1980

A Computerized Planning Model for Small Farms in Southeastern South Dakota

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A COMPUTERIZED PLANNING MODEL FOR SMALL FARMS IN SOUTHEASTERN SOUTH DAKOTA

by

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A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science, Major in
Economics, South Dakota
State University

1980

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IN SOUTHEASTERN SOUTH DAKOTA

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Thesis Adviser

Date

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ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to my Major Adviser, Dr. Herb Allen, for his guidance, support, and suggestions while completing this thesis. I am also indebted to Drs. Wallace Aanderud and Charles Lamberton for their comments concerning this thesis. I also wish to thank Dr. Wayne Ellingson for his help and time given with the computer programs. Special thanks are given to Nancy Hurtig for her work in typing the orals copy of the thesis.

I wish to express my deepest thanks to my parents, Louie and Valda De Smet for their endless support and encouragement leading to the completion of this thesis.

I wish to thank my wife, Carmen, for being so unselfish while I worked on this. Also thanks are extended for her support and effort in editing and typing the final copy.

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SUMMARY

Structural changes in agriculture resulting in fewer and larger farms carries strong implications for smaller farms. Included in the small farm group are small, low-resource, and part-time farmers, some of which are unable to generate an adequate income due to limited resources.

This research study has developed a managerial tool for assisting low-resource farmers in developing optimal farm plans. The planning model is an interaction of familiar components (budgets) with a complex mathematical model (linear programming) to provide an efficient analytical tool for use by farmers to aid in their managerial process.

This study has placed emphasis upon the development of an LP model which is representative of small farm operations in Southeastern South Dakota. The model may be employed by altering the input-output coefficients to make the model representative of a specific farm situation. Price data may also be entered so that the model accurately reflects an individual operator's price expectations. Methodology for changing input data and obtaining output has been a major concern of this study. Additional effort was placed upon the development of budgets for small scale enterprises and off-farm employment to be incorporated into the model. A primary objective has been to provide a simple method to transfer the farmer's personal situation into a computer program which allows for more precise and detailed analysis than may otherwise be possible.

To use this planning model, a farmer must complete the individual enterprise budgets. The procedure for doing this has been simplified

by using basic budgets. Following the completion of the budgets, it is necessary to complete the "Profit and Price Input Sheets" and the "Supplies of Available Resources" sheets. With the completion of these sheets, the information required to run the computer program has been gathered.

Information required for the completion of the crop budgets is available in Chapter 3. The information provided should be studied, and the budgets changed, if necessary, to reflect the personal situation. The crop activities to be included in the model should then be checked on the "Profit and Price Input Sheet" for crops, available in Chapter 6. Any profit figures, computed through the budgets, that are different from those given in the model should be transferred to this sheet. The sell prices on this sheet should also be studied and changed as desired.

The information required for the completion of the livestock budgets is available in Chapter 4. The procedure for submitting personal data follows the same guidelines as used in the crop budget discussion. Then the profit figures are transferred from the budgets to the "Profit and Price Input Sheets" for livestock, also in Chapter 6. Personal price expectations are then supplied for the corresponding supplemental activities. The supplemental activities required for the various production activities immediately follow the production activities for each livestock type. It is very important to keep the buy price for a commodity higher than the sell price for the same commodity.

The final step in the data submission process is to complete the "Supplies of Available Resources" sheet in Chapter 6. The discussion and information needed are detailed in Chapter 5. Off-farm employment

alternatives, farm labor supplies, and family living expenses are discussed and completed. The supply values are then transferred to the "Supplies of Available Resources" sheets. Land acreage and available capital are also completed in this section.

With the completion of the previous steps, all information needed to run the computer program has been gathered. The computer outputs a final plan, which is returned to the farmer, that is as realistic as the initially supplied information. The final plan is identical in format to the example farm output in Chapter 7.

CHAPTER 1

INTRODUCTION

At the present time, farming as an occupation or supplementary activity has never been quite so uncertain. High interest rates, inflation, and national economic conditions have all been integral factors contributing to this occurrence. This condition makes it especially hard on all groups of farmers except the well-established, larger farmers. Structural changes in agriculture resulting in fewer and larger farms carries strong implications, not only for the smaller farms, but also for rural communities.

The trend to fewer, larger, and more highly capitalized farms manned by fewer workers has complex impacts on rural communities. American society has recently become highly concerned over the economic and social viability of rural communities, the majority of which have been in a continuous process of decline over the last two decades. This erosion of economic and social opportunity has strong prospects of continuation under present trends in farm size and capital technology. To date, the plight of rural communities results mainly from the structural changes in the farm sector about them. (Heady and Sonka, Card Report 48, page 1.)

Included in the group of smaller farms are small, low-resource, and the part-time farmer. Some of these farmers are unable to generate an adequate farm income due to limited land, labor, capital, and/or management resources. Thus, if additional capital were available, the land, labor, and management resources could cease to be limitations.

Additional capital could secure more land, either through renting or purchase; additional capital would also hire more labor or enable participation in a farm management service.

Typically, capital is generated from the profit from the farm enterprises. However, off-farm employment is another means by which capital for farm investments could be generated. Off-farm employment, taken in order to generate farm capital, should complement the farm operation as much as possible. "Less-than-adequate" farm families desiring this alternative must find off-farm employment which will minimize competition with the farming operation. Off-farm employment may not directly affect the farm operation, such as when the wife works off the farm, unless she generally helps in the farming operation.

Another method for increasing farm income may be through more efficient resource use. This could include alternative enterprises which may fit the farm resources more efficiently and/or enterprises that are less capital intensive and more labor intensive.

The organization of farm and off-farm activities must be treated as activities making up an integrated family-production unit. Management decisions for the family must reflect both farm and off-farm resource employment demands and income possibilities. The purpose of this study is to provide an aid to farm families with which they can combine all possible opportunities and resources into one production unit--the family--to help them devise a plan to enable them to become a viable economic unit.

Objectives

(1) To develop a set of enterprise budgets for Southeastern South Dakota that will be compatible with a linear programming model.

(2) To provide an efficient and convenient method for farmers to use the budgets to derive linear programming production coefficients that represent their individual situation.

(3) To develop a linear programming model with resources and activities that represent a typical small farm operation. This will include activities such as off-farm employment, specialty crops, and small scale enterprises.

(4) To develop a computer program that will simplify data input procedures to the extent that the IBM MPS/360 program may be used with farmers as an effective planning tool.

Farm Definition

A farm adequate for economic viability will vary greatly by farm type, geographic region, managerial and business knowledge of the operator, family composition, and other factors. An adequate farm has been defined as a business with sufficient resources and productivity to yield enough farm income to meet expenses for: (a) farm expenses, including depreciation, maintenance of the livestock herd, equipment, land and buildings, and interest on borrowed capital; (b) family living; (c) enough capital growth for new farm investments required to keep in step with technological advance and rising levels of living. (Nikolitch, page 27.)

A new official definition of a farm was instituted in 1974 by the U.S. Department of Agriculture (USDA). The definition recognizes inflation and other changes that have occurred in farming. "The new definition requires a place to have $1,000 minimum sales of farm products to be counted as a farm. The previous definition, used since 1959, required only $50 in farm product sales on places of 10 acres or larger, or $250 on smaller places." (Committee on Agriculture, Nutrition, and Forestry, page 2.)

This study is designed to aid farmers with a gross farm income of less than $40,000, but who also operate a legitimate farm according to USDA standards. This group could be composed of small farms, low-resource farms, and part-time farms. The purpose of the study is to increase net family income through any means that is compatible with the family organization.

Sources of Data

The preliminary data was obtained mainly from ten farms in the Clay-Yankton Farm Records Program conducted by the Economics Department at South Dakota State University. An average of this set of farms provided some basic characteristics of small and/or low-resource farms in that area of the state. The program was organized in an attempt to aid low-resource farmers in the area, therefore, basic characteristics of these farms provides a basis or the groundwork of this study.

The requirements for both livestock and crop enterprises were obtained from various extension publications dealing with that area of the state. The price of each required input was then updated to bring the budgets up to date.

Several other publications from various private organizations, other universities, and the extension services of other states were also used to obtain supplementary data.

Description of Area

The study area for which the model was developed included the seven East Southeastern counties of South Dakota. They include Clay, Lincoln, Minnehaha, Moody, Turner, Union, and Yankton (see Figure 1).

The climate of the area has an average of 150 frost-free days with wide seasonal and day-to-day temperature fluctuations. The average last spring frost date is about May 5, and October 5 is the average date for the first-fall frost in Southeastern South Dakota.

Temperature

The temperature range in the area has a climate with extremes of summer heat, winter cold, and rapid fluctuations of temperature. Temperatures during the winter months often drop to 20 degrees below zero or lower while in the summer, readings of 100 degrees or more are common. A reading of 100 degrees or higher may be expected on an average of about 2.5 times in July, a little more than once a year in August and a little less than once a year in June. On the average, temperatures will drop to zero or below on 26 days per year and fail to climb above zero at least one day per year. The highest recorded temperature for the area was 118 degrees above zero, and the lowest recorded temperature was 46 degrees below zero.

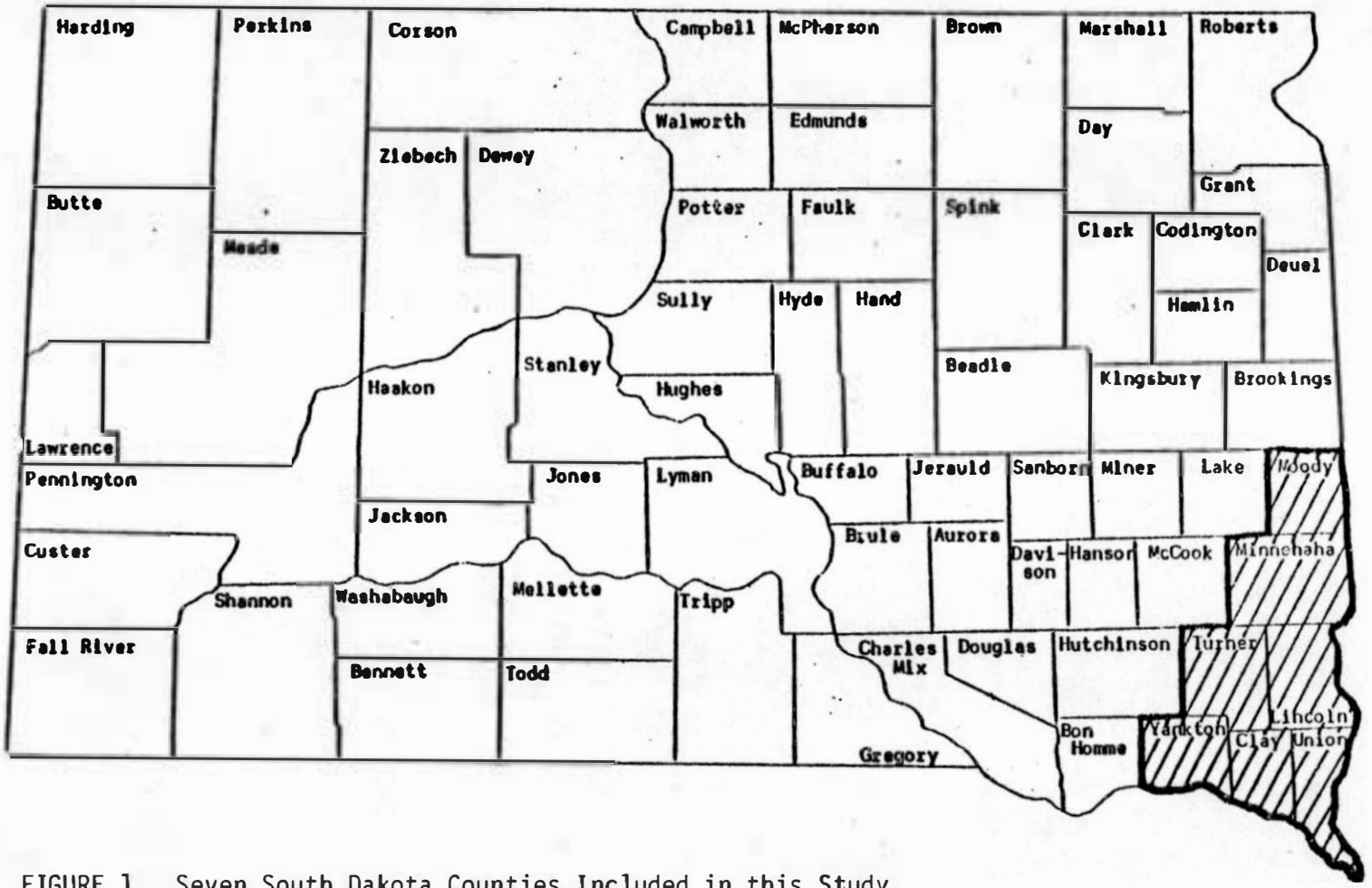

FIGURE 1. Seven South Dakota Counties Included in this Study

Precipitation

Annual precipitation averages 24.5 inches. Approximately 75 percent, 18.37 inches, of the total annual precipitation falls when temperatures are ideal for plant growth. Much of the summer rain comes as short, hard showers or thunderstorms which occur mainly in June.

The average seasonal snowfall is 32 inches. Seasonal totals have varied from 202 inches of snow in 1930-31 to over 100 inches in 1961-62. Strong winds often accompany the snowfall causing large drifts in and around sheltered areas, while open areas may remain nearly bare.

Hail sometimes accompanies thunderstorms and can be expected about once a year. It is likely to fall in June during the heaviest thunderstorms, but it may fall anytime during the growing season.

Wind and Relative Humidity

During the cold season, winds are usually from the northwest and average 12 miles per hour. During the warm season, winds are usually from the southeast and average 10 miles per hour.

Relative humidity usually varies widely from early morning to afternoon. It averages from about 50 percent in the afternoon to 90 percent in the early morning during the summer and from about 65 percent in the afternoon to 80 percent in the early morning during the winter months.

Soils

The counties in this study lie in the Chernazem Region and are the sole counties making up the Southeast Prairie Upland soil zone. The eastern parts of Turner and Yankton counties lie in the Southern

James Flatland soil zone, but this is a relatively small portion of each county.

Soil associations of the Southeast Prairie Upland area are mainly of the nearly level to undulating Egan, Viborg, and Badus series in Lincoln, Turner, and parts of Clay and Union Counties. The Egan soils are deep, friable, well drained silty clay loams. The Viborg soils are moderately well drained associates of Egan. The Badus soils occupy flats and shallow basins and are somewhat poorly drained and may be somewhat saline. Maintenance problems are organic matter and nutrients on the Egan and Viborg soils. Drainage is the main maintenance problem on Badus soils. (Westin, Puhr, Buntley, Soil Survey Series Number 3, page 21.)

Minnehaha and Moody counties are composed of the Moody, Trent, and Croften series. The Moody soils are deep, permeable, well-drained, silty clay loams, occupying the ridge tops and gentle side slopes. The Croften soils are thin and occupy the steeper slopes. The Trent soils are deep, permeable, and moderately well drained. The maintenance problems of this soils series is water erosion control. (Westin, Puhr, and Buntley, page 21.)

A small part of Lincoln and Union Counties compose the Moody, Croften, and Alcester series. The Moody and Croften soils are described above. The Alcester soils are very thick, dark colored soils of drainways. The Alcester soils actually are developed from material eroded from adjacent slopes. (Westin, Puhr, and Buntley, page 21.)

The southern part of Clay and Union Counties compose the Luton, Volin, and Onawa series. These are soils of the Missouri river flood

plain. Generally, the clay soils, like the Luton, occur next to the bluff. Along side the river are the medium-textured, very youthful Onawa soils and the sands. Between these two positions, on higher-laying flats are the deep, friable, well-drained Volin soils. Maintenance problems include improving permeability on the clay soils and controlling flooding and washing on the Onawa soils. (Westin, Puhr, and Buntley, page 21.)

Land Uses

The major crops grown in the region are corn, oats, soybeans, and alfalfa. Corn, oats, and alfalfa are feed crops, while soybeans is the major cash crop. A majority of the farms in the area are combinations of grain and livestock units. Table 1-1 shows the approximate percent of land in production of the various crops by county.

Table 1-1. Percent of Land in Production of the Various Crops

County	Crop[1]								
	Corn	Oats	Barley	Soy-beans	Wheat[2]	Sorg-hum	Al-falfa	Wild Hay	Other[3]
Clay	30.1	7.4	.1	17.3	.6	.6	5.2	.8	38.0
Lincoln	34.0	11.6	.2	11.5	.2	.3	4.5	.5	36.0
Minnehaha	30.6	11.4	1.1	4.4	.1	.1	6.2	1.2	44.0
Moody	27.3	11.2	1.0	7.9	.5	.1	6.2	1.4	38.0
Turner	28.5	15.0	.2	7.8	.2	.5	6.0	1.7	39.0
Union	35.1	7.9	.1	15.5	.9	.1	3.0	.4	37.0
Yankton	23.5	11.7	.2	5.7	.4	.8	6.6	3.5	47.0

[1]The approximate land in each crop, by county is an average of 1970-75.
[2]The wheat category includes Durum, Spring, and Winter Wheat.
[3]Approximate percent of land not accounted for by crops. Assumed to be in rangeland or pasture.

Summary

This study is designed to aid farmers with a gross farm income of less than $40,000, but who operate a legitimate farm according to USDA standards. The area is composed mainly of combination grain and livestock units, with the principle crops being corn, oats, soybeans, and alfalfa. Development of a linear programming model to be used by these farmers as a planning aid is the principle objective of this study.

A discussion of the model is contained in Chapter 2. The model objective function, an explanation of budgeting, and a general explanation of linear programming follows.

CHAPTER 2

METHOD OF ANALYSIS

The method used in this study to analyze changes in the farm organization and to find the optimum farm plan was linear programming. However, the linear programming model used is nothing more than a combination of activity budgets which should be familiar to regional farmers. Therefore, the method of analysis is an interaction of familiar components (budgets) into a relatively new system (linear programming) to provide an efficient analytical tool for use by researchers, educators, and farmers.

"A budget is a written plan for future action, including the quantified anticipated results. Budgets indicate what to expect, dollar-wise, from a course of action before that action is taken." (Osburn and Schneeberger, page 147.) The farm budget is an important tool for every farm manager. The farm budget is completed, maintained, and used for the same purpose that any item on the farm is used to aid the farmer in obtaining greater profits or making larger savings in the operation of the farm.

An important distinction between the various types of budgets is necessary before continuing. This study will deal with two types: (1) activity budgets, and (2) the total farm budget. The activity budgets are dealt with in Chapters 3, 4, and 5, and are explained in detail in each chapter. The activity budgets are very important and must be given careful attention. It is this chosen combination of activity budgets which represents the farm or comprises the total farm budget.

Therefore, if the total farm budget is to be relevant, the individual activity budgets must also be relevant. The usefulness of any budget depends on the degree of accuracy and realism used in defining the present system. Production and price values must be consistent with the pertinent technical and economic conditions. The values must conform to the performance expected of the business and management that will implement decisions based on the budgets.

The total farm budget, which is based on the individual activity budgets, is provided by the linear programming model. Determining the profitability of different farm plans is the goal of both budgeting and linear programming, but they are complementary rather than competitive. Linear programming is a more exact and inclusive technique than budgeting. Linear programming provides an efficient way to determine the total farm plan from a complex set of alternatives. The total farm plan is determined by the linear programming model which uses as inputs the values arrived at in the activity budgets.

The procedure to determine the total farm plan is relatively simple:

(1) The relevant activity budgets for the farm are filled out in Chapters 3, 4, and 5.

(2) The necessary values are transferred to the "Profit and Price Input Sheets" in Chapter 6.

(3) Present supplies of available resources are listed in the "Supplies Available Sheet" (also in Chapter 6).

(4) The values enumerated in Chapter 6 are then transferred by the computer programmer to the computer.

(5) The computer outputs a total farm budget for the farm such as the example in Chapter 7.

Characteristics and Definitions of Linear Programming

"Linear programming has been used as a research tool by agricultural economists to specify the optimum organization of resources and enterprises on farms, to suggest desirable farm adjustments, to specify profit maximizing mixes of commodities, . . . , and to solve related types of problems." (Heady and Candler, page 1.) The theoretical concepts on which the method depends have been known for many years, but it was only during, and immediately following World War II, that its application to farm planning problems was first stressed.

Components of a Linear Programming Model

A linear programming problem has three quantitative components: an objective, alternative methods or processes for attaining the objective, and resource or other restrictions. (Heady and Candler, page 2.) Any problem which has these three components can be expressed as a linear programming problem.

The Objective. For the typical farm management problem, the objective will be to maximize income or minimize cost.

Alternative Methods or Processes. Given the objective, unless it can be attained in more than one way, there is no problem to be analyzed. "Given several methods or processes (different enterprises and different methods or techniques of producing the enterprises by which the objective can be attained) we choose from among them the methods or processes which are most efficient in converting resources into the objective." (Heady and Candler, page 3.)

Resource Restrictions. A linear programming problem does not exist unless resources are restricted or limited and defined by fixed quantities of certain resources.

Definition of Terms

The terms process or activity are synonymous and used frequently in linear programming. They may be thought of in the same context as an enterprise, but the concept of an enterprise has a broader connotation than either process or activity. Hog production may be thought of as an enterprise. But spring farrowing is a different activity from that of fall farrowing. (Heady and Candler, page 11.)

The term process is defined even more narrowly. Corn with fertilizer is a different process than corn without fertilizer, but both are still one activity.

Assumptions

For a linear programming model to apply and to get a sufficiently precise solution, some basic assumptions must be fulfilled. (Heady and Candler, page 12.)

Additivity and Linearity. The total amount of resources used by several activities must be equal to the sum of the resources used by each individual activity.

Divisibility. It is assumed that factors can be used and commodities can be produced in quantities which are fractional units. That is, resources and products are considered to be continuous--to be infinitely divisible.

Finiteness. It is assumed that there is a limit to the number of alternative activities and to the resource restrictions which need to be considered.

Single-value Expectations. The linear programming methods used widely to date assume that resource supplies, input-output coefficients, and prices are known with certainty.

Explanation of Objective--Profit

A farm family has a set of somewhat specific goals when they enter farming and as time proceeds some goals may be achieved, some altered, some may be forgotten, and new ones will become prevalent. A farm family may have some of the following objectives: accumulation of extra assets (such as a home, land, and/or modern conveniences), soil conservation, home employment for the children, educational costs, investment in family health, security, and a wide variety of other considerations. There are probably as many objectives as there are individual farmers, as each will have personal goals.

This study assumes that the overriding objective is to maximize profit. Profit is probably not the sole objective of most farmers, but indirectly, it can lead to the attainment of other goals. Profit may not be an end in itself, but a means of reaching an end or goal. Therefore, the model is designed to maximize profit given the farm's resources and/or restrictions.

The profit figure employed in this study is total revenue less cash expenses. It represents the money available for "extra" family expenditures, new investments, savings, and debt retirement. The final

value is a combination of all family activities (farm and non-farm employment) less family living expenses and farm operation expenses.

Summary

The activity budgets provide an orderly method of defining the specific components of the farm organization. Linear programming is an efficient means of analyzing and combining the individual activities into a total farm plan. The total farm plan can then be interpreted to find the optimum acres of specific crops and numbers of specific types of livestock, and net-farm income.

CHAPTER 3

THE CROP ACTIVITIES

Crop enterprises are subdivided into two separate groups of crop activities. The first group, cash-crops, includes crops grown primarily for sale. The cash-crop group in the model is comprised of the following activities: barley, spring wheat, flax, soybeans, and grain sorghum. The above crops have a positive value in the objective function and are calculated as total revenue per acre, less per acre variable costs of production. Total revenue is figured as bushels per acre times the expected price per bushel. Variable production costs include all cash costs incurred in the process of planting and harvesting the crop. The variable production expenses do not include any expenses that would be encountered if no crop were planted. Fixed costs include taxes, depreciation, insurance, and interest.

The second group, within the crop enterprise, includes the feed-crop activities. Feed-crops can be produced for sale or as an input into the livestock enterprise. These activities have a negative value in the objective function as they are produced at a cost and the receipts are recovered from the value added to the livestock enterprise. The feed-crop activities in the model include dryland and irrigated corn, dryland and irrigated alfalfa, corn silage, oats, and grass hay. The profit value is simply the sum of the variable costs of production and, therefore, is negative. Units of the crop produced are then transferred via transfer rows, to any livestock activity which requires that crop in the production process. Any portion of a feed-crop not consumed by the

various livestock activities is automatically sold. The model assumes there is no crop carry-over.

For convenience, both cash and feed crop activities will be discussed in this chapter. In order to develop the required budgets, a good understanding of the method used to arrive at the various figures is required. The profit figure in the LP model for the various crops is based on figures in Tables 3-3 through 3-6. The figures in these tables are transferred to the appropriate budgets, the budgets are then computed, and the model profit figure is determined. Therefore, the values used in the budgets must be realistic because the solution given by the model is directly determined by the values in the independent budgets.

Following are the assumptions and methods used to arrive at the various figures in Tables 3-3 through 3-6 which are required for completion of the budgets. These figures are guidelines and will serve if personal figures are not available. People are allowed to use personal figures, figures from the tables, or a combination of the two. The objective is to arrive at the best possible budgets to reflect the actual farm situation.

Land Rental

The model provides the opportunity to rent both crop and pasture land. Land will automatically be rented for any activity which is more profitable than the rental charge. The actual rental charge for cropland is to be placed in row 111 of Table 6-7. The actual rental charge for pasture land is placed in row 112 in the same table. The

number of acres which are rented continuously each year, for each type of land, are placed in Section 1 of the "Available Resources Supply Sheet," Table 6-8. The values placed here should only include acres which are expected to be part of the land supply in the future.

Explanation of Assumed Crop Budget Values

Yield

The projected yields for all crops except irrigated corn, irrigated alfalfa, corn silage, and grass hay are from EMC 780 (Derscheid, Aanderud, and Allen) for Southeastern South Dakota. The yields for irrigated corn and irrigated alfalfa, for the same region, are taken from C226 (Allen, Derscheid, Aanderud, and Zeman.) Corn silage and grass hay yields are assumed approximations.

Seed

The planting rate for dryland corn is assumed to be 18,800 kernels per acre and 27,000 kernels per acre for irrigated corn. Both planting rates assume a 15 percent mortality rate, so a final plant population of 16,000 and 23,000 plants, respectively, is expected. A price of 57 cents per 1,000 kernels is used.

Both dryland and irrigated alfalfa are assumed to be planted once every three years. Therefore, seed and fertilizer are prorated over a three-year period. Dryland alfalfa is planted at six pounds per acre and irrigated alfalfa at nine pounds per acre. Alfalfa seed is purchased for $2.20 per pound.

Soybeans are seeded at a rate of one bushel per acre, and soybean seed is $11.75 per bushel.

Grain sorghum seed is valued at 44 cents per pound, and four pounds are required per acre.

Seed costs for small grains (oats, barley, and spring wheat) and flax are based on recommendations that certified seed be planted on one-half the acreage every third year to provide good quality seed for all the acreage for two years and half the acreage the third year. The calculation is 84 percent or .84 times the price of uncertified seed plus 16 percent or .16 times the price of certified seed. The seed cost for these crops is the above values times the recommended seeding rate. This is summarized in Table 3-1.

Table 3-1. Assumed Seeding Rate and Costs Per Acre for Small Grains

	Seed Price per Bushel		Seeding Rate	Seed Costs
	Uncertified	Certified	Bu./Acre	per Acre
Oats	$2.75	$4.50	3.0	$9.09
Barley	4.00	5.50	1.26	5.35
Spring Wheat	4.50	7.75	1.5	7.53
Flax	7.50	9.90	1.5	11.83

It is assumed that some seed needs to be applied to a stand of grass hay each year, and $1 has been set as the cost per acre for this operation.

Corn for silage is planted at the same rate as dryland corn or 18,800 kernels per acre. The price of seed for corn silage is $.47 per 1,000 kernels.

Fertilizer

The assumed rates of application for both nitrogen and phosphate for each crop is given in Table 3-2. Nitrogen is priced at $.25 per pound and phosphate at $.27 per pound.

Table 3-2. Assumed Fertilizer Pounds and Costs Per Acre

	Pounds/Acre		Total
	Nitrogen	Phosphate	Cost/Acre
Dryland Corn & Grain Sorghum	70	30	$25.60
Irrigated Corn	150	60	53.70
Oats, Barley, Spring Wheat	40	30	18.10
Flax	45	15	15.30
Soybeans	6	18	6.36
Dryland Alfalfa*	0	60	5.40
Irrigated Alfalfa*	8	140	13.27
Grass Hay	0	20	5.40
Corn Silage	60	20	20.40

*Dryland and irrigated alfalfa are planted and fertilized once every three years, and the total cost per acre is one-third of the actual total.

Herbicides and Insecticides

Type and time of control will cause this figure to vary widely, therefore, the values in Tables 3-3 through 3-6 are approximations from the Plant Science Department at South Dakota State University. They are a reliable estimate for average practices in the region.

Crop Insurance

The price of crop insurance varies with location, and the amount of coverage carried depends on the individual farmer. The values in Tables 3-3 through 3-6 are estimates for the region assuming an average price for the combined counties in the region.

Storage and Drying

It costs approximately $.03 per bushel to store the crop and about $.12 per bushel to dry it. The values for soybeans, grain sorghum, and both dryland and irrigated corn include the drying charge. Corn silage is assumed to be stored at $.60 per ton.

Fuel and Lubricants

The average complement of implements required by the various crops are taken from C226 (Allen, Derscheid, Aanderud, and Zeman.) The complement of implements used for each crop, along with total machine hours per acre, are given in Appendix A. Two formulas are necessary to compute the value for the "Fuel and Lubricants" row in each budget.

First, gallons of fuel per hour used by the tractor is required. Table A-11 includes some common values for this item, but it is easy to figure. Gallons of fuel per hour is equal to the tractor's horsepower rating times the fuel conversion factor for the proper fuel type. The fuel conversion factors are:

Gasoline Engines	.069
LP Gas Units	.0819
Diesel Engines	.0484

(Source: Allen, Costs Per Hour and Per Acre . . .)

Fuel and lubricants per acre equals total machine hours per acre (from proper table in Appendix A) times gallons of fuel per hour (from Table A-11 or figured above) times 1.15 times the price of the proper fuel. The 1.15 is included because lubricants (oil and grease) are assumed to be 15 percent of fuel used.

The fuel and lubricants value used in figuring the budgets is based on a diesel rated at 135 horsepower and a fuel price of $1 per gallon. All crops except dryland and irrigated alfalfa, grass hay, corn silage, and irrigated corn have a $.50 charge for trucking included in the fuel and lubricants figure. Irrigated corn has a trucking charge of $1 per acre.

Overhead

Overhead expenses include general operating costs to the farm that cannot be attributed to any one specific crop or livestock activity. The value used for the budgets, $3.50, is an estimate of the per acre charge needed to cover the farm share of electricity, telephone, utilities, and farm magazines.

Machinery Repairs

The value for machinery repairs is based on an updated EMC 780 publication by Aanderud and Allen. The values from this publication, after being inflated by 12 percent, are used in the budgets.

Interest on Capital and Investment and Depreciation and Insurance

Both of these values are again based on the Aanderud and Allen publication. Interest on capital and investment is based on annual

operating capital and machinery investment capital, and it is estimated that the value has increased by $.50 per acre since Aanderud and Allen's publication. Depreciation and insurance are estimated to have increased by $.25 per acre.

Labor

Labor charges are assessed at $3.50 per hour times the hours of labor required by each crop plus 10 percent to cover overhead labor.

Real Estate Tax

Real estate taxes are computed at 1 percent of land valued at $950 per acre.

Land Charges

Land charges are an estimated return on investment of 4 percent for grass hay, 6 percent for irrigated corn and alfalfa, and 5 percent for all other crops, based on land valued at $950 per acre.

Irrigation Costs

In the budgets for the two irrigated crops (corn and alfalfa), there are additional costs to consider. Irrigation fuel cost, irrigation lubrication expenses, and irrigation repair costs must be included in the variable cost section of the irrigated crop budgets. Interest on the irrigation equipment must also be considered in the fixed cost section. The values for the above expenses were obtained from C226 and were inflated by 15 percent.

Explanation of Crop Budgeting Procedures

The crop activities for the farm will be broken into four sections. The two major divisions, cash and feed crops will be maintained. The cash crops will be discussed in a normal cash crop section and a specialty cash crop section. The feed-crop budgets will be discussed in two sections; dryland and irrigated. Thus, the four sections are: normal cash crops, cash specialty crops, dryland feed-crops, and irrigated feed-crop budgets.

Normal Cash Crops

The values needed to fill out the cash-crop work forms are obtained from Table 3-3. The values in Table 3-3 were used to obtain the standard model profit value. These are guideline figures and may be used if the actual values are not known. When the budget is complete, the value in the box labeled (3) is transferred to the proper position in Table 6-1, the "Profit and Price Input Sheet" for crops. The appropriate "crop number" is checked. A checkmark is placed by the crop number even if the "model profit" value is used. This method is used to show the computer programmer that this activity is to be included for consideration. The transferred profit figure will be positive because total revenue per acre should be greater than total variable costs per acre. If this condition is not satisfied, then the cash cost of production is greater than total revenue.

Specialty Cash Crops

The specialty crops include sweet corn and popcorn. Guideline values for the specialty crops are available in Table 3-4. The work

form to be used for both specialty crops is given in Table 3-8. The same work form is used for both specialty crops, but total revenue for sweet corn is figured as price per dozen ears times the number of dozen produced per acre. Total revenue for popcorn is total pounds of popcorn produced per acre times the value of each pound. The model profit figure, given in the box labeled (3) is transferred to Table 6-1, the "Profit and Price Input Sheet" for crops.

Dryland Feed-Crops

The budgeting process for dryland feed-crops is very similar to the one followed for cash-crops. The standard values are found in Table 3-5, and once again, these are close estimates to serve as guidelines. The budget to use is given in Table 3-9, the dryland feed-crop budget. The model profit figure is once again in the box (labeled 2) and is to be transferred to Table 6-1. The profit value to be transferred for all feed-crop budgets, both dryland and irrigated, is negative. The profit figure is simply the sum of the variable costs per acre.

Irrigated Feed-Crops

The method for filling out the work form for irrigated feed-crops is identical to that followed for dryland feed-crops. Table 3-10 for irrigated feed-crops differs from dryland crops only by the addition of the variable and fixed costs encountered with an irrigation system. The guideline values are presented in Table 3-6. Once again, the negative profit figure arrived at is to be transferred to the "Profit and Price Input Sheet," Table 6-1.

Table 3-3. Assumed Values for Normal Cash-Crop Budgets

Crop Yield & Production Costs	Barley	Spring Wheat	Flax	Soybeans	Grain Sorghum
Projected Yield	43.0	27.0	17.0	25.0	52.0
Variable Costs:					
Seed	$ 5.35	$ 7.53	$ 11.83	$ 11.75	$ 1.75
Fertilizer	18.10	18.10	15.30	6.36	25.60
Herbicides	.83	1.10	.83	11.20	2.42
Insecticides	1.15	1.15	.11	.33	5.66
Crop Insurance	2.75	2.50	2.75	2.75	2.75
Storage & Drying	1.29	.81	.51	3.75	7.80
Overhead	3.50	3.50	3.50	3.50	3.50
Fuel & Lubricants	9.16	9.16	8.88	9.94	11.05
Machinery Repairs	4.54	4.54	4.42	4.48	4.82
TOTAL	46.57	48.39	48.13	54.06	65.35
Fixed Costs:					
Interest on Cap. & Invest.	10.80	10.85	10.65	10.60	11.45
Depreciation & Insurance	13.25	13.25	13.10	12.15	12.80
Labor	7.47	7.52	7.25	7.70	8.40
Real Estate Tax	9.50	9.50	9.50	9.50	9.50
TOTAL	41.02	41.12	40.50	39.95	42.15
Prod. Cost/Acre	87.59	89.51	88.63	94.01	107.50
Prod. Cost/Unit	2.04	3.31	5.21	3.76	2.07
Land Charge	47.50	47.50	47.50	47.50	47.50
TOTAL (Cost/Acre)	135.09	137.01	136.13	141.51	155.00
TOTAL (Cost/Unit)	3.14	5.07	8.01	5.66	2.98

Table 3-4. Assumed Values for Specialty Cash-Crop Budgets

Crop Yield & Production Costs	Sweet Corn	Popcorn
Projected Yield	1200.0 doz.	3500.0 lbs.
Variable Costs:		
Seed	45.00	26.25
Fertilizer	49.30	46.20
Herbicides	10.00	8.25
Insecticides	7.50	6.00
Crop Insurance	4.00	3.50
Storage & Marketing	15.00	20.00
Overhead	3.50	3.50
Fuel & Lubricants	9.00	11.20
Machinery Repairs	4.25	5.15
TOTAL	147.55	130.05
Fixed Costs:		
Interest on Capital & Investments	15.75	12.75
Depreciation & Insurance	16.25	14.25
Labor	140.35	17.85
Real Estate Tax	9.50	9.50
TOTAL	181.85	54.35
Prod. Cost/Acre	329.40	184.40
Prod. Cost/Unit	.27	.05
Land Charge	47.50	47.50
TOTAL (Cost/Acre)	376.90	231.90
TOTAL (Cost/Unit)	.31	.07

Table 3-5. Assumed Values for Feed-Crop Budgets

Crop Yield & Production Costs	Corn	Oats	Alfalfa	Corn Silage	Grass Hay
Projected Yield	75.0	70.0	3.5	9.0	2.8
Variable Costs:					
Seed	10.70	9.09	4.40	8.84	1.00
Fertilizer	25.60	18.10	5.40	20.40	5.40
Herbicides	8.58	1.10	----	6.00	----
Insecticides	6.60	1.15	.57	5.00	----
Crop Insurance	3.75	2.50	----	2.00	----
Storage & Drying	11.25	2.10	----	2.85	----
Overhead	3.50	3.50	3.50	3.50	3.50
Fuel & Lubricants	11.00	9.16	10.86	11.77	6.45
Machinery Repairs	5.15	4.54	13.73	5.45	10.48
TOTAL	86.13	51.24	38.46	65.81	26.83
Fixed Costs:					
Interest on Capital & Investments	13.00	10.80	9.10	12.75	8.25
Depreciation & Insurance	15.25	13.25	11.35	14.40	10.35
Labor	8.75	7.41	18.20	10.50	15.45
Real Estate Tax	9.50	9.50	9.50	9.50	9.50
TOTAL	46.50	40.96	48.15	47.15	43.55
Prod. Cost/Acre	132.63	92.20	86.61	112.96	70.38
Prod. Cost/Unit	1.77	1.32	24.75	12.55	25.13
Land Charge	47.50	47.50	47.50	47.50	38.00
TOTAL (Cost/Acre)	180.13	139.70	134.11	160.46	108.38
TOTAL (Cost/Unit)	2.40	2.00	38.32	17.83	38.71

Table 3-6. Assumed Values for Irrigated Feed-Crop Budgets

Crop Yield & Production Costs	Irrigated Corn	Irrigated Alfalfa
Projected Yield	130.0	6.0
Variable Costs:		
Seed	15.39	6.60
Fertilizer	53.70	13.27
Herbicides	16.00	---
Insecticides	11.00	1.00
Crop Insurance	5.00	---
Storage & Drying	19.50	---
Overhead	3.50	3.50
Fuel & Lubricants	13.09	13.33
Machinery Repairs	6.84	15.21
Irrig. Fuel Cost	21.48	26.08
Irrig. Lube Cost	3.22	3.91
Irrig. Repair Cost	3.47	4.22
TOTAL	172.19	87.12
Fixed Costs:		
Interest on Capital & Investments	14.30	10.40
Depreciation & Insurance	16.75	12.85
Labor	13.65	21.70
Real Estate Tax	9.50	9.50
Interest on Irrig. Equipment	15.46	15.54
TOTAL	69.66	69.99
Prod. Cost/Acre	241.85	157.11
Prod. Cost/Unit	1.86	26.18
Land Charge	57.00	57.00
TOTAL (Cost/Acre)	298.85	214.11
TOTAL (Cost/Unit)	2.30	35.68

Table 3-7. Work Form for Normal Cash Crop Budgets _____(Crop Name)

RECEIPTS:

TOTAL REVENUE/ACRE	_____Yield x _____Price/Unit		_____(1)

VARIABLE COSTS:

SEED	_____	
FERTILIZER	_____	
HERBICIDES	_____	
INSECTICIDES	_____	
CROP INSURANCE	_____	
STORAGE & DRYING	_____	
OVERHEAD	_____	
FUEL & LUBRICANTS	_____	
MACHINERY REPAIRS	_____	
TOTAL VARIABLE COSTS		_____(2)
PROFIT VALUE FOR THE MODEL (1 - 2)		_____(3)

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	_____	
DEPRECIATION & INSURANCE	_____	
LABOR	_____	
REAL ESTATE TAX	_____	
TOTAL FIXED COSTS		_____(4)
PRODUCTION COSTS/ACRE (2 + 4)		_____(5)
PRODUCTION COSTS/UNIT (5 ÷ YIELD)		_____
LAND CHARGES	_____	(6)
TOTAL COSTS/ACRE (5 + 6)		_____(7)
TOTAL COSTS/UNIT (7 ÷ YIELD)		_____

Table 3-8. Work Form for Specialty Cash-Crop Budget _____(Crop Name)

RECEIPTS:

TOTAL REVENUE	_____lbs or doz x _____Price	_____(1)

SECTION A COSTS:

SEED	_____	
FERTILIZER	_____	
HERBICIDES	_____	
INSECTICIDES	_____	
CROP INSURANCE	_____	
OVERHEAD	_____	
STORAGE & MARKETING COSTS	_____	
FUEL & LUBRICANTS	_____	
MACHINERY REPAIRS	_____	
TOTAL VARIABLE COSTS		_____(2)
MODEL PROFIT FIGURE		_____(3)

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	_____	
DEPRECIATION & INSURANCE	_____	
LABOR	_____	
REAL ESTATE TAX	_____	
TOTAL FIXED COSTS		_____(4)
PRODUCTION COSTS/ACRE (2 + 4)		_____(5)
PRODUCTION COSTS/UNIT (5 ÷ YIELD)		_____
LAND CHARGES	_____(6)	
TOTAL COSTS/ACRE (5 + 6)		_____(7)
TOTAL COSTS/UNIT (7 ÷ YIELD)		_____

Table 3-9. Work Form for Dryland Feed-Crop Budget _____(Crop Name)

RECEIPTS:

TOTAL REVENUE/ACRE	_____Yield x _____Price/Unit		_____(1)

VARIABLE COSTS:

SEED		
FERTILIZER		
HERBICIDES		
INSECTICIDES		
CROP INSURANCE		
STORAGE & DRYING		
OVERHEAD		
FUEL & LUBRICANTS		
MACHINERY REPAIRS		
TOTAL VARIABLE COSTS		_____(2)

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT		
DEPRECIATION & INSURANCE		
LABOR		
REAL ESTATE TAX		
TOTAL FIXED COSTS		_____(3)
PRODUCTION COSTS/ACRE (2 + 3)		_____(4)
PRODUCTION COSTS/UNIT (4 ÷ YIELD)		_____
LAND CHARGES	_____(5)	
TOTAL COSTS/ACRE (4 + 5)		_____(6)
TOTAL COSTS/UNIT (6 ÷ YIELD)		_____

Table 3-10. Work Form for Irrigated Feed-Crop Budget _____(Crop Name)

RECEIPTS:

TOTAL REVENUE/ACRE	_____Yield x _____Price/Unit		_____(1)

VARIABLE COSTS:

SEED	_____	
FERTILIZER	_____	
HERBICIDES	_____	
INSECTICIDES	_____	
CROP INSURANCE	_____	
STORAGE & DRYING	_____	
OVERHEAD	_____	
FUEL & LUBRICANTS	_____	
MACHINERY REPAIRS	_____	
IRRIGATION FUEL COSTS	_____	
IRRIGATION LUBRICANTS COSTS	_____	
IRRIGATION REPAIR COSTS	_____	
TOTAL VARIABLE COSTS		_____(2)

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	_____	
DEPRECIATION & INSURANCE	_____	
LABOR	_____	
REAL ESTATE TAX	_____	
TOTAL FIXED COSTS		_____(3)
PRODUCTION COSTS/ACRE (2 + 3)		_____(4)
PRODUCTION COSTS/UNIT (4 ÷ YIELD)		_____
LAND CHARGES	_____(5)	
TOTAL COSTS/ACRE (4 + 5)		_____(6)
TOTAL COSTS/UNIT (6 ÷ YIELD)		_____

CHAPTER 4

THE LIVESTOCK ACTIVITIES

Chapter 3 explained the budgets for the various crop activities used in the model. Chapter 4 provides the same information for the various livestock activities. The following discussion will be broken into five sections: four dealing with a specific type of livestock, and the last section contains specialty livestock activities. The sections include beef, swine, dairy, sheep, and specialty livestock.

The individual work forms in all five sections follow the same format. Total receipts are first determined, followed by Section A costs and Section B costs. The final item in the work forms is the average operating capital requirements. The total average capital requirements figure attempts to typify the amount needed to produce one unit of the activity. (Various examples of completed budgets are available in Chapter 7.)

The activities are listed below by section with a brief explanation accompanying each. Preceding each group of work forms is a table enumerating the assumed values used in completing the work forms for the model.

The assumed feed values used in constructing the work forms for the given model are given in Tables 4-1 and 4-2. Table 4-1 is composed of the general feed inputs used by the various livestock activities. For example, corn is valued at $2.20 a bushel for all livestock activities requiring corn.

Table 4-1. Feed Values Used for All Livestock Activities

FEED INPUT	PRICE
Corn	$ 2.20/bu.
Corn Silage	16.00/ton
Oats	1.35/bu.
Alfalfa Hay	37.00/ton
Prairie Hay	30.00/ton
Pasture	10.00/AUM
Salt & Mineral	7.00/cwt.

Table 4-2 lists specialty feed requirements used in the various work forms. These requirements are subdivided by livestock type.

Table 4-2. Prices Used for Other Feed Requirements

BEEF	PRICE
Beef Supplement	$10.00/cwt
SWINE	
Pork Supplement	16.00/cwt
Creep Ration	17.70/cwt
SHEEP	
Sheep Supplement	10.00/cwt
DAIRY	
Dairy Supplement	10.00/cwt
Calf Starter	11.90/cwt
Calf Grower	14.25/cwt
Milk Starter	48.20/cwt
TURKEYS & CHICKENS	
Chick Mash	11.00/cwt
Layer Mash	9.00/cwt
Oyster Shells	2.50/cwt
Turkey Supplement	12.00/cwt

Beef

There are 11 activities included in this section. They are as follows:

(1) Beef cows with feeder calves sold in October

(2) Beef cows with creep fed calves sold in October

(3) Raising replacement heifers

(4) Wintering steer calves, October to March

(5) Summer grazing steers, April to September

(6) Wintering and summer grazing steers, October to August

(7) Wintering heifer calves, October to March

(8) Full fed steer calf

(9) Full fed heifer calf

(10) Finish yearling steer

(11) Feed out yearling heifers

The proper work form is found which closely approximates the actual farm situation. The work form is then filled out to determine the profit figure which is transferred to Table 6-2, the "Profit and Price Input Sheet" for beef. The opportunity is provided on this sheet to change animal and feed purchase values. The assumed values which are listed in Table 4-3 can be used if personal values are not known.

Table 4-3. Assumed Values for the Beef Work Forms

MODEL NAME WORK FORM NUMBER	BEEF COWF 4-4	BEEF COWC 4-5	PREP HEIF 4-6	WINT STER 4-7	SUMM STER 4-8	W&S STEER 4-9
RECEIPTS						
Raised Livestock less death loss	275.00	302.97	651.20	557.00	612.00	608.80
Sale of Culls	92.10	92.74	24.00	---	---	---
TOTAL RECEIPTS	367.10	395.71	675.20	557.00	612.00	608.80
SECTION A COSTS						
Breeding Charge	11.00	11.00	11.00	---	---	---
Veterinary & Drugs	6.00	6.00	4.50	2.10	2.10	3.60
Equipment Repairs	.50	.55	.45	.35	.25	.35
Building Repairs	.75	.75	.65	.50	---	.45
Transportation & Marketing Costs	---	---	---	---	10.00	---
SECTION A TOTAL	18.25	18.30	16.60	2.95	12.35	4.40
PROFIT FIGURE	-18.25	-18.30	-16.60	-2.95	599.65	-4.40
SECTION B COSTS						
Corn	4.40	19.80	---	17.60	---	---
Oats	5.40	5.40	32.40	18.90	---	---
Corn Silage	---	---	---	10.40	---	---
Alfalfa Hay	14.80	14.80	11.10	12.95	---	---
Prairie Hay	39.00	39.00	27.00	---	---	22.50
Pasture	80.00	80.00	50.00	---	34.00	32.00
Beef Supplement	15.00	15.00	20.00	---	---	20.00
Salt & Mineral	4.20	4.20	2.10	.70	.70	1.40
Transportation & Marketing Costs	5.00	5.00	6.40	8.75	---	6.60
Animal Purchase Charge	---	---	318.75	403.75	500.00	403.75
SECTION B TOTAL	167.80	183.20	467.75	473.05	534.70	486.25
TOTAL PRODUCTION COSTS	187.05	201.50	484.35	476.00	547.05	490.65

Table 4-3 Continued

MODEL NAME WORK FORM NUMBER	WINT HEIF 4-10	FINF STER 4-11	FULF HEIF 4-12	FINY STER 4-13	FINY HEIF 4-14
RECEIPTS					
Raised Livestock less death loss	455.00	790.00	652.65	853.85	748.40
Sale of Culls	---	---	---	---	---
TOTAL RECEIPTS	455.00	790.00	652.65	853.85	748.40
SECTION A COSTS					
Breeding Charge	---	---	---	---	---
Veterinary & Drugs	2.50	4.00	4.00	1.60	1.60
Equipment Repairs	.35	2.00	2.00	2.00	2.00
Building Repairs	.45	2.50	2.25	2.25	2.25
Transportation & Marketing Costs	---	11.25	10.00	12.50	11.25
SECTION A TOTAL	3.30	19.75	18.25	18.35	17.10
PROFIT FIGURE	-3.30	770.35	634.40	835.50	731.30
SECTION B COSTS					
Corn	17.60	105.60	88.00	96.80	70.40
Oats	17.55	13.50	10.80	---	---
Corn Silage	9.60	---	---	---	40.00
Alfalfa Hay	11.10	33.30	29.60	14.80	11.10
Prairie Hay	---	12.00	6.00	28.80	---
Pasture	---	---	---	---	---
Beef Supplement	---	22.50	20.00	11.00	20.00
Salt & Mineral	.70	2.10	1.75	1.05	1.05
Transportation & Marketing Costs	8.75	---	---	---	---
Animal Purchase Charge	318.75	403.75	318.75	565.50	462.00
SECTION B TOTAL	384.05	592.75	474.90	717.95	604.55
TOTAL PRODUCTION COSTS	387.35	612.50	493.15	736.30	621.65

Table 4-4. Beef Cow Unit, Feeder Calf Sold, October Replacements First Calf as 2 Year Olds, 92% Calf Crop, 16% Replacements Raised, One Bull Per 25 Cows

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RECEIPTS:

STEER CALF	_____	cwt x	_____	Price x .46 =			
HEIFER CALF	_____	cwt x	_____	Price x .28 =			
CULL HEIFER	_____	cwt x	_____	Price x .02 =			
CULL COW	_____	cwt x	_____	Price x .15 =			
TOTAL RECEIPTS						_____	(1)

SECTION A COSTS:

BREEDING CHARGE						_____	
VETERINARY & DRUGS						_____	
EQUIPMENT REPAIRS						_____	
BUILDING REPAIRS						_____	
SECTION A TOTAL (PROFIT FIGURE)							(2)

SECTION B COSTS:

CORN	2.0	bu	@	_____		_____	
OATS	4.0	bu	@	_____		_____	
ALFALFA HAY	.4	ton	@	_____		_____	
PRAIRIE HAY	1.3	ton	@	_____		_____	
PASTURE	8.0	AUM	@	_____		_____	
BEEF SUPPLEMENT	1.5	cwt	@	_____		_____	
SALT & MINERAL	.6	cwt	@	_____		_____	
TRANSPORTATION AND MARKETING COSTS						_____	
SECTION B TOTAL							(3)
TOTAL PRODUCTION COSTS (2 + 3)							(4)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE COW VALUE	600.00		
1/25 OF A BULL	80.00		
REPLACEMENT CHARGE PER COW	115.00		
GRAIN & FORAGE	30.00		
OTHER COSTS	25.00		
TOTAL AVERAGE CAPITAL REQUIREMENTS		850.00	(5)

Table 4-5. Beef Cow Unit, Creep Fed Calves Sold, October Replacements First Calf as 2 Year Olds, 92% Calf Crop, 16% Replacements Raised, One Bull Per 25 Cows

RECEIPTS:			
STEER CALF	_____cwt x _____Price x .46 =	_____	
HEIFER CALF	_____cwt x _____Price x .28 =	_____	
CULL HEIFER	_____cwt x _____Price x .02 =	_____	
CULL COW	_____cwt x _____Price x .15 =	_____	
TOTAL RECEIPTS			_____(1)
SECTION A COSTS:			
BREEDING CHARGE		_____	
VETERINARY & DRUGS		_____	
EQUIPMENT REPAIRS		_____	
BUILDING REPAIRS		_____	
SECTION A TOTAL (PROFIT FIGURE)			_____(2)
SECTION B COSTS:			
CORN	9.0 bu @_____	_____	
OATS	4.0 bu @_____	_____	
ALFALFA HAY	.4 ton @_____	_____	
PRAIRIE HAY	1.3 ton @_____	_____	
PASTURE	8.0 AUM @_____	_____	
BEEF SUPPLEMENT	1.5 cwt @_____	_____	
SALT & MINERAL	.6 cwt @_____	_____	
TRANSPORTATION & MARKETING COSTS		_____	
SECTION B TOTAL			_____(3)
TOTAL PRODUCTION COSTS (2 + 3)			_____(4)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
AVERAGE COW VALUE		600.00	
1/25 OF A BULL		80.00	
REPLACEMENT CHARGE PER COW		115.00	
GRAIN & FORAGE		35.00	
OTHER COSTS		25.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			855.00(5)

