

South Dakota State University

Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

Electronic Theses and Dissertations

1980

A Computerized Planning Model for Small Farms in Southeastern South Dakota

Rodney Gene De Smet

Follow this and additional works at: <https://openprairie.sdstate.edu/etd>



Part of the [Agricultural and Resource Economics Commons](#), and the [Agricultural Economics Commons](#)

Recommended Citation

De Smet, Rodney Gene, "A Computerized Planning Model for Small Farms in Southeastern South Dakota" (1980). *Electronic Theses and Dissertations*. 5828.
<https://openprairie.sdstate.edu/etd/5828>

This Thesis - Open Access is brought to you for free and open access by Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

A COMPUTERIZED PLANNING MODEL FOR SMALL FARMS
IN SOUTHEASTERN SOUTH DAKOTA

by

RODNEY GENE DE SMET

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

1980

A COMPUTERIZED PLANNING MODEL FOR SMALL FARMS
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.

Herbert R. Allen
Thesis Adviser

Date

Head, Economics Dept.

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.

TABLE OF CONTENTS

	Page
LIST OF TABLES	ix
SUMMARY	1
 Chapter	
1. INTRODUCTION	4
Objectives	6
Farm Definition	6
Sources of Data	7
Description of Area	8
Temperature	8
Precipitation	10
Wind and Relative Humidity	10
Soils	10
Land Uses	12
Summary	13
2. METHOD OF ANALYSIS	14
Characteristics and Definitions of Linear Programming	16
Components of a Linear Programming Model	16
The Objective	16
Alternative Methods or Processes	16
Resource Restrictions	17
Definition of Terms	17

TABLE OF CONTENTS (cont.)

Chapter	Page
Assumptions	17
Additivity and Linearity	17
Divisibility	17
Finiteness	18
Single-value Expectations	18
Explanation of Objective--Profit	18
Summary	19
3. THE CROP ACTIVITIES	20
Land Rental	21
Explanation of Assumed Crop Budget Values	22
Yield	22
Seed	22
Fertilizer	24
Herbicides and Insecticides	24
Crop Insurance	25
Storage and Drying	25
Fuel and Lubricants	25
Overhead	26
Machinery Repairs	26
Interest on Capital and Investment and Depreciation and Insurance	26
Labor	27

TABLE OF CONTENTS (cont.)

Chapter	Page
Real Estate Tax	27
Land Charges	27
Irrigation Costs	27
Explanation of Crop Budgeting Procedures	28
Normal Cash Crops	28
Specialty Cash Crops	28
Dryland Feed-Crops	29
Irrigated Feed-Crops	29
4. THE LIVESTOCK ACTIVITIES	38
Beef	40
Swine	54
Sheep	62
Dairy	70
Specialty Livestock Activities	76
5. THE RIGHT HAND SIDE	80
Land	81
Labor	81
Capital	85
Operating Capital	85
Livestock Capital	85
Building Capital	86
Family Living Expenses	87

TABLE OF CONTENTS (cont.)

Chapter	Page
6. MODEL INPUT DATA	89
The Profit and Price Input Sheets	89
The Crop Activities	90
The Livestock Activities	90
Profit and Price Input Preparation Procedure	91
Supplies of Available Resources	91
7. EXPLANATION AND EVALUATION OF A FARM PLAN	103
Clay-Yankton Records Summary	103
Example Farm	104
Crop Budgets	104
Livestock Budgets	106
Off-Farm Employment Budget	122
Resource Supply Sheets	124
Explanation of Output	127
8. REVIEW OF LITERATURE	133
Educational Programs	133
Alternative Enterprise Combinations	134
Computer Assisted Programs	135
Summary	136
LITERATURE CITED	137
BIBLIOGRAPHY	138

TABLE OF CONTENTS (cont.)

	Page
APPENDIX A	142
APPENDIX B	150
APPENDIX C	158
APPENDIX D	178
APPENDIX E	182

LIST OF TABLES

Table	Page
1-1. Percent of Land in Production of the Various Crops	12
3-1. Assumed Seeding Rate and Costs Per Acre for Small Grains .	23
3-2. Assumed Fertilizer Pounds and Costs Per Acre	24
3-3. Assumed Values for Normal Cash-Crop Budgets	30
3-4. Assumed Values for Specialty Cash-Crop Budgets	31
3-5. Assumed Values for Feed-Crop Budgets	32
3-6. Assumed Values for Irrigated Feed-Crop Budgets	33
3-7. Work Form for Normal Cash Crop Budgets	34
3-8. Work Form for Specialty Cash-Crop Budget	35
3-9. Work Form for Dryland Feed-Crop Budget	36
3-10. Work Form for Irrigated Feed-Crop Budget	37
4-1. Feed Prices Used for all Livestock Activities	39
4-2. Prices Used for Other Feed Requirements	39
4-3. Assumed Values for the Beef Work Forms	41
4-4. Beef Cow Unit, Feeder Calf Sold, October, Replacements First Calve as 2 Year Olds, 92% Calf Crop, 16% Replacements Raised, One Bull Per 25 Cows	43
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	44
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	45
4-7. Wintering Steer Calves, 5 Months, October to March, Average Daily Gain 1.5 Pounds	46

LIST OF TABLES (cont.)

Table	Page
4-8. Summer Grazing Steers, 500 Pounds, 5.5 Months, April to September, Gain 225 Pounds	47
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	48
4-10. Wintering Heifer Calves, 5 Months, October to March, Average Daily Gain 1.5 Pounds	49
4-11. Full Fed Steer Calf, Liberal Grain, Gain 650 Pounds in 11 Months on Feed	50
4-12. Full Fed Heