investment schedule for the alternative. The cash flow will have large negative numbers during the year the facility is constructed and positive figures during the remaining years except where large replacements of equipment are necessary every five years. A major positive cash balance occurs in the last year of the project when credit is taken for the remaining salvage value of the investment and the working capital balance.

The year-by-year present values of the investment and net revenue schedules for each of the alternatives are shown in the last two columns of Analysis 1 to 33. These figures are obtained by applying the corresponding present value factor at the rate of return for the project to the total annual investment and net revenue schedules. The sums of the two present value columns are identical by definition, because the IRR is that earning rate on investment which makes them equal.

The benefit/cost ratio is shown in the lower center of Analysis 1 to 33. The discount rates at which the ratios are computed are shown to the left as annual percentages. The benefit/cost ratio will be 1.00 at an interest rate identical to the computed annual return to capital shown in the upper center portion of Analysis 1 to 33 for each individual alternative.

7.6 Comparative Return on Investment for Alternatives

The investment feasibility analysis shown in Analysis 1 to 33 indicates the comparative return on investment for a specific alternative including:

1. Margin changes due to deviation in annual average market hog prices.
2. Producer constructed finishing facility versus contract constructed

finishing facility.

3. Feed efficiency alternatives.
4. Feed grain price alternatives.
5. Litter size marketed.
6. Increased overhead due to higher labor costs.
7. Herd loss versus vaccination for TGE.
8. Breeding herd acquisition and replacement methods.
9. Purchase and storage of feed grain during harvest to take advantage of lower seasonal prices discussed in Chapter 4.
10. Varying the entry year into production to test the aggregate effect of the hog cycle.
11. Increasing feed efficiency and cut out value by improved breeding stock selection.
12. Varying the planning horizon.
13. In and out during years of low prices for market hogs.
14. Selling feeder pigs.

The cycle in marketing hog prices affects the sales revenue and the operating margins of a swine enterprise. The profit margin per pound of pork produced fluctuates in the same direction as the selling price, but the swings are relatively greater. Testing the impact of changes in market hog prices was accomplished by altering the average annual prices in Table 6-4. The results of this analysis are summarized below and indicate that market price is extremely critical to the project.

Price Influence on Annual Return to Capital

Analysis	Deviation from Annual Average Price in Table 6-4	Internal Rate of Return	Present Value Balance for an Interest Rate of 8% (in 000's dollars)
2	- $2.00	5.10%	- 74
3	- $1.00	10.49%	64
4	- $0.50	13.52%	142
1	Standard	15.69%	199
5	+ $0.50	18.07%	262
6	+ $1.00	20.19%	327
7	+ $2.00	24.62%	409

The rate of return on total capital investment is substantially higher for the facility utilizing the producer-constructed, open-lot finishing facility. The relative rates of return are indicated by the following comparisons:

Finishing Facility	Analysis	Return	Present Value Balance at 8% Interest
$35 per pig farmer-constructed facility	1	15.69%	$199,000
$15 per pig farmer-constructed temporary-type facility	8	21.01%	$266,000
$45 per pig contract-constructed environment-controlled facility	9	13.47%	$151,000

The annual rate of return to capital increases as the price of feed grain decreases. The comparative rates of return for various feed grain prices are:

Price of Feed Grain per hundredweight	Analysis	Return	Present Value Balance at 8% Interest
$1.80	12	19.09%	$287,000
$2.00	1	15.69%	$199,000
$2.20	13	12.54%	$117,000

The comparative rates of return to capital resulting from increasing or decreasing litter size marketed reflects the fixed costs involved in herd maintenance. The results are shown below:

Pigs Marketed per Litter	Analysis	Return	Present Value Balance at 8% Interest
7.5	14	12.80%	$123,000
8.0	1	15.69%	$199,000
8.5	15	18.67%	$279,000

Increasing the labor force to four men would make the project feasibility marginal. The added operating costs without a corresponding increase in revenue is not feasible. The comparative returns are:

Labors	Analysis	Return	Present Value Balance at 8% Interest
2	1	15.69%	$199,000
4	16	10.87%	$74,000

The comparative returns of vaccinating the sows to prevent TGE and the alternative of losing a pig crop twice during the project as shown in the total revenue column of Analysis 17 decreases the return for both but the comparative ratio favors vaccination. Losses from TGE would seriously hinder the project.

Alternative	Analysis	Return	Present Value Balance at 8% Interest
No vaccination and no loss	1	15.69%	$199,000
Vaccination for TGE and no loss	18	14.00%	$123,000
No vaccination and loss of two pig crops	17	10.26%	$60,000

The returns to capital are substantially higher for renting the breeding herd at $1.25 per pig marketed or replacing the breeding gilts from gilts produced by the project versus continuous purchasing of breeding stock from purebred breeders. The returns are:

Replacement Method	Analysis	Return	Present Value Balance at 8% Interest
Purchase from Breeders	1	15.69%	$199,000
Rent Herd	19	18.31%	$234,000
Internal Replacement	33	19.02%	$288,000

Grain storage receives considerable attention in the swine industry as the price of grain is typically lower at harvest time (Chapter 4). The cost of grain storage was computed at $1.25 per hundredweight, 1¢/cwt. additional operating cost, and 1/2% shrink. The total facility cost is $92,000 and is noted as an increase in column one, Analysis 20.

Working capital requirements increase as the cash outlay is in the beginning of the period when the grain enters storage. This is reflected in column 2, Analysis 20 as a total of $48,000 over the life of the alternative. Operating expenses in column 5 decrease only $5,000 per year.

Storing grain for the entire year is not feasible. The added capital cost and high working capital requirements more than offset the savings in operating expense. The comparative rates are:

Grain Procurement	Analysis	Return	Present Value Balance at 8% Interest
Purchase as required	1	15.69%	$199,000
Purchase at harvest	20	11.75%	$125,000

The comparative returns resulting from the entry year in the hog cycle vary from desirable to totally undesirable, once again pointing out the effect of the hog cycle discussed in Chapter 5. The returns to capital indicate if entry cannot be made in 1973, then it is advantageous to wait until 1976.

First Year of Production	Analysis	Return	Present Value Balance at 8% Interest
1973	1	15.69%	$199,000
1974	21	11.10%	$84,000
1975	22	9.63%	$47,000
1976	23	12.18%	$114,000

Herd improvement can be made by purchasing superior breeding stock from purebred breeders who have a vigorous performance record as well as improvement and testing programs. The improved breeding stock command premium prices. The improved stock increases estimated costs per gilt to $150 and $300 to $500 for boars in order to increase feed efficiency by .5 pound feed per pound of pork produced or to improve market quality and gain 50¢ premium per hundredweight for the market hogs produced. These improvements significantly increase the

capital investment in column 1 of Analysis 24 and 25. The increased feed efficiency lowers the operating expenses of Analysis 24 by $40,000 annually and increases the total revenue column in Analysis 25.

The comparative results below indicate that increased breeding herd costs can be justified for feed efficiency but not for cut out value.

Breeding Herd Improvement	Analysis	Return	Present Value Balance at 8% Interest
Normal	1	15.69%	$199,000
Feed Efficiency	24	21.10%	$362,000
Cut Out Value	25	14.61%	$181,000

The comparative analysis of the planning horizon shows no significant difference in return. However, note the present value balance:

Years of Production	Analysis	Return	Present Value Balance at 8% Interest
10	1	15.69%	$199,000
5	26	15.23%	$109,000
15	27	16.00%	$239,000

The hog cycle is directly correlated to the in-and-out producer who always gets in at the wrong time. One alternative assumes that management is superior in price forecasting techniques and is out of production whenever the market hog price is below $18 per hundred. The results are not feasible due to loss of revenue to cover fixed costs as shown in the net revenue column of Analysis 28. The return to capital for this option is 14.32%.

Analysis 29 contains data from an actual commercial operation in North Central Texas and has a return of -4.50%. This comparative competitive

disadvantage is to be expected for the reasons discussed in Chapter 3.

The alternatives involving feeder pig production involve elimination of the finishing facility and marketing the pigs at 45 pounds. The results are not favorable if the feeder pigs are sold at 1.5 x the price of market hogs. The returns increase if the feeder pig price is 1.8 x the market hog price; however, neither option compares favorably to marketing slaughter hogs.

Market	Analysis	Return	Present Value Balance at 8% Interest
Market hogs	1	15.69%	$199,000
Feeder pigs at 1.5 x market hog price	31	-0.09%	-$116,000
Feeder pigs at 1.8 x market hog price	32	11.84%	$58,000

7.7 Summary Evaluation of Alternatives

The most critical factors affecting the potential economic return of this commercial swine operation are:

1. Market hog price and the hog cycle.
2. Feed efficiency.
3. Capital investment in facilities.
4. Feed grain costs.
5. Breeding stock replacement procedure.

Management of an individual commercial swine operation may exercise management decisions and procedures to take advantage of the higher prices in the hog cycle as in 1973, breeding stock selection to improve feed efficiency, capital outlay in facilities and either renting the herd or replacing the gilts

from the herd.

However, management has little control over feed grain price or the average price received for market hogs.

The most promising alternative studied in this preliminary analysis is the construction of a producer-built temporary-type finishing facility, increasing litter size to 8.5 pigs per litter marketed and selecting rented breeding stock for increased feed efficiency. The results of this composite of the above positive factors is shown in the annual return to capital in Analysis 30. The positive factors are: Market Entry - 1973, Litter Size - 8.5, Feed Efficiency - 3.25, and a rented herd.

Analysis	Return	Present Value Balance at 8% Interest
30	31.08%	$437,000
1	15.69%	$199,000

Returns of this magnitude are highly attractive and are more carefully studied in the next chapter.

INVESTMENT FEASIBILITY ANALYSIS

1 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 15.69 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8644	442.	0.
2	1973	34.	50.	84.	525.	296.	229.	0.7472	63.	171.
3	1974	34.	0.	34.	465.	296.	169.	0.6459	22.	109.
4	1975	34.	0.	34.	359.	296.	63.	0.5583	19.	35.
5	1976	34.	0.	34.	420.	296.	124.	0.4826	16.	60.
6	1977	126.	0.	126.	442.	296.	146.	0.4172	53.	61.
7	1978	34.	0.	34.	431.	296.	135.	0.3606	12.	49.
8	1979	34.	0.	34.	375.	296.	79.	0.3117	11.	25.
9	1980	34.	0.	34.	426.	296.	130.	0.2694	9.	35.
10	1981	34.	0.	34.	525.	296.	229.	0.2329	8.	53.
11	1982	34.	0.	34.	493.	296.	197.	0.2013	7.	40.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.1740	-24.	0.
	TOTAL	857.	0.	857.	4461.	2960.	1501.		638.	638.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.37	1039.	760.	279.
8.00	1.27	930.	731.	199.
10.00	1.19	837.	704.	133.
15.00	1.02	658.	645.	13.
20.00	0.89	531.	595.	-64.
30.00	0.71	369.	517.	-148.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

2 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. -$2 GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 5.10 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.9515	486.	0.
2	1973	34.	50.	84.	481.	296.	185.	0.9053	76.	167.
3	1974	34.	0.	34.	421.	296.	125.	0.8614	29.	108.
4	1975	34.	0.	34.	315.	296.	19.	0.8196	28.	16.
5	1976	34.	0.	34.	376.	296.	80.	0.7798	27.	62.
6	1977	126.	0.	126.	399.	296.	103.	0.7420	93.	76.
7	1978	34.	0.	34.	388.	296.	92.	0.7060	24.	65.
8	1979	34.	0.	34.	331.	296.	35.	0.6717	23.	24.
9	1980	34.	0.	34.	383.	296.	87.	0.6391	22.	56.
10	1981	34.	0.	34.	481.	296.	185.	0.6081	21.	112.
11	1982	34.	0.	34.	447.	296.	151.	0.5786	20.	87.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.5505	-75.	0.
	TOTAL	857.	0.	857.	4022.	2960.	1062.		773.	773.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	0.97	735.	760.	-25.
8.00	0.90	658.	731.	-74.
10.00	0.84	592.	704.	-112.
15.00	0.72	466.	645.	-179.
20.00	0.63	377.	595.	-217.
30.00	0.51	265.	517.	-252.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

3 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 9.0 HOG PR. -$1 GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 10.49 PERCENT

YEAR NO.	YEAR IDENT.	INVESTMENT ($ 1000) FACILITIES	INVESTMENT ($ 1000) WORKING CAPITAL	INVESTMENT ($ 1000) TOTAL	OPERATING ($ 1000) TOTAL REVENUE	OPERATING ($ 1000) OPERATING EXPENSES **	OPERATING ($ 1000) NET REVENUE	PRESENT VALUE FACTOR	PRESENT VALUE INVESTMENT	PRESENT VALUE NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.9051	462.	0.
2	1973	34.	50.	84.	503.	296.	207.	0.8192	69.	170.
3	1974	34.	0.	34.	443.	296.	147.	0.7414	25.	109.
4	1975	34.	0.	34.	338.	296.	42.	0.6711	23.	28.
5	1976	34.	0.	34.	398.	296.	102.	0.6074	21.	62.
6	1977	126.	0.	126.	420.	296.	124.	0.5497	69.	68.
7	1978	34.	0.	34.	410.	296.	114.	0.4975	17.	57.
8	1979	34.	0.	34.	353.	296.	57.	0.4503	15.	26.
9	1980	34.	0.	34.	405.	296.	109.	0.4076	14.	44.
10	1981	34.	0.	34.	503.	296.	207.	0.3689	13.	76.
11	1982	34.	0.	34.	470.	296.	174.	0.3339	11.	58.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.3022	-41.	0.
	TOTAL	857.	0.	857.	4243.	2960.	1283.		698.	698.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.17	888.	760.	128.
8.00	1.09	795.	731.	64.
10.00	1.02	716.	704.	11.
15.00	0.87	563.	645.	-82.
20.00	0.76	455.	595.	-140.
30.00	0.61	317.	517.	-199.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

4 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. -$.50 GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 13.52 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8809	450.	0.
2	1973	34.	50.	84.	515.	296.	219.	0.7759	65.	170.
3	1974	34.	0.	34.	454.	296.	158.	0.6835	23.	108.
4	1975	34.	0.	34.	359.	296.	63.	0.6021	20.	38.
5	1976	34.	0.	34.	409.	296.	113.	0.5303	18.	60.
6	1977	126.	0.	126.	432.	296.	136.	0.4671	59.	64.
7	1978	34.	0.	34.	421.	296.	125.	0.4115	14.	51.
8	1979	34.	0.	34.	364.	296.	68.	0.3625	12.	25.
9	1980	34.	0.	34.	416.	296.	120.	0.3193	11.	38.
10	1981	34.	0.	34.	515.	296.	219.	0.2812	10.	62.
11	1982	34.	0.	34.	482.	296.	186.	0.2477	8.	46.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.2182	-30.	0.
	TOTAL	857.	0.	857.	4367.	2960.	1407.		661.	661.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.28	975.	760.	215.
8.00	1.19	873.	731.	142.
10.00	1.12	786.	704.	82.
15.00	0.96	618.	645.	-27.
20.00	0.84	499.	595.	-96.
30.00	0.67	348.	517.	-169.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

5 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. +8.50 GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 18.07 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8469	433.	0.
2	1973	34.	50.	84.	535.	296.	239.	0.7173	60.	171.
3	1974	34.	0.	34.	475.	296.	179.	0.6075	21.	109.
4	1975	34.	0.	34.	370.	296.	74.	0.5146	17.	38.
5	1976	34.	0.	34.	430.	296.	134.	0.4358	15.	58.
6	1977	126.	0.	126.	452.	296.	156.	0.3691	47.	58.
7	1978	34.	0.	34.	441.	296.	145.	0.3126	11.	45.
8	1979	34.	0.	34.	384.	296.	88.	0.2648	9.	23.
9	1980	34.	0.	34.	437.	296.	141.	0.2242	8.	32.
10	1981	34.	0.	34.	535.	296.	239.	0.1899	6.	45.
11	1982	34.	0.	34.	503.	296.	207.	0.1609	5.	33.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.1362	-19.	0.
	TOTAL	857.	0.	857.	4562.	2960.	1602.		613.	613.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.46	1109.	760.	349.
8.00	1.36	993.	731.	262.
10.00	1.27	894.	704.	189.
15.00	1.09	702.	645.	57.
20.00	0.95	566.	595.	-29.
30.00	0.76	393.	517.	-123.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

6 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. +$1.00 GRAIN PR. $2.00 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 20.19 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	50.	561.	0.	0.	0.	0.8320	467.	0.
2	1973	34.	0.	34.	547.	296.	251.	0.6923	24.	174.
3	1974	34.	0.	34.	486.	296.	190.	0.5760	20.	109.
4	1975	34.	0.	34.	381.	296.	85.	0.4793	16.	41.
5	1976	34.	0.	34.	440.	296.	144.	0.3988	14.	57.
6	1977	126.	0.	126.	463.	296.	167.	0.3318	42.	55.
7	1978	34.	0.	34.	452.	296.	156.	0.2761	9.	43.
8	1979	34.	0.	34.	395.	296.	99.	0.2297	8.	23.
9	1980	34.	0.	34.	447.	296.	151.	0.1911	6.	29.
10	1981	34.	0.	34.	546.	296.	250.	0.1590	5.	40.
11	1982	34.	0.	34.	515.	296.	219.	0.1323	4.	29.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.1101	-15.	0.
	TOTAL	857.	0.	857.	4672.	2960.	1712.		600.	600.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.55	1186.	763.	423.
8.00	1.44	1062.	735.	327.
10.00	1.35	955.	709.	247.
15.00	1.15	750.	651.	99.
20.00	1.00	605.	602.	3.
30.00	0.80	420.	526.	-106.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

7 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. +$2 GRAIN PR $2.00 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL 24.62 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8024	410.	0.
2	1973	34.	50.	84.	568.	296.	272.	0.6439	54.	175.
3	1974	34.	0.	34.	508.	296.	212.	0.5166	18.	110.
4	1975	34.	0.	34.	400.	296.	104.	0.4146	14.	43.
5	1976	34.	0.	34.	461.	296.	165.	0.3326	11.	55.
6	1977	126.	0.	126.	483.	296.	187.	0.2669	34.	50.
7	1978	34.	0.	34.	473.	296.	177.	0.2142	7.	38.
8	1979	34.	0.	34.	416.	296.	120.	0.1719	6.	21.
9	1980	34.	0.	34.	468.	296.	172.	0.1379	5.	24.
10	1981	34.	0.	34.	566.	296.	270.	0.1107	4.	30.
9	1980	34.	0.	34.	426.	303.	123.	0.0888	3.	11.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.0712	-10.	0.
	TOTAL	857.	0.	857.	4769.	2967.	1802.		556.	556.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.67	1268.	760.	508.
8.00	1.56	1140.	731.	409.
10.00	1.46	1030.	704.	326.
15.00	1.26	815.	645.	170.
20.00	1.11	661.	595.	67.
30.00	0.90	463.	517.	-54.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

8 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 15 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.5 LAB+$.20

ANNUAL RETURN ON CAPITAL 21.01 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	370.	0.	370.	0.	0.	0.	0.8264	306.	0.
2	1973	71.	51.	122.	525.	298.	227.	0.6829	83.	155.
3	1974	34.	0.	34.	465.	298.	167.	0.5644	19.	94.
4	1975	34.	0.	34.	359.	298.	61.	0.4664	16.	28.
5	1976	34.	0.	34.	420.	298.	122.	0.3854	13.	47.
6	1977	146.	0.	146.	442.	298.	144.	0.3185	47.	46.
7	1978	34.	0.	34.	431.	298.	133.	0.2632	9.	35.
8	1979	34.	0.	34.	375.	298.	77.	0.2175	7.	17.
9	1980	34.	0.	34.	426.	298.	128.	0.1798	6.	23.
10	1981	34.	0.	34.	525.	298.	227.	0.1486	5.	34.
11	1982	34.	0.	34.	493.	298.	195.	0.1228	4.	24.
12	1983	-71.	-51.	-122.	0.	0.	0.	0.1015	-12.	0.
	TOTAL	788.	0.	788.	4461.	2980.	1481.		503.	503.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.50	1025.	682.	343.
8.00	1.41	918.	651.	266.
10.00	1.33	826.	623.	203.
15.00	1.15	649.	562.	87.
20.00	1.02	524.	512.	12.
30.00	0.84	364.	436.	-71.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

9 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 45 OR LAND $750 ACRE LITTER 8.0 HOG PR. STO GRAIN PR. $2.00 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL 13.47 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	PRESENT VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	551.	0.	551.	0.	0.	0.	0.8813	486.	0.
2	1973	34.	50.	84.	525.	296.	229.	0.7766	65.	178.
3	1974	34.	0.	34.	465.	296.	169.	0.6844	23.	116.
4	1975	34.	0.	34.	359.	296.	63.	0.6032	21.	38.
5	1976	34.	0.	34.	420.	296.	124.	0.5315	18.	66.
6	1977	146.	0.	146.	442.	296.	146.	0.4684	68.	68.
7	1978	34.	0.	34.	431.	296.	135.	0.4128	14.	56.
8	1979	34.	0.	34.	375.	296.	79.	0.3638	12.	29.
9	1980	34.	0.	34.	426.	296.	130.	0.3206	11.	42.
10	1981	34.	0.	34.	525.	296.	229.	0.2825	10.	65.
11	1982	34.	0.	34.	493.	296.	197.	0.2490	8.	49.
12	1983	-90.	-50.	-140.	0.	0.	0.	0.2194	-31.	0.
	TOTAL	913.	0.	913.	4461.	2960.	1501.		706.	706.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.28	1039.	810.	229.
8.00	1.19	930.	779.	151.
10.00	1.12	837.	751.	86.
15.00	0.96	658.	688.	-30.
20.00	0.84	531.	634.	-104.
30.00	0.67	369.	551.	-182.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

10 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.0

ANNUAL RETURN ON CAPITAL 25.31 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.7980	408.	0.
2	1973	34.	43.	77.	525.	256.	269.	0.6368	49.	171.
3	1974	34.	0.	34.	465.	256.	209.	0.5082	17.	106.
4	1975	34.	0.	34.	359.	256.	103.	0.4055	14.	42.
5	1976	34.	0.	34.	420.	256.	164.	0.3236	11.	53.
6	1977	126.	0.	126.	442.	256.	186.	0.2582	33.	48.
7	1978	34.	0.	34.	431.	256.	175.	0.2061	7.	36.
8	1979	34.	0.	34.	375.	256.	119.	0.1644	6.	20.
9	1980	34.	0.	34.	426.	256.	170.	0.1312	4.	22.
10	1981	34.	0.	34.	525.	256.	269.	0.1047	4.	28.
11	1982	34.	0.	34.	493.	256.	237.	0.0836	3.	20.
12	1983	-86.	-43.	-129.	0.	0.	0.	0.0667	-9.	0.
	TOTAL	857.	0.	857.	4461.	2560.	1901.		546.	546.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.74	1317.	757.	560.
8.00	1.62	1179.	728.	451.
10.00	1.51	1061.	701.	360.
15.00	1.30	832.	641.	191.
20.00	1.13	670.	591.	80.
30.00	0.91	464.	513.	-49.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

11 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 4.0

ANNUAL RETURN ON CAPITAL 8.66 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	ICENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.9203	470.	0.
2	1973	34.	54.	88.	525.	325.	200.	0.8470	75.	169.
3	1974	34.	0.	34.	465.	325.	140.	0.7795	27.	109.
4	1975	34.	0.	34.	359.	325.	34.	0.7173	24.	24.
5	1976	34.	0.	34.	420.	325.	95.	0.6602	22.	63.
6	1977	126.	0.	126.	442.	325.	117.	0.6076	77.	71.
7	1978	34.	0.	34.	431.	325.	106.	0.5591	19.	59.
8	1979	34.	0.	34.	375.	325.	50.	0.5146	17.	26.
9	1980	34.	0.	34.	426.	325.	101.	0.4736	16.	48.
10	1981	34.	0.	34.	525.	325.	200.	0.4358	15.	87.
11	1982	34.	0.	34.	493.	325.	168.	0.4011	14.	67.
12	1983	-86.	-54.	-140.	0.	0.	0.	0.3691	-52.	0.
	TOTAL	857.	0.	857.	4461.	3250.	1211.		724.	724.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.10	838.	761.	76.
8.00	1.02	750.	733.	17.
10.00	0.96	675.	706.	-31.
15.00	0.82	531.	647.	-116.
20.00	0.72	429.	597.	-168.
30.00	0.58	300.	519.	-219.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

12 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STD GRAIN $1,80 FEED EFF. 3.5

ANNUAL RETURN ON CAPITAL 19.09 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8397	429.	0.
2	1973	34.	47.	81.	525.	282.	243.	0.7051	57.	171.
3	1974	34.	0.	34.	465.	282.	183.	0.5921	20.	108.
4	1975	34.	0.	34.	359.	282.	77.	0.4972	17.	38.
5	1976	34.	0.	34.	420.	282.	138.	0.4175	14.	58.
6	1977	126.	0.	126.	442.	282.	160.	0.3505	44.	56.
7	1978	34.	0.	34.	431.	282.	149.	0.2943	10.	44.
8	1979	34.	0.	34.	375.	282.	93.	0.2472	8.	23.
9	1980	34.	0.	34.	426.	282.	144.	0.2075	7.	30.
10	1981	34.	0.	34.	525.	282.	243.	0.1743	6.	42.
11	1982	34.	0.	34.	493.	282.	211.	0.1463	5.	31.
12	1983	-86.	-47.	-133.	0.	0.	0.	0.1229	-16.	0.
	TOTAL	857.	0.	857.	4461.	2820.	1641.		602.	602.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.50	1136.	759.	378.
8.00	1.39	1017.	730.	287.
10.00	1.30	915.	703.	213.
15.00	1.12	719.	643.	75.
20.00	0.98	580.	593.	-14.
30.00	0.78	402.	515.	-113.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

13 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STO GRAIN PR. $2.20 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL 12.54 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8886	454.	0.
2	1973	34.	52.	86.	525.	309.	216.	0.7895	68.	171.
3	1974	34.	0.	34.	465.	309.	156.	0.7016	24.	109.
4	1975	34.	0.	34.	359.	309.	50.	0.6234	21.	31.
5	1976	34.	0.	34.	420.	309.	111.	0.5539	19.	61.
6	1977	126.	0.	126.	442.	309.	133.	0.4922	62.	65.
7	1978	34.	0.	34.	431.	309.	122.	0.4373	15.	53.
8	1979	34.	0.	34.	375.	309.	66.	0.3886	13.	26.
9	1980	34.	0.	34.	426.	309.	117.	0.3453	12.	40.
10	1981	34.	0.	34.	525.	309.	216.	0.3068	10.	66.
11	1982	34.	0.	34.	493.	309.	184.	0.2726	9.	50.
12	1983	-86.	-52.	-138.	0.	0.	0.	0.2423	-33.	0.
	TOTAL	857.	0.	857.	4461.	3090.	1371.		674.	674.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.25	949.	761.	188.
8.00	1.16	849.	732.	117.
10.00	1.08	765.	705.	59.
15.00	0.93	601.	646.	-45.
20.00	0.81	485.	596.	-111.
30.00	0.65	338.	518.	-180.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

14 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 1.5 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL 12.80 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8866	453.	0.
2	1973	34.	47.	81.	494.	282.	212.	0.7860	64.	167.
3	1974	34.	0.	34.	437.	282.	155.	0.6968	24.	108.
4	1975	34.	0.	34.	337.	282.	55.	0.6178	21.	34.
5	1976	34.	0.	34.	395.	282.	113.	0.5477	19.	62.
6	1977	126.	0.	126.	416.	282.	134.	0.4856	61.	65.
7	1978	34.	0.	34.	406.	282.	124.	0.4305	15.	53.
8	1979	34.	0.	34.	352.	282.	70.	0.3817	13.	27.
9	1980	34.	0.	34.	401.	282.	119.	0.3384	12.	40.
10	1981	34.	0.	34.	494.	282.	212.	0.3000	10.	64.
11	1982	34.	0.	34.	465.	282.	183.	0.2659	9.	49.
12	1983	-86.	-47.	-133.	0.	0.	0.	0.2358	-31.	0.
	TOTAL	857.	0.	857.	4197.	2820.	1377.		668.	668.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.26	953.	759.	194.
8.00	1.17	853.	730.	123.
10.00	1.09	768.	703.	65.
15.00	0.94	603.	643.	-40.
20.00	0.82	487.	593.	-107.
30.00	0.66	339.	515.	-176.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

15 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.5 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL 18.67 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8427	431.	0.
2	1973	34.	52.	86.	556.	310.	246.	0.7101	61.	175.
3	1974	34.	0.	34.	492.	310.	182.	0.5984	20.	109.
4	1975	34.	0.	34.	381.	310.	71.	0.5043	17.	36.
5	1976	34.	0.	34.	445.	310.	135.	0.4250	14.	57.
6	1977	126.	0.	126.	469.	310.	159.	0.3581	45.	57.
7	1978	34.	0.	34.	457.	310.	147.	0.3018	10.	44.
8	1979	34.	0.	34.	403.	310.	93.	0.2543	9.	24.
9	1980	34.	0.	34.	452.	310.	142.	0.2143	7.	30.
10	1981	34.	0.	34.	556.	310.	246.	0.1806	6.	44.
11	1982	34.	0.	34.	520.	310.	210.	0.1522	5.	32.
12	1983	-86.	-52.	-138.	0.	0.	0.	0.1283	-18.	0.
	TOTAL	857.	0.	857.	4731.	3100.	1631.		609.	609.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.48	1129.	761.	368.
8.00	1.38	1011.	732.	279.
10.00	1.29	910.	705.	204.
15.00	1.11	714.	646.	68.
20.00	0.97	576.	596.	-20.
30.00	0.77	400.	518.	-117.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

16 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STD GRAIN PR $2.00 FEED EFF 3.5 LABORS 4

ANNUAL RETURN ON CAPITAL 10.87 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.9020	461.	0.
2	1973	34.	52.	86.	525.	316.	209.	0.8136	70.	170.
3	1974	34.	0.	34.	465.	316.	149.	0.7338	25.	109.
4	1975	34.	0.	34.	359.	316.	43.	0.6619	23.	28.
5	1976	34.	0.	34.	420.	316.	104.	0.5970	20.	62.
6	1977	126.	0.	126.	442.	316.	126.	0.5385	68.	68.
7	1978	34.	0.	34.	431.	316.	115.	0.4857	17.	56.
8	1979	34.	0.	34.	375.	316.	59.	0.4381	15.	26.
9	1980	34.	0.	34.	426.	316.	110.	0.3952	13.	43.
10	1981	34.	0.	34.	525.	316.	209.	0.3564	12.	74.
11	1982	34.	0.	34.	493.	316.	177.	0.3215	11.	57.
12	1983	-86.	-52.	-138.	0.	0.	0.	0.2900	-40.	0.
	TOTAL	857.	0.	857.	4461.	3160.	1301.		694.	694.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.18	900.	761.	140.
8.00	1.10	806.	732.	74.
10.00	1.03	726.	705.	20.
15.00	0.88	570.	646.	-76.
20.00	0.77	461.	596.	-135.
30.00	0.62	322.	518.	-196.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

17 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STD GRAIN PR $2.00 FEED EFF. 3.5 HERD LOSS

ANNUAL RETURN ON CAPITAL 10.26 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.9069	463.	0.
2	1973	34.	50.	84.	525.	296.	229.	0.8225	69.	188.
3	1974	71.	0.	71.	316.	222.	94.	0.7459	53.	70.
4	1975	34.	0.	34.	359.	296.	63.	0.6765	23.	43.
5	1976	34.	0.	34.	420.	296.	124.	0.6135	21.	76.
6	1977	126.	0.	126.	442.	296.	146.	0.5564	70.	81.
7	1978	34.	0.	34.	431.	296.	135.	0.5046	17.	68.
8	1979	34.	0.	34.	375.	296.	79.	0.4576	16.	36.
9	1980	71.	0.	71.	289.	222.	67.	0.4150	29.	28.
10	1981	34.	0.	34.	525.	296.	229.	0.3764	13.	86.
11	1982	34.	0.	34.	493.	296.	197.	0.3414	12.	67.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.3096	-42.	0.
	TOTAL	931.	0.	931.	4175.	2812.	1363.		744.	744.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.15	939.	813.	126.
8.00	1.08	839.	779.	60.
10.00	1.01	754.	748.	6.
15.00	0.87	590.	680.	-89.
20.00	0.76	475.	623.	-148.
30.00	0.61	329.	537.	-208.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

1P ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 FCE PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 VAC. FOR TGE

ANNUAL RETURN ON CAPITAL 14.00 PERCENT

YEAR NO.	YEAR IDENT.	INVESTMENT (US$1000) FACILITIES	WORKING CAPITAL	TOTAL	OPERATING (US$1000) TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	PRESENT VALUE FACTOR	PRESENT VALUE INVESTMENT	PRESENT VALUE NET REVENUE
3	1971	0.	0.	0.	0.	0.	0.	0.6750	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.5921	303.	0.
2	1973	34.	51.	85.	525.	303.	222.	0.5194	44.	115.
3	1974	34.	0.	34.	465.	303.	162.	0.4557	15.	74.
4	1975	34.	0.	34.	359.	303.	56.	0.3997	14.	22.
5	1976	34.	0.	34.	420.	303.	117.	0.3506	12.	41.
6	1977	126.	0.	126.	442.	303.	139.	0.3076	39.	43.
7	1978	34.	0.	34.	431.	303.	128.	0.2698	9.	35.
8	1979	34.	0.	34.	375.	303.	72.	0.2367	8.	17.
9	1980	34.	0.	34.	426.	303.	123.	0.2076	7.	26.
10	1981	34.	0.	34.	525.	303.	222.	0.1821	6.	40.
11	1982	34.	0.	34.	493.	303.	190.	0.1598	5.	30.
12	1983	-86.	-51.	-137.	0.	0.	0.	0.1402	-19.	0.
	TOTAL	857.	0.	857.	4461.	3030.	1431.		443.	443.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN US$1000 REVENUE	OUTLAY	BALANCE
6.00	1.30	832.	638.	193.
8.00	1.21	704.	581.	123.
10.00	1.13	600.	530.	70.
15.00	0.97	412.	424.	-12.
20.00	0.85	293.	345.	-52.
30.00	0.68	160.	235.	-75.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

19 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR $2.00 FEED EFF 3.5 RENT HERD

ANNUAL RETURN ON CAPITAL 18.31 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	ICENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	445.	0.	445.	0.	0.	0.	0.8453	376.	0.
2	1973	17.	52.	69.	502.	296.	206.	0.7145	49.	147.
3	1974	17.	0.	17.	445.	296.	149.	0.6039	10.	90.
4	1975	17.	0.	17.	344.	296.	48.	0.5105	9.	25.
5	1976	17.	0.	17.	402.	296.	106.	0.4315	7.	46.
6	1977	109.	0.	109.	423.	296.	127.	0.3647	40.	46.
7	1978	17.	0.	17.	412.	296.	116.	0.3083	5.	36.
8	1979	17.	0.	17.	359.	296.	63.	0.2606	4.	16.
9	1980	17.	0.	17.	408.	296.	112.	0.2203	4.	25.
10	1981	17.	0.	17.	502.	296.	206.	0.1862	3.	38.
11	1982	17.	0.	17.	445.	296.	149.	0.1574	3.	23.
12	1983	-86.	-52.	-138.	0.	0.	0.	0.1330	-18.	0.
	TOTAL	621.	0.	621.	4242.	2960.	1282.		492.	492.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.54	892.	580.	311.
8.00	1.41	799.	565.	234.
10.00	1.31	721.	550.	170.
15.00	1.10	568.	514.	53.
20.00	0.95	460.	482.	-22.
30.00	0.75	321.	427.	-105.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

I N V E S T M E N T F E A S I B I L I T Y A N A L Y S I S

20 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 GRAIN STORAGE

ANNUAL RETURN ON CAPITAL 11.75 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	603.	70.	673.	0.	0.	0.	0.8949	602.	0.
2	1973	34.	28.	62.	525.	291.	234.	0.8008	50.	187.
3	1974	34.	0.	34.	465.	291.	174.	0.7166	24.	125.
4	1975	34.	0.	34.	359.	291.	68.	0.6412	22.	44.
5	1976	34.	0.	34.	420.	291.	129.	0.5738	20.	74.
6	1977	126.	0.	126.	442.	291.	151.	0.5135	65.	78.
7	1978	34.	0.	34.	431.	291.	140.	0.4595	16.	64.
8	1979	34.	0.	34.	375.	291.	84.	0.4112	14.	35.
9	1980	34.	0.	34.	426.	291.	135.	0.3679	13.	50.
10	1981	34.	0.	34.	525.	291.	234.	0.3293	11.	77.
11	1982	34.	0.	34.	493.	291.	202.	0.2946	10.	60.
12	1983	-104.	-98.	-202.	0.	0.	0.	0.2637	-53.	0.
	TOTAL	931.	0.	931.	4461.	2910.	1551.		792.	792.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.25	1074.	860.	213.
8.00	1.15	961.	836.	125.
10.00	1.06	865.	812.	53.
15.00	0.90	679.	757.	-77.
20.00	0.78	548.	707.	-159.
30.00	0.61	381.	626.	-244.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

21 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC. 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.5 BEGIN PROD 74

ANNUAL RETURN ON CAPITAL 11.10 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1972	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1973	511.	0.	511.	0.	0.	0.	0.9001	460.	0.
2	1974	34.	50.	84.	465.	296.	169.	0.8102	68.	137.
3	1975	34.	0.	34.	359.	296.	63.	0.7293	25.	46.
4	1976	34.	0.	34.	420.	296.	124.	0.6565	22.	81.
5	1977	34.	0.	34.	442.	296.	146.	0.5909	20.	86.
6	1978	126.	0.	126.	431.	296.	135.	0.5319	67.	72.
7	1979	34.	0.	34.	375.	296.	79.	0.4788	16.	38.
8	1980	34.	0.	34.	426.	296.	130.	0.4310	15.	56.
9	1981	34.	0.	34.	525.	296.	229.	0.3879	13.	89.
11	1982	34.	0.	34.	465.	296.	169.	0.3492	12.	59.
12	1983	34.	0.	34.	380.	296.	84.	0.3143	11.	26.
0		-86.	-50.	-136.	0.	0.	0.	0.2829	-38.	0.
	TOTAL	857.	0.	857.	4288.	2960.	1328.		690.	690.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.20	914.	760.	154.
8.00	1.12	816.	731.	84.
10.00	1.04	731.	704.	27.
15.00	0.88	568.	645.	-77.
20.00	0.76	453.	595.	-142.
30.00	0.59	306.	517.	-210.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

22 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 BEGIN PROD 75

ANNUAL RETURN ON CAPITAL 9.63 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1973	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1974	511.	0.	511.	0.	0.	0.	0.9122	466.	0.
2	1975	34.	50.	84.	359.	296.	63.	0.8320	70.	52.
3	1976	34.	0.	34.	420.	296.	124.	0.7589	26.	94.
4	1977	34.	0.	34.	442.	296.	146.	0.6923	24.	101.
5	1978	34.	0.	34.	431.	296.	135.	0.6314	21.	85.
6	1979	126.	0.	126.	375.	296.	79.	0.5760	73.	46.
7	1980	34.	0.	34.	426.	296.	130.	0.5254	18.	68.
8	1981	34.	0.	34.	525.	296.	229.	0.4792	16.	110.
9	1982	34.	0.	34.	465.	296.	169.	0.4371	15.	74.
10	1983	34.	0.	34.	359.	296.	63.	0.3987	14.	25.
11	1984	34.	0.	34.	444.	296.	148.	0.3637	12.	54.
12	1985	-86.	-50.	-136.	0.	0.	0.	0.3317	-45.	0.
	TOTAL	857.	0.	857.	4246.	2960.	1286.		709.	709.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.15	876.	760.	116.
8.00	1.06	778.	731.	47.
10.00	0.99	695.	704.	-10.
15.00	0.83	533.	645.	-112.
20.00	0.70	419.	595.	-176.
30.00	0.53	275.	517.	-242.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

23 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 BEGIN PROD 76

ANNUAL RETURN ON CAPITAL 12.18 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1974	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1975	511.	0.	511.	0.	0.	0.	0.8914	456.	0.
2	1976	34.	50.	84.	420.	296.	124.	0.7946	67.	99.
3	1977	34.	0.	34.	442.	296.	146.	0.7083	24.	103.
4	1978	34.	0.	34.	431.	296.	135.	0.6314	21.	85.
5	1979	34.	0.	34.	375.	296.	79.	0.5628	19.	44.
6	1980	126.	0.	126.	426.	296.	130.	0.5017	63.	65.
7	1981	34.	0.	34.	525.	296.	229.	0.4472	15.	102.
8	1982	34.	0.	34.	465.	296.	169.	0.3986	14.	67.
9	1983	34.	0.	34.	359.	296.	63.	0.3553	12.	22.
10	1984	34.	0.	34.	420.	296.	124.	0.3167	11.	39.
11	1985	34.	0.	34.	469.	296.	173.	0.2823	10.	49.
12	1986	-86.	-50.	-136.	0.	0.	0.	0.2517	-34.	0.
	TOTAL	857.	0.	857.	4332.	2960.	1372.		677.	677.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.25	947.	760.	187.
8.00	1.16	845.	731.	114.
10.00	1.08	758.	704.	54.
15.00	0.91	590.	645.	-55.
20.00	0.79	470.	595.	-125.
30.00	0.61	317.	517.	-200.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

24 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.0 IMPROVED HERD

ANNUAL RETURN ON CAPITAL 21.10 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	545.	0.	545.	0.	0.	0.	0.8258	450.	0.
2	1973	42.	50.	92.	525.	256.	269.	0.6819	63.	183.
3	1974	42.	0.	42.	465.	256.	209.	0.5631	24.	118.
4	1975	42.	0.	42.	359.	256.	103.	0.4650	20.	48.
5	1976	42.	0.	42.	420.	256.	164.	0.3840	16.	63.
6	1977	133.	0.	133.	442.	256.	186.	0.3171	42.	59.
7	1978	42.	0.	42.	431.	256.	175.	0.2619	11.	46.
8	1979	42.	0.	42.	366.	256.	110.	0.2162	9.	24.
9	1980	42.	0.	42.	426.	256.	170.	0.1786	8.	30.
10	1981	42.	0.	42.	525.	256.	269.	0.1475	6.	40.
11	1982	42.	0.	42.	493.	256.	237.	0.1218	5.	29.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.1006	-14.	0.
	TOTAL	970.	0.	970.	4452.	2560.	1892.		639.	639.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.55	1311.	847.	464.
8.00	1.45	1174.	812.	362.
10.00	1.36	1057.	779.	277.
15.00	1.17	829.	709.	120.
20.00	1.03	668.	651.	17.
30.00	0.82	463.	562.	-99.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

I N V E S T M E N T F E A S I B I L I T Y A N A L Y S I S

25 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. +.50 GRAIN PR. $2.00 FEED EFF. 3.0 IMPROVED CUT OUT

ANNUAL RETURN ON CAPITAL 14.61 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	545.	0.	545.	0.	0.	0.	0.8725	476.	0.
2	1974	42.	50.	92.	535.	296.	239.	0.7613	70.	182.
3	1975	42.	0.	42.	475.	296.	179.	0.6643	28.	119.
4	1976	42.	0.	42.	370.	296.	74.	0.5796	24.	43.
5	1977	42.	0.	42.	430.	296.	134.	0.5057	21.	68.
6	1978	134.	0.	134.	452.	296.	156.	0.4413	59.	69.
8	1979	42.	0.	42.	441.	296.	145.	0.3850	16.	56.
9	1980	42.	0.	42.	384.	296.	88.	0.3360	14.	30.
10	1981	42.	0.	42.	437.	296.	141.	0.2931	12.	41.
11	1982	42.	0.	42.	535.	296.	239.	0.2558	11.	61.
12	1983	42.	0.	42.	503.	296.	207.	0.2232	9.	46.
0		-86.	-50.	-136.	0.	0.	0.	0.1947	-26.	0.
	TOTAL	971.	0.	971.	4562.	2960.	1602.		714.	714.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.31	1109.	848.	262.
8.00	1.22	993.	812.	181.
10.00	1.15	894.	780.	114.
15.00	0.99	702.	709.	-8.
20.00	0.87	566.	651.	-85.
30.00	0.70	393.	562.	-169.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

26 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 YEARS PROD 5

ANNUAL RETURN ON CAPITAL 15.23 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	445.	0.	445.	0.	0.	0.	0.8678	386.	0.
2	1972	71.	50.	121.	525.	296.	229.	0.7531	91.	172.
3	1973	34.	0.	34.	465.	296.	169.	0.6535	22.	110.
4	1974	34.	0.	34.	359.	296.	63.	0.5671	19.	36.
5	1975	34.	0.	34.	420.	296.	124.	0.4922	17.	61.
6	1976	34.	0.	34.	478.	296.	182.	0.4271	15.	78.
0		-200.	-50.	-250.	0.	0.	0.	0.3706	-93.	0.
	TOTAL	452.	0.	452.	2247.	1480.	767.		457.	457.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.32	617.	466.	150.
8.00	1.23	576.	466.	109.
10.00	1.16	539.	465.	74.
15.00	1.01	461.	458.	3.
20.00	0.89	398.	446.	-48.
30.00	0.73	306.	418.	-112.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

27 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 YEARS PROD 15

ANNUAL RETURN ON CAPITAL 16.00 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8621	441.	0.
2	1973	34.	50.	84.	525.	296.	229.	0.7431	62.	170.
3	1974	34.	0.	34.	465.	296.	169.	0.6406	22.	108.
4	1975	34.	0.	34.	359.	296.	63.	0.5522	19.	35.
5	1976	34.	0.	34.	420.	296.	124.	0.4761	16.	59.
6	1977	126.	0.	126.	442.	296.	146.	0.4104	52.	60.
7	1978	34.	0.	34.	431.	296.	135.	0.3538	12.	48.
8	1979	34.	0.	34.	375.	296.	79.	0.3050	10.	24.
9	1980	34.	0.	34.	426.	296.	130.	0.2629	9.	34.
11	1981	34.	0.	34.	525.	296.	229.	0.2266	8.	52.
12	1982	126.	0.	126.	465.	296.	169.	0.1954	25.	33.
13	1983	39.	0.	39.	359.	296.	63.	0.1684	7.	11.
14	1984	39.	0.	39.	420.	296.	124.	0.1452	6.	18.
15	1985	39.	0.	39.	442.	296.	146.	0.1252	5.	18.
16	1986	39.	0.	39.	431.	296.	135.	0.1079	4.	15.
17	1987	39.	0.	39.	397.	296.	101.	0.0930	4.	9.
18	1988	-25.	-50.	-75.	0.	0.	0.	0.0802	-6.	0.
	TOTAL	1205.	0.	1205.	6482.	4440.	2042.		694.	694.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.36	1274.	935.	340.
8.00	1.27	1111.	871.	239.
10.00	1.19	976.	817.	159.
15.00	1.03	731.	711.	20.
20.00	0.90	571.	635.	-64.
30.00	0.72	382.	532.	-150.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

28 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 35 LITTER 8.0 HOG PR. STD GRAIN PR. $2.00 FEED EFF. 3.5 IN AND OUTER

ANNUAL RETURN ON CAPITAL 14.32 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	PRESENT VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8747	447.	0.
2	1973	34.	50.	84.	525.	296.	229.	0.7652	64.	175.
3	1974	5.	0.	5.	493.	296.	197.	0.6693	3.	132.
4	1975	71.	-30.	41.	0.	20.	-20.	0.5855	24.	-12.
5	1976	34.	30.	64.	420.	296.	124.	0.5122	33.	64.
6	1977	34.	0.	34.	442.	296.	146.	0.4480	15.	65.
7	1978	5.	0.	5.	459.	296.	163.	0.3919	2.	64.
8	1979	163.	-30.	133.	0.	20.	-20.	0.3428	46.	-7.
9	1980	34.	30.	64.	426.	296.	130.	0.2999	19.	39.
10	1981	34.	0.	34.	525.	296.	229.	0.2623	9.	60.
11	1982	5.	0.	5.	493.	284.	209.	0.2294	1.	48.
12	1983	-125.	-50.	-175.	0.	0.	0.	0.2007	-35.	0.
	TOTAL	805.	0.	805.	3783.	2396.	1387.		628.	628.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.32	960.	725.	235.
8.00	1.23	859.	699.	160.
10.00	1.15	774.	676.	98.
15.00	0.98	609.	621.	-12.
20.00	0.86	493.	575.	-82.
30.00	0.69	346.	502.	-156.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

29 ANALYSIS OF 450 SOW FARROW TO MARKET OPERATION C. R. RAYL
LITTER 8.6 GRAIN COST $2.70 SUPPLEMENT $6.00 FEED EFF 3.5

ANNUAL RETURN ON CAPITAL -4.50 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
1	1971	373.	49.	422.	301.	299.	2.	1.0471	442.	2.
2	1972	23.	0.	23.	363.	299.	64.	1.0964	25.	70.
3	1973	23.	0.	23.	423.	299.	124.	1.1480	26.	142.
4	1974	23.	0.	23.	374.	299.	75.	1.2021	28.	90.
5	1975	23.	0.	23.	288.	299.	-11.	1.2587	29.	-14.
6	1976	162.	0.	162.	338.	299.	39.	1.3180	214.	51.
7	1977	23.	0.	23.	355.	299.	56.	1.3800	32.	77.
8	1978	23.	0.	23.	346.	299.	47.	1.4450	33.	68.
9	1979	23.	0.	23.	301.	299.	2.	1.5131	35.	3.
10	1980	23.	0.	23.	439.	299.	140.	1.5843	36.	222.
11	1981	-64.	-49.	-113.	0.	0.	0.	1.6589	-187.	0.
	TOTAL	655.	0.	655.	3528.	2990.	538.		712.	712.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	0.66	388.	584.	-196.
8.00	0.62	351.	563.	-212.
10.00	0.59	320.	543.	-223.
15.00	0.52	258.	498.	-241.
20.00	0.46	212.	460.	-248.
30.00	0.38	152.	401.	-248.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

R. PHILLIPS AG. ECON. 641, K.S.U.

INVESTMENT FEASIBILITY ANALYSIS

30 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC 15 LITTER 8.5 HOG PR. STD GRAIN PR. $2.00 FEED EFF 3.25 RENT HERD

ANNUAL RETURN ON CAPITAL 31.08 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	370.	0.	370.	0.	0.	0.	0.7629	282.	0.
2	1973	18.	46.	64.	502.	271.	231.	0.5820	37.	134.
3	1974	18.	0.	18.	445.	271.	174.	0.4440	8.	77.
4	1975	18.	0.	18.	344.	271.	73.	0.3387	6.	25.
5	1976	18.	0.	18.	402.	271.	131.	0.2584	5.	34.
6	1977	130.	0.	130.	423.	271.	152.	0.1971	26.	30.
7	1978	18.	0.	18.	412.	271.	141.	0.1504	3.	21.
8	1979	18.	0.	18.	359.	271.	88.	0.1147	2.	10.
9	1980	18.	0.	18.	408.	271.	137.	0.0875	2.	12.
10	1981	18.	0.	18.	502.	271.	231.	0.0668	1.	15.
11	1982	18.	0.	18.	445.	271.	174.	0.0509	1.	9.
12	1983	-71.	-46.	-117.	0.	0.	0.	0.0389	-5.	0.
	TOTAL	591.	0.	591.	4242.	2710.	1532.		368.	368.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	1.99	1065.	536.	529.
8.00	1.84	955.	518.	437.
10.00	1.72	860.	501.	359.
15.00	1.47	677.	462.	215.
20.00	1.28	547.	428.	119.
30.00	1.02	381.	373.	8.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

31 ANALYSIS OF 600 SOW FARROW TO WEANING OPERATION C. R. RAYL
FAC FOR P16 8.5 PIG PR. STD X 1.5 X 45 GRAIN PR. $2.00 RENT HERD TWO MEN

ANNUAL RETURN ON CAPITAL -0.09 PERCENT

YEAR		INVESTMENT ($ 1000)			OPERATING ($ 1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	285.	0.	285.	0.	0.	0.	1.0009	285.	0.
2	1973	18.	17.	35.	167.	101.	66.	1.0018	35.	66.
3	1974	18.	0.	18.	148.	101.	47.	1.0026	18.	47.
4	1975	18.	0.	18.	115.	101.	14.	1.0035	18.	14.
5	1976	18.	0.	18.	134.	101.	33.	1.0044	18.	33.
6	1977	53.	0.	53.	141.	101.	40.	1.0053	53.	40.
7	1978	18.	0.	18.	138.	101.	37.	1.0062	18.	37.
8	1979	18.	0.	18.	120.	101.	19.	1.0070	18.	19.
9	1980	18.	0.	18.	136.	101.	35.	1.0079	18.	35.
10	1981	18.	0.	18.	167.	101.	66.	1.0088	18.	67.
11	1982	18.	0.	18.	148.	101.	47.	1.0097	18.	47.
12	1983	-94.	-17.	-111.	0.	0.	0.	1.0106	-112.	0.
	TOTAL	406.	0.	406.	1414.	1010.	404.		406.	406.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $ 1000 REVENUE	OUTLAY	BALANCE
6.00	0.74	281.	378.	-97.
8.00	0.68	252.	368.	-116.
10.00	0.63	227.	358.	-131.
15.00	0.54	179.	334.	-155.
20.00	0.47	145.	311.	-167.
30.00	0.37	101.	275.	-173.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

37 ANALYSIS OF 633 SOW FARROW TO WEANING OPERATION C. R. RAYL
FAL FOR PIG 8.5 PIG PR. STD X 1.8 X 45 GRAIN PR. $2.00 RENT HERD TWO MEN

ANNUAL RETURN ON CAPITAL 11.84 PERCENT

YEAR		INVESTMENT (US$1000)			OPERATING (US$1000)			PRESENT VALUE FACTOR	PRESENT VALUE	
NO.	ICENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE		INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	285.	0.	285.	0.	0.	0.	0.8941	255.	0.
2	1973	18.	24.	42.	201.	101.	100.	0.7995	34.	80.
3	1974	18.	0.	18.	178.	101.	77.	0.7148	13.	55.
4	1975	18.	0.	18.	138.	101.	37.	0.6391	12.	24.
5	1976	18.	0.	18.	161.	101.	60.	0.5715	10.	34.
6	1977	53.	0.	53.	169.	101.	68.	0.5110	27.	35.
7	1978	18.	0.	18.	165.	101.	64.	0.4569	8.	29.
8	1979	18.	0.	18.	144.	101.	43.	0.4085	7.	18.
9	1980	18.	0.	18.	164.	101.	63.	0.3652	7.	23.
10	1981	18.	0.	18.	201.	101.	100.	0.3266	6.	33.
11	1982	18.	0.	18.	178.	101.	77.	0.2920	5.	22.
0		-94.	-24.	-118.	0.	0.	0.	0.2611	-31.	0.
	TOTAL	406.	0.	406.	1699.	1010.	689.		393.	393.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN US$1000 REVENUE	OUTLAY	BALANCE
6.00	1.26	479.	381.	98.
8.00	1.16	429.	371.	58.
10.00	1.07	387.	362.	25.
15.00	0.90	304.	338.	-34.
20.00	0.78	245.	316.	-70.
30.00	0.61	170.	278.	-108.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

INVESTMENT FEASIBILITY ANALYSIS

33 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C. R. RAYL
FAC.35 LITTER 8.0 HOG PR. STD GRAIN $2.00 FEED EFF. 3.5 REPLACE INTERNALLY

ANNUAL RETURN ON CAPITAL 19.02 PERCENT

YEAR		INVESTMENT ($US 1000)			OPERATING ($US 1000)			PRESENT	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	VALUE FACTOR	INVESTMENT	NET REVENUE
0	1971	0.	0.	0.	0.	0.	0.	1.0000	0.	0.
1	1972	511.	0.	511.	0.	0.	0.	0.8402	429.	0.
2	1973	10.	50.	60.	513.	296.	217.	0.7059	42.	153.
3	1974	10.	0.	10.	455.	296.	159.	0.5931	6.	94.
4	1975	10.	0.	10.	351.	296.	55.	0.4983	5.	27.
5	1976	10.	0.	10.	411.	296.	115.	0.4187	4.	48.
6	1977	102.	0.	102.	432.	296.	136.	0.3518	36.	48.
7	1978	10.	0.	10.	422.	296.	126.	0.2956	3.	37.
8	1979	10.	0.	10.	367.	296.	71.	0.2483	2.	18.
9	1980	10.	0.	10.	417.	296.	121.	0.2087	2.	25.
10	1981	10.	0.	10.	513.	296.	217.	0.1753	2.	38.
11	1982	10.	0.	10.	483.	296.	187.	0.1473	1.	28.
12	1983	-86.	-50.	-136.	0.	0.	0.	0.1238	-17.	0.
	TOTAL	617.	0.	617.	4364.	2960.	1404.		517.	517.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN $US 1000 REVENUE	OUTLAY	BALANCE
6.00	1.64	972.	593.	378.
8.00	1.49	870.	582.	288.
10.00	1.37	783.	570.	213.
15.00	1.14	615.	540.	75.
20.00	0.97	496.	511.	-15.
30.00	0.75	346.	460.	-114.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

8.0 MONTHLY OPERATING COSTS AND REVENUES UNDER THE SELECTED ALTERNATIVE

8.1 Method of Selection

The selection of the promising and realistic alternative is based on the findings discussed in Chapter 7. The inputs into this alternative are technically and economically sound from the standpoint of facilities cost, market hog prices, feed grain and production costs and the production performance expected from swine. These inputs combine the more profitable variables investigated in Chapters 6 and 7. However, realism and accuracy are not sacrificed for optimism. The projected cash flow and return on investment for this alternative is computed in the same manner as described in Chapters 6 and 7 except that the projected schedule of capital investment and the projected schedule of net operating revenue is computed monthly rather than annually as in the previous chapters.

8.2 General Desgin of Selected Alternative

The selected alternative is a 600-sow farrow-to-market operation. This operation would have a contractor-constructed 3-building, 156-sow capacity farrowing unit, and a 3-building, 1350-pig nursery. Both of these units are fully slatted and environment controlled. The 680 head gestation facility for the breeding herd and a 20-lot, 3700-head, open-lot finishing facility are to be producer constructed.

This operation requires 100 acres of land and two wells.

Feed grain storage is limited to a required 60-day supply.

The production cycle is for a sow to enter the farrowing house, farrow and remain for not more than 4 weeks. The pigs would then be transferred to the nursery for 4 weeks and the sow returned to the gestation facility for breeding. The pigs are then transferred to the finishing facility for an

additional 15 to 16 weeks, until they reach 220 pounds. Each facility has a 2-week cleaning and airing period at the end of each cycle. This practice enhances disease control. The construction, replacement, and repair schedule for this facility is shown in Table 9-1.

8.3 Monthly Projected Volume and Sales Revenue

The monthly projected volume is based on 8.0 pigs per litter raised to a market weight of 220 pounds. The total annual volume produced by 600 sows is 9600 head. Annual replacement of breeding stock requires that 200 gilts be returned to the breeding herd. The total projected market volume is 9600 less 220, or 9380 head annually. Continuous farrowing under environmentally-controlled conditions would produce a nearly constant outflow of market hogs.

Sow and boar salvage volume is based on replacement of the sows every 3 years and the boars every 2 years. The sale volume of sows is 220 annually at a weight of 550 pounds and is evenly distributed throughout the year except in the start up and phase out of the project. Initially, projections are that 5 sows per month would be marketed at a weight of 400 pounds during January to June, 1973 and 10 sows per month would be marketed at a weight of 450 pounds during July to December, 1973. During phase out, the sows would be marketed as their litters were weaned from December 1982 through May, 1983.

The projected volume of boars to be marketed is 5 in January and 5 in June, three months after purchase of their replacements. This practice is to establish the new boars as capable breeders. The projected market weight of the boars is 700 pounds. All boars would be phased out and marketed in February, 1983.

The projected monthly sales revenue from market hogs is computed by

multiplying monthly volume marketed by the projected monthly price shown in Table 5-6. The total market hog revenue is shown in column 4, Table 9-2.

The projected revenue from the salvage of boars and sows is calculated by multiplying the projected volume by the market hog price less $3 per hundred for sows and less $10 per hundred for boars. Marketings of sows during start up would be at a lighter wieght and command a higher price; thus, the marketings during the start up from January 1973 to December 1973 are calculated at $2 per hundred less than the projected market hog price.

The sow and boar salvage revenue is shown in column 5, Table 9-2.

8.4 Monthly Projected Market Hog and Herd Production Cost

The projected market hog production costs were based on a 3.5 feed efficiency or 662 pounds of milo and 110 pounds protein supplement discussed in Chapter 3, and an average milo price of $2.00 and a protein price of $6.00 per hundredweight seasonally adjusted as shown in Table 4-1.

Other costs included were Health - 96¢ per pig (Table 6-7), Utilities - $1.25 per pig, Market Expense - $1.50 per pig and Pig Starter Feed - 47¢ per pig. The average cost after birth for a 215 pound pig marketed is $24.61 or $11.45 per hundredweight. These costs are prorated during the start up phase to reflect the number of pigs in the farrowing house, nursery and finishing house. The total monthly projected market hog production cost is shown in column 6, Table 9-2.

The projected monthly herd production costs are computed for a 660 sow herd (60 head of gilts for replacements) and 20 boars. The annual milo consumption is computed at 1730 pounds for sows and 1648 pounds for boars. Annual protein supplement consumption is computed at 420 pounds for sows and 400 pounds for boars. The price for this supplement is projected at $6.00

per hundredweight. The average milo price is $2.00 per hundredweight seasonally adjusted as shown in Table 4-1. Herd health cost is estimated to be $1.50 per head per year. Marketing expense of $1.50 per head is evenly divided throughout the project. During the start up and phase out periods these costs are prorated according to the procurement and sales schedules. The total monthly projected herd production costs are shown in column 7, Table 9-2.

The projected monthly overhead costs are shown in column 8, Table 9-2. The detailed computation of these costs is shown in Table 6-8. The minor difference in the start up phase represents monthly management costs and expenses prior to hiring labor. These costs are expected to remain relatively stable and are computed as an average monthly outlay without seasonal adjustment.

9.0 PROJECTED CASH FLOW AND RETURN ON INVESTMENT FOR THE SELECTED ALTERNATIVE

9.1 Monthly Projection Method

The monthly projected cash flow for this alternative is simultaneously affected by the capital cost for facilities and equipment, the breeding herd procurement schedule, the construction and start up schedule, the operating capital requirements and the projected monthly net revenue. The method used to measure the potential return for this alternative is the internal rate of return discussed in detail in Chapter 7. The interaction of the hog cycle and seasonal fluctuations in the price of milo produce large monthly changes in the net income schedule of commercial swine operations. Therefore, the economic potential of the selected alternative is measured by scheduling the investments and benefits monthly.

9.2 Projected Capital Investment for Facilities and Equipment

The projected capital requirements for facilities is based on the construction schedule of the facilities (Table 9-1) and the purchase schedule for equipment. The estimated monthly capital requirements are shown in the first column of Table 9-2. The largest portion of the capital investment for facilities occurs during 1972 as is indicated in Table 9-2 with major reinvestment occurring in 1977 and 1979 to replace worn out equipment (Table 9-1A) in concurrence with engineering replacement schedules. This accounting for replacement is in accordance with the principles of an IRR analysis. The repairs and maintenance are included in this column and are estimated to be $500 per month. The salvage value of the project is shown as an investment credit at the bottom of column 1 in Table 9-2. The credit is one-third the original cost of equipment and facilities plus the full value of the land and site improvements (Table

9-1B)

9.3 Projected Capital Investment for Breeding Stock

The capital investment for breeding stock is shown in column 2 of Table 9-2. The major portion of this investment occurs in the period from July 1972 to December 1972. Minor capital investments are required for replacement gilts from January 1973 until November 1973 prior to the maturity of gilts produced by this operation. Purebred boars are purchased annually from established purebred breeders at the spring and fall sales and the capital investment is made in March and October.

A study of the purebred publications reports of purebred sales indicates that the price of breeding stock fluctuates more violently than the price of market hogs. The purchase price of gilts should be about $100 per head considering that the hog cycle in 1972 will be at a low ebb and that project acquisitions would represent a relatively large volume purchase. The price of purebred boars is expected to be about $300 per head. No investment credit is made at the bottom of column 2 in Table 9-2 as the herd salvage value at the end of the project is accounted as an increase in herd salvage revenue in column 5. The total capital investment in facilities is shown in the first column of Analysis 34 and is the summation of the monthly investment in facilities and breeding stock. This column is labeled Facilities in the analysis.

9.4 Projected Working Capital Requirements

The monthly projected working capital requirements show a rapid buildup in column 3 of Table 9-2 and column 2, Analysis 34, until the operation produces a positive net revenue. The working capital requirement is constructed by addition of the monthly production expenses and the overhead. The initial requirement prior to May 1973 accumulates to slightly over $93,000. This

large requirement is retired by transferring funds from net revenue into working capital. This requirement levels out at approximately $25,000 and fluctuates with the seasonal changes in the milo price.

Investment credits for working capital are entered during the close out phase of the project.

9.5 Projected Monthly Net Revenue

The projected monthly schedules of operating total revenue, operating expenses, and net revenue before depreciation, interest and income tax are shown in the center section of Analysis 34. The large negative net revenue figures until May, 1973 are due to start up production expenses in the absence of revenue. The net revenue fluctuations are caused by the interaction of the hog cycle and the seasonal variations in hog prices. Net revenue is relatively high for the initial month of production, due to the projected peak in cyclic hog prices, and reaches a maximum in February, 1974. Net revenue declines with minor monthly fluctuations until November, 1976 and starts recovering to another peak in February, 1978. The lowest projected net revenue occurs in April, 1979. However, this net revenue is sufficient to cover operating expenses for that month. According to the projections, the months from November through May of 1980 will be the most difficult for the project financially. Nevertheless, this low occurs after a sufficient period of higher net revenue to tide over the project until the upward swing in the hog price cycle brings improved earnings in 1981 and 1982.

9.6 Summary Evaluation of the Selected Alternative

The selected alternative produces an internal return on total capital of 36.46 percent and a present value balance at 8 percent interest of $825,780

before depreciation, interest and income tax as shown in Analysis 34. The corresponding benefit-cost ratio is 2.89.

The project yields a sufficient internal rate of return to be highly attractive to prospective investors by cursory comparisons in relation to the present opportunity cost of capital.

Table 9-1

Facility Construction and Equipment Purchase Schedule

Month	Item	Cost	Total Monthly Investment
Mar. 1972			$28,000
	Land (100 acres at $250)	$25,000	
	Pickup Truck	3,000	
Apr. 1972			14,900
	Gestation Facility (25% of $70 x 680)	11,900	
	Tractor	3,000	
May 1972			17,900
	Gestation Facility (25% of $70 x 680)	11,900	
	Water system	6,000	
June 1972			16,300
	Gestation facility (25% of $70 x 680)	11,900	
	Pig trailer	500	
	Incidentals	1,500	
	Feed handling equipment	400	
	Feed wagon	2,000	
July 1972			11,900
	Gestation facility (25% of $70 x 680)	11,900	
Aug. 1972			21,880
	Farrowing house (10% of one house)	3,380	
	Finishing facility (33-1/3% of facil.)	18,500	
Sept. 1972			37,050
	Farrowing house (40% of one house)	13,520	
	Farrowing house (10% of one house)	3,380	
	Nursery (10% of one building)	1,650	
	Finishing facility (33-1/3% of facil.)	18,500	
Oct. 1972			62,950
	Farrowing house (50% of one house)	16,900	
	Farrowing house (40% of one house)	13,520	
	Farrowing house (10% of one house)	3,380	
	Nursery (10% of one building)	1,650	
	Nursery (10% of one building)	1,650	
	Nursery (40% of one building)	6,550	
	Finishing facility (33-1/3% of facil.)	18,500	
	Feed handling equipment	800	

Table 9-1 (cont.)

Month	Item	Cost	Total Monthly Investment
Nov. 1972			$79,470
	Farrowing house (40% of one house)	13,520	
	Farrowing house (50% of one house)	16,900	
	Nursery (50% of one building)	8,150	
	Nursery (40% of one building)	6,550	
	Nursery (40% of one building)	6,550	
	Feed mill	25,000	
	Manure handling equipment	2,000	
	Feed handling equipment	800	
Dec. 1972			34,800
	Farrowing house (50% of one house)	16,900	
	Nursery (50% of one building)	8,150	
	Nursery (40% of one building)	8,150	
	Feed handling equipment	1,600	
Jan. 1973			800
	Feed handling equipment	800	
Feb. 1973			800
	Feed handling equipment	800	
June 1973			6,000
	Trailer house	6,000	

Table 9-1A

Replacement Schedule for Equipment and Facilities

Item	Month	Cost
Farrowing House		
Replace slats, hoses, feeders at $50/unit.	Oct. 1977	$2,600
	Nov. 1977	2,600
	Dec. 1977	2,600
Finishing Facility		
Replace damaged feeders, waters and fencing, estimated at 1/3 the original total cost.	May 1978	6,166
	June 1978	6,166
	July 1978	6,166
Nursery		
Requires minor repairs included in the $500/ month estimated repair and maintenance cost.		
Gestation Facility		
Replace damaged feeders, fencing and waters, estimated at 1/3 the original total cost.	Aug. 1978	3,966
	Sept.1978	3,966
	Oct. 1978	3,966
Maintenance and Repairs		
The estimated cost of upkeep of facilities and equipment is 2-1/2% of the original value or $6,000 or $500/month.		$500/month

Equipment	Expected Life	Month Replaced	Cost
Pickup truck	3 years	Mar. 75-78-81	3,000
Tractor	5 years	Apr. 1977	3,000
Pig trailer	5 years	June 1977	500
Manure handler	5 years	Nov. 1977	2,000
Feed wagon	5 years	June 1977	2,000

Table 9-1B

Estimated Salvage Value

Land	Full Value	$25,000
Well	Full Value	6,000
Buildings & Equipment	1/3 Original Cost	100,583
TOTAL		131,583

Table 9-2

MONTHLY SCHEDULE OF PROJECTED CAPITAL INVESTMENT, WORKING CAPITAL, OPERATING REVENUE AND OPERATING EXPENSES

	CAPITAL INVESTMENT			OPERATING REVENUE		OPERATING EXPENSES		
Year Month	Facil.	Breed. Stock	Work. Cap.	Market Hog	Sow Salv.	Market Hog Prod.	Herd Prod.	Over-head Costs
C72JA			1CCC					1CCC
172FB			1CCC					1CCC
272MR	28CCC		225C					225C
372AP	14SCC		225C					225C
472MY	17SCC		225C					225C
572JN	163CC		225C					225C
672JL	119CC	1C9CC	325C				584	2666
772AC	2188C	1C9CC	3727				1061	2666
872SP	37C5C	1C9CC	4165				1495	2666
972CT	62955C	1C9CC	4796				213C	2666
1C72NV	7547C	1C9CC	5121				2455	2666
1172DC	34RCC	115CC	6631			5C4	3C6C	2666
1273JA	8CC	5CC	7856		365	2545	3CCC	2666
1373FB	8CC	5CC	11731		381	6420	3026	2666
1473MR	5CC	5CC	15663		375	10333	3043	2666
1573AP	5CC	5CC	19579		375	14243	3049	2666
1673MY	5CC	5CC	-14826	39577	431	1945C	3066	2666
1773JN	6CCC	5CC	-3CCCR	44905	534	19593	3172	2666
1873JL	5CC	1CCC	-21956	46417	1151	19662	329C	2666
1973AC	5CC	1CCC	-10916	47073	117C	19777	3369	2666
2C73SP	5CC	1CCC	-762	44132	1C91	19C37	3347	2666
2173CT	5CC	1CCC	-3C4	44451	11CC	18EEC	34CC	2666
2273NV	5CC	1CCC	16	47795	1189	18693	3403	2666
2373DC	5CC		219	52366	1312	18878	3437	2666
2474JA	5CC		188	52837	2567	19C37	3466	2666
2574FB	5CC		189	53408	2901	19196	3496	2666
2674MR	5CC	15CC	125	48921	2632	19302	3515	2666
2774AP	5CC		42	45157	2406	19337	3522	2666
2874MY	5CC		134	46216	247C	1945C	3543	2666
2974JN	5CC		169	47947	3222	19593	3569	2666
3C74JL	5CC		82	46552	261C	19662	3582	2666
3174AC	5CC		-101	46451	249C	19577	3566	2666
3274SP	5CC		-640	42098	2223	19C37	3466	2666
3374CT	5CC	15CC	-423	38555	2C34	18EPC	34CC	2666
3474NV	5CC		16	38132	1985	18693	3403	2666
3574DC	5CC		219	38014	1978	18878	3437	2666
3675JA	5CC		188	37981	2408	19C37	3466	2666
3775FB	5CC		189	38804	2025	19196	3496	2666
3875MR	35CC	15CC	125	36451	1884	19302	3515	2666
3975AP	5CC		42	35124	1804	19337	3522	2666
4C75MY	5CC		134	35544	2C7C	1945C	3543	2666
4175JN	5CC		169	41560	2706	19593	3569	2666
4275JL	5CC		82	42787	2264	19662	3582	2666
4375AC	5CC		-101	40804	2145	19577	3566	2666
4475SP	5CC		-640	37897	1971	19C37	3466	2666
4575CT	5CC	15CC	-423	36726	19CC	18EPC	3400	2666