Table 4-6. Raising Replacement Heifers, Bred to Calve as 2 Year Olds, Enter as 375 Pound Calves, October, Sell 900 Pound Bred Heifers, 2% Death Loss

RECEIPTS:

BRED HEIFER	____Head x ____Price	= ____	(1)
NON-BREEDER OR CULL	____cwt x ____Price x .05	= ____	(2)
MINUS DEATH LOSS	[2% of ____ (1 + 2)]	= ____	
	TOTAL RECEIPTS		____(3)

SECTION A COSTS:

BREEDING CHARGE	____	
VETERINARY & DRUGS	____	
EQUIPMENT REPAIRS	____	
BUILDING REPAIRS	____	
SECTION A TOTAL (PROFIT FIGURE)		____(4)

SECTION B COSTS:

CHARGE FOR HEIFER CALF	3.75 bu @____	____	
OATS	24.0 bu @____	____	
ALFALFA HAY	.3 ton @____	____	
PRAIRIE HAY	.9 ton @____	____	
PASTURE	5.0 AUM @____	____	
BEEF SUPPLEMENT	2.0 cwt @____	____	
SALT & MINERAL	.3 cwt @____	____	
TRANSPORTATION & MARKETING COSTS		____	
SECTION B TOTAL			____(5)
TOTAL PRODUCTION COSTS (4 + 5)			____(6)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

HEIFER CALF INVESTMENT	420.00	
GRAIN & FORAGE	90.00	
OTHER COSTS	40.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		550.00(7)

Table 4-7. Wintering Steer Calves, 5 Months, October to March, Average Daily Gain 1.5 Pounds

RECEIPTS:			
FEEDER STEER	_____cwt x _____Price =	_____(1)	
MINUS DEATH LOSS	[1.5% of _____ (1)] =	_____(2)	
TOTAL RECEIPTS (1 - 2)			_____(3)
SECTION A COSTS:			
VETERINARY & DRUGS		_____	
EQUIPMENT REPAIRS		_____	
BUILDING REPAIRS		_____	
SECTION A TOTAL (PROFIT FIGURE)			_____(4)
SECTION B COSTS:			
STEER CALF	4.25 cwt @_____	_____	
CORN	8.0 bu @_____	_____	
OATS	14.0 bu @_____	_____	
ALFALFA HAY	.35 ton @_____	_____	
CORN SILAGE	.65 ton @_____	_____	
SALT & MINERAL	.1 cwt @_____	_____	
TRANSPORTATION & MARKETING COSTS		_____	
SECTION B TOTAL			_____(5)
TOTAL COSTS (4 + 5)			_____(6)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
STEER CALF INVESTMENT		175.00	
GRAIN & FORAGE		35.00	
OTHER COSTS		5.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			215.00(7)

Table 4-8. Summer Grazing Steers, 500 Pounds, 5.5 Months, April to September Gain 225 Pounds

RECEIPTS:

STOCKER OR FEEDER STEER	____cwt x ____Price =	____(1)	
MINUS DEATH LOSS	[.5% of ____ (1)] =	____(2)	
TOTAL RECEIPTS (1 - 2)			____(3)

SECTION A COSTS:

VETERINARY & DRUGS	____	
EQUIPMENT REPAIRS	____	
TRANSPORTATION & MARKETING COSTS	____	
SECTION A TOTAL		____(4)
PROFIT FIGURE (3 - 4)		____(5)

SECTION B COSTS:

STEER CALF	5.0 cwt @____	____	
PASTURE	3.4 AUM @____	____	
SALT & MINERAL	.1 cwt @____	____	
SECTION B COSTS			____(6)
TOTAL COSTS (4 + 6)			____(7)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

STEER INVESTMENT	250.00	
FORAGE	10.00	
OTHER COSTS	5.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		265.00(8)

Table 4-9. Wintering and Summer Grazing Steer Calves, 10 Months, October 15 to August 15, Average Daily Gain .8 Pounds for 6 Months 1.6 Pounds for 4 Months

RECEIPTS:			
FEEDER STEER	____cwt x ____Price =	____(1)	
MINUS DEATH LOSS	[2.5% of ____ (1)] =	____(2)	
TOTAL RECEIPTS (1 - 2)			____(3)
SECTION A COSTS:			
VETERINARY & DRUGS		____	
EQUIPMENT REPAIRS		____	
BUILDING REPAIRS		____	
SECTION A TOTAL (PROFIT FIGURE)			____(4)
SECTION B COSTS:			
STEER CALF	4.25 cwt @____	____	
PRAIRIE HAY	.75 ton @____	____	
PASTURE	3.2 AUM @____	____	
BEEF SUPPLEMENT	2.0 cwt @____	____	
SALT & MINERAL	.2 cwt @____	____	
TRANSPORTATION & MARKETING COSTS		____	
SECTION B TOTAL			____(5)
TOTAL COSTS (4 + 5)			____(6)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
STEER INVESTMENT		375.00	
FORAGE		35.00	
OTHER COSTS		20.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			430.00(7)

Table 4-10. Wintering Heifer Calves, 5 Months, October to March
Average Daily Gain 1.5 Pounds

RECEIPTS:			
FEEDER HEIFER	_____cwt x _____Price =	_____	(1)
MINUS DEATH LOSS	[1.5% of _____ (1)] =	_____	(2)
TOTAL RECEIPTS (1 - 2)			_____(3)
SECTION A COSTS:			
VETERINARY & DRUGS		_____	
EQUIPMENT REPAIRS		_____	
BUILDING REPAIRS		_____	
SECTION A TOTAL (PROFIT FIGURE)			_____(4)
SECTION B COSTS:			
HEIFER CALF	4.25 cwt @_____	_____	
CORN	8.0 bu @_____	_____	
OATS	13.0 bu @_____	_____	
ALFALFA HAY	.3 ton @_____	_____	
CORN SILAGE	.6 ton @_____	_____	
SALT & MINERAL	.1 cwt @_____	_____	
TRANSPORTATION & MARKETING COSTS		_____	
SECTION B TOTAL			_____(5)
TOTAL COSTS (4 + 5)			_____(6)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
HEIFER CALF INVESTMENT		130.00	
GRAIN & FORAGE		30.00	
OTHER COSTS		5.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			165.00(7)

Table 4-11. Full Fed Steer Calf, Liberal Grain, Gain 650 Pounds in 11 Months on Feed

RECEIPTS:

SLAUGHTER STEER	_____cwt x _____Price =	_____(1)	
MINUS DEATH LOSS	[2% of _____ (1)] =	_____(2)	
TOTAL RECEIPTS (1 - 2)			_____(3)

SECTION A COSTS:

VETERINARY & DRUGS	_____	
EQUIPMENT REPAIRS	_____	
BUILDING REPAIRS	_____	
TRANSPORTATION & MARKETING COSTS	_____	
SECTION A TOTAL		_____(4)
PROFIT FIGURE (3 - 4)		_____(5)

SECTION B COSTS:

STEER CALF	4.25 cwt @_____	_____	
CORN	48.0 bu @_____	_____	
OATS	10.0 bu @_____	_____	
ALFALFA HAY	.9 ton @_____	_____	
PRAIRIE HAY	.4 ton @_____	_____	
BEEF SUPPLEMENT	2.25 cwt @_____	_____	
SALT & MINERAL	.3 cwt @_____	_____	
SECTION B TOTAL			_____(6)
TOTAL COSTS (4 + 6)			_____(7)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

STEER INVESTMENT	375.00	
GRAIN & FORAGE	55.00	
OTHER COSTS	25.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		455.00(8)

Table 4-12. Full Fed Heifer Calf, Liberal Roughage Gain 550 Pounds in 9.5 Months on Feed

RECEIPTS:			
SLAUGHTER HEIFER	_____cwt x _____Price =	_____(1)	
MINUS DEATH LOSS	[2% of _____ (1)] =	_____(2)	
TOTAL RECEIPTS (1 - 2)			_____(3)
SECTION A COSTS:			
VETERINARY & DRUGS		_____	
EQUIPMENT REPAIRS		_____	
BUILDING REPAIRS		_____	
TRANSPORTATION & MARKETING COSTS		_____	
SECTION A TOTAL			_____(4)
PROFIT FIGURE (3 - 4)			_____(5)
SECTION B COSTS:			
HEIFER CALF	3.75 cwt @_____	_____	
CORN	40.0 bu @_____	_____	
OATS	8.0 bu @_____	_____	
ALFALFA HAY	.8 ton @_____	_____	
PRIARIE HAY	.2 ton @_____	_____	
BEEF SUPPLEMENT	2.20 cwt @_____	_____	
SALT & MINERAL	.25 cwt @_____	_____	
SECTION B TOTAL			_____(6)
TOTAL COSTS (4 + 6)			_____(7)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
HEIFER INVESTMENT		275.00	
GRAIN & FORAGE		45.00	
OTHER COSTS		25.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			345.00(8)

Table 4-13. Finishing Yearling Steer, Liberal Roughage, Gain 500 Pounds in 7.5 Months on Feed

RECEIPTS:

SLAUGHTER STEER	_____cwt x _____Price =	_____(1)	
MINUS DEATH LOSS	[1% of _____ (1)] =	_____(2)	
TOTAL RECEIPTS (1 - 2)			_____(3)

SECTION A COSTS:

VETERINARY & DRUGS	_____	
EQUIPMENT REPAIRS	_____	
BUILDING REPAIRS	_____	
TRANSPORTATION & MARKETING COSTS	_____	
SECTION A TOTAL		_____(4)
PROFIT FIGURE (3 - 4)		_____(5)

SECTION B COSTS:

YEARLING STEER	6.5 cwt @_____	_____	
CORN	44.0 bu @_____	_____	
ALFALFA HAY	.4 ton @_____	_____	
PRAIRIE HAY	.96 ton @_____	_____	
BEEF SUPPLEMENT	1.1 cwt @_____	_____	
SALT & MINERAL	.15 cwt @_____	_____	
SECTION B TOTAL			_____(6)
TOTAL COSTS (4 + 6)			_____(7)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

YEARLING STEER	400.00	
GRAIN & FORAGE	45.00	
OTHER COSTS	15.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		460.00(8)

Table 4-14. Feed Out Yearling Heifers, Liberal Corn Silage, Gain 450 Pounds in 7 Months on Feed

RECEIPTS:			
SLAUGHTER HEIFER	____cwt x ____Price =	____(1)	
MINUS DEATH LOSS	[1% of ____ (1)] =	____(2)	
TOTAL RECEIPTS (1 - 2)			____(3)
SECTION A COSTS:			
VETERINARY & DRUGS		____	
EQUIPMENT REPAIRS		____	
BUILDING REPAIRS		____	
TRANSPORTATION & MARKETING COSTS		____	
SECTION A TOTAL			____(4)
PROFIT FIGURE (3 - 4)			____(5)
SECTION B COSTS:			
YEARLING HEIFER	6.0 cwt @____	____	
CORN	32.0 bu @____	____	
CORN SILAGE	2.5 ton @____	____	
ALFALFA HAY	.3 ton @____	____	
BEEF SUPPLEMENT	2.0 cwt @____	____	
SALT & MINERAL	.15 cwt @____	____	
SECTION B TOTAL			____(6)
TOTAL COSTS (4 + 6)			____(7)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
YEARLING HEIFER		280.00	
GRAIN & FORAGE		30.00	
OTHER COSTS		15.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS			325.00(8)

Swine

The swine activities (raise and finish butcher hogs, produce and sell feeder pigs, buy and finish feeder pigs, and buy and pasture finish feeder pigs) are broken into subsections by process for ease and model purposes. These processes enable the operator to consider a wider range of options and to closely adapt the present system to a given model process. The processes are identified by numbers 1 through 8 and have the following meaning:

1 -- OWNS AND USES A CONFINEMENT SYSTEM

2 -- HAS A REMODELED BUILDING AND USES THE CRATE METHOD

3 -- HAS A REMODELED BUILDING AND USES THE PEN METHOD

4 -- NEEDS TO BUILD A CONFINEMENT SYSTEM

5 -- REMODEL BUILDING AND PURCHASE EQUIPMENT FOR THE CRATE METHOD[1]

6 -- REMODEL BUILDING AND PURCHASE EQUIPMENT FOR THE PEN METHOD[1]

7 -- USES EXISTING PASTURE SYSTEM

8 -- SET UP NEW PASTURE SYSTEM[1]

The processes for each activity all have the same Section B feed requirements. The assumed values used in developing the model for each activity are given in Table 4-15. The only work form figures that change with the type of process are building and equipment repairs. The values used for the various processes are given by activity in Tables 4-16 through 4-19.

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[1]The assumed equipment and remodeling costs are listed in Appendix B.

Table 4-15. Assumed Values for the Swine Work Forms

MODEL NAME	RBUT HOG	PROD FDR	BU& FINF	PAST FNF
WORK FORM NUMBER	4-20	4-21	4-22	4-23
RECEIPTS				
Raised Livestock less death loss	1347.12	557.12	886.50	886.50
Sale of Sow	144.00	144.00	---	---
TOTAL RECEIPTS	1491.12	701.12	886.50	886.50
SECTION A COSTS				
Breeding Charge	8.00	8.00	---	---
Veterinary & Drugs	40.00	36.00	20.00	20.00
Equipment Repairs	8.00*	5.60**	6.00***	1.20
Building Repairs	10.50*	8.75**	7.35***	.40
Transportation & Marketing Costs	35.00	10.00	26.25	26.25
SECTION A TOTAL	101.50	68.35	59.60	47.85
PROFIT FIGURE	1389.62	632.77	826.90	838.65
SECTION B COSTS				
Corn	404.80	88.00	231.00	220.00
Oats	40.50	40.50	---	---
Creep Ration	102.65	109.75	---	---
Alfalfa Hay	14.80	11.10	7.40	---
Pasture	20.00	5.00	---	20.00
Pork Supplement	264.00	57.60	152.00	128.00
Salt & Mineral	11.90	3.50	5.60	4.90
Animal Purchase Charge	---	---	350.00	350.00
SECTION B TOTAL	858.65	315.45	756.00	722.90
TOTAL PRODUCTION COSTS	960.15	383.83	805.60	770.75

*Values given are for conventional confinement system. See Table 4-16 for values of other processes.
**Values given are for conventional confinement system. See Table 4-17 for values of other processes.
***Values given are for conventional confinement system. See Table 4-18 for values of other processes.

Table 4-16. Building and Equipment Repairs for Raising and Finishing Butcher Hogs

Process	Building Repairs	Equipment Repairs
1	10.50	8.00
2	7.00	14.50
3	4.95	9.75
4	10.50	8.00
5	7.00	14.50
6	7.95	9.75

Table 4-17. Building and Equipment Repairs for Producing and Selling Feeder Pigs

Process	Building Repairs	Equipment Repairs
1	8.75	5.60
2	2.65	10.85
3	3.50	1.90
4	8.75	5.60
5	2.65	10.85
6	3.50	1.90

Table 4-18. Building and Equipment Repairs for Buying and Finishing Feeder Pigs

Process	Building Repairs	Equipment Repairs
1	7.35	6.00
3	1.10	1.10
4	7.35	6.00
6	1.10	1.10

Table 4-19. Building and Equipment Repairs for Buying and Pasture Finishing Feeder Pigs

Process	Building Repairs	Equipment Repairs
7	.40	1.20
8	.40	1.20

In the model processes 4, 5, 6, and 8, each have an entry in building capital. The model thus requires building capital to be borrowed if any of these processes are to be used. Thus, planners are forced to look at the interest payments in organizing the farm plan.

The following work forms are handled in the same fashion as those for beef. The work forms are completed and the appropriate values are then transferred to Table 6-3, the "Profit and Price Input Sheet" for swine.

Table 4-20. Sow and Two Litters, Raising and Finishing Butcher Hogs 15 Pigs Per Sow, March and September Farrowing, One Saved for Replacement From March Litter, Market 225 Pound Market Hogs

Production Facilities to be used: _____
(enter process number & description)

RECEIPTS:

MARCH BUTCHER HOGS	8 x 2.25 cwt x _____	Price =	_____
SEPTEMBER BUTCHER HOGS	7 x 2.25 cwt x _____	Price =	_____
SOW	_____ cwt x _____	Price =	_____(1)
MINUS DEATH LOSS	[2% of _____ (1)]	=	_____

TOTAL RECEIPTS _____(2)

SECTION A COSTS:

BREEDING CHARGE	_____
VETERINARY & DRUGS	_____
EQUIPMENT REPAIRS	_____
BUILDING REPAIRS	_____
TRANSPORTATION & MARKETING COSTS	_____

SECTION A TOTAL _____(3)

PROFIT FIGURE (2 - 3) _____(4)

SECTION B COSTS:

CORN	184.0 bu @_____	_____
OATS	30.0 bu @_____	_____
CREEP RATION	5.8 cwt @_____	_____
ALFALFA HAY	.4 ton @_____	_____
PASTURE	2.0 AUM @_____	___
PORK SUPPLEMENT	16.5 cwt @_____	
SALT & MINERAL	1.7 cwt @_____	

SECTION B TOTAL

TOTAL COSTS (3 + 5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE SOW VALUE	
1/25 OF A BOAR @ 200.00	
GRAIN & FORAGE	
OTHER COSTS	

TOTAL AVERAGE CAPITAL REQUIR

Table 4-22. Ten Purchased Feeder Pigs, 40 to 225 Pounds

Production Facilities to be used: _____
(enter process number & description)

RECEIPTS:

BUTCHER HOGS	10 x 2.25 cwt x _____ Price =	_____(1)	
MINUS DEATH LOSS	[1.5% of _____ (1)] =	_____(2)	
TOTAL RECEIPTS (1 - 2)			_____(3)

SECTION A COSTS:

VETERINARY & DRUGS	_____	
EQUIPMENT REPAIRS	_____	
BUILDING REPAIRS	_____	
TRANSPORTATION & MARKETING COSTS	_____	
SECTION A TOTAL		_____(4)
PROFIT FIGURE (3 - 4)		[_____](5)

SECTION B COSTS:

FEEDER PIGS	10 (40# Pigs) @_____	_____	
CORN	10 x 10.5 bu @_____	_____	
ALFALFA HAY	10 x .02 ton @_____	_____	
PORK SUPPLEMENT	10 x .95 cwt @_____	_____	
SALT & MINERAL	10 x .08 cwt @_____	_____	
SECTION B TOTAL			_____(6)
TOTAL COSTS (4 + 6)			_____(7)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

PURCHASE CAPITAL FOR PIGS	140.00	
GRAIN & FORAGE	70.00	
OTHER COSTS	65.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		275.00(8)

Table 4-23. Ten Purchased Feeder Pigs, Finished on Pasture for August-September Market, 40 to 225 Pounds

Production Facilities to be used: _____
(enter process number & description)

RECEIPTS:

BUTCHER HOGS	10 x 2.25 cwt x _____ Price =	_____	(1)
MINUS DEATH LOSS	[1.5% of _____ (1)] =	_____	(2)
TOTAL RECEIPTS (1 - 2)			_____ (3)

SECTION A COSTS:

VETERINARY & DRUGS	_____	
EQUIPMENT REPAIRS	_____	
BUILDING REPAIRS	_____	
TRANSPORTATION & MARKETING COSTS	_____	
SECTION A TOTAL		_____ (4)
PROFIT FIGURE (3 - 4)		_____ (5)

SECTION B COSTS:

FEEDER PIGS	10 (40# Pigs) @_____	_____	
CORN	10 x 10.0 bu @_____	_____	
PASTURE	10 x .2 AUM @_____	_____	
PORK SUPPLEMENT	10 x .8 cwt @_____	_____	
SALT & MINERAL	10 x .07 cwt @_____	_____	
SECTION B TOTAL			_____ (6)
TOTAL COSTS (4 + 6)			_____ (7)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

PURCHASE CAPITAL FOR PIGS	140.00	
GRAIN & FORAGE	75.00	
OTHER COSTS	55.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		270.00 (8)

Sheep

The activity budgets for the sheep section are handled exactly as the beef budgets were. The appropriate values are then transferred to Table 6-4.

The sheep activities included in the model are as follows:

(1) Ewe and lambs, sell lamb crop in May-June as feeders

(2) Ewe and lambs, sell lamb crop in August as feeders

(3) Ewe and lambs, sell lamb crop in July as market lambs

(4) Ewe and lambs, sell lamb crop in September, ½ feeders-½ market lambs

(5) Raising replacement ewes

(6) Drylotting 100 feeder lambs for 2 months

The assumed values which are listed in Table 4-24 can be used if personal values are not known.

Table 4-24. Assumed Values for the Sheep Work Forms

MODEL NAME WORK FORM NUMBER	MAYF LAMB 4-25	AUGF LAMB 4-26	JULM LAMB 4-27	FD&M LAM 4-28	PREP EWES 4-29	DRYL OTFD 4-30
RECEIPTS						
Raised Livestock Less Death Loss	61.32	61.32	80.94	71.13	88.20	7305.90
Sale of Culls	2.81	2.81	2.81	2.81	---	---
Sale of Livestock Products	12.29	12.29	12.68	12.49	10.08	45.50
TOTAL RECEIPTS	76.42	76.42	96.43	86.43	98.28	7351.40
SECTION A COSTS						
Breeding Charge	1.00	1.00	1.00	1.00	---	---
Veterinary & Drugs	1.20	1.20	1.20	1.20	1.00	60.00
Shearing	1.10	1.10	1.10	1.10	1.10	---
Equipment Repairs	.50	.50	.50	.50	.25	17.00
Building Repairs	.30	.30	.30	.30	.15	25.00
Transportation & Marketing Costs	1.75	1.75	1.85	1.75	1.75	125.00
SECTION A TOTAL	5.85	5.85	5.95	5.85	4.25	227.00
PROFIT FIGURE	70.57	70.57	90.48	80.58	94.03	7124.40
SECTION B COSTS						
Corn	3.30	1.10	11.00	1.54	.88	528.00
Alfalfa Hay	5.20	5.55	8.50	5.92	5.92	222.00
Prairie Hay	6.00	6.00	6.00	9.00	6.00	15.00
Pasture	10.00	12.00	10.00	12.00	7.00	---
Sheep Supplement	2.50	4.00	2.50	4.00	---	---
Salt & Mineral	1.05	1.05	1.12	1.12	1.12	35.00
Animal Replacement or Purchase Cost	24.00	24.00	24.00	24.00	51.10	5110.00
SECTION B TOTAL	52.05	53.70	63.12	57.58	72.02	5910.00
TOTAL PRODUCTION COSTS	57.90	59.55	69.07	63.43	76.27	6137.00

Table 4-25. Ewe and Lambs, Sell 120% Lamb Crop in May-June as Feeders, 20% Replacement Ewes Purchased, 2% Ewe Death Loss

RECEIPTS:

FEEDER LAMBS	_____	cwt x 1.2 x	_____	Price =	_____
LAMB WOOL INCENTIVE	_____	cwt x 1.2 x	_____	Price =	_____
SHORN WOOL	_____	pounds x	_____	Price =	_____
WOOL INCENTIVE PAYMENT	_____	pounds x	_____	Price =	_____
CULL EWE	_____	cwt x .18 x	_____	Price =	_____

TOTAL RECEIPTS _____(1)

SECTION A COSTS:

BREEDING CHARGE	_____
VETERINARY & DRUGS	_____
SHEARING	_____
EQUIPMENT REPAIRS	_____
BUILDING REPAIRS	_____
TRANSPORTATION & MARKETING COSTS	_____

SECTION A TOTAL _____(2)

PROFIT FIGURE (1 - 2) _____(3)

SECTION B COSTS:

CORN	1.5 bu	@_____		_____
ALFALFA HAY	.14 ton	@_____		_____
PRAIRIE HAY	.2 ton	@_____		_____
PASTURE	1.0 AUM	@_____		_____
SHEEP SUPPLEMENT	.25 cwt	@_____		_____
SALT & MINERAL	.15 cwt	@_____		_____
REPLACEMENT EWE COST	20% of	_____		_____

SECTION B TOTAL _____(4)

TOTAL COSTS (2 + 4) _____(5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE EWE VALUE	75.00
1/35 OF A RAM @ 175.00	5.00
GRAIN & FORAGE	7.00
OTHER COSTS	18.00

TOTAL AVERAGE CAPITAL REQUIREMENTS 105.00(6)

Table 4-26. Ewe and Lambs, Sell 120% Lamb Crop in August as Feeders
20% Replacement Ewes Purchased, 2% Ewe Death Loss

RECEIPTS:

FEEDER LAMBS	____ cwt x 1.2 x	____ Price =	____
LAMB WOOL INCENTIVE	____ cwt x 1.2 x	____ Price =	____
SHORN WOOL	____ pounds x	____ Price =	____
WOOL INCENTIVE PAYMENT	____ pounds x	____ Price =	____
CULL EWE	____ cwt x .18 x	____ Price =	____

TOTAL RECEIPTS ____(1)

SECTION A COSTS:

BREEDING CHARGE	____
VETERINARY & DRUGS	____
SHEARING	____
EQUIPMENT REPAIRS	____
BUILDING REPAIRS	____
TRANSPORTATION & MARKETING COSTS	____

SECTION A TOTAL ____(2)

PROFIT FIGURE (1 - 2) ____(3)

SECTION B COSTS:

CORN	.5 bu	@____	____
ALFALFA HAY	.15 ton	@____	____
PRAIRIE HAY	.2 ton	@____	____
PASTURE	1.2 AUM	@____	____
SHEEP SUPPLEMENT	.4 cwt	@____	____
SALT & MINERAL	.15 cwt	@____	____
REPLACEMENT EWE COST	20% of	____	____

SECTION B TOTAL ____(4)

TOTAL COSTS (2 + 4) ____(5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE EWE VALUE	75.00
1/35 OF A RAM @ 175.00	5.00
GRAIN & FORAGE	7.00
OTHER COSTS	18.00

TOTAL AVERAGE CAPITAL REQUIREMENTS 105.00(6)

Table 4-27. Ewes and Lambs, Sell 120% Lamb Crop in July as Market Lambs, 20% Replacement Ewes Purchased, 2% Ewe Death Loss

RECEIPTS:

MARKET LAMBS	____ cwt x 1.2 x	____ Price =	____	
LAMB WOOL INCENTIVE	____ cwt x 1.2 x	____ Price =	____	
SHORN WOOL	____ pounds x	____ Price =	____	
WOOL INCENTIVE PAYMENT	____ pounds x	____ Price =	____	
CULL EWE	____ cwt x .18 x	____ Price =	____	
TOTAL RECEIPTS				____(1)

SECTION A COSTS:

BREEDING CHARGE	____	
VETERINARY & DRUGS	____	
SHEARING	____	
EQUIPMENT REPAIRS	____	
BUILDING REPAIRS	____	
TRANSPORTATION & MARKETING COSTS	____	
SECTION A TOTAL		____(2)
PROFIT FIGURE (1 - 2)		____(3)

SECTION B COSTS:

CORN	5.5 bu	@____	____	
ALFALFA HAY	.23 ton	@____	____	
PRAIRIE HAY	.2 ton	@____	____	
PASTURE	1.0 AUM	@____	____	
SHEEP SUPPLEMENT	.25 cwt	@____	____	
SALT & MINERAL	.15 cwt	@____	____	
REPLACEMENT EWE COST	20% of	____	____	
SECTION B TOTAL				____(4)
TOTAL COSTS (2 + 4)				____(5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE EWE VALUE	75.00	
1/35 OF A RAM @ 175.00	5.00	
GRAIN & FORAGE	7.00	
OTHER COSTS	18.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		105.00(6)

Table 4-28. Ewe and Lambs, Sell 120% Crop in September as Half Feeders - Half Market Lambs, 20% Replacement Ewes Purchased, 2% Ewe Death Loss

RECEIPTS:

MARKET LAMBS	_____	cwt x	.6 x	_____	Price =	_____
FEEDER LAMBS	_____	cwt x	.6 x	_____	Price =	_____
LAMB WOOL INCENTIVE	_____	cwt x	1.2 x	_____	Price =	_____
SHORN WOOL	_____	pounds	x	_____	Price =	_____
WOOL INCENTIVE PAYMENT	_____	pounds	x	_____	Price =	_____
CULL EWE	_____	cwt x	.18 x	_____	Price =	_____

TOTAL RECEIPTS _____(1)

SECTION A COSTS:

BREEDING CHARGE	_____
VETERINARY & DRUGS	_____
SHEARING	_____
EQUIPMENT REPAIRS	_____
BUILDING REPAIRS	_____
TRANSPORTATION & MARKETING COSTS	_____

SECTION A TOTAL _____(2)

PROFIT FIGURE (1 - 2) _____(3)

SECTION B COSTS:

CORN	.7 bu	@_____	_____
ALFALFA HAY	.16 ton	@_____	_____
PRAIRIE HAY	.3 ton	@_____	_____
PASTURE	1.2 AUM	@_____	_____
SHEEP SUPPLEMENT	.4 cwt	@_____	_____
SALT & MINERAL	.16 cwt	@_____	_____
REPLACEMENT EWE COST	20% of	_____	_____

SECTION B TOTAL _____(4)

TOTAL COSTS (2 + 4) _____(5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE EWE VALUE	75.00
1/35 OF A RAM @ 175.00	5.00
GRAIN & FORAGE	7.00
OTHER COSTS	18.00

TOTAL AVERAGE CAPITAL REQUIREMENTS 105.00(6)

Table 4-29. Raising Replacement Ewes, Sell or Place in Own Breeding Flock, September 1

RECEIPTS:

OPEN EWES	_____ cwt x _____ Price =		_____(1)
SHORN WOOL	_____ lbs x _____ Price =		
WOOL INCENTIVE PAYMENT	_____ lbs x _____ Price =		
MINUS DEATH LOSS	[2% of _____ (1)] =		
TOTAL RECEIPTS			_____(2)

SECTION A COSTS:

VETERINARY & DRUGS		
SHEARING		
EQUIPMENT REPAIRS		
BUILDING REPAIRS		
TRANSPORTATION & MARKETING COSTS		
SECTION A TOTAL		_____(3)
PROFIT FIGURE (2 - 3)		_____(4)

SECTION B COSTS:

EWE LAMB COST	.7 cwt @_____		
CORN	.4 bu @_____		
ALFALFA HAY	.16 ton @_____		
PRAIRIE HAY	.2 ton @_____		
PASTURE	.7 AUM @_____		
SALT & MINERAL	.16 cwt @_____		
SECTION B TOTAL			_____(5)
TOTAL COSTS (2 + 4)			_____(6)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

EWE LAMB PURCHASE COST	55.00	
GRAIN & FORAGE	5.00	
OTHER COSTS	5.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		65.00(7)

Table 4-30. 100 Feeder Lambs, Drylot, 2 Month Feeding Period
Gain 30 Pounds Per Lamb

RECEIPTS:

MARKET LAMBS	_____ cwt x 100.0 x	____Price =	_____(1)
LAMB WOOL INCENTIVE	_____ cwt x 100.0 x	____Price =	_____
MINUS DEATH LOSS	[2% of _____ (1)]	=	_____
	TOTAL RECEIPTS		_____(2)

SECTION A COSTS:

VETERINARY & DRUGS		_____
EQUIPMENT REPAIRS		_____
BUILDING REPAIRS		_____
TRANSPORTATION & MARKETING COSTS		_____
	SECTION A TOTAL	_____(3)
	PROFIT FIGURE (2 - 3)	_____(4)

SECTION B COSTS:

PURCHASE FEEDERS	.7 cwt @_____ x 100		_____
CORN	240.00 bu @_____		_____
ALFALFA HAY	6.0 ton @_____		_____
PRAIRIE HAY	.5 ton @_____		_____
SALT & MINERAL	5.0 cwt @_____		_____
	SECTION B TOTAL		_____(5)
	TOTAL COSTS (3 + 5)		_____(6)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

FEEDER LAMB INVESTMENT	1550.00	
GRAIN & FORAGE	80.00	
OTHER COSTS	55.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		1685.00(7)

Dairy

The dairy activity budgets are handled in a slightly different manner than were either the beef or swine budgets. The same work form can be used for various quantities of milk produced if the requirements are also changed. The assumed values for each quantity of milk are given in Table 4-31.

The dairy activities are broken down within the model in a similar manner as the swine activities. The dairy processes are identified by numbers 1 through 3 and have the following meaning:

1 -- OWNS AND USES A CONVENTIONAL SYSTEM

2 -- OWNS AND USES A CONVERTED BARN

3 -- REMODEL BUILDING AND PURCHASE EQUIPMENT FOR THE CONVERTED BARN METHOD[2]

Assumed building, equipment, and average capital requirements are detailed for each process in Table 4-32.

With the use of Tables 4-31 and 4-32, the work forms can be completed and the appropriate values transferred to Table 6-5, the "Profit and Price Input Sheet" for dairy.

---

[2]The assumed equipment and remodeling costs are listed in Appendix B.

Table 4-31. Assumed Values for the Dairy Work Forms

MODEL NAME	10CWT MK	12CWT MK	14CWT MK	16CWT MK	RDAIR MK
WORK FORM NUMBER	4-33A	4-33B	4-33C	4-33D	4-34
RECEIPTS					
Raised Livestock less death loss	---	---	---	---	873.75
Milk	1100.00	1375.00	1540.00	1760.00	---
Sale of Calves and Culls	250.00	275.00	285.00	300.00	29.25
TOTAL RECEIPTS	1350.00	1650.00	1325.00	2060.00	903.00
SECTION A COSTS					
Breeding Charge	15.00	15.00	15.00	15.00	10.00
Equipment Repairs	14.00*	14.00*	14.00*	14.00*	1.40
Building Repairs	8.75*	8.75*	8.75*	8.75*	3.50
Veterinary & Drugs	10.50	10.50	10.50	10.50	7.50
Milk Hauling	25.00	31.25	35.00	40.00	---
Records & Herd Testing	15.00	15.00	15.00	15.00	---
Transportation & Marketing Costs	5.65	5.65	5.65	5.65	7.50
SECTION A TOTAL	93.90	100.15	103.90	108.90	29.90
PROFIT FIGURE	1256.10	1549.85	1721.10	1951.10	873.10
SECTION B COSTS					
Animal Replacement or Purchase Cost	200.00	250.00	275.00	300.00	125.00
Corn	99.00	114.40	132.00	165.00	6.60
Oats	67.50	72.90	74.25	81.00	9.45
Corn Silage	44.80	76.80	76.00	76.00	---
Alfalfa Hay	74.00	74.00	111.00	111.00	40.70
Prairie Hay	7.50	7.50	---	---	66.00
Pasture	40.99	20.00	10.00	10.00	70.00
Dairy Supplement	40.00	40.00	40.00	45.00	12.00
Salt & Mineral	4.20	5.60	7.50	7.50	2.10
Milk Starter	---	---	---	---	16.87
Calf Starter	---	---	---	---	28.56
Calf Grower	---	---	---	---	41.33
SECTION B TOTAL	577.00	661.20	725.75	795.50	418.61
TOTAL PRODUCTION COSTS	670.90	761.35	829.65	904.40	448.51

Table 4-31. Continued

A. 10,000 pounds of milk produced annually.

B. 12,500 pounds of milk produced annually.

C. 14,000 pounds of milk produced annually.

D. 16,000 pounds of milk produced annually.

*Values given are for conventional confinement system. See Table 4-32 for other process values.

Table 4-32. Assumed Costs for Various Processes

	Equipment Repairs	Building Repairs	Average Value of Cow	Replacement Value per Cow	Grain & Forage	Other Direct Costs
CONVENTIONAL BARN						
10,000 lbs of milk	14.00	8.75	720	200	105.85	65.00
12,500 lbs of milk	14.00	8.75	850	250	112.75	72.90
14,000 lbs of milk	14.00	8.75	903	275	122.50	75.50
16,000 lbs of milk	14.00	8.75	950	300	134.40	78.60
CONVERTED BARN						
10,000 lbs of milk	4.70	3.50	720	200	105.85	57.75
12,500 lbs of milk	4.70	3.50	850	250	112.75	65.60
14,000 lbs of milk	4.70	3.50	903	275	122.50	68.25
16,000 lbs of milk	4.70	3.50	950	300	134.40	71.30

Table 4-33. Dairy Cow, ___ Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased

Check one: ___ Conventional system being used
___ Converted barn being used
___ Need to remodel barn

RECEIPTS:

MILK	_____ cwt x _____ Price =		
SALE OF CALVES & CULLS		=	_____
TOTAL RECEIPTS			_____(1)

SECTION A COSTS:

BREEDING CHARGE	_____
EQUIPMENT REPAIRS	_____
BUILDING REPAIRS	_____
VETERINARY & DRUGS	_____
MILK HAULING	_____
RECORDS & HERD TESTING	_____
TRANSPORTATION & MARKETING COSTS	_____
SECTION A TOTAL	_____(2)
PROFIT FIGURE (1 - 2)	_____(3)

SECTION B COSTS:

REPLACEMENT CHARGE		_____
CORN	_____bu @_____	_____
OATS	_____bu @_____	_____
CORN SILAGE	_____ton @_____	_____
ALFALFA HAY	_____ton @_____	_____
PRAIRIE HAY	_____ton @_____	_____
PASTURE	_____AUM @_____	_____
DAIRY SUPPLEMENT	_____cwt @_____	_____
SALT & MINERAL	_____cwt @_____	_____
SECTION B TOTAL		_____(4)
TOTAL COSTS (2 + 4)		_____(5)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE VALUE OF COW	_____
REPLACEMENT VALUE PER COW	_____
GRAIN & FORAGE	_____
OTHER COSTS	_____
TOTAL AVERAGE CAPITAL REQUIREMENTS	_____(6)

Table 4-34. Raising Dairy Replacements, Costs and Returns, Per Heifer Calf Purchased or Started, 5% Non-Breeder or Cull, 8% Death Loss, Sell or Use Springer Heifer for Herd Replacement

RECEIPTS:

SPRINGER HEIFER	.95 Head x	_____ Value =	_____	(1)
NON-BREEDER OR CULL	.05 x _____ cwt x	_____ Price =	_____	(2)
MINUS DEATH LOSS	[8% of _____ (1 + 2)]	=	_____	(3)
TOTAL RECEIPTS (1 + 2) - 3				_____ (4)

SECTION A COSTS:

BREEDING CHARGE		_____	
VETERINARY & DRUGS		_____	
EQUIPMENT REPAIRS		_____	
BUILDING REPAIRS		_____	
TRANSPORTATION & MARKETING COSTS		_____	
SECTION A TOTAL			_____ (5)
PROFIT FIGURE (4 - 5)			_____ (6)

SECTION B COSTS:

PURCHASE OR TRANSFER VALUE OF CALF		_____	
CORN	3.0 bu @_____	_____	
OATS	7.0 bu @_____	_____	
ALFALFA HAY	1.1 ton @_____	_____	
PRAIRIE HAY	2.2 ton @_____	_____	
PASTURE	7.0 AUM @_____	_____	
DAIRY SUPPLEMENT	1.2 cwt @_____	_____	
SALT & MINERAL	.3 cwt @_____	_____	
MILK STARTER	.35 cwt @_____	_____	
CALF STARTER	2.4 cwt @_____	_____	
CALF GROWER	2.9 cwt @_____	_____	
SECTION B TOTAL			_____ (7)
TOTAL COSTS (5 + 7)			_____ (8)

AVERAGE OPERATING CAPITAL REQUIREMENTS:

HEIFER CALF	250.00	
GRAIN & FORAGE	85.00	
OTHER COSTS	75.00	
TOTAL AVERAGE CAPITAL REQUIREMENTS		410.00 (9)

Specialty Livestock Activities

Chickens and turkeys are the activities making up this section. The procedure for completing the work forms for this section is identical to the beef and sheep sections. The assumed values are given in Table 4-35. The profit values are transferred to Table 6-6, the "Profit and Price Input Sheet" for specialty livestock activities.

Table 4-35. Assumed Values for the Chicken and Turkey Work Forms

MODEL NAME	CHICKENS	TURKEYS
WORK FORM NUMBER	4-36	4-37
RECEIPTS		
Raised Livestock less death loss	---	990.00
Sale of Culls	39.00	---
Sale of Eggs	855.40	---
TOTAL RECEIPTS	894.40	990.00
SECTION A COSTS		
Veterinary & Drugs	50.00	16.00
Building Repairs	7.00	50.00
Equipment Repairs	4.00	13.50
Electricity, Fuel, & Litter	25.00	---
Transportation & Marketing Costs	12.00	10.00
SECTION A TOTAL	98.00	89.50
PROFIT FIGURE	796.40	900.50
SECTION B COSTS		
Purchased Birds	78.00	125.00
Corn	220.00	225.00
Oats	72.90	---
Alfalfa Hay	---	185.00
Turkey Supplement	---	306.00
Chicken Mash	110.00	---
Layer Mash	270.00	---
Oyster Shells	6.25	---
SECTION B TOTAL	757.15	841.00
TOTAL PRODUCTION COSTS	855.15	930.50

Table 4-36. 100 Hen Farm Laying Flock

RECEIPTS:

EGGS	(___Hens x ____doz x ____Price) =		
HENS	=		
CULL PULLETS	=		
TOTAL REVENUE			____(1)

SECTION A COSTS:

VETERINARY & DRUGS			
BUILDING REPAIRS			
EQUIPMENT REPAIRS			
ELECTRICITY, FUEL, & LITTER			
TRANSPORTATION & MARKETING COSTS			
SECTION A TOTAL			____(2)
PROFIT VALUE FOR THE MODEL (1 - 2)			____(3)

SECTION B COSTS:

SEXED CHICKS	120 chicks @____		
CORN	100 bu @____		
OATS	54 bu @____		
CHICK MASH	10 cwt @____		
LAYER MASH	30 cwt @____		
OYSTER SHELLS	2.5 cwt @____		
SECTION B TOTAL			____(4)
TOTAL COSTS (2 + 4)			____

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE HEN INVESTMENT	200.00	
AVERAGE CHICK INVESTMENT	50.00	
GRAIN	90.00	
COMMERCIAL FEED	110.00	
OTHER DIRECT COSTS	50.00	
TOTAL OPERATING CAPITAL REQUIREMENTS		500.00(5)

Table 4-37. 100 Turkeys

RECEIPTS:

TURKEY SALES	100 x _____ Price/lb x lbs =	_____	(1)
MINUS DEATH LOSS	[1% of _____ (1)] =	_____	(2)
TOTAL REVENUE (1 - 2)			_____ (3)

SECTION A COSTS:

VETERINARY & DRUGS	_____	
BUILDING REPAIRS	_____	
EQUIPMENT REPAIRS	_____	
TRANSPORTATION & MARKETING COSTS	_____	
SECTION A TOTAL		_____ (4)
PROFIT VALUE FOR THE MODEL (3 - 4)		_____ (5)

SECTION B COSTS:

PURCHASED BIRDS	100.0 x _____ Price	_____	
SUPPLEMENT	25.5 cwt x _____ Price	_____	
CORN	100.0 bu x _____ Price	_____	
ALFALFA HAY	5.0 ton x _____ Price	_____	
SECTION B TOTAL			_____ (6)
TOTAL COSTS (4 + 6)			_____

AVERAGE OPERATING CAPITAL REQUIREMENTS:

PURCHASED TURKEYS	65.00	
GRAIN & FORAGE	350.00	
OTHER COSTS	40.00	
TOTAL OPERATING CAPITAL REQUIREMENTS		455.00 (7)

CHAPTER 5

THE RIGHT HAND SIDE

Chapters 3 and 4 provided the format to derive the activity profit values to enable the model to be closely simulated to the actual farm organization. The budgets were computed, the appropriate values transferred, and the major portion of the model was ready for calculation. Chapter 5 explains the formulation of the final portion of the model, the RHS (Right Hand Side). The RHS is synonymous with the supply side and resources available.

The resources available limit the size of each activity or the size of the entire farm organization. The amount of resources available serves as a physical limitation on the farm to prevent the possibility of unlimited size. The components of the supply side are listed in Chapter 6 in Table 6-8, "The Resources Available Supply Sheet." Included are: acres of land by type, labor available for various uses, and the amounts of the various capital types.

The amount available for each resource in the supply side is available at no cost. The relevant question becomes how to best use the amount of available resources to obtain the optimum farm plan. This is accomplished through the computer when the model is run with each individual farm's available supply. For convenience, a list and explanation of the various resources follows.

Land

Crop and pasture land, both owned and rented, are the components of this category. Total acres of each type of land are entered in the appropriate row of the "Resources Available Supply Sheet" in the land section. Rented acres of both crop and pasture land have a rental charge associated with each acre, therefore, it is imperative that they are handled properly. The per acre rental charge associated with both crop and pasture land is to be entered in the appropriate row in Table 6-7.

Labor

With the family being the primary unit, and with the assumption that increased profit is equivalent to increased family satisfaction or well-being, the model is designed to maximize profit. For this reason, family labor can be subdivided between labor for the farm and labor for off-farm employment. The two subdivisions of labor should complement or supplement each other.

Table 5-1 is provided as an aid for computing the supply of labor available to the farm by the family. Hours of family labor are supplied to the farm without any cost. This does not include any hired labor. The hours provided by each family member are totaled by month to attain the available monthly farm labor supply. Total monthly farm hours are transferred to section 2 of the "Available Resources Supply Sheet," Table 6-8.

Table 5-1. Estimated Monthly Farm Labor Supply

Month	Father	Mother	Person A*	Person B*	Person C*	Total**
			Hours/Month			
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						

*Persons A, B, and C are considered to be non-paid children. Non-paid in the sense that this labor is available without a cost, or without a deduction, from operating capital.

**Total "non-paid" farm hours are to be transferred by month to the "Resources Available Supply Sheet" in Chapter 6.

Section 3 of the "Available Resources Supply Sheet" is composed of two different off-farm employment activities. These activities are present in the model for family members whose earnings are returned to the family unit. Off-farm employment by the wife, a child, and/or the farm operator is simply another income-generating component for the family. The hours worked off-the-farm for two people are to be listed by person, by year in Table 6-8. Two different off-farm employment activities are provided to adequately handle two people who may work different hours, and because two different people usually will not have identical hourly earnings.

A possible format for determining off-farm employment profit figures is given in Table 5-2. The possible expenses are fairly easy to handle if only one person works off-the-farm. If two people undertake off-farm employment and ride together, then gasoline and auto repairs per month can be divided by two and each person is assigned one-half of these costs. Everyone will not have the same expenses, but the format provided will serve as a general guideline.

Table 5-2. Profit of Off-Farm Employment

	Person A		Person B	
MONTHLY SALARY		_____(1)		_____(1)
LESS POSSIBLE EXPENSES:				
Meals/month	_____		_____	
Gas/month	_____		_____	
Auto Repairs/month	_____		_____	
Babysitter/month	_____		_____	
SUBTOTAL		_____(2)		_____(2)
MONTHLY PROFIT (1 - 2)		_____(3)		_____(3)
HOURLY PROFIT FOR MODEL (3 ÷ Hours worked/month)		[ ]*		[ ]**

*This value is transferred to Row 109 of the "Profit Input Sheet" in Chapter 6.

**This value is transferred to Row 110 of the "Profit Input Sheet" in Chapter 6.

Capital

To enable proper handling, capital is subdivided into three categories: (1) operating capital, (2) livestock capital, and (3) building capital. To insure a reliable solution, the different types of capital must be well defined and precisely handled.

Operating Capital

Operating capital is needed to handle day-to-day transactions. The supply of operating capital is diminished by crop planting inputs, livestock feed purchases, and through family living expenditures. Profit from the previous year's farming operation, government payments, and off-farm employment are some factors which provide operating capital. Operating capital is also provided in the model through borrowing at 12 percent interest. Personal values to accommodate for individual situations can be placed in Table 6-2. The supply of operating capital available to the farm, at no cost, should reflect only that money which is in the idle balances drawing no interest or other earnings. This amount is transferred to the "Available Resources Supply Sheet," Table 6-8.

Livestock Capital

The sole purpose of livestock capital is for livestock purchases. The supply of livestock capital for Table 6-8 is determined by computing the amount of capital necessary to purchase all livestock in the farm organization at the present time. The livestock currently on the farm requires no purchase capital, and therefore, this capital is available to the farm at no cost. From this it would seem feasible to exclude

livestock capital from the model. This is not true as any expansion of a present system or diversification into new activities requires new or more livestock capital. Livestock capital for this purpose can be borrowed at 11 percent interest in the present model. Individual interest rates for borrowing capital for livestock purchases can be supplied in row 50, Table 6-2, to fit individual situations.

Building Capital

The purpose of building capital is for renovation of present buildings to accommodate a different activity and for building new buildings. The supply of building capital available at no cost belongs in Table 6-8. It is figured by estimating the current purchase price of all buildings and improvements, including fencing materials, used for any type of livestock production. The house, garages, and storage buildings not being used for livestock production are not included in the above calculation. However, if a barn or building is available and renovation is contemplated, then its present value is included. Borrowing money to provide new buildings for livestock production is available in the model at 10 percent interest. Personal interest rate estimations for building capital are to be placed in row 71 in Table 6-3.

The interest rates placed on the "Profit Input Sheet" should be as realistic as possible to accurately specify the actual situation. If this condition is satisfied, the solution will be more accurate than if unrealistic and inaccurate interest rates are used.

Family Living Expenses

In most cases, family living expenses are not formally considered when dealing with farm planning and organizational models. Family expenses are generally only considered as a deduction from, or the sole purpose of net farm income. In this model, they are treated as an expense, and the net income figure derived in Table 7-18 reflects the return above living expenses. This return, or profit, may then be used to expand the farm organization to purchase "leisure" items, or saved.

Some common cash items comprising family living expenses are: purchased food, clothing, personal items, household operations, repairs, health, recreation, education, donations, and auto operation. Non-cash expenditures include depreciation of: home, home furnishings, and the automobile. Farm produce used for personal consumption is also a non-cash family expenditure.

Table 5-3 provides an estimation of total family living costs related to the size of the household and expected income. The figures in the table serve as guidelines and can be used if personal information is unavailable. To use the table, find the "Family Income" figure which is nearest estimated income, then move across the row to the correct "Number of Persons in the Household" column. This value is then transferred to Table 7-18.

Table 5-3. Estimated Total Family Living Costs Related to Number of Persons and Income**

Family Income	Estimated Expenses* Number of Persons in the Household			
$	2	4	6	8
7,500	7,160	8,110	9,120	9,940
9,500	7,900	8,860	9,630	10,460
11,500	8,690	9,910	10,970	11,860
13,500	9,520	10,730	11,780	12,680
15,500	10,360	11,590	12,640	13,550
17,500	11,290	12,500	13,560	14,450
19,500	12,380	13,620	14,670	15,630
21,500	12,850	14,110	15,220	16,230
23,500	13,300	14,610	15,760	16,820
25,500	13,750	15,100	16,320	17,410
27,500	14,200	15,600	16,860	18,010
29,500	14,650	16,090	17,400	18,600
31,500	15,210	16,590	17,940	19,200
33,500	15,570	17,080	18,490	19,790
35,500	16,020	17,620	19,030	20,370
37,500	16,470	18,080	19,600	20,970
39,500	16,920	18,580	20,120	21,570

*Total estimated expenditures above do not include taxes, savings, major remodeling, legal fees, or funeral expenses.

**Source: Management Guide for Planning a Farm or Ranch Business, page 9, inflated by 10 percent.

CHAPTER 6

MODEL INPUT DATA

Chapter 6 identifies the enterprise profits developed for use in the basic model stored in the computer. Buy and sell prices are also identified. Changes in any of these values may be made by using the budgeting procedures described in Chapters 3, 4, and 5. The input sheets described in this chapter provide for an orderly method of data arrangement to aid the computer programmer. All information necessary for completion of this chapter comes either from Chapters 3 through 5 or from personal estimates or experience.

To obtain a realistic solution from the model, there are a few basic rules to follow.

(1) Budgets which typify the actual total farm situation should be incorporated in the model.

(2) Actual prices or the best possible estimates should be used in the budgets, the buy activities, and the sell activities.

(3) The buy price for an activity must always be higher than the sell price for the same activity (i.e., buy corn at $2.25 and sell corn at $2.20). If this condition is not satisfied, the model may provide a feasible solution, but one that is not realistic.

The Profit and Price Input Sheets

The profit and price input sheets are broken into six tables by enterprise. All tables follow an identical format to provide continuity when filling them out.

The Crop Activities

Table 6-1 lists all of the crop activities and also includes the sell options available for the feed-crops. It is important to remember that all activities with a negative model profit figure can be transferred to a livestock activity as a feed input. It is also assumed that there is no crop carry-over. Therefore, any crop units that are not fed must be sold. This explains the reasoning behind the sell options for the feed-crops in Table 6-1.

For crops with a positive model profit figure, this figure is the residual of total revenue and total variable costs. If one of these activities is grown, it is automatically sold at the price used in deriving the budget.

The Livestock Activities

Chapter 4 provided all of the data for Tables 6-2 through 6-6, except the various sell prices which are personal estimates. It is important to choose the correct activities to typify the farm and to use the best personal estimates possible.

A question may arise as to why buy corn, oats, steer calves, etc., are included in the tables. They are included for two reasons: (1) these various activities may not be included in the present farm organization, and (2) even if these activities are part of the present organization, a greater quantity may be required to obtain the optimal solution.

Sell options are included to accommodate the various activities with negative model profit figures. The specific supplemental activities necessary to fulfill a given livestock activity may be obtained

from the budgets in Chapter 4. (Examples of budgets and the corresponding input sheets are available in Chapter 7.)

Profit and Price Input Preparation Procedure

The proper procedure for completing Tables 6-1 to 6-6 should be as follows.