4675NV	5CC		16	33712	1720	18693	3403	2666
4775CC	5CC		219	33796	1725	18878	3437	2666
4876JA	5CC		188	35140	2186	19037	3466	2666
4976FB	5CC		185	35914	1852	19196	3496	2666
5076MR	5CC	15CC	125	35426	1823	19302	3515	2666
5176AP	5CC		42	34956	1794	19337	3522	2666
5276MY	5CC		134	35611	1834	19450	3543	2666
5276JN	5CC		169	37477	2376	19593	3569	2666
5476JL	5CC		82	35947	2094	19662	3582	2666
5576AC	5CC		-101	37863	1969	19577	3566	2666
5676SP	5CC		-640	37292	1934	19037	3466	2666
5776CT	5CC	15CC	-423	35006	1797	18680	3400	2666
5876NV	5CC		16	32636	1655	18693	3403	2666
5976CC	5CC		219	34367	1759	18878	3437	2666
6077JA	5CC		188	35695	2232	19037	3466	2666
6177FB	5CC		185	37023	1918	19196	3496	2666
6277MR	5CC	15CC	125	36804	1905	19302	3515	2666
6377AP	35CC		42	36855	1908	19337	3522	2666
6477MY	5CC		134	41174	2167	19450	3543	2666
6577JN	3CCC		169	46501	2105	19593	3569	2666
6677JL	5CC		82	48014	2578	19662	3582	2666
6777AC	5CC		-101	48669	2617	19577	3566	2666
6877SP	5CC		-640	45728	2441	19037	3466	2666
6977CT	31CC	15CC	-423	46047	2460	18680	3400	2666
7077NV	51CC		16	43190	2288	18693	3403	2666
7177CC	31CC		219	47762	2563	18878	3437	2666
7278JA	5CC		188	48232	3245	19037	3466	2666
7378FB	5CC		185	48804	2625	19196	3496	2666
7478MR	35CC	15CC	125	44316	2356	19302	3515	2666
7578AP	5CC		42	40552	2130	19337	3522	2666
7678MY	6666		134	41611	2194	19450	3543	2666
7778JN	6666		169	43342	2850	19593	3569	2666
7878JL	6666		82	43947	2334	19662	3582	2666
7978AC	4466		-101	41846	2208	19577	3566	2666
8078SP	4466		-640	37493	1947	19037	3466	2666
8178CT	4466	15CC	-423	34351	1758	18680	3400	2666
8278NV	5CC		16	29981	1496	18693	3403	2666
8378CC	5CC		219	29863	1485	18878	3437	2666
8479JA	5CC		188	29830	1758	19037	3466	2666
8579JB	5CC		189	30653	1536	19196	3496	2666
8679MR	5CC	15CC	125	28301	1395	19302	3515	2666
8779AP	5CC		42	26973	1315	19337	3522	2666
8879MY	5CC		134	31393	1581	19450	3543	2666
8979JN	5CC		169	33409	2048	19593	3569	2666
9079JL	5CC		82	34636	1775	19662	3582	2666
9179AC	5CC		-101	32653	1656	19577	3566	2666
9279SP	5CC		-640	29746	1482	19037	3466	2666
9379CT	5CC	15CC	-423	28569	1411	18680	3400	2666

9479NV	5CC		16	29964	1495	18693	3403	2666
9579DC	5CC		219	30048	1500	18878	3439	2666
9680JA	5CC		188	31393	1685	19037	3466	2666
9780FP	5CC		189	32166	1627	19196	3496	2666
9880MR	5CC	1500	125	31678	1598	19302	3515	2666
9980AP	5CC		42	31200	1569	19237	3522	2666
10080MY	5CC		134	31863	1609	19450	3543	2666
10180JN	5CC		169	33729	2073	19593	3569	2666
10280JL	5CC		82	36199	1869	19662	3582	2666
10380AG	5CC		-101	34115	1744	19577	3566	2666
10480SP	5CC		-640	33544	1710	19037	3466	2666
10580CT	5CC	1500	-423	31258	1572	18680	3400	2666
10680NV	5CC		16	31040	1559	18693	3403	2666
10780DC	5CC		219	32771	1663	18878	3437	2666
10881JA	5CC		188	34099	2110	19037	3466	2666
10981FB	5CC		189	35426	1823	19196	3496	2666
11081MR	3500	1500	125	35208	1809	19302	3515	2666
11181AP	5CC		42	35258	1812	19237	3522	2666
11281MY	5CC		134	39577	2072	19450	3543	2666
11381JN	5CC		169	44905	2978	19593	3569	2666
11481JL	5CC		82	46417	2482	19662	3582	2666
11581AG	5CC		-101	47073	2521	19577	3566	2666
11681SP	5CC		-640	44132	2345	19037	3466	2666
11781CT	5CC	1500	-423	44451	2364	18680	3400	2666
11881NV	5CC		16	47795	2565	18693	3403	2666
11981DC	5CC		219	52366	2839	18878	3437	2666
12082JA	5CC		188	52837	3015	19037	3466	2666
12182FP	5CC		189	53408	2901	19196	3496	2666
12282MR	5CC	1500	125	48921	2632	19302	3515	2666
12382AP	5CC		42	45157	2406	19237	3522	2666
12482MY	5CC		134	46216	2470	19450	3543	2666
12582JN	5CC		169	47947	3222	19593	3569	2666
12682JL	5CC		82	48552	2610	19662	3582	2666
12782AG	5CC		-101	47540	2484	19577	3566	2666
12882SP	5CC		-766	43086	2223	19037	3340	2666
12982CT	1CC		-510	39869	2034	18680	3187	2666
13082NV	1CC		-74	39026	1985	18693	3100	2666
13182CC	1CC		193	38506	10791	18878	3108	2666
13283JA	1CC		-248	38872	10780	19037	2701	2666
13383FB	1CC		-303	39714	12685	19196	2239	2666
13483MR	1CC		-447	37306	10275	19302	1686	2666
13583AP	1CC		-442	35948	9845	19237	1209	2666
13683MY	1CC		-364	40471	11291	19450	732	2666
13783JN	1CC		-1493	42535		18689		2666
13883JL	1CC		-1614	42791		17075		2666
13983AG	1CC		-4027	41761		13048		2666
14083SP	1CC		-4203	38786		8845		2666
14183CT	1CC		-2907	37562		5938		2666
14283NV	-1315883		-8604					

INVESTMENT FEASIBILITY ANALYSIS

34 ANALYSIS OF 600 SOW FARROW TO MARKET OPERATION C.R. RAYL
FAC.IF LITTER 8.0 FCG PR. MONTHLY MODEL GRAIN $2 BASE FEED EFF 3.5 FARM REP

INTERNAL RETURN ON TOTAL CAPITAL 36.46 PERCENT

YEAR		INVESTMENT (DOLLARS)			OPERATING (DOLLARS)			PRESENT VALUE	PRESENT VALUE	
NO.	IDENT.	FACILITIES	WORKING CAPITAL	TOTAL	TOTAL REVENUE	OPERATING EXPENSES **	NET REVENUE	FACTOR	INVESTMENT	NET REVENUE
0	72JA	0.	1000.	1000.	0.	1000.	-1000.	1.0000	1000.	-1000.
1	72FB	0.	1000.	1000.	0.	1000.	-1000.	0.9744	974.	-974.
2	72MR	28000.	2250.	30250.	0.	2250.	-2250.	0.9499	28723.	-2136.
3	72AP	14900.	2250.	17150.	0.	2250.	-2250.	0.9252	15868.	-2082.
4	72MY	17900.	2250.	20150.	0.	2250.	-2250.	0.9016	18167.	-2029.
5	72JN	16300.	2250.	18550.	0.	2250.	-2250.	0.8795	16296.	-1977.
6	72JL	22800.	3250.	26050.	0.	3250.	-3250.	0.8560	22300.	-2782.
7	72AG	32780.	3727.	36507.	0.	3727.	-3727.	0.8342	30459.	-3109.
8	72SP	47950.	4165.	52115.	0.	4165.	-4165.	0.8128	42361.	-3385.
9	72OT	73850.	4796.	78646.	0.	4796.	-4796.	0.7920	62290.	-3799.
10	72NV	90370.	5121.	95491.	0.	5121.	-5121.	0.7718	73698.	-3952.
11	72DC	46300.	6630.	52930.	0.	6630.	-6630.	0.7520	39800.	-4986.
12	73JA	1300.	7850.	9150.	265.	8215.	-7850.	0.7328	6705.	-5753.
13	73FB	1300.	11731.	13031.	381.	12112.	-11731.	0.7141	9305.	-8377.
14	73MR	1000.	15663.	16663.	379.	16042.	-15663.	0.6958	11594.	-10898.
15	73AP	1000.	19579.	20579.	379.	19958.	-19579.	0.6780	13953.	-14275.
16	73MY	1000.	-14826.	-13826.	40000.	25182.	14826.	0.6607	-9134.	9795.
17	73JN	6500.	-20000.	-13508.	45439.	25431.	20008.	0.6438	-8696.	12881.
18	73JL	1500.	-21950.	-20450.	47568.	25618.	21950.	0.6273	-12829.	13770.
19	73AG	1500.	-10916.	-9416.	48243.	25812.	22431.	0.6113	-5756.	13711.
20	73SP	1500.	-762.	738.	45223.	25050.	20173.	0.5956	440.	12016.
21	73OT	1500.	-304.	1196.	45551.	24746.	20805.	0.5804	694.	12075.
22	73NV	1500.	16.	1516.	48984.	24762.	24222.	0.5656	857.	13699.
23	73DC	500.	219.	719.	53678.	24981.	28697.	0.5511	396.	15815.
24	74JA	500.	188.	688.	55704.	25169.	30535.	0.5370	369.	16398.
25	74FB	500.	189.	689.	56309.	25358.	30951.	0.5233	361.	16196.
26	74MR	2000.	125.	2125.	51553.	25483.	26070.	0.5099	1084.	13293.
27	74AP	500.	42.	542.	47563.	25525.	22038.	0.4969	269.	10950.
28	74MY	500.	134.	634.	48686.	25659.	23027.	0.4841	307.	11149.
29	74JN	500.	165.	665.	51165.	25828.	25341.	0.4718	316.	11955.
30	74JL	500.	82.	582.	51162.	25910.	25252.	0.4597	268.	11608.
31	74AG	500.	-101.	399.	48931.	25809.	23122.	0.4479	179.	10357.
32	74SP	500.	-640.	-140.	44321.	25165.	19152.	0.4365	-61.	8360.
33	74OT	2000.	-423.	1577.	40589.	24746.	16243.	0.4253	671.	6909.