(1) Use the proper budgets, available in Chapter 3 for the crop activities and Chapter 4 for the livestock activities, to obtain the correct activities to be included in the model.

(2) Place an X beside the corresponding activity numbers in the "Profit and Price Input Sheets" included in the model.

(3) Place your profit estimate under column headed "your estimate." If no entry is made in the column "your estimate," the given model profit figure will be assumed.

(4) Complete the table with personal values for the various buy and sell activities listed on each sheet. Once again, if no entry is made, the given model value will be assumed.

Chapter 7 includes examples of budgets and the corresponding "Profit and Price Input Sheets."

Supplies of Available Resources

Chapter 5 has explained and provided information that can be used in the preparation of Table 6-8. It is important to provide all the necessary information for Table 6-8 if a realistic solution is to be obtained. An example farm situation is explained and Table 6-8 is completed in Chapter 7.

Table 6-1. Profit and Price Input Sheet - Crops

Activity Number	Crop Activity	Model Name	Model Profit	Your Estimate
___01.	CORN	CORN	-88.52	_____/ACRE
___02.	IRRIGATED CORN	IRRCORN	-147.23	_____/ACRE
___03.	CORN SILAGE	CORNSILG	-65.15	_____/ACRE
___04.	OATS	OATS	-53.10	_____/ACRE
___05.	BARLEY	BARLEY	54.69	_____/ACRE
___06.	SPRING WHEAT	SPWHEAT	44.24	_____/ACRE
___07.	ALFALFA	ALFALFA	-40.73	_____/ACRE
___08.	IRRIGATED ALFALFA	IRRALF	-55.78	_____/ACRE
___09.	FLAX	FLAX	69.05	_____/ACRE
___10.	SOYBEANS	SOYBEANS	95.94	_____/ACRE
___11.	GRAIN SORGHUM	GRAINSOR	52.00	_____/ACRE
___12.	GRASS HAY	GRASSHAY	-34.23	_____/ACRE
___13.	POPCORN	POPCORN	219.95	_____/ACRE
___14.	SWEET CORN	SWEETCON	752.45	_____/ACRE
___15.	SELL CORN	SELLCORN	2.20	_____/BU
___16.	SELL CORN SILAGE	SELLCSIL	16.00	_____/TON
___17.	SELL OATS	SELLOATS	1.35	_____/BU
___18.	SELL ALFALFA	SELLALF	37.00	_____/TON
___19.	SELL GRASS HAY	SELGRHAY	30.00	_____/TON

Table 6-2. Profit and Price Input Sheet - Beef

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___20.	BEEF COW--FEEDER CALF	BEEFCOWF	-18.25	_____/HD
___21.	BEEF COW--CREEP FED CALF	BEEFCOWC	-18.30	_____/HD
___22.	RAISE REPLACEMENT HEIFER	RREPHEIF	-16.60	_____/HD
___23.	WINTER STEER--5 MONTHS	WINTSTER	-2.95	_____/HD
___24.	SUMMER GRAZE STEER--5.5 MO	SUMMSTER	599.65	_____/HD
___25.	WINTER & SUMMER STEER--10 MO	W&SSTEER	-4.40	_____/HD
___26.	WINTER HEIFER	WINTHEIF	-3.30	_____/HD
___27.	FULL-FED STEER CALF--11 MO	FINFSTER	770.35	_____/HD
___28.	FULL-FED HEIFER CALF--9.5 MO	FULFHEIF	634.40	_____/HD
___29.	FINISH YEARLING STEER--7.5 MO	FINYSTER	835.50	_____/HD
___30.	FINISH YEARLING HEIFER--7 MO	FINYHEIF	731.30	_____/HD
___31.	BUY CORN	BUYCORN	-2.25	_____/BU
___32.	BUY OATS	BUYOATS	-1.40	_____/BU
___33.	BUY ALFALFA	BUYALF	-40.00	_____/TON
___34.	BUY GRASS HAY	BUYGRHAY	-31.00	_____/TON
___35.	BUY CORN SILAGE	BUYCSILG	-17.00	_____/TON
___36.	BUY BEEF SUPPLEMENT	BUYBEEFS	-10.00	_____/CWT
___37.	BUY SALT & MINERAL	BUYS&MIN	-7.00	_____/CWT
___38.	ANIMAL UNIT MONTHS	AUM	-10.00	_____/AUM
___39.	BUY HEIFER CALF	BUYHFCF	-330.00	_____/HD
___40.	BUY STEER CALF	BUYSTCF	-410.00	_____/HD
___41.	BUY YEARLING HEIFER	BUYYHEIF	-430.00	_____/HD
___42.	BUY YEARLING STEER	BUYYSTER	-565.00	_____/HD

Table 6-2. Continued

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___43.	SELL CULL COW	SELLCULL	550.00	_____/HD
___44.	SELL YEARLING STEER	SELLYSTER	555.00	_____/HD
___45.	SELL YEARLING HEIFER	SELLYHEIF	420.00	_____/HD
___46.	SELL STEER CALF	SELLSTCF	400.00	_____/HD
___47.	SELL HEIFER CALF	SELHFCF	320.00	_____/HD
___48.	SELL REPLACEMENT HEIFER	SELREPHF	300.00	_____/HD
___49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
___50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$

Table 6-3. Profit and Price Input Sheet - Hogs

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___51.	RAISE & FINISH BUTCHER HOGS--1	RBUTHOG1	1389.62	_____/SOW
___52.	RAISE & FINISH BUTCHER HOGS--2	RBUTHOG2	1386.62	_____/SOW
___53.	RAISE & FINISH BUTCHER HOGS--3	RBUTHOG3	1393.42	_____/SOW
___54.	RAISE & FINISH BUTCHER HOGS--4	RBUTHOG4	1398.62	_____/SOW
___55.	RAISE & FINISH BUTCHER HOGS--5	RBUTHOG5	1386.62	_____/SOW
___56.	RAISE & FINISH BUTCHER HOGS--6	RBUTHOG6	1393.42	_____/SOW
___57.	PRODUCE & SELL FEEDER PIGS--1	PRODFDR1	632.77	_____/LITTER
___58.	PRODUCE & SELL FEEDER PIGS--2	PRODFDR2	633.62	_____/LITTER
___59.	PRODUCE & SELL FEEDER PIGS--3	PRODFDR3	641.72	_____/LITTER
___60.	PRODUCE & SELL FEEDER PIGS--4	PRODFDR4	632.77	_____/LITTER
___61.	PRODUCE & SELL FEEDER PIGS--5	PRODFDR5	633.62	_____/LITTER
___62.	PRODUCE & SELL FEEDER PIGS--6	PRODFDR6	641.72	____/LITTER
___63.	BUY & FINISH FEEDER PIGS--1	BU&FINF1	826.90	_____/10 HD
___64.	BUY & FINISH FEEDER PIGS--3	BU&FINF3	832.45	_____/10 HD
___65.	BUY & FINISH FEEDER PIGS--4	BU&FINF4	826.90	_____/10 HD
___66.	BUY & FINISH FEEDER PIGS--6	BU&FINF6	832.45	_____/10 HD
___67.	BUY & FINISH FEEDERS ON PASTURE--7	PASTFNF7	838.65	_____/10 HD
___68.	BUY & FINISH FEEDERS ON PASTURE--8	PASTFNF8	838.65	_____/10 HD
___31.	BUY CORN	BUYCORN	-2.25	_____/BU
___32.	BUY OATS	BUYOATS	-1.40	_____/BU
___33.	BUY ALFALFA	BUYALF	-40.00	_____/TON
___37.	BUY SALT & MINERAL	BUYS&MIN	-7.00	_____/TON

Table 6-3. Continued

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
38.	ANIMAL UNIT MONTHS	AUM	-10.00	_____/AUM
49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
69.	BUY PORK SUPPLEMENT	BUYPORKS	-16.00	_____/CWT
70.	BUY PIG CREEP	BUYPIGCP	-17.70	_____/CWT
71.	BUILDING CAPITAL	BUILDCAP	-.10	_____/$
72.	BUY FEEDER PIG	BUYFDPIG	-35.00	_____/HD

Legend:

1--OWNS & USES CONFINEMENT SYSTEM
2--OWNS & USES CRATE METHOD
3--OWNS & USES PEN METHOD
4--NEED TO BUILD A CONFINEMENT SYSTEM
5--HAVE TO REMODEL BARN OR BUILD & PURCHASE EQUIPMENT FOR CRATE METHOD
6--HAVE TO REMODEL BARN OR BUILD & PURCHASE EQUIPMENT FOR PEN METHOD
7--ALREADY USES A PASTURE SYSTEM
8--HAVE TO BUILD A PASTURE SYSTEM

Table 6-4. Profit and Price Input Sheet - Sheep

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___73.	RAISE & SELL MAY FEEDER LAMBS	MAYFLAMB	70.57	_____/HD
___74.	RAISE & SELL JULY MARKET LAMBS	JULMLAMB	90.48	_____/HD
___75.	RAISE & SELL AUGUST FEEDER LAMBS	AUGFLAMB	70.57	_____/HD
___76.	RAISE & SELL ½ FEEDERS & ½ MARKET LAMBS	FD&MKLAM	80.58	_____/HD
___77.	RAISING REPLACEMENT EWES	RREPEWES	94.03	_____/HD
___78.	DRYLOT 100 FEEDER LAMBS	DRYLOTFD	7124.40	_____/SET
___79.	RAISE MAY FEEDER LAMBS TO BE DRYLOTTED	FEEDMLAM	-4.10	_____/HD
___31.	BUY CORN	BUYCORN	-2.25	_____/BU
___33.	BUY ALFALFA	BUYALF	-40.00	_____/TON
___34.	BUY GRASS HAY	BUYGRHAY	-31.00	_____/TON
___37.	BUY SALT & MINERAL	BUYS&MIN	-7.00	_____/CWT
___38.	ANIMAL UNIT MONTHS	AUM	-10.00	_____/AUM
___49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
___40.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
___80.	BUY SHEEP SUPPLEMENT	BUYSHEPS	-10.00	_____/CWT
___81.	BUY FEEDER LAMB	BUYFLAMB	-51.10	_____/HD
___82.	SELL FEEDER LAMB	SELLLAMB	50.00	_____/HD

Table 6-5. Profit and Price Input Sheet - Dairy

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
83.	PRODUCE 10 CWT MILK--1	10CWTMK1	1256.10	_____/HD
84.	PRODUCE 12.5 CWT MILK--1	12CWTMK1	1549.85	_____/HD
85.	PRODUCE 14 CWT MILK--1	14CWTMK1	1721.10	_____/HD
86.	PRODUCE 16 CWT MILK--1	16CWTMK1	1915.10	_____/HD
87.	PRODUCE 10 CWT MILK--2	10CWTMK2	1270.65	_____/HD
88.	PRODUCE 12.5 CWT MILK--2	12CWTMK2	1564.40	_____/HD
89.	PRODUCE 14 CWT MILK--2	14CWTMK2	1735.65	_____/HD
90.	PRODUCE 16 CWT MILK--2	16CWTMK2	1965.65	_____/HD
91.	PRODUCE 10 CWT MILK--3	10CWTMK3	1270.65	_____/HD
92.	PRODUCE 12.5 CWT MILK--3	12CWTMK3	1564.40	_____/HD
93.	PRODUCE 14 CWT MILK--3	14CWTMK3	1735.65	_____/HD
94.	PRODUCE 16 CWT MILK--3	16CWTMK3	1965.65	_____/HD
95.	RAISE DAIRY REPLACEMENTS	RDAIRREP	873.10	_____/HD
31.	BUY CORN	BUYCORN	-2.25	_____/BU
32.	BUY OATS	BUYOATS	-1.40	_____/BU
33.	BUY ALFALFA	BUYALF	-40.00	_____/TON
34.	BUY GRASS HAY	BUYGRHAY	-31.00	_____/TON
35.	BUY CORN SILAGE	BUYCSILG	-17.00	_____/TON
37.	BUY SALT & MINERAL	BUYS&MIN	-7.00	_____/CWT
38.	ANIMAL UNIT MONTHS	AUM	-10.00	_____/AUM
49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
71.	BUILDING CAPITAL	BUILDCAP	-.10	_____/$

Table 6-5. Continued

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___96.	BUY DAIRY SUPPLEMENT	BUYDAIRS	-10.00	_____/CWT
___97.	BUY MILK STARTER	BUYMKST	-48.20	_____/CWT
___98.	BUY CALF STARTER	BUYCFST	-11.90	_____/CWT
___99.	BUY CALF GROWER	BUYCAFGR	-14.25	_____/CWT
___100.	BUY DAIRY HEIFER	BUYDARHF	-330.00	_____/HD

Table 6-6. Profit and Price Input Sheet - Specialty Activities

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
101.	CHICKENS	CHICKENS	796.40	_____/FLOCK
31.	BUY CORN	BUYCORN	-2.25	_____/BU
32.	BUY OATS	BUYOATS	-1.40	_____/BU
49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
102.	BUY SEXED CHICKS	BUYSEXCH	-.65	_____/HD
103.	BUY CHICK MASH	BUYCMASH	-11.00	_____/CWT
104.	BUY LAYER MASH	BUYLMASH	-9.00	_____/CWT
105.	BUY OYSTER SHELLS	BUYOSHEL	-2.50	_____/CWT
106.	TURKEYS	TURKEYS	900.40	_____/FLOCK
31.	BUY CORN	BUYCORN	-2.25	_____/BU
33.	BUY ALFALFA	BUYALF	-35.00	_____/TON
49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
107.	BUY YOUNG TURKEYS	BUYYTURK	-1.25	_____/HD
108.	BUY TURKEY SUPPLEMENT	BUYTKSUP	-12.00	_____/CWT

Table 6-7. Profit and Price Input Sheet - Specialty

Activity Number	Activity	Model Name	Model Profit	Your Estimate
___109.	OFF-FARM EMPLOYMENT--1	OFF-FME1	4.25	_____/HOUR
___110.	OFF-FARM EMPLOYMENT--2	OFF-FME2	4.75	_____/HOUR
___111.	RENT CROP LAND	RENTCROP	-100.00	_____/ACRE
___112.	RENT PASTURE LAND	RENTPAST	-50.00	_____/ACRE

Table 6-8. Supplies of Available Resources

RESOURCE	MODEL NAME	MODEL SUPPLIES	YOUR ESTIMATE
SECTION 1			
CROPLAND	CROPLAND	315.0	_____/ACRES
PASTURE LAND	PASTLAND	45.0	_____/ACRES
SECTION 2			
FARM LABOR FOR JANUARY	FARMLJAN	250.0	_____/HOURS
FARM LABOR FOR FEBRUARY	FARMLFEB	250.0	_____/HOURS
FARM LABOR FOR MARCH	FARMLMAR	250.0	_____/HOURS
FARM LABOR FOR APRIL	FARMLAPR	250.0	_____/HOURS
FARM LABOR FOR MAY	FARMLMAY	250.0	_____/HOURS
FARM LABOR FOR JUNE	FARMLJUN	250.0	_____/HOURS
FARM LABOR FOR JULY	FARMLJUL	250.0	_____/HOURS
FARM LABOR FOR AUGUST	FARMLAUG	250.0	_____/HOURS
FARM LABOR FOR SEPTEMBER	FARMLSEP	250.0	_____/HOURS
FARM LABOR FOR OCTOBER	FARMLOCT	250.0	_____/HOURS
FARM LABOR FOR NOVEMBER	FARMLNOV	250.0	_____/HOURS
FARM LABOR FOR DECEMBER	FARMLDEC	250.0	_____/HOURS
SECTION 3			
OFF-FARM LABOR, JAN-DEC	OFFMJ-D1	1920.0	_____/HOURS
OFF-FARM LABOR, JAN-DEC	OFFMJ-D2	720.0	_____/HOURS
SECTION 4			
OPERATING CAPITAL	OPCAPINV	81,150.00	_____/$
LIVESTOCK CAPITAL	LICAPINV	51,500.00	_____/$
BUILDING CAPITAL	BUCAPINV	35,000.00	_____/$

CHAPTER 7

EXPLANATION AND EVALUATION OF A FARM PLAN

Chapters 3 through 6 contained detailed explanations of the individual components which comprise the total farm plan. Chapter 7 will combine these individual components for an example farm in the region. The data will be based on information obtained from the 1978 Clay-Yankton Farm Records Program.

The various budgets, tables, input sheets, and supply sheets needed to adequately describe the true situation will be completed. This data will then be formatted and placed in the computer to obtain the final farm plan. The computer generated farm plan will then be analyzed and explained.

Clay-Yankton Records Summary

A summary of records from farms included in the 1978 Farm Record Program for the area are outlined below. Total acres operated was 364 acres which included 312 acres of cropland, 36 acres of wild hay or grazing land, and 16 acres of wasteland or farmstead. Of the 364 acres operated, approximately 60 percent, or 251 acres, were rented. The average farm used 17.6 months or about 1.5 years of labor each year.

They had livestock sales of $37,217; crop sales of $17,528; and other income (off-farm employment) of $5,287.

They have an average investment of $29,538 in machinery and equipment, $92,656 in land improvements, and $51,612 in livestock and feed.

The farms averaged 135 acres of corn, 40 acres of oats, 68 acres of soybeans, 15 acres of sorghum or corn silage, 45 acres of alfalfa, and 9 acres of set-aside which make up the 312 acres of tillable land.

The farms seemed to be average to high in efficiency of management. They weaned 7.33 pigs per litter and weaned .92 calves per cow. Corn yielded 77 bushels per acre, oats 42 bushels per acre, alfalfa 4.33 tons per acre, and corn silage 9 tons per acre.

Example Farm

For convenience purposes an example farm, based upon data from the farm records previously discussed, will be referred to as the Gene Johnson farm. Mr. Johnson owns 375 acres of land in Southeastern South Dakota. This consists of 315 acres of cropland, 50 acres of pasture, and 10 acres of farmstead and waste. There are 16.4 months of labor supplied per year by Gene and his two sons. He has $60,000 of operating capital and $45,000 of livestock capital available for use.

The Johnson's are currently milking 30 cows, with production per cow ranging from 12,500 to 14,000 pounds of milk annually. He would like to have the optimum number of dairy cows, the most profitable crop organization, and determine whether or not to invest in herd improvement to produce an average of 14,000 pounds of milk annually.

Mrs. Johnson works 40 hours per week in town and is paid $4.60 per hour.

Crop Budgets

Mr. Johnson's first step is the submission of information regarding his crop organization. He wishes to consider a mixture of cash and

dryland feed-crops. The cash crops which are considered are barley, spring wheat, soybeans, and grain sorghum. Corn, oats, corn silage, alfalfa, and grass hay comprise the considered feed-crops.

The steps required for the submission of this data are listed below. These steps should be followed in this order to insure proper completion.

(1) Find the list of the possible budgets on the "Profit and Price Input Sheet" for crops in Chapter 6.

(2) Place a "check mark" next to the activity number of those activities to be included in the farm planning procedure.

(3) Look at the budget forms (in Chapter 3) for those crop activities which are to be included in the farm plan.

(4) Revise the budgets so the personal situation is reflected.

Mr. Johnson feels the budgets are correct for all the crop activities, except soybeans. He thinks he will be able to sell his soybeans for $5.50 instead of $6.00 per bushel. He revises the soybean budget to reflect this situation, and the profit figure changes from $95.94 to $83.44 per acre.

(5) Transfer the desired changes from the individual budgets to Table 7-12, the "Profit and Price Input Sheet" for crops.

Mr. Johnson transfers $83.44 into the column "your estimate" to reflect the decision made above.

(6) On the input sheet, one should also check the sell prices that are listed for feed-crops. These activities reflect the need to dispose of any crops which are raised but not fed as a livestock input. The sell prices should be changed at this time.

Mr. Johnson says alfalfa is expected to sell for about $20.00 per ton instead of $37.00. He revises the input sheet to reflect this situation.

Livestock Budgets

With the crop information submitted, the next step is to complete the data for the desired livestock activities. The procedure is similar to that employed in handling the crop situation.

The budgets (Chapter 4) and the "Profit and Price Input Sheets" (Chapter 6) for the various livestock activities are broken into sections by major livestock type. The beef budgets are completed first and are followed by swine, sheep, dairy, and specialty activities.

The first step is to examine the "Profit and Price Input Sheets" and identify the livestock activities which are to be included in the model. The information is prepared by following the six steps outlined in the crop budgets section.

On the livestock input sheet, one should also check the buy prices listed for needed inputs. These activities reflect the need to purchase any inputs which are not raised or are not raised in sufficient quantity for the desired livestock activity. Any desired changes in the buy prices should be submitted at this time. The buy prices must always remain higher for a given commodity than the sell price of the same commodity for the model to run properly.

Mr. Johnson wishes only to consider a dairy operation in his farm plan. It would have been possible to consider any livestock activity or any combination of those listed in Chapter 6.

He wishes to consider in his farm plan the activities which produce 12,500 and 14,000 pounds of milk annually in a conventional milking parlor which he owns. He believes that it will be impossible to buy corn silage, therefore, he places a very high buy price of $-999.00 in the appropriate blank. He also feels that he can buy alfalfa for $23.00 a ton instead of $40.00. He changes the input sheet to reflect this situation, but is careful to keep the buy price for alfalfa higher than the sell price.

The completed budgets and input sheets for all the activities to be included in his farm plan are presented on the following pages.

Table 7-1. Cash-Crop Budget — Barley (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	43.0 Yield x 2.40 Price/Unit		103.20(1)
VARIABLE COSTS:			
SEED		5.35	
FERTILIZER		18.10	
HERBICIDES		.83	
INSECTICIDES		1.15	
CROP INSURANCE		2.65	
STORAGE & DRYING		1.29	
OVERHEAD		3.50	
FUEL & LUBRICANTS		9.16	
MACHINERY REPAIRS		4.54	
	TOTAL VARIABLE COSTS		46.57(2)
	PROFIT VALUE FOR THE MODEL (1 - 2)		56.63(3)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		10.80	
DEPRECIATION & INSURANCE		13.25	
LABOR		7.47	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		41.02(4)
	PRODUCTION COSTS/ACRE (2 + 4)		87.59(5)
	PRODUCTION COSTS/UNIT (5 ÷ YIELD)		2.04
LAND CHARGES		47.50(6)	
	TOTAL COSTS/ACRE (5 + 6)		135.07(7)
	TOTAL COSTS/UNIT (7 ÷ YIELD)		3.14

Table 7-2. Cash-Crop Budget — Spring Wheat (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	27.0 Yield x 3.50 Price/Unit		94.50(1)
VARIABLE COSTS:			
SEED		7.53	
FERTILIZER		18.10	
HERBICIDES		1.10	
INSECTICIDES		1.15	
CROP INSURANCE		2.50	
STORAGE & DRYING		.81	
OVERHEAD		3.50	
FUEL & LUBRICANTS		9.16	
MACHINERY REPAIRS		4.54	
	TOTAL VARIABLE COSTS		48.39(2)
	PROFIT VALUE FOR THE MODEL (1 - 2)		46.11(3)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		10.85	
DEPRECIATION & INSURANCE		13.25	
LABOR		7.52	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		41.12(4)
	PRODUCTION COSTS/ACRE (2 + 4)		89.51(5)
	PRODUCTION COSTS/UNIT (5 ÷ YIELD)		3.31
LAND CHARGES		47.50(6)	
	TOTAL COSTS/ACRE (5 + 6)		137.01(7)
	TOTAL COSTS/UNIT (7 ÷ YIELD)		5.07

Table 7-3. Cash-Crop Budget — Soybeans (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	25 Yield x 5.50 Price/Unit		137.50(1)
VARIABLE COSTS:			
SEED		11.75	
FERTILIZER		6.36	
HERBICIDES		11.20	
INSECTICIDES		.33	
CROP INSURANCE		2.75	
STORAGE & DRYING		3.75	
OVERHEAD		3.50	
FUEL & LUBRICANTS		9.94	
MACHINERY REPAIRS		4.48	
	TOTAL VARIABLE COSTS		54.06(2)
	PROFIT VALUE FOR THE MODEL (1 - 2)		83.44(3)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		10.60	
DEPRECIATION & INSURANCE		12.15	
LABOR		7.70	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		39.95(4)
	PRODUCTION COSTS/ACRE (2 + 4)		94.01(5)
	PRODUCTION COSTS/UNIT (5 ÷ YIELD)		3.76
LAND CHARGES		47.50(6)	
	TOTAL COSTS/ACRE (5 + 6)		141.51(7)
	TOTAL COSTS/UNIT (7 ÷ YIELD)		5.66

Table 7-4. Cash-Crop Budget — Grain Sorghum (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	52.0 Yield x 2.30 Price/Unit		119.60(1)
VARIABLE COSTS:			
SEED		1.75	
FERTILIZER		25.60	
HERBICIDES		2.42	
INSECTICIDES		5.66	
CROP INSURANCE		2.75	
STORAGE & DRYING		7.80	
OVERHEAD		3.50	
FUEL & LUBRICANTS		11.05	
MACHINERY REPAIRS		4.82	
	TOTAL VARIABLE COSTS		65.35(2)
	PROFIT VALUE FOR THE MODEL (1 - 2)		54.25(3)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		11.45	
DEPRECIATION & INSURANCE		12.80	
LABOR		8.40	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		42.15(4)
	PRODUCTION COSTS/ACRE (2 + 4)		107.50(5)
	PRODUCTION COSTS/UNIT (5 ÷ YIELD)		2.07
LAND CHARGES		47.50(6)	
	TOTAL COSTS/ACRE (5 + 6)		155.00(7)
	TOTAL COSTS/UNIT (7 ÷ YIELD)		2.98

Table 7-5. Dryland Feed-Crop Budget — Corn (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	75 Yield x 2.20 Price/Unit		165.00(1)
VARIABLE COSTS:			
SEED		10.70	
FERTILIZER		25.60	
HERBICIDES		8.58	
INSECTICIDES		6.60	
CROP INSURANCE		3.75	
STORAGE & DRYING		11.25	
OVERHEAD		3.50	
FUEL & LUBRICANTS		11.00	
MACHINERY REPAIRS		5.15	
	TOTAL VARIABLE COSTS		86.13(2)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		13.00	
DEPRECIATION & INSURANCE		15.25	
LABOR		8.75	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		46.50(3)
	PRODUCTION COSTS/ACRE (2 + 3)		132.63(4)
	PRODUCTION COSTS/UNIT (4 ÷ YIELD)		1.77
LAND CHARGES		47.50(5)	
	TOTAL COSTS/ACRE (4 + 5)		180.13(6)
	TOTAL COSTS/UNIT (6 ÷ YIELD)		2.40

Table 7-6. Dryland Feed-Crop Budget — Corn Silage (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	9.0 Yield x 16.0 Price/Unit		144.00(1)
VARIABLE COSTS:			
SEED		8.84	
FERTILIZER		20.40	
HERBICIDES		6.00	
INSECTICIDES		5.00	
CROP INSURANCE		2.00	
STORAGE & DRYING		2.85	
OVERHEAD		3.50	
FUEL & LUBRICANTS		11.77	
MACHINERY REPAIRS		5.45	
	TOTAL VARIABLE COSTS		65.81(2)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		12.75	
DEPRECIATION & INSURANCE		14.40	
LABOR		10.50	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		47.15(3)
	PRODUCTION COSTS/ACRE (2 + 3)		112.96(4)
	PRODUCTION COSTS/UNIT (4 ÷ YIELD)		12.55
LAND CHARGES		47.50(5)	
	TOTAL COSTS/ACRE (4 + 5)		160.46(6)
	TOTAL COSTS/UNIT (6 ÷ YIELD)		17.83

Table 7-7. Dryland Feed-Crop Budget Oats (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	70 Yield x 1.35 Price/Unit		94.50(1)
VARIABLE COSTS:			
SEED		9.09	
FERTILIZER		18.10	
HERBICIDES		1.10	
INSECTICIDES		1.15	
CROP INSURANCE		2.50	
STORAGE & DRYING		2.10	
OVERHEAD		3.50	
FUEL & LUBRICANTS		9.16	
MACHINERY REPAIRS		4.54	
	TOTAL VARIABLE COSTS		51.24(2)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		10.80	
DEPRECIATION & INSURANCE		13.25	
LABOR		7.41	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		40.96(3)
	PRODUCTION COSTS/ACRE (2 + 3)		92.20(4)
	PRODUCTION COSTS/UNIT (4 ÷ YIELD)		1.32
LAND CHARGES		47.50(5)	
	TOTAL COSTS/ACRE (4 + 5)		139.70(6)
	TOTAL COSTS/UNIT (6 ÷ YIELD)		2.00

Table 7-8. Dryland Feed-Crop Budget — Alfalfa (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	3.5 Yield x 20.00 Price/Unit		70.00 (1)
VARIABLE COSTS:			
SEED		4.40	
FERTILIZER		5.40	
HERBICIDES		----	
INSECTICIDES		.57	
CROP INSURANCE		----	
STORAGE & DRYING		----	
OVERHEAD		3.50	
FUEL & LUBRICANTS		10.86	
MACHINERY REPAIRS		13.73	
	TOTAL VARIABLE COSTS		38.46 (2)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		9.10	
DEPRECIATION & INSURANCE		11.35	
LABOR		18.20	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		48.15 (3)
	PRODUCTION COSTS/ACRE (2 + 3)		86.61 (4)
	PRODUCTION COSTS/UNIT (4 ÷ YIELD)		24.75
LAND CHARGES		47.50 (5)	
	TOTAL COSTS/ACRE (4 + 5)		134.11 (6)
	TOTAL COSTS/UNIT (6 ÷ YIELD)		38.32

Table 7-9. Dryland Feed-Crop Budget — Grass Hay (Crop Name)

RECEIPTS:			
TOTAL REVENUE/ACRE	2.8 Yield x 30.0 Price/Unit		84.00(1)
VARIABLE COSTS:			
SEED		1.00	
FERTILIZER		5.40	
HERBICIDES		----	
INSECTICIDES		----	
CROP INSURANCE		----	
STORAGE & DRYING		----	
OVERHEAD		3.50	
FUEL & LUBRICANTS		6.45	
MACHINERY REPAIRS		10.48	
	TOTAL VARIABLE COSTS		26.83(2)
FIXED COSTS:			
INTEREST ON CAP. & INVESTMENT		8.25	
DEPRECIATION & INSURANCE		10.35	
LABOR		15.45	
REAL ESTATE TAX		9.50	
	TOTAL FIXED COSTS		43.55(3)
	PRODUCTION COSTS/ACRE (2 + 3)		70.38(4)
	PRODUCTION COSTS/UNIT (4 ÷ YIELD)		25.13
LAND CHARGES		38.00(5)	
	TOTAL COSTS/ACRE (4 + 5)		108.38(6)
	TOTAL COSTS/UNIT (6 ÷ YIELD)		38.71

Table 7-10. Dairy Cow, 12500 Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased

RECEIPTS:			
MILK	125 cwt x 11.00Price	1375.00	
SALE OF CALVES & CULLS		275.00	
TOTAL RECEIPTS			1650.00(1)
SECTION A COSTS:			
BREEDING CHARGE		15.00	
EQUIPMENT REPAIRS		14.00	
BUILDING REPAIRS		8.75	
VETERINARY & DRUGS		10.50	
MILK HAULING		31.25	
RECORDS & HERD TESTING		15.00	
TRANSPORTATION & MARKETING COSTS		5.65	
SECTION A TOTAL			100.15(2)
PROFIT FIGURE (1 - 2)			1549.85(3)
SECTION B COSTS:			
REPLACEMENT CHARGE	(25% of 1000)	250.00	
CORN	52 bu @ 2.20	250.00	
OATS	54 bu @ 1.35	114.40	
CORN SILAGE	4.8 ton @16.00	72.90	
ALFALFA HAY	2 ton @37.00	74.00	
PRAIRIE HAY	.25 ton @30.00	7.50	
PASTURE	2 AUM @10.00	20.00	
DAIRY SUPPLEMENT	4 cwt @10.00	40.00	
SALT & MINERAL	.8 cwt @ 7.00	5.60	
SECTION B TOTAL			661.20(4)
TOTAL COSTS (2 + 4)			761.35(5)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
AVERAGE VALUE OF COW		850.00	
REPLACEMENT VALUE PER COW		250.00	
GRAIN & FORAGE		112.75	
OTHER COSTS		72.90	
TOTAL AVERAGE CAPITAL REQUIREMENTS			1285.65(6)

Table 7-11. Dairy Cow, 14000 Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased

RECEIPTS:			
MILK	140 cwt x 11.00Price	1540.00	
SALE OF CALVES & CULLS		285.00	
TOTAL RECEIPTS			1825.00(1)
SECTION A COSTS:			
BREEDING CHARGE		15.00	
EQUIPMENT REPAIRS		14.00	
BUILDING REPAIRS		8.75	
VETERINARY & DRUGS		10.50	
MILK HAULING		35.00	
RECORDS & HERD TESTING		15.00	
TRANSPORTATION & MARKETING COSTS		5.65	
SECTION A TOTAL			103.90(2)
PROFIT FIGURE (1 - 2)			1721.10(3)
SECTION B COSTS:			
REPLACEMENT CHARGE	(25% of 1100)	275.00	
CORN	60 bu @ 2.20	132.00	
OATS	55 bu @ 1.35	74.25	
CORN SILAGE	4.75ton @16.00	76.00	
ALFALFA HAY	3.0 ton @37.00	111.00	
PRAIRIE HAY	--- ton @ ---	---	
PASTURE	1.0 AUM @10.00	10.00	
DAIRY SUPPLEMENT	4 cwt @10.00	40.00	
SALT & MINERAL	1.0 cwt @ 7.00	7.00	
SECTION B TOTAL			725.25(4)
TOTAL COSTS (2 + 4)			829.15(5)
AVERAGE OPERATING CAPITAL REQUIREMENTS:			
AVERAGE VALUE OF COW		903.00	
REPLACEMENT VALUE PER COW		275.00	
GRAIN & FORAGE		122.50	
OTHER COSTS		68.25	
TOTAL AVERAGE CAPITAL REQUIREMENTS			1368.75(6)

Table 7-12. Profit and Price Input Sheet - Crops

Activity Number	Crop Activity	Model Name	Model Profit	Your Estimate
X 01.	CORN	CORN	-86.13	_____/ACRE
02.	IRRIGATED CORN	IRRCORN	-72.19	_____/ACRE
X 03.	CORN SILAGE	CORNSILG	-65.81	_____/ACRE
X 04.	OATS	OATS	-51.24	_____/ACRE
X 05.	BARLEY	BARLEY	56.63	_____/ACRE
X 06.	SPRING WHEAT	SPWHEAT	46.11	_____/ACRE
X 07.	ALFALFA	ALFALFA	-38.46	_____/ACRE
08.	IRRIGATED ALFALFA	IRRALF	-87.12	_____/ACRE
09.	FLAX	FLAX	70.87	_____/ACRE
X 10.	SOYBEANS	SOYBEANS	95.94	83.44/ACRE
X 11.	GRAIN SORGHUM	GRAINSOR	54.25	_____/ACRE
X 12.	GRASS HAY	GRASSHAY	-26.83	_____/ACRE
13.	POPCORN	POPCORN	219.95	_____/ACRE
14.	SWEET CORN	SWEETCON	752.45	_____/ACRE
15.	SELL CORN	SELLCORN	2.20	_____/BU
16.	SELL CORN SILAGE	SELLCSIL	16.00	_____/TON
17.	SELL OATS	SELLOATS	1.35	_____/BU
18.	SELL ALFALFA	SELLALF	37.00	20.00/TON
19.	SELL GRASS HAY	SELLGRHAY	30.00	_____/TON

Table 7-13. Profit and Price Input Sheet - Dairy

Activity Number	Livestock Activity	Model Name	Model Profit	Your Estimate
___83.	PRODUCE 10 CWT MILK--1	10CWTMK1	1256.10	_____/HD
X 84.	PRODUCE 12.5 CWT MILK--1	12CWTMK1	1549.85	_____/HD
X 85.	PRODUCE 14 CWT MILK--1	14CWTMK1	1721.10	_____/HD
___86.	PRODUCE 16 CWT MILK--1	16CWTMK1	1915.10	_____/HD
___87.	PRODUCE 10 CWT MILK--2	10CWTMK2	1270.65	_____/HD
___88.	PRODUCE 12.5 CWT MILK--2	12CWTMK2	1564.40	_____/HD
___89.	PRODUCE 14 CWT MILK--2	14CWTMK2	1735.65	_____/HD
___90.	PRODUCE 16 CWT MILK--2	16CWTMK2	1965.65	_____/HD
___91.	PRODUCE 10 CWT MILK--3	10CWTMK3	1270.65	_____/HD
___92.	PRODUCE 12.5 CWT MILK--3	12CWTMK3	1564.40	_____/HD
___93.	PRODUCE 14 CWT MILK--3	14CWTMK3	1735.65	_____/HD
___94.	PRODUCE 16 CWT MILK--3	16CWTMK3	1965.65	_____/HD
___95.	RAISE DAIRY REPLACEMENTS	RDAIRREP	873.10	_____/HD
___31.	BUY CORN	BUYCORN	-2.25	_____/BU
___32.	BUY OATS	BUYOATS	-1.40	_____/BU
X 33.	BUY ALFALFA	BUYALF	-40.00	-23.00/TON
___34.	BUY GRASS HAY	BUYGRHAY	-31.00	_____/TON
X 35.	BUY CORN SILAGE	BUYCSILG	-17.00	-999.00/TON
___37.	BUY SALT & MINERAL	BUYS&MIN	-7.00	_____/CWT
___38.	ANIMAL UNIT MONTHS	AUM	-10.00	_____/AUM
___49.	OPERATING CAPITAL	OPERCAP	-.12	_____/$
___50.	LIVESTOCK CAPITAL	LIVECAP	-.11	_____/$
___71.	BUILDING CAPITAL	BUILDCAP	-.10	_____/$

Table 7-14. Profit and Price Input Sheet - Specialty

Activity Number	Activity	Model Name	Model Profit	Your Estimate
X 109.	OFF-FARM EMPLOYMENT--1	OFF-FME1	4.25	3.75/HOUR
110.	OFF-FARM EMPLOYMENT--2	OFF-FME2	4.75	/HOUR
111.	RENT CROP LAND	RENTCROP	-100.00	/ACRE
112.	RENT PASTURE LAND	RENTPAST	-50.00	/ACRE

Off-Farm Employment Budget

The model was developed with capabilities of handling two different off-farm employment alternatives. It is important to remember that none, one, or both of the budgets may require completion, depending on the actual situation. A guideline form to aid in the completion of the budgets is presented in Chapter 5.

Mrs. Johnson works in town 12 months and 160 hours each month. Her gross pay for the coming year will be $8,820.00. When converted to a monthly basis, she grosses $735 per month. Mr. Johnson enters this value in blank (1) of the form. He feels she spends $75 per month on meals, $50 for gas commuting between home and town, and about $10 for auto repairs. These values are entered in the appropriate blanks. The children require no babysitter, therefore, the corresponding blank contains no entry. The expenses are then totaled and entered in the blank labeled (2).

Monthly profit is then computed by subtracting the value on blank (2) from the value on blank (1). Mr. Johnson arrives at $600 per month. An hourly profit of $3.75 is derived by dividing the monthly profit, $600, by total hours worked per month, 160. This figure, $3.75, is transferred to the appropriate "Profit and Price Input Sheet." Mr. Johnson's completed forms follow.

Table 7-15. Profit of Off-Farm Employment

	Person A		Person B	
MONTHLY SALARY		735.00(1)		_____(1)
LESS POSSIBLE EXPENSES:				
Meals/month	75.00		_____	
Gas/month	50.00		_____	
Auto Repairs/month	10.00		_____	
Babysitter/month	---		_____	
SUBTOTAL		135.00(2)		_____(2)
MONTHLY PROFIT (1 - 2)		600.00(3)		_____(3)
HOURLY PROFIT FOR MODEL (3 ÷ Hours Worked/month)		3.75*		_____**

*This value is transferred to Row 109 of the "Profit Input Sheet" in Chapter 6.

**This value is transferred to Row 110 of the "Profit Input Sheet" in Chapter 6.

Resource Supply Sheets

The final step of data preparation requires the completion of the farm labor form from Chapter 5 and of the "Supplies of Available Resources" sheets from Chapter 6.

Mr. Johnson feels that he supplies 250 hours of labor to the farm each month. His two sons also supply various hours throughout the summer through October. He enters the number of hours, by month, for himself and his two sons. The hours are then totaled by month, and the monthly totals are transferred to Section 2 of the "Supplies of Available Resources" using the following procedure. He places 315 and 50 acres on the blanks for cropland and pasture land, respectively.

Section 2 was completed when farm labor hours were transferred in the above discussion. Section 3 is completed by transferring Mrs. Johnson's monthly off-farm employment hours to the proper blanks.

Mr. Johnson has $60,000 to devote to operations, dairy cattle worth $45,000, and a dairy barn valued at $10,000. This completes Section 4 and is all the information he supplied. The completed Farm Labor Supply Sheet and "Supplies of Available Resources" sheets follow.

Mr. Johnson has supplied the necessary information with the completion of the "Profit and Price Input Sheets" and the "Supplies of Available Resources." Thus, when these input sheets adequately describe the true farm situation they can be submitted to the computer for analysis. The formatted data for Mr. Johnson's farm are available in Appendix D.

Table 7-16. Estimated Monthly Farm Labor Supply

Month	Father	Mother	Person A*	Person B*	Person C*	Total**
			Hours/Month			
January	250					250
February	250					250
March	250					250
April	250					250
May	250		75	75		400
June	250		125	125		500
July	250		125	125		500
August	250		100	100		450
September	250		75	75		400
October	250		50	50		350
November	250					250
December	250					250

*Persons A, B, and C are considered to be non-paid children. Non-paid in the sense that this labor is available without a cost, or without a deduction, from operating capital.

**Total "non-paid" farm hours are to be transferred by month to the "Resources Available Supply Sheet" in Chapter 6.

Table 7-17. Supplies of Available Resources

RESOURCE	MODEL NAME	MODEL SUPPLIES	YOUR ESTIMATE
SECTION 1			
CROPLAND	CROPLAND	315.0	315 /ACRES
PASTURE LAND	PASTLAND	45.0	50 /ACRES
SECTION 2			
FARM LABOR FOR JANUARY	FARMLJAN	250.0	250 /HOURS
FARM LABOR FOR FEBRUARY	FARMLFEB	250.0	250 /HOURS
FARM LABOR FOR MARCH	FARMLMAR	250.0	250 /HOURS
FARM LABOR FOR APRIL	FARMLAPR	250.0	250 /HOURS
FARM LABOR FOR MAY	FARMLMAY	250.0	400 /HOURS
FARM LABOR FOR JUNE	FARMLJUN	250.0	500 /HOURS
FARM LABOR FOR JULY	FARMLJUL	250.0	500 /HOURS
FARM LABOR FOR AUGUST	FARMLAUG	250.0	450 /HOURS
FARM LABOR FOR SEPTEMBER	FARMLSEP	250.0	400 /HOURS
FARM LABOR FOR OCTOBER	FARMLOCT	250.0	350 /HOURS
FARM LABOR FOR NOVEMBER	FARMLNOV	250.0	250 /HOURS
FARM LABOR FOR DECEMBER	FARMLDEC	250.0	250 /HOURS
SECTION 3			
OFF-FARM LABOR, JAN-DEC	OFFMJ-D1	1920.0	1920 /HOURS
OFF-FARM LABOR, JAN-DEC	OFFMJ-D2	720.0	____/HOURS
SECTION 4			
OPERATING CAPITAL	OPCAPINV	81,150.00	60,000/$
LIVESTOCK CAPITAL	LICAPINV	51,500.00	45,000/$
BUILDING CAPITAL	BUCAPINV	35,000.00	10,000/$

Explanation of Output

Sections 1 and 2 of the output provide the relevant information and are presented in Tables 7-19 and 7-20. Table 7-19 gives the profit value of the farm plan in the objective row under the column labeled "ACTIVITY." Mr. Johnson's farm plan returns a profit value of $83,701.12.

For purposes of this study, profit maximization is assumed to be the overriding objective. Mr. Johnson feels that the family's goals can be attained in this manner. He feels there is a direct correlation between the profit figure and the number of indirect goals that can be obtained.

The profit figure, $83,701.12, reflects income over cash costs. To reduce this figure to net family and net-farm income, Table 7-18 must be completed.

The remaining entries under the "ACTIVITY" column indicate how much of the original "Supplies of Available Resources" were used in the production process. In this case all of the cropland, pasture land, farm labor in April, and off-farm employment for the wife were used.

The column "SLACK ACTIVITY" depicts the amount of the original "Supplies of Available Resources" unused in the farm plan. Some farm labor is unused in all months except April. Part of the operating and livestock capital also is unused. The values under the columns "ACTIVITY" and "SLACK ACTIVITY" for the transfer rows, numbers 16 through 23, are zero.

The shadow prices for the slack activities, which are zero, are printed in the column labeled "DUAL ACTIVITY." The profit row value in this column should be ignored. The remaining values specify the change

Table 7-18. Work Form for Deriving Net-Farm Income

Profit Figure from Computer Output		_____(1)
Depreciation on Equipment (use actual amount or estimate at 10% of equipment investment)	_____	
Depreciation on Buildings (use actual amount or estimate at 5% of building investment)	_____	
Interest on Borrowed Capital (computer deducts)		
Repairs (computer deducts)		
Land Taxes	_____	
Insurance on Real Estate	_____	
Insurance on Machinery	_____	
Insurance on Personal Property	_____	
Total Fixed Deductions (add above items)		_____(2)
NET FAMILY INCOME (1 - 2)		_____(3)
Less Off-Farm Income	_____(4)	
NET FARM INCOME (3 - 4)		_____(5)
Less Family Living Expenses	_____(6)	
CASH REMAINING FOR NEW INVESTMENTS, LUXURY SPENDING, AND SAVINGS (5 - 6)		_____(7)

Table 7-19. Section 1 of the Output--The Rows Section

SECTION 1 - ROWS

NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
1	PROFIT	BS	83701.11787	83701.11787-	NONE	NONE	1.00000
2	CROPLAND	UL	315.00000	.	NONE	315.00000	32.78864-
3	PASTLAND	UL	50.00000	.	NONE	50.00000	57.17000-
4	FARMLJAN	BS	193.63905	56.36095	NONE	250.00000	.
5	FARMLFEB	BS	193.63905	56.36095	NONE	250.00000	.
6	FARMLMAR	BS	193.63905	56.36095	NONE	250.00000	.
7	FARMLAPR	UL	250.00000	.	NONE	250.00000	253.25678-
8	FARMLMAY	BS	298.54931	101.45069	NONE	400.00000	.
9	FARMLJUN	BS	298.54931	201.45069	NONE	500.00000	.
10	FARMLJUL	BS	217.32742	282.67258	NONE	500.00000	.
11	FARMLAUG	BS	214.00789	235.99211	NONE	450.00000	.
12	FARMLSEP	BS	392.94633	7.05367	NONE	400.00000	.
13	FARMLOCT	BS	334.54142	15.45858	NONE	350.00000	.
14	FARMLNOV	BS	193.63905	56.36095	NONE	250.00000	.
15	FARMLDEC	BS	193.63905	56.36095	NONE	250.00000	.
16	CORNINV	EQ	.	.	.	.	2.25000-
17	OATSINV	EQ	.	.	.	.	1.40000-
18	GRHAYINV	EQ	.	.	.	.	30.00000-
19	ALFINV	EQ	.	.	.	.	20.35676-
20	AUMINV	EQ	.	.	.	.	55.97500-
21	SILAGINV	EQ	.	.	.	.	16.58333-
22	SALTMIN	EQ	.	.	.	.	7.00000-
23	DAIRYSUP	EQ	.	.	.	.	10.00000-
24	OFFHJ-D1	EQ	1920.00000	.	1920.00000	1920.00000	3.75000-
25	OPCAPINV	BS	21150.29914	38849.70085	NONE	60000.00000	.
26	LICAPINV	BS	42600.59171	2399.40828	NONE	45000.00000	.
27	BARRCAP	BS	.	.	NONE	NONE	.

Table 7-20. Section 2 of the Output--The Columns Section

SECTION 2 - COLUMNS

NUMBER	.COLUMN.	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	.REDUCED COST.
28	CORN	LL	.	86.13000-	.	NONE	.82000-
29	OATS	LL	.	51.24000-	.	NONE	11.35432-
30	BARLEY	LL	.	56.63000	.	NONE	14.14716-
31	SPWHEAT	LL	.	46.11000	.	NONE	24.66716-
32	SOYBEANS	BS	261.36506	83.44000	.	NONE	.
33	GRAINSOR	LL	.	54.25000	.	NONE	3.86432-
34	CORNSILG	BS	20.43968	65.81000-	.	NONE	.
35	GRASSHAY	BS	17.72682	26.83000-	.	NONE	.
36	ALFALFA	BS	33.19527	38.46000-	.	NONE	.
37	12CWTMK1	LL	.	1549.85000	.	NONE	194.39741-
38	14CWTMK1	BS	38.72781	1721.10000	.	NONE	.
39	AUM	BS	32.27318	10.00000-	.	NONE	.
40	BUYCORN	BS	2323.66864	2.25000-	.	NONE	.
41	BUYOATS	BS	2130.02959	1.40000-	.	NONE	.
42	BUYALF	LL	.	23.00000-	.	NONE	2.64324-
43	BUYCSILG	LL	.	999.00000-	.	NONE	982.41667-
44	BUYGRHAY	LL	.	31.00000-	.	NONE	1.00000-
45	BUYS&MIN	BS	38.72781	7.00000-	.	NONE	.
46	BUYDAIRS	BS	154.91124	10.00000-	.	NONE	.
47	SELLCORN	LL	.	2.20000	.	NONE	.05000-
48	SELLOATS	LL	.	1.35000	.	NONE	.05000-
49	SELLALF	LL	.	20.00000	.	NONE	.35676-
50	SELLCSIL	LL	.	16.00000	.	NONE	.58333-
51	SELGRHAY	BS	49.63511	30.00000	.	NONE	.
52	OPERCAP	LL	.	.12000-	.	NONE	.12000-
53	LIVECAP	LL	.	.11000-	.	NONE	.11000-
54	OFF-FME1	BS	1920.00000	3.75000	.	NONE	.

in the value of the farm plan which would result from one less unit of the resource in the original "Supplies of Available Resources." In Mr. Johnson's example, all values are followed by a minus sign, indicating that tightening the resource restraints would lessen the value of the farm plan. Resources which are in excess supply have a shadow price of zero. Zeroes in the output appear as blanks except for the decimal point. In this case, one less acre of cropland would reduce profit by $32.79, and one less hour of labor in April would reduce profit by $253.25.

Section 2 provides information on the actual activities in the final farm plan. Activity levels are printed under the column labeled "ACTIVITY." The level of the activity appears in the output in the same units as it was entered on the forms available in Chapter 6. Mr. Johnson raised 261 acres of soybeans, 20 acres of corn silage, 18 acres of grass hay, and 33 acres of alfalfa. He milks 39 dairy cows producing 140 cwt. of milk annually. He purchases the necessary corn, oats, salt and mineral, and dairy supplement for his dairy operation. He sells 49.5 tons of grass hay which are not needed in his present operation.

The column "Input Cost" repeats the original profit figure and prices assigned in the model. They have no significance in interpreting the output report except to see that they correspond to the values originally intended. It is easy to see that the buy corn silage price has indeed been changed to $-999.00, and the profit on soybeans is $83.44.

The lower and upper limit columns will contain meaningful entries only when the original model contains provisions for bounding the activities. Bounding can be used to force activities into or out of the model. There were none used in this farm plan.

The reduced cost column shows the income penalties associated with forcing an activity currently not in the farm plan into the plan. Oats, for example, are not in the plan and a zero is found in the activity column. The reduced cost column entry of -11.35 shows that forcing one acre of oats into the plan would reduce profit by $11.35.

Mr. Johnson's farm plan can be summarized as follows. The farm plan should produce a profit of $83,701.12 if the profit, price, and supply values he supplied are realistic. He should produce soybeans, corn silage, grass hay, and alfalfa and should milk about 39 cows. If more labor were available to the farm in April, profit could be increased.

This is the best plan available given Mr. Johnson's information. This does not mean that it is totally realistic. He may feel it is better to plant less soybeans and plant some corn and oats. This would alleviate the purchase of corn and oats for the dairy activity. The computerized farm plan is designed to provide a foundation to which the farmer can apply common sense to aid him in his managerial process.

CHAPTER 8

REVIEW OF LITERATURE

Several studies discussing various methods of aiding less-than-adequate farms are analyzed in this chapter. An investigation of objectives, procedures, and conclusions provides a basis of what has already been done. Various programs will be discussed and analyzed to provide the foundation for this study. The discussion will be broken into three categories: (1) educational programs, (2) combination of normal and alternative enterprises for optimum resource use, and (3) computer assisted programs.

Educational Programs

There are a great number of these studies available. Most of them are conducted by the state's extension agents with support help from state specialists. The method used most commonly was for the Extension Service to employ local farmers as program aides to work with low income farmers on an intensive basis to help develop the capacity of these farmers to take advantage of income opportunities available to them. The objective was to demonstrate the effectiveness of a program aide in working with small farm operators on an intensive basis to bring about changes in production and management practices.

In conclusion, incomes and living standards were increased, but not substantially.

The major accomplishment of these studies was not one of increasing anything. They did show that a majority of the farmers were

interested in helping themselves and would do it if methods were available. Later studies have used the premise of farmers helping themselves to develop new methods of aiding farmers. With this supposition, it is no wonder that methods to aid farmers have advanced through stages to the degree available today.

Examples of the above studies were carried out in: Lawrence County, Alabama (1); Trigg County, Kentucky (2); Shelby County, Tennessee (3); and ten counties scattered throughout Texas (4).

Five recommendations were made from a summary of the above studies: (1) determine resource adjustment rates, (2) demonstrate income possibilities on efficiently operated and managed farm units, (3) determine and demonstrate the value of fertilizer use, (4) refine existing input-output data for use in farm planning, and (5) identify problems needing additional research.