34	74NV	500.	16.	516.	40117.	24762.	15355.	0.4145	214.	6364.
35	74DC	500.	219.	719.	39992.	24981.	15011.	0.4039	290.	6062.
36	75JA	500.	188.	688.	40289.	25169.	15220.	0.3935	271.	5989.
37	75FB	500.	189.	689.	40829.	25358.	15471.	0.3835	264.	5935.
38	75MR	5000.	125.	5125.	38335.	25483.	12852.	0.3737	1915.	4802.
39	75AP	500.	42.	542.	36928.	25525.	11403.	0.3641	197.	4152.
40	75MY	500.	134.	634.	41614.	25659.	15955.	0.3548	225.	5661.
41	75JN	500.	169.	669.	44266.	25828.	18438.	0.3457	231.	6374.
42	75JL	500.	82.	582.	45051.	25910.	19141.	0.3369	196.	6448.
43	75AG	500.	-101.	399.	42549.	25809.	17140.	0.3283	141.	5626.
44	75SP	500.	-640.	-140.	35868.	25169.	14699.	0.3199	-45.	4702.
45	75CT	2000.	-423.	1577.	38620.	24746.	13874.	0.3117	492.	4324.
46	75NV	500.	16.	516.	35432.	24762.	10670.	0.3037	157.	3241.
47	75DC	500.	219.	719.	35521.	24981.	10540.	0.2959	213.	3119.
48	76JA	500.	188.	688.	37326.	25169.	12157.	0.2884	194.	3506.
49	76FB	500.	189.	689.	37766.	25358.	12408.	0.2810	194.	3487.
50	76MR	2000.	125.	2125.	37249.	25483.	11766.	0.2738	562.	3222.
51	76AP	500.	42.	542.	36750.	25525.	11225.	0.2668	145.	2995.
52	76MY	500.	134.	634.	37445.	25659.	11786.	0.2600	165.	3064.
53	76JN	500.	169.	669.	39853.	25828.	14025.	0.2533	169.	3553.
54	76JL	500.	82.	582.	42041.	25910.	16131.	0.2469	144.	3967.
55	76AG	500.	-101.	399.	39832.	25809.	14023.	0.2406	96.	3375.
56	76SP	500.	-640.	-140.	35226.	25169.	14057.	0.2344	-33.	3295.
57	76CT	2000.	-423.	1577.	36803.	24746.	12057.	0.2284	360.	2754.
58	76NV	500.	16.	516.	34291.	24762.	9529.	0.2226	119.	2121.
59	76DC	500.	219.	719.	36126.	24981.	11145.	0.2169	156.	2417.
60	77JA	500.	188.	688.	37927.	25169.	12758.	0.2113	145.	2696.
61	77FB	500.	189.	689.	38941.	25358.	13583.	0.2059	142.	2797.
62	77MR	2000.	125.	2125.	38709.	25483.	13226.	0.2007	426.	2654.
63	77AP	3000.	42.	3542.	28763.	25525.	13238.	0.1955	694.	2588.
64	77MY	500.	134.	634.	43341.	25659.	17682.	0.1905	121.	3369.
65	77JN	3000.	169.	3169.	49606.	25828.	23778.	0.1857	588.	4414.
66	77JL	500.	82.	582.	50552.	25910.	24682.	0.1809	105.	4465.
67	77AG	500.	-101.	399.	51286.	25809.	25477.	0.1763	70.	4491.
68	77SP	500.	-640.	-140.	48169.	25169.	23000.	0.1718	-24.	3951.
69	77CT	4000.	-423.	4177.	48507.	24746.	23761.	0.1674	699.	3977.
70	77NV	5100.	16.	5116.	45478.	24762.	20716.	0.1631	834.	3379.
71	77DC	3100.	219.	3319.	50325.	24981.	25344.	0.1589	527.	4026.
72	78JA	500.	188.	688.	51477.	25169.	26308.	0.1549	107.	4074.
73	78FB	500.	189.	689.	51429.	25358.	26071.	0.1509	104.	3934.
74	78MR	5000.	125.	5125.	46672.	25483.	21189.	0.1470	754.	3146.
75	78AP	500.	42.	542.	42682.	25525.	17157.	0.1433	78.	2458.
76	78MY	6666.	134.	6800.	43805.	25659.	18146.	0.1396	949.	2534.
77	78JN	6666.	169.	6835.	46192.	25828.	20364.	0.1360	930.	2770.
78	78JL	6666.	82.	6748.	46281.	25910.	20371.	0.1326	895.	2761.
79	78AG	4466.	-101.	4365.	44054.	25809.	18245.	0.1292	564.	2357.
80	78SP	4466.	-640.	3826.	39440.	25169.	14271.	0.1259	482.	1796.
81	78CT	5566.	-423.	5543.	36109.	24746.	11363.	0.1227	680.	1394.

82	78NV	500.	16.	516.	31477.	24762.	6715.	0.1195	62.	803.
83	78DC	500.	219.	719.	31352.	24981.	6371.	0.1165	84.	742.
84	7SJA	500.	188.	688.	31568.	25169.	6419.	0.1139	76.	728.
85	7SJB	500.	189.	689.	32189.	25358.	6831.	0.1106	76.	755.
86	7SMR	2000.	125.	2125.	29696.	25483.	4213.	0.1078	229.	454.
87	7SAP	500.	42.	542.	28288.	25525.	2763.	0.1050	57.	290.
88	7SMY	500.	134.	634.	32974.	25659.	7315.	0.1023	65.	746.
89	7SJN	500.	169.	669.	35457.	25828.	9629.	0.0997	67.	960.
90	7SJL	500.	82.	582.	36411.	25910.	10501.	0.0971	57.	1020.
91	7SAG	500.	-101.	399.	34309.	25809.	8500.	0.0947	38.	808.
92	7SSP	500.	-640.	-140.	31228.	25169.	6059.	0.0922	-13.	559.
93	7SOT	2000.	-423.	1577.	29980.	24746.	5234.	0.0899	142.	470.
94	7SNV	500.	16.	516.	31459.	24762.	6697.	0.0876	45.	587.
95	7SDC	500.	219.	719.	31548.	24983.	6565.	0.0853	61.	560.
96	8CJA	500.	188.	688.	33278.	25169.	8109.	0.0832	67.	674.
97	8CFB	500.	189.	689.	33793.	25358.	8435.	0.0810	56.	694.
98	8CMR	2000.	125.	2125.	33276.	25483.	7793.	0.0790	169.	615.
99	8CAP	500.	42.	542.	32777.	25525.	7252.	0.0769	42.	556.
100	8CMY	500.	134.	634.	33472.	25659.	7813.	0.0750	48.	586.
101	8CJN	500.	169.	669.	35802.	25828.	9974.	0.0731	49.	729.
102	8CJL	500.	82.	582.	36068.	25910.	10158.	0.0712	41.	866.
103	8CAG	500.	-101.	399.	35859.	25809.	10050.	0.0694	28.	697.
104	8CSP	500.	-640.	-140.	35254.	25169.	10085.	0.0676	-9.	682.
105	8COT	2000.	-423.	1577.	32830.	24746.	8084.	0.0659	104.	532.
106	8CNV	500.	16.	516.	32599.	24762.	7837.	0.0642	33.	503.
107	8CDC	500.	219.	719.	34434.	24981.	9453.	0.0625	45.	591.
108	81JA	500.	188.	688.	36209.	25169.	11040.	0.0609	42.	673.
109	81FB	500.	189.	689.	37249.	25358.	11891.	0.0594	41.	706.
110	81MR	5000.	125.	5125.	37017.	25483.	11534.	0.0579	297.	667.
111	81AP	500.	42.	542.	37070.	25525.	11545.	0.0564	31.	651.
112	81MY	500.	134.	634.	41649.	25659.	15990.	0.0549	35.	879.
113	81JN	500.	169.	669.	47883.	25828.	22055.	0.0535	36.	1181.
114	81JL	500.	82.	582.	48859.	25910.	22989.	0.0522	30.	1199.
115	81AG	500.	-101.	399.	49594.	25809.	23785.	0.0508	20.	1209.
116	81SP	500.	-640.	-140.	46477.	25169.	21308.	0.0495	-7.	1055.
117	81OT	2000.	-423.	1577.	46815.	24746.	22069.	0.0483	76.	1065.
118	81NV	500.	16.	516.	50360.	24762.	25598.	0.0470	24.	1204.
119	81DC	500.	219.	719.	55205.	24981.	30224.	0.0458	33.	1385.
120	82JA	500.	188.	688.	56452.	25169.	31283.	0.0447	31.	1397.
121	82FB	500.	189.	689.	56309.	25358.	30951.	0.0435	30.	1347.
122	82MR	2000.	125.	2125.	51553.	25483.	26070.	0.0424	90.	1105.
123	82AP	500.	42.	542.	47563.	25525.	22038.	0.0413	22.	911.
124	82MY	500.	134.	634.	48686.	25659.	23027.	0.0403	26.	927.
125	82JN	500.	169.	669.	51169.	25828.	25341.	0.0392	26.	994.
126	82JL	500.	82.	582.	51162.	25910.	25252.	0.0382	22.	965.
127	82AG	500.	-101.	399.	50024.	25809.	24215.	0.0373	15.	902.
128	82SP	500.	-766.	-266.	45309.	25043.	20266.	0.0363	-10.	736.
129	82OT	100.	-510.	-410.	41903.	24533.	17370.	0.0354	-15.	614.

130	82NV	100.	-74.	26.	41011.	24459.	16552.	0.0345	1.	570.
131	82DC	100.	193.	293.	49697.	24652.	25045.	0.0336	10.	841.
132	83JA	100.	-248.	-148.	49652.	24404.	25248.	0.0327	-5.	826.
133	83FB	100.	-303.	-203.	52399.	24101.	28298.	0.0319	-6.	902.
134	83MR	100.	-447.	-347.	47585.	23654.	23931.	0.0311	-11.	744.
135	83AP	100.	-442.	-342.	45793.	23212.	22581.	0.0303	-10.	684.
136	83MY	100.	-364.	-264.	51762.	22848.	28914.	0.0295	-8.	853.
137	83JN	100.	-1459.	-1359.	42535.	21355.	21180.	0.0288	-40.	609.
138	83JL	100.	-1614.	-1514.	43751.	19741.	24050.	0.0280	-42.	674.
139	83AG	100.	-4027.	-3927.	41761.	15714.	26047.	0.0273	-107.	711.
140	83SP	100.	-4207.	-4103.	38786.	11611.	27275.	0.0266	-109.	726.
141	83CT	100.	-2907.	-2807.	37582.	8804.	28978.	0.0259	-73.	751.
142	83NV	-131583.	-8804.	-140187.	0.	0.	0.	0.0253	-3541.	0.
	TOTAL	413663.	0.	413663.	5313258.	3230364.	2082934.		278796.	378796.

INTEREST PER CENT	BENEFIT/COST RATIO	PRESENT VALUE IN DOLLARS REVENUE	OUTLAY	BALANCE
6.00	3.26	1417673.	438534.	978139.
7.00	3.06	1236690.	436195.	800495.
8.00	2.89	1262100.	436320.	825780.
15.00	2.05	875098.	427785.	447313.
25.00	1.40	567126.	405014.	162112.
35.00	1.04	397058.	381953.	15105.

**EXCLUDING DEPRECIATION, INTEREST, AND INCOME TAX

10.0 ACKNOWLEDGMENTS

The author is indebted to many persons and organizations for their helpful information and cooperation provided during the study. Several have been cited in a general way in Section 2.2. The author extends an expression of thanks to Dr. Robert H. Hines, Dr. Leonard W. Schruben, and Dr. John H. McCoy for serving on his graduate committee, to Mr. Joe M. Tiao for computer programming and to the clerical and supporting staff who worked on the study.

Last but not least, the author expresses sincere appreciation to Dr. Richard Phillips, his advisor, for the expert economic guidance, moral support, and fine cooperation maintained throughout this study.

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FEASIBILITY ANALYSIS OF A COMMERCIAL SWINE OPERATION

by

CHARLES R. RAYL

B. S., Kansas State University, 1965

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Agricultural Economics

Kansas State University
Manhattan, Kansas

1971

This is a detailed study of the technical and economic feasibility of a commercial swine farrow-to-market operation.

A combination of statistical, mathematical and economic analysis is used in conjunction with current swine husbandry practices to complete the various steps of the feasibility study.

Projected hog prices are estimated by isolating the secular trend and determining annual and monthly fluctuations from the secular trend and developing a price projection model based on historical patterns.

Projected milo prices are developed from historical patterns in annual average prices and monthly deviations from the average price.

Location analysis is made by determining feed costs and hog price differentials by state and the resulting effect on operating margins for the commercial hog operation.

The principle measure of economic potential used in this study is the Internal Rate of Return or I.R.R. The IRR is a measure of the potential return to capital investment in the project based on the time flow of money into and out of the project and is the return which equates the present value of the investment schedule to the present value of the schedule of net benefits.

The inputs into the investment schedules are developed from information received from producers, commercial feed and livestock equipment companies and animal scientists. The inputs into the benefit schedules are developed from the hog price projection model described above.

The financial viability of a commercial swine operation depends upon the construction of the facility at a reasonable cost, breeding programs to enhance feed efficiency, sound animal husbandry practices for marketing large litters

to establish favorable operating margins and initial entry into the market when the hog cycle is in an upswing.

The most promising alternative considered for commercial hog production is a 600-sow continuous farrow-to-market operation. This operation is projected to yield an annual return on capital before depreciation, interest and income tax of 36.46 percent.