Alternative Enterprise Combinations

Most studies dealing with alternative enterprises use a guideline approach. The objective of the study is to enlighten farmers to the various activities which are adaptable to the region. They tend to concentrate on specialty activities in general terms showing approximately how much of each resource (land, labor, capital, and management) is needed and the timeliness of it.

The Agricultural Research Service (5) in 1966 issued information concerning the general characteristics of different livestock activities. The bulletin provides health, feeding, and housing conditions necessary to handle various livestock types. It provides general

information on normal activities such as beef, sheep, swine, etc., and included bees and rabbits as specialty or alternative activities.

Brockett (6) and Stewart (7) provided more detailed information for both crops and livestock with both normal and specialty activities for each. Stewart's study showed an increase in income when a combination of both normal and specialty activities were included in the farm plan. This type of farm plan enabled more efficient resource allocation. Brockett's study did not attempt to analyze any enterprise combinations. It showed only what was available and resources required.

These studies provided information and budgets in an attempt to give farmers alternatives which might enable more efficient resource use, and thus, increase incomes. Budgeting is a method for allocating resources efficiently if there are limited activities. These studies do a very good job of aiding farmers with few activity alternatives to consider. For more than a few activities, budgeting is time consuming and can become complex. Therefore, to determine an optimum farm plan of any complexity, using this method is uneconomical and must be modified.

Computer Assisted Programs

Woolf, Wiegmann, and Fielder (8) attempted to examine budgets of alternative opportunities for increasing incomes on small farms in four river areas of the Mississippi River Delta in Louisiana. They presented planning guides for use by farmers in choosing the most profitable combination of resources and enterprises given their resource limitations. Linear programming techniques were used to determine maximum profit plans on small farms with different quantities of resources and given techniques of production.

The authors determined that even though all situations programmed may not exactly apply to any given farm, they should serve as guides for many farms with similar resources. As resources (such as size of farm, available labor, etc.) change for any farm situation, the optimum combination of enterprises will also change.

The study enabled farmers to plan their farm operation in an efficient manner using a linear programming model. The only problem is the farm plan that the farmers refer to is not their own. This may or may not provide an optimal solution to their own situation. The only way that every farmer can get their own optimal solution is for them to use the model with their own actual resources.

Summary

The study done here was an attempt to carry forward one more step what all of the above studies have done. The study is based on the premise that farmers want to help themselves. Then a combination of budgeting and linear programming was used to enable farmers to provide personal data on resources available.

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APPENDIX A

EXPLANATION OF THE FUEL AND LUBRICANTS FIGURE TO BE USED IN THE CROP BUDGETS

The following tables, A-1 to A-10, are provided as an average implement complement for each crop. Total hours per acre are determined for use in figuring the budget value for fuel and lubricants. Table A-11 provides the gallons of fuel used per hour based on the type of fuel and the tractor's horsepower rating.

Total hours per acre are figured by multiplying the first three columns of the table (implement width, tractor speed, and average efficiency) to produce the subtotal. Hours per acre is equal to 8.25 divided by the subtotal. This figure is then multiplied by the number of times over for each implement to get total hours per acre. The sum of this column provides the total hours per acre of the entire machinery complement.

Once this figure and the figure for gallons of fuel per hour are obtained, the fuel and lubricants value can be computed. The computational format is: total hours/acre x gal. of fuel/hour x 1.15 x price of fuel. This is the value for fuel and lubricants in each respective budget. Table A-12 is provided for any computations necessary to change the fuel and lubricants value.

Table A-1. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Corn

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	1.0	.2865
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Cycloplanter W/F	13.0	7.0	.70	63.60	.1295	1.0	.1295
4-Row Cultivator	13.0	3.8	.76	37.54	.2197	.75	.1648
SP Combine-Corn	13.3	3.0	.67	26.73	.3086	1.0	.3086
Stalk Shredder	12.5	4.8	.81	48.60	.1698	1.0	.1698
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.57	.0764
							1.3972

1.3972 x 6.534 x 1.15 x 1.00 = 10.50 + .50 for trucking = 11.00

Table A-2. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Irrigated Corn

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	1.0	.2865
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	2.0	.2470
Cycloplanter W/F	13.0	7.0	.70	63.70	.1295	1.0	.1295
4-Row Cultivator	13.0	3.8	.76	37.54	.2197	1.0	.2197
SP Combine-Corn	13.3	3.0	.67	26.73	.3086	1.0	.3086
Stalk Shredder	12.5	4.8	.81	48.60	.1698	1.0	.1698
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.82	.1099
							1.6091

1.6091 x 6.534 x 1.15 x 1.00 = 12.09 + 1.00 for trucking = 13.09

Table A-3. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Oats, Barley, and Spring Wheat

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
Chisel Wheel MTD	25.0	4.1	.80	82.00	.1006	1.0	.1006
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Drill 2-8f; W/F	16.0	4.0	.68	43.52	.1892	1.0	.1892
SP Swather	10.5	5.5	.77	44.47	.1203	1.0	.1203
SP Combine-Grain	13.3	3.0	.67	26.73	.3086	1.0	.3086
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.8	.1072
							1.153

1.153 x 6.534 x 1.15 x 1.00 = 8.66 + .50 for trucking = 9.16

Table A-4. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Flax

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
Chisel Wheel MTD	25.0	4.1	.80	82.00	.1006	1.0	.1006
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Drill 2-8f; W/F	16.0	4.0	.68	43.52	.1896	1.0	.1896
SP Swather	10.5	5.5	.77	44.47	.1203	1.0	.1203
SP Combine-Grain	13.3	3.0	.67	26.73	.3086	1.0	.3086
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.52	.0697
							1.1155

1.1155 x 6.534 x 1.15 x 1.00 = 8.38 + .50 for trucking = 8.88

Table A-5. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Soybeans

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	1.0	.2865
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Cycloplanter W/F	13.0	7.0	.70	63.70	.1295	1.0	.1295
4-Row Cultivator	13.0	3.8	.76	37.54	.2197	1.2	.2636
SP Combine-Grain	13.3	3.0	.67	26.73	.3086	1.0	.3086
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.05	.0067
							1.2565

1.2565 x 6.534 x 1.15 x 1.00 = 9.44 + .50 for trucking = 9.94

Table A-6. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Grain Sorghum

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	1.0	.2865
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Cycloplanter W/F	13.0	7.0	.70	63.70	.1295	1.0	.1295
4-Row Cultivator	13.0	3.8	.76	37.54	.2197	1.2	.2636
SP Combine-Grain	13.3	3.0	.67	26.73	.3086	1.0	.3086
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	1.15	.1541
							1.4039

1.4039 x 6.534 x 1.15 x 1.00 = 10.54 + .50 for trucking = 11.05

Table A-7. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Alfalfa

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	.33	.0945
Tandom Disc	15.0	4.8	.83	59.76	.1381	.33	.0456
Drill 2-8f; W/F	16.0	4.0	.68	43.52	.1896	.33	.0626
Spike Harrow	18.0	5.3	.70	66.78	.1235	.33	.0408
SP Swather	10.5	5.5	.77	44.47	.1855	3.0	.5566
Medium Baler	20.5	3.0	.67	41.20	.2002	3.0	.6007
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.33	.1541
							1.4450

1.445 x 6.534 x 1.15 x 1.00 = 10.86

Table A-8. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Irrigated Alfalfa

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	.35	.1003
Tandom Disc	15.0	4.8	.83	59.76	.1381	.70	.0967
Drill 2-8f; W/F	16.0	4.0	.68	43.52	.1896	.35	.0664
Spike Harrow	18.0	5.3	.70	66.78	.1235	.70	.0865
SP Swather	10.5	5.5	.77	44.47	.1855	3.5	.6493
Medium Baler	20.5	3.0	.67	41.20	.2002	3.5	.7007
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.55	.0737
							1.7736

1.7736 x 6.534 x 1.15 x 1.00 = 13.33

Table A-9. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Grass Hay

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	.1	.0287
Tandom Disc	15.0	4.8	.83	59.76	.1381	.1	.0138
Drill 2-8f; W/F	16.0	4.0	.68	43.52	.1896	.1	.0190
Spike Harrow	18.0	5.3	.70	66.78	.1235	.1	.0124
SP Swather	10.5	5.5	.77	44.47	.1855	2.0	.3710
Medium Baler	20.5	3.0	.67	41.20	.2002	2.0	.4004
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.1	.0134
							.8587

.8587 x 6.534 x 1.15 x 1.00 = 6.45

Table A-10. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Corn Silage

Implements	Impl. Width	Tractor Speed	Average Efficiency	Sub-Total	Hrs./ acre	Times Over	Total hrs./acre
6-16 TS-SM Plow	8.0	4.5	.80	28.80	.2865	1.0	.2865
Tandom Disc	15.0	4.8	.83	59.76	.1381	1.0	.1381
Spike Harrow	18.0	5.3	.70	66.78	.1235	1.0	.1235
Cycloplanter W/F	13.0	7.0	.70	63.70	.1295	1.0	.1295
4-Row Cultivator	13.0	3.8	.76	37.54	.2197	.60	.1318
Silage Cutter	6.6	4.0	.60	15.84	.5208	1.0	.5208
Stalk Chopper	12.5	4.8	.81	48.60	.1698	1.0	.1698
Sprayer 8-Row	27.0	3.8	.60	61.56	.1340	.50	.0670
							1.567

1.567 x 6.534 x 1.15 x 1.00 = 11.77

Table A-11. Gallons of Fuel Per Hour by Horsepower Rating

Horsepower	Gas	LP	Diesel
35	2.415	2.867	1.694
45	3.105	3.686	2.178
60	4.140	4.914	2.904
80	5.520	6.552	3.872
100	6.900	8.190	4.840
125	8.625	10.238	6.050
135	9.315	11.057	6.534
165	11.385	13.514	7.986
180	12.420	14.742	8.712

Table A-12. Fuel and Lubricant Value Computational Worksheet

Crop	Total Hrs. Per Acre	Gallons of Fuel/Hour	Lubricant Multiplier	Price of Fuel/Gal.	Final Value for Budget

APPENDIX B

Table B-1. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow and Finish Butcher Hogs Using the Crate Method for 8 Sows

BUILDING COSTS:			
INSULATION		350.00	
INSTALLING INSULATION		150.00	
LUMBER		300.00	
REMOVE & REPLACE FIXTURES		375.00	
MISCELLANEOUS EXPENSES		200.00	
LABOR		225.00	
TOTAL BUILDING COSTS			1600.00
PER SOW			200.00
EQUIPMENT COSTS:			
FURNACE		400.00	
HEAT LAMPS	8 @ 4.35	35.00	
WATERERS	6 @ 70.00	420.00	
FEEDERS	3 @ 70.00	210.00	
FARROWING CRATES	8 @ 230.00	1840.00	
TOTAL EQUIPMENT COSTS			2905.00
PER SOW			363.15

Table B-2. Building and Equipment Costs for Remodeling a Barn to Farrow and Finish Butcher Hogs Using the Pen Method for 8 Sows

BUILDING COSTS:			
INSULATION		350.00	
INSTALLING INSULATION		150.00	
LUMBER		500.00	
REMOVE & REPLACE FIXTURES		400.00	
MISCELLANEOUS EXPENSES		250.00	
LABOR		300.00	
TOTAL BUILDING COSTS			1950.00
PER SOW			243.75
EQUIPMENT COSTS:			
FURNACE		400.00	
HEAT LAMPS	8 @ 4.35	35.00	
WATERERS	6 @ 70.00	420.00	
FEEDERS	3 @ 70.00	210.00	
WATER PANS	8 @ 2.00	16.00	
FEED PANS	8 @ 2.00	16.00	
MISCELLANEOUS		33.00	
TOTAL EQUIPMENT COSTS			1130.00
PER SOW			141.25

Table B-3. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow 18 Sows with the Crate Method for Selling Feeder Pigs

BUILDING COSTS:			
INSULATION		350.00	
INSTALLING INSULATION		150.00	
LUMBER		150.00	
REMOVE & REPLACE FIXTURES		250.00	
MISCELLANEOUS EXPENSES		300.00	
LABOR		150.00	
TOTAL BUILDING COSTS			1350.00
PER SOW			75.00
EQUIPMENT COSTS:			
FURNACE		400.00	
HEAT LAMPS	18 @ 4.00	70.00	
WATERERS	2 @ 70.00	140.00	
FEEDERS	2 @ 70.00	140.00	
FARROWING CRATES	18 @ 230.00	4140.00	
TOTAL EQUIPMENT COSTS			4890.00
PER SOW			271.70

Table B-4. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow 18 Sows with the Pen Method for Selling Feeder Pigs

BUILDING COSTS:			
INSULATION		350.00	
INSTALLING INSULATION		150.00	
LUMBER		600.00	
REMOVE FIXTURES		250.00	
MISCELLANEOUS EXPENSES		200.00	
LABOR		250.00	
TOTAL BUILDING COSTS			1800.00
PER SOW			100.00
EQUIPMENT COSTS:			
FURNACE		400.00	
HEAT LAMPS	18 @ 4.00	70.00	
WATERERS	2 @ 70.00	140.00	
FEEDERS	2 @ 70.00	140.00	
WATER PANS	18 @ 2.00	36.00	
FEED PANS	18 @ 2.00	36.00	
MISCELLANEOUS		28.00	
TOTAL EQUIPMENT COSTS			850.00
PER SOW			47.25

Table B-5. Approximate Building and Equipment Costs for Remodeling a Barn to Finish Feeder Pigs with the Pen Method

BUILDING COSTS:			
INSULATION		350.00	
INSTALLING INSULATION		150.00	
LUMBER		250.00	
REMOVE & REPLACE FIXTURES		400.00	
MISCELLANEOUS EXPENSES		150.00	
LABOR		200.00	
TOTAL BUILDING COSTS			1500.00
PER SET OF FEEDERS			31.25
EQUIPMENT COSTS:			
FURNACE		400.00	
HEAT LAMPS	10 @ 4.00	40.00	
WATERERS	6 @ 70.00	420.00	
FEEDERS	6 @ 70.00	420.00	
MISCELLANEOUS		20.00	
TOTAL EQUIPMENT COSTS			1300.00
PER SET OF FEEDERS			27.10

Table B-6. Approximate Building and Equipment Costs to Implement a Pasture Finish Operation

BUILDING COSTS:			
SMALL SHED		200.00	
TOTAL BUILDING COSTS			200.00
PER SET OF FEEDERS			10.00
EQUIPMENT COSTS:			
FEEDERS	3 @ 70.00	210.00	
WATERERS	3 @ 70.00	210.00	
FENCE		180.00	
TOTAL EQUIPMENT COSTS			600.00
PER SET OF FEEDERS			30.00

Table B-7. Approximate Building and Equipment Costs for Remodeling a Barn for Milking 10 Dairy Cows

BUILDING COSTS:		
REMOVE FIXTURES	200.00	
CARPENTRY	150.00	
ELECTRICAL HOOKUP	300.00	
PLUMBING	150.00	
GENERAL LABOR & HOOKUP	200.00	
TOTAL BUILDING COSTS		1000.00
PER COW		100.00
EQUIPMENT COSTS:		
WATER TANK	200.00	
STANCHIONS	350.00	
VACUUM PUMP	225.00	
BUCKETS & PIPE	100.00	
MISCELLANEOUS	50.00	
LABOR	50.00	
BULK TANK & HOOKUP	225.00	
TOTAL EQUIPMENT COSTS		1175.00
PER COW		117.50

APPENDIX C

Table C-1. Complete Matrix for the Model

	CORN	IRRCORN	CORNSILG	OATS	BARLEY	SPWHEAT	ALFALFA	IRRALF	FLAX	SOYBEANS	GRAINSOR	GRASSHAY
PROFIT	-88.52	-147.23	-65.15	-53.10	54.69	44.24	-40.73	-55.78	69.05	93.92	52.00	-34.23
CROPLAND	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
PASTLAND												1.0
FARMLAPR	.2	.3	.2	.1	.15	.15		.06		.2	.1	
FARMLMAY	.3	.4	.3	.3	.25	.25	.4	.45	.3	.3	.4	.4
FARMLJUN	.25	.7	.3	.3	.3	.3	.4	.9	.3	.3	.5	.4
FARMLJUL		.4		.5	.5	.5	.5	.8	.5			.4
FARMLAUG		.8		.5	.5	.5	.4	.6	.5			.4
FARMLSEP	.7	1.0	.8	.25	.25				.25	.7	.9	
FARMLOCT	.8	.35	.5					.1		.5	.4	
CORNINV	-75.0	-130.0										
OATSINV				-70.0								
ALFINV							-3.5	-6.0				
GRHAYINV												-2.8
SILAGINV			-9.0									
OPCAPINV	18.00	65.00										

Table C-1. Continued

	BUYCORN	SELLCORN	BUYOATS	SELLOATS	BUYALF	SELLALF	BUYCSIL	SELCSIL	BUYGRHAY	SELGRHAY
PROFIT	-2.25	2.20	-1.40	1.35	-40.00	37.00	-17.00	16.00	-31.00	30.00
CORNINV	-1.0	1.0								
OATSINV			-1.0	1.0						
ALFINV					-1.0	1.0				
GRHAYINV									-1.0	1.0
SILAGINV							-1.0	1.0		
OPCAPINV	2.25		1.40		40.00		17.00		31.00	

Table C-1. Continued

	BUYS&MIN	BUYGEEFS	BUYPORKS	BUYDAIRS	BUYSHEPS	BUYPIGCR	BUYMKST	BUYCAFST	BUYCAFGR	AUM
PROFIT	-7.00	-10.00	-16.00	-10.00	-10.00	-17.70	-48.20	-11.90	-14.25	-10.00
SALT&MIN	-1.0									
BEEFSUPP		-1.0								
PORKSUPP			-1.0							
DIARSUPP				-1.0						
SHEEPSUP					-1.0					
MILSTART							-1.0			
CALSTART								-1.0		
CALFGROW									-1.0	
PIGCREEP						-1.0				
PASTLAND										1.0
AUMINV										-1.2
OPCAPINV	7.00	10.00	16.00	10.00	10.00	17.00	48.20	11.90	14.25	10.00

Table C-1. Continued

	BEEFCOWF	BEEFCOWC	RREPHEIF	WINTSTER	SUMMSTER	W&SSTEER	WINTHEIF	FINTSTER	FULFHEIF	FINYSTER	FINYHEIF
PROFIT	-18.25	-18.30	-16.60	-2.95	599.00	-4.40	-3.30	770.35	634.40	835.50	731.30
FARMLFAN	.6	.5	1.0	.7		.6	.7	.2	.2	.2	.2
FARMLFEB	.6	.5	1.0	.7		.6	.7	.2	.2	.2	.2
FARMLMAR	1.1	.75	.75			.5		.2	.2	.2	.2
FARMLAPR	1.1	.75	.75		.3	.5		.2	.2	.2	.2
FARMLMAY	.5	.75	.5		.3	.5		.2	.2	.2	.2
FARMJUN	.5	.75	.5		.3	.5		.2	.2	.2	.2
FARMLJUL	.1	.4	.5		.3	.2		.2	.2	.2	
FARMLAUG	.1	.4	.5		.3	.2		.2	.2		
FARMLSEP	.25	.6	.75	.3	.4	.3	.3	.2	.2		
FARMLOCT	.25	.6	.75	.4		.3	.4	.2	.2		
FARMLNOV	.6	.5	1.0	.7		.6	.7	.2		.2	
FARMLDEC	.6	.5	1.0	.7		.6	.7			.2	.2
CORNINV	2.0	9.0		8.0			8.0	48.0	40.0	44.0	32.0
OATSINV	4.0	4.0	24.0	14.0			13.0	10.0	8.0		
ALFINV	.4	.4	.3	.35			.3	.9	.8	.4	.3
GRHAYINV	1.3	1.3	.9			.75		.4	.2	.96	
AUMINV	8.0	8.0	5.0		3.4	3.2					
SILAGINV				.65			.6				2.5

Table C-1. Continued

	BEEFCOWF	BEEFCOWC	RREPHEIF	WINTSTER	SUMMSTER	W&SSTEER	WINTHEIF	FINTSTER	FULFHEIF	FINYSTER	FINYHEIF
SALT&MIN	.6	.6	.3	.1	.1	.2	.1	.3	.25	.15	.15
BEEFSUPP	1.5	1.5	2.0			2.0		2.25	2.0	1.1	2.0
BEEFCOW	1.0	1.0									
REPHEIF			-1.0								
CULLCOW	-.15	-.15									
YEARSTER				-1.0	1.0	-1.0				1.0	
YEARHEIF							-1.0				1.0
STERCALF	-.46	-.46		1.0		1.0		1.0			
HEIFCALF	-.30	-.30	1.0				1.0		1.0		
OPCAPINV	55.00	55.00	130.00	40.00	15.00	55.00	35.00	80.00	70.00	60.00	45.00
LICAPINV	2700.00	2700.00	400.00	400.00	500.00	400.00	320.00	400.00	320.00	570.00	460.00

Table C-1. Continued

	BUYYSTER	SELYSTER	BUYYHEIF	SELYHEIG	BUYSTCF	SELLSTCF	BUYHFCF	SELHFCF	SELREPHF	SELLCULL
PROFIT	-565.00	555.00	-430.00	420.00	-410.00	400.00	-330.00	320.00	300.00	550.00
YEARSTER	-1.0	1.0								
YEARHEIF			-1.0	1.0						
STERCALF					-1.0	1.0				
HEIFCALF							-1.0	1.0		
REPHEIF									1.0	
CULLCOW										1.0
LICAPINV	565.00		430.00		410.00		330.00			

Table C-1. Continued

	T0CWTMK1	T2CWTMK1	T4CWTMK1	T6CWTMK1	T0CWTMK2	T2CWTMK2	T4CWTMK2	T6CWTMK2
PROFIT	1265.10	1549.85	1721.10	1915.10	1270.65	1564.40	1735.65	1965.65
FARMLJAN	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLFEB	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLMAR	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLAPR	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLMAY	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLJUN	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLJUL	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLAUG	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLSEP	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLOCT	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLNOV	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
FARMLDEC	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
CORNINV	45.0	52.0	60.0	75.0	45.0	52.0	60.0	75.0
OATSINV	50.0	54.0	55.0	60.0	50.0	54.0	55.0	60.0
ALFINV	2.0	2.0	3.0	3.0	2.0	2.0	3.0	3.0
GRHAYINV	.25	.25			.25	.25		
AUMINV	4.0	2.0	1.0	1.0	4.0	2.0	1.0	1.0
SILAGINV	2.5	4.8	4.75	4.75	2.5	4.8	4.75	4.75
SALT&MIN	.6	.8	1.0	1.0	.6	.8	1.0	1.0
DAIRSUPP	4.0	4.0	4.0	4.5	4.0	4.0	4.0	4.5
OPCAPINV	170.85	185.65	198.00	213.00	163.60	178.35	190.75	205.70
LICAPINV	800.00	1000.00	1100.00	1200.00	800.00	1000.00	1100.00	1200.00

Table C-1. Continued

	T0CWTMK3	T2CWTMK3	T4CWTMK3	T6CWTMK3	RDAIRREP	BUYDARHF	BUYFLAMB	SELLLAMB
PROFIT	1270.65	1564.40	1735.65	1965.65	873.10	-125.00	-51.10	50.00
FARMLJAN	6.0	6.0	6.0	6.0	2.0			
FARMLFEB	6.0	6.0	6.0	6.0	2.0			
FARMLMAR	6.0	6.0	6.0	6.0	2.0			
FARMLAPR	6.0	6.0	6.0	6.0	2.0			
FARMLMAY	6.0	6.0	6.0	6.0	1.0			
FARMLJUN	6.0	6.0	6.0	6.0	1.0			
FARMLJUL	6.0	6.0	6.0	6.0	1.0			
FARMLAUG	6.0	6.0	6.0	6.0	1.0			
FARMLSEP	6.0	6.0	6.0	6.0	2.0			
FARMLOCT	6.0	6.0	6.0	6.0	2.0			
FARMLNOV	6.0	6.0	6.0	6.0	2.0			
FARMLDEC	6.0	6.0	6.0	6.0	2.0			
CORNINV	45.0	52.0	60.0	75.0	3.0			
OATSINV	50.0	54.0	55.0	60.0	7.0			
ALFINV	2.0	2.0	3.0	3.0	1.1			
GRHAYINV	.25	.25			2.2			

Table C-1. Continued

	T0CWTMK3	T2CWTMK3	T4CWTMK3	T6CWTMK3	RDAIRREP	BUYDARHF	BUYFLAMB	SELLLAMB
AUMINV	4.0	2.0	1.0	1.0	7.0			
SILAGINV	2.5	4.8	4.75	4.75				
SALT&MIN	.6	.8	1.0	1.0	.3			
DAIRSUPP	4.0	4.0	4.0	4.5	1.2			
OPCAPINV	163.60	178.35	190.75	205.70	160.00	125.00		
LICAPINV	800.00	1000.00	1100.00	1200.00	250.00		51.10	
BUCAPINV	2000.00	2000.00	2000.00	2000.00				
MILSTART					.35			
CALSTART					2.4			
CALFGROW					2.9			
FEEDLAMB							-1.0	1.0
DAIRYHEF					1.0	-1.0		

Table C-1. Continued

	MAYFLAMB	JULMLAMB	AUGFLAMB	FDRMKLAM	RREPEWES	DRYLOTFD	FEEDMLAMB
PROFIT	70.57	90.48	70.57	80.58	94.03	7124.40	-4.10
FARMLJAN	.15	.15	.15	.2			.15
FARMLFEB	.15	.15	.15	.2			.15
FARMLMAR	.6	.7	.15	.3	.25		.6
FARMLAPR	.6	.7	.15	.3	.25		.6
FARMLMAY	.15	.15	.2	.1	.35		.15
FARMLJUN	.15	.15	.2	.1	.35		.15
FARMLJUL	.15	.15	.2	.2	.35	9.0	.15
FARMLAUG	.15	.15	.2	.2	.35	9.0	.15
FARMLSEP	.15	.15	.15	.2			.15
FARMLOCT	.15	.15	.15	.2			.15
FARMLNOV	.15	.15	.15	.2			.15
FARMLDEC	.15	.15	.15	.2			.15
CORNINV	1.5	5.0	.5	.7		240.0	1.5
ALFINV	.14	.23	.15	.16	.4	6.0	.14
GRHAYINV	.2	.2	.2	.3	.16	.5	.2
AUMINV	1.0	1.0	1.2	1.2	.2		1.0
SALT&MIN	.15	.16	.15	.16	.16	5.0	.15
SHEEPSUP	.25	.25	.4	.4	.7		.25
OPCAPINV	25.00	26.00	25.00	25.00	10.00	135.00	25.00
LICAPINV	80.00	80.00	80.00	80.00	55.00	1550.00	80.00
FEEDLAMB						100.0	-1.2

Table C-1. Continued

	RBUTHOG1	PROOFDR1	BU&FINF1	RBUTHOG2	PROOFDR2	RBUTHOG3	PROOFOR3	BU&FINNF3
PROFIT	1389.62	632.77	826.90	1386.62	633.62	1393.42	641.72	832.45
FARMLJAN	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLFEB	2.0	.10	1.0	2.1	1.1	2.1	1.1	1.1
FARMLMAR	4.0	4.5	1.0	4.1	4.6	5.2	4.7	1.1
FARMLAPR	3.0	3.5	1.0	3.1	3.6	3.2	3.7	1.1
FARMLMAY	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLJUN	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLJUL	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1
FARMLAUG	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1
FARMLSEP	4.0	5.0	1.0	4.1	5.1	4.2	5.2	1.1
FARMLOCT	3.0	4.0	1.0	3.1	4.1	3.2	4.2	1.1
FARMLNOV	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLOEC	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
CORNINV	184.0	40.0	105.0	184.0	40.0	184.0	40.0	105.0
OATSINV	30.0	30.0		30.0	30.0	30.0	30.0	
ALFINV	.4	.3	.2	.4	.3	.4	.3	.2
AUMINV	2.0	.5		2.0	.5	2.0	.5	
SALT&MIN	.17	.5	.8	1.7	.5	1.7	.5	.8
PORKSUPP	16.5	3.6	9.5	16.5	3.6	16.5	3.6	9.5

Table C-1. Continued

	RBUTHOG1	PRODFOR1	BU&FINF1	RBUTHOG2	PRODFDR2	RBUTHOG3	PRODFDR3	BU&FINNF3
PIGCREEP	5.8	6.2		5.8	6.2	5.8	6.2	
OPCAPINV	390.00	160.00	135.00	390.00	160.00	390.00	160.00	130.00
LICAPINV	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
BUCAPINV								
FEEDPIG			10.0					10.0

Table C-1. Continued

	RBUTHOG4	PRODFDR4	BU&FINF4	RBUTHOG5	PRODFDR5	RBUTHOG6	PRODFDR6	BU&FINF6
PROFIT	1389.62	632.77	826.90	1386.62	633.62	1393.42	641.72	832.45
FARMLJAN	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLFEB	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLMAR	4.0	4.5	1.0	4.1	4.6	4.2	4.7	1.1
FARMLAPR	3.0	3.5	1.0	3.1	3.6	3.2	3.7	1.1
FARMLMAY	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLJUN	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLJUL	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1
FARMLAUG	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1
FARMLSEP	4.0	5.0	1.0	4.1	5.1	4.2	5.2	1.1
FARMLOCT	3.0	4.0	1.0	3.1	4.1	3.2	4.2	1.1
FARMLNOV	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
FARMLDEC	2.0	1.0	1.0	2.1	1.1	2.1	1.1	1.1
CORNINV	184.0	40.0	105.0	184.0	40.0	184.0	40.0	105.0
OATSINV	30.0	30.0		30.0	30.0	30.0	30.0	
ALFINV	.4	.3	.2	.4	.3	.4	.3	.2
AUMINV	2.0	.5		2.0	.5	2.0	.5	

Table C-1. Continued

	RBUTHOG4	PRODFDR4	BU&FINF4	RBUTHOG5	PRODFDR5	RBUTHOG6	PRODFDR6	BU&FINF6
SALT&MIN	1.7	.5	.8	1.7	.5	1.7	.5	.8
PORKSUPP	16.5	3.6	9.5	16.5	3.6	16.5	3.6	9.5
PIGCREEP	5.8	6.2		5.8	6.2	5.8	6.2	
OPCAPINV	390.00	160.00	135.00	390.00	160.00	390.00	160.00	130.00
LICAPINV	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
BUCAPINV	30000.00	30000.00	28000.00	4050.00	5600.00	2775.00	2400.00	2400.00
FEEDPIG			10.0					10.0

Table C-1. Continued

	PASTFNF7	PASTFNF8	BUYFDPIG
PROFIT	838.65	838.65	-35.00
FARMLJUN	1.2	1.2	
FARMLJUL	1.3	1.3	
FARMLAUG	1.4	1.4	
FARMLSEP	1.3	1.3	
CORNINV	100.00	100.00	
AUMINV	2.0	2.0	
SALT&MIN	.8	.8	
PORKSUPP	8.0	8.0	
OPCAPINV	130.00	130.00	
LICAPINV	350.00	350.00	35.00
BUCAPINV		550.00	
FEEDPIG	1.0	1.0	-1.0

Table C-1. Continued

	CHICKENS	BUYSEXCH	BUYCMASH	BUYLMASH	BUYOSHEL	TURKEYS	BUYYBIRD	BUYTSUPP
PROFIT	796.40	-.65	-11.00	-9.00	-2.50	900.50	-1.25	-12.00
FARMLJAN	20.00					8.0		
FARMLFEB	20.00					8.0		
FARMLMAR	20.00					8.0		
FARMLAPR	20.00					8.0		
FARMLMAY	10.0					8.0		
FARMLJUN	10.0					8.0		
FARMLJUL	10.0					8.0		
FARMLAUG	10.0					8.0		
FARMLSEP	20.0					8.0		
FARMLOCT	20.0					8.0		
FARMLNOV	20.0					8.0		
FARMLDEC	20.0					8.0		
CORNINV	100.0					100.0		
OATSINV	54.0							
ALFINV						5.0		
CHICKENINV	120.0	-1.0						
CMASHINV	10.0		-1.0					
LMASHINV	30.0			-1.0				

Table C-1. Continued

	CHICKENS	BUYSEXCH	BUYCMASH	BUYLMASH	BUYOSHEL	TURKEYS	BUYYBIRD	BUYTSUPP
SHELLINV	2.5				-1.0			
TURKSUPP						25.5		-1.0
BIRDINV						100.0	-1.0	
OPCAPINV	200.00		11.00	9.00	2.50	60.00		12.00
LICAPINV	55.00	.65				65.00	1.25	

Table C-1. Continued

	POPCORN	SWEETCORN	OPERCAP	LIVECAP	BUILDCAP	OFF-FME1	OFF-FME2	FAMILYEX	RENTCROP	RENTPAST
PROFIT	219.95	752.45	-.12	-.11	-.10	4.25	4.75	-1.0	-100.00	-50.00
CROPLAND	1.0	1.0							-1.0	
FARMLAPR	.5	1.0								
FARMLMAY	1.0	1.0								
FARMJUN	.75	3.0								
FARMLJUL	.75	10.0								
FARMLAUG	1.0	20.0								
FARMLSEP	1.0	5.0								
OPCAPINV	45.00	60.00	-1.0					1.0	100.00	50.00
LICAPINV				-1.0						
BUCAPINV					-1.0					
BARRCAP			1.0	1.0	1.0					
OFFMJ-01						1.0				
OFFMJ-02							1.0			
PASTLAND										-1.0

Table C-2. Stored Model Supply Values

ROW NAME	SUPPLY
CROPLAND	315.0
PASTLAND	45.0
FARMLJAN	250.0
FARMLFEB	250.0
FARMLMAR	250.0
FARMLAPR	250.0
FARMLMAY	250.0
FARMLJUN	250.0
FARMLJUL	250.0
FARMLAUG	250.0
FARMLSEP	250.0
FARMLOCT	250.0
FARMLNOV	250.0
FARMLDEC	250.0
OPCAPINV	81150.0
LICAPINV	51500.0
BUCAPINV	35000.0
OFFMJ-D1	1920.0
OFFMJ-D2	720.0

APPENDIX D

FORMAT FOR SUBMITTING THE DATA AND METHODOLOGY REQUIRED TO OBTAIN MODEL RESULTS

The complete matrix, as detailed in Appendix C, is stored under VSPC ID Number 71074. The stored version reflects budgets which were completed using the assumed values given throughout the thesis.

The methodology for changing the model so that it will approximate the actual farm situation is relatively simple. The necessary steps to complete the changes for Mr. Johnson's farm are listed below.

(1) Log-on.

(2) Set the line-length to 132 characters. This is accomplished by entering LIN 132 and assures that the output is in an orderly sequence.

(3) Enter INP, which shows that you are ready to input information into the computer. The first information to be submitted deals with the activities. The row number from the Profit and Price Input Sheets are entered in columns 1-3, being right justified. The model name is then entered in columns 4-11, being left justified. Then, if a Profit or Price value is to be changed, the new value is entered starting in column 12. If no change is desired, then no entry is made starting in column 12. The row number, entered in columns 1-3, is used only to distinguish between activity and RHS entries. When the activity changes are completed, a -1 is entered in columns 2 and 3. The format for making these changes is detailed in Table D-1.

(4) When step #3 is complete, modifications are made in the RHS. There is nothing entered in columns 1-3. The RHS name is entered in columns 4-11, always starting in column 4. Any changes in the given values are entered, starting in column 12. When the changes are completed, enter LAST in columns 4-7.

(5) The data file containing the information derived in steps #3 and #4 must be named and saved. It is named by entering NAM_____, with the desired name entered on the blank. It is saved by entering SAV.

(6) This information is then submitted to the computer, its status checked, and found to be completed in the following way:
   A. Submitted by entering: SUB RODFORT (name given file in step #5).
   B. To check the status for completion, enter: STA (job number.

(7) Step #6 is completed when the computer prints: COMPLETED. With the completion of step #6, the data is in an acceptable format for submission into the MPSX program. This is done by entering: SUBRODMPS.

(8) When the program is found to be completed, the output is retrieved in the following way. Enter LOA OUT ___ D 2. This tells the computer to load out the output for the job number listed in the two blanks. This output is then listed by entering: LIS.

(9) Log-off.

Table D-1. Profit and Price Format for Mr. Johnson's Farm

			COLUMN NUMBER																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		1	C	O	R	N													
		3	C	O	R	N	S	I	L	G									
		4	O	A	T	S													
		5	B	A	R	L	E	Y											
		6	S	P	W	H	E	A	T										
		7	A	L	F	A	L	F	A										
	1	0	S	O	Y	B	E	A	N	S	8	3	.	4	4				
	1	1	G	R	A	I	N	S	O	R									
	1	2	G	R	A	S	S	H	A	Y									
	1	8	S	E	L	L	A	L	F		2	0	.						
	3	3	B	U	Y	A	L	F			-	2	3	.					
	3	5	B	U	Y	C	S	I	L	G	-	9	9	9	.				
	8	4	1	2	C	W	T	M	K	1									
	8	5	1	4	C	W	T	M	K	1									
	9	9	0	F	F	-	F	M	E	1	3	.	7	5					
	-	1																	

Table D-2. RHS Format for Mr. Johnson's Farm

			COLUMN NUMBER																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			F	A	R	M	L	M	A	Y	4	0	0	.					
			F	A	R	M	L	J	U	N	5	0	0	.					
			F	A	R	M	L	J	U	L	5	0	0	.					
			F	A	R	M	L	A	U	G	4	5	0	.					
			F	A	R	M	L	S	E	P	4	0	0	.					
			F	A	R	M	L	O	C	T	3	5	0	.					
			C	R	O	P	L	A	N	D	3	1	5	.					
			P	A	S	T	L	A	N	D	5	0	.						
			O	P	C	A	P	I	N	V	6	0	0	0	0	.			
			L	I	C	A	P	I	N	V	4	5	0	0	0	.			
			B	U	C	A	P	I	N	V	1	0	0	0	0	.			
			L	A	S	T													

APPENDIX E

Table E-1. The Fortran Program Used in the Model

```
10 //JOB JOB '71072099',WAYNE,MSGLEVEL=1,CLASS=J
20 // EXEC WATFIV,OUT=D
30 //GO.FT10F001 DD UNIT=3340,DISP=OLD,DSN=RODMPS,VOL=SER=VS1701
31 //GO.FT11F001 DD UNIT=3340,DISP=(OLD,KEEP),DSN=BCD,VOL=SER=VS1701
40 //GO.FT12F001 DD DSN=TEMP,UNIT=3340,VOL=SER=VS1701,
50 // DISP=OLD
60 //GO.SYSIN DD *
70 $JOB
80       INTEGER RHS,END,R,COL,RWTYP(100),C1,C2,NELT(150),IND(30,150)
90       REAL*8 RWNAM(100),NAM(2),V(2),CNAM,CLNAM(150),OLDCOL,VAL(30,150),
100     * VALUE,LAST,BLK,RVAL(100),RHSN,RHSV(100)
110      INTEGER IRNUT(100),ICNUT(150),LST(150),INDC(18,150),CLS(18)
120      DATA R,COL,RHS,BLK,END/'R','C','RHS','        ','END'/
130      DATA NELT/150*0/
140      DATA INDC/2700*0/, LST/150*0/
150      DATA LAST/'LAST'/
160      DATA IRNUT,ICNUT/250*0/
170      DO 40 I=1,100
180   40 RHSV(I)=0.
190      IK=10
200      I11=11
210      I5=5
220      READ(I5,50) IJ
230   50 FORMAT(I2)
240      IF (IJ.GT.0) GO TO 306
250   60 READ(IK,70) C1,C2
260   70 FORMAT(2A1)
270      IF (C1.NE.R) GO TO 60
280 C
290 C     ROWS SECTION
300 C
310      IR=0
320   90 READ(IK,100) C1,C2,NAM(1)
330  100 FORMAT(2A1,2X,A8)
340      IF (C1.EQ.COL) GO TO 120
350      IR=IR+1
360      RWTYP(IR)=C2
370      RWNAM(IR)=NAM(1)
380      GO TO 90
390  120 CONTINUE
400 C
410 C     COLUMNS SECTION
```

```
C
      NROW=IR
      NC=0
  125 READ(IK,130) C1,CNAM,NAM(1),V(1),NAM(2),V(2)
  130 FORMAT(A3,1X,A8,2X,A8,2X,F12.0,3X,A8,2X,F12.0)
      GO TO 140
  135 READ(IK,130) C1,CNAM,NAM(1),V(1),NAM(2),V(2)
      IF (C1.EQ.RHS) GO TO 190
      IF (CNAM.EQ.OLDCOL) GO TO 150
  140 NC=NC+1
      OLDCOL=CNAM
      CLNAM(NC)=CNAM
      IR=0
  150 CONTINUE
      DO 170 I1=1,2
      IF (NAM(I1).EQ.BLK) GO TO 170
      DO 160 J=1,NROW
      IR=IR+1
      IF (IR.GT.NROW) IR=1
      IF (NAM(I1).NE.RWNAM(IR)) GO TO 160
      NELT(NC)=NELT(NC)+1
      IN=NELT(NC)
      VAL(IN,NC)=V(I1)
      IND(IN,NC)=IR
      GO TO 170
  160 CONTINUE
C     ERROR: CAN NOT FIND ROW NAME IN COLUMNS SECTION
  170 CONTINUE
      GO TO 135
  190 CONTINUE
C
C     RHS SECTION
C
      IR=0
  200 READ(IK,130) C1,RHSN,NAM(1),V(1),NAM(2),V(2)
      IF (C1.EQ.END) GO TO 300
C     FIND ROW NAME AND ASSIGN VALUE
      DO 250 I1=1,2
      IF (NAM(I1).EQ.BLK) GO TO 250
      DO 230 I=1,NROW
      IR=IR+1
      IF (IJ.EQ.0) GO TO 350
      IF (NAM(I1).EQ.RWNAM(IR)) GO TO 240
  230 CONTINUE
C     ERROR: CAN NOT ROW NAME FOR RHS
  240 RHSV(IR)=V(I1)
  250 CONTINUE
      GO TO 200
  300 CONTINUE
      WRITE(12) NROW,NC,(RWTYP(I),I=1,NROW),(NELT(J),J=1,NC)
      WRITE(12) (RWNAM(I),I=1,NROW),(RHSV(I),I=2,NROW),
```

```
     *  (CLNAM(I),I=1,NC)
        DO 305 I=1,30
  305 WRITE(12) (VAL(I,J),J=1,NC),(IND(I,J),J=1,NC)
        GO TO 350
  306 CONTINUE
        READ(12) NROW,NC,(RWTYP(I),I=1,NROW),(NELT(J),J=1,NC)
        READ(12) (RWNAM(I),I=1,NROW),(RHSV(I),I=2,NROW),
     *  (CLNAM(I),I=1,NC)
        DO 310 I=1,30
  310 READ(12) (VAL(I,J),J=1,NC),(IND(I,J),J=1,NC)
  350 CONTINUE
  490 READ(I5,500) CNAM,CLS
  500 FORMAT(A8,18I4)
        IF (CNAM.EQ.LAST) GO TO 560
C
C     COUNT NON ZERO ITEMS IN CLS
C
        NZ=0
        DO 510 I=1,18
        IF (CLS(I).EQ.0) GO TO 520
        NZ=NZ+1
  510 CONTINUE
  520 CONTINUE
C     FIND CNAM COLUMN NUMBER
        DO 530 J=1,NC
        IF (CNAM.EQ.CLNAM(J)) GO TO 540
  530 CONTINUE
C     ERROR:  CAN NOT FIND ACTIVITY NAME
        WRITE(6,9000) CNAM
 9000 FORMAT(' CAN NOT FIND NAME***',A8)
  540 CONTINUE
        DO 550 I=1,NZ
  550 INDC(I,J)=CLS(I)
        LST(J)=NZ
        GO TO 490
  560 CONTINUE
C
C     SELECT ACTIVITIES TO BE INCLUDED
C
  590 READ(I5.600) IC,CNAM,VALUE
        WRITE(6,601) IC,CNAM,VALUE
  601 FORMAT(' ',I3,A8,F12.0)
  600 FORMAT(I3,A8,F12.0)
        IF (IC.LT.0) GO TO 700
        DO 610 J=1,NC
        IF (CNAM.EQ.CLNAM(J)) GO TO 620
  610 CONTINUE
C     ERROR IF GET HERE
        WRITE(6,9000) CNAM
  620 CONTINUE
        ICNUT(J)=1
```

Table E-1. Continued

```
      NR=NELT(J)
      DO 625 I=1,NR
      IR=IND(I,J)
  625 IRNUT(IR)=1
      IF (VALUE.NE.0.0) VAL(1,J)=VALUE
      NZ=LST(J)
      IF (NZ.EQ.0) GO TO 590
      DO 640 I=1,NZ
      J1=INDC(I,J)
      ICNUT(J1)=1
      NR=NELT(J1)
      DO 630 I1=1,NR
      IR=IND(I1,J1)
  630 IRNUT(IR)=1
  640 CONTINUE
      GO TO 590
  700 CONTINUE
C
C     CHANGE RHS
C
  710 READ(I5,720) CNAM,VALUE
  720 FORMAT(3X,A8,F12.0)
      IF (CNAM.EQ.LAST) GO TO 750
      DO 730 I=1,NROW
      IF (CNAM.EQ.RWNAM(I)) GO TO 740
  730 CONTINUE
C     ERROR IF GET HERE: CAN NOT FIND ROW NAME TO UPDATE
      WRITE(6,9000) CNAM
  740 RHSV(I)=VALUE
      GO TO 710
  750 CONTINUE
C
C     WRITE BCDOUT
C
      WRITE(I11,800)
  800 FORMAT('NAME',10X,'FARM')
      WRITE(I11,810)
  810 FORMAT('ROWS')
      DO 830 I=1,NROW
      IF (IRNUT(I).EQ.0) GO TO 830
      WRITE(I11,820) RWTYP(I),RWNAM(I)
  820 FORMAT(1X,A1,2X,A8)
  830 CONTINUE
      WRITE(I11,840)
  840 FORMAT('COLUMNS')
      DO 870 I=1,NC
      IF (ICNUT(I).EQ.0) GO TO 870
      NR=NELT(I)
      DO 860 J=1,NR
      IR=IND(J,I)
      WRITE(I11,850) CLNAM(I),RWNAM(IR),VAL(J,I)
```

Table E-1. Continued

```
1880    850 FORMAT(4X,A8,2X,A8,2X,F12.5)
1890    860 CONTINUE
1900    870 CONTINUE
1910        WRITE(I11,880)
1920    880 FORMAT('RHS')
1930        DO 900 I=2,NROW
1940        IF (IRNUT(I).EQ.0) GO TO 900
1950        WRITE(I11,890) RWNAM(I),RHSV(I)
1960    890 FORMAT(4X,'SUPPLY',4X,A8,2X,F12.5)
1970    900 CONTINUE
1980        WRITE(I11,910)
1990    910 FORMAT('ENDATA')
2047        STOP
2057        END
2067 $ENTRY
2077  1
2087 CORN       89 101
2097 IRRCORN    89 101
2107 CORNSILG   92 101
2117 OATS       90 101
2127 BARLEY    101
2137 SPWHEAT   101
2147 ALFALFA    91 101
2157 IRRALF     91 101
2167 FLAX      101
2177 SOYBEANS  101
2187 GRAINSOR  101
2197 GRASSHAY   93 101
2207 RBUTHOG1   63  64  65  66  69 101 102  85  86
2217 RBUTHOG2   63  64  65  66  69 101 102  85  86
2227 RBUTHOG3   63  64  65  66  69 101 102  85  86
2237 RBUTHOG4   63  64  65  66  69 101 102 103  85  86
2247 RBUTHOG5   63  64  65  66  69 101 102 103  85  86
2257 RBUTHOG6   63  64  65  66  69 101 102 103  85  86
2267 PRODFDR1   63  64  65  66  69 101 102  85  86
2277 PRODFDR2   63  64  65  66  69 101 102  85  86
2287 PRODFDR3   63  64  65  66  69 101 102  85  86
2297 PRODFDR4   63  64  65  66  69 101 102 103  85  86
2307 PRODFDR5   63  64  65  66  69 101 102 103  85  86
2317 PRODFDR6   63  64  65  66  69 101 102 103  85  86
2327 BU&FINF1   64  66  69 101 102  85  88
2337 BU&FINF3   64  66  69 101 102  85  88
2347 BU&FINF4   64  66  69 101 102 103  85  88
2357 BU&FINF6   64  66  69 101 102 103  85  88
2367 PASTFNF7   63  66  69 101 102  85  88
2377 PASTFNF8   63  66  69 101 102 103  85  88
2387 MAYFLAMB   63  64  66  68  69 101 102  80
2397 JULMLAMB   63  64  66  68  69 101 102  80
2407 AUGFLAMB   63  64  66  68  69 101 102  80
2417 FD&MKLAM   63  64  66  68  69 101 102  80
2427 RREPEWES   63  64  66  68  69 101 102
```

Table E-1. Continued

```
2437 DRYLOTFD  64  66  68  69 101 102  87
2447 FEEDMLAM  63  64  66  68  69 101 102  80  87 100
2457 10CWTMK1  63  64  65  66  67  68  69 101 102  75
2467 12CWTMK1  63  64  65  66  67  68  69 101 102  75
2477 14CWTMK1  63  64  65  66  67  69 101 102  75
2487 16CWTMK1  63  64  65  66  67  69 101 102  75
2497 10CWTMK2  63  64  65  66  67  68  69 101 102  75
2507 12CWTMK2  63  64  65  66  67  68  69 101 102  75
2517 14CWTMK2  63  64  65  66  67  69 101 102  75
2527 16CWTMK2  63  64  65  66  67  69 101 102  75
2537 10CWTMK3  63  64  65  66  67  68  69 101 102 103  75
2547 12CWTMK3  63  64  65  66  67  68  69 101 102 103  75
2557 14CWTMK3  63  64  65  66  67  69 101 102 103  75
2567 16CWTMK3  63  64  65  66  67  69 101 102 103  75
2577 RDAIRREP  63  64  65  66  68  69 101 102  75  76  77  78  79
2587 BEEFCOWF  63  64  65  66  68  69  70  94  97  98 101 102
2597 BEEFCOWC  63  64  65  66  68  69  70  94  97  98 101 102
2607 RREPHEIF  65  66  68  69  70  74  99 101 102
2617 WINTSTER  64  65  66  67  69  95  73 101 102
2627 SUMMSTER  63  69  73 101 102
2637 W&SSTEER  63  68  69  70  95  73 101 102
2647 WINTHEIF  64  65  66  67  69  96  74 101 102
2657 FINFSTER  64  65  66  68  69  70  73 101 102
2667 FULFHEIF  64  65  66  68  69  70  74 101 102
2677 FINYSTER  64  66  68  69  70  71 101 102
2687 FINYHEIF  64  66  67  69  70  72 101 102
2697 CHICKENS  64  65 101 102  81  82  83  84
2698 TURKEYS   64  66 101 102 108 109
2699 POPCORN  101
2700 SWEETCON 101
2701 RENTCROP 101
2702 RENTPAST 101
2703 FAMILYEX 101
2704 HIRELJAN 101
2705 HIRELFEB 101
2706 HIRELMAR 101
2707 HIRELAPR 101
2708 HIRELMAY 101
2709 HIRELJUN 101
2710 HIRELJUL 101
2711 HIRELAUG 101
2712 HIRELSEP 101
2713 HIRELOCT 101
2714 HIRELNOV 101
2715 HIRELDEC 101
2716 LAST
```

Table E-2. The MPSX Program Used in the Model

```
 10 //ROD JOB 71072099,'ROD',MSGLEVEL=1,CLASS=J
 20 //JOBLIB DD DSN=MPSX.SYSTM360,DISP=SHR,VOL=SER=TECH71,UNIT=3340
 30 //MPSCOMP EXEC PGM=DJLCOMP,REGION=86K
 40 //SCRATCH1 DD UNIT=3340,SPACE=(TRK,(2,2))
 50 //SCRATCH2 DD UNIT=3340,SPACE=(TRK,(2,2))
 60 //SCRATCH3 DD UNIT=3340,SPACE=(TRK,(2,2))
 70 //SCRATCH4 DD UNIT=3340,SPACE=(TRK,(2,2))
 80 //SYSMLCP DD UNIT=3340,SPACE=(TRK,(2,2)),DISP=(NEW,PASS)
 90 //SYSPRINT DD SYSOUT=D
100 //SYSABEND DD SYSOUT=A
110 //SYSIN DD *
120 PROGRAM
130 INITIALZ
140 MOVE(XDATA,'FARM')
142 MOVE(XPBNAME,'PBFILE')
144 CONVERT('SUMMARY','FILE','BCD')
152 MOVE(XOBJ,'PROFIT')
154 MOVE(XRHS,'SUPPLY')
180 SETUP('MAX')
210 CRASH
220 PRIMAL
230 SOLUTION
240 EXIT
250 PEND
260 //MPSEXEC EXEC PGM=DJLEXEC,COND=(0,NE,MPSCOMP),PARM=TASK,REGION=86K
280 //SCRATCH1 DD UNIT=3340,SPACE=(CYL,(4),,CONTIG)
290 //SCRATCH2 DD UNIT=3340,SPACE=(CYL,(4),,CONTIG)
300 //PROBFILE DD UNIT=3340,SPACE=(CYL,(4),,CONTIG)
310 //MATRIX1 DD UNIT=3340,SPACE=(CYL,(4),,CONTIG)
320 //ETA1 DD UNIT=3340,SPACE=(CYL,(4),,CONTIG)
330 //SYSMLCP  DD DSNAME=*.MPSCOMP.SYSMLCP,DISP=(OLD,DELETE)
340 //SYSPRINT DD SYSOUT=D
350 //SYSPUNCH DD SYSOUT=B
355 //BCD DD DSN=BCD,UNIT=3340,DISP=OLD,VOL=SER=VS1701
360 //SYSIN DD *
428 ENDATA
430 //
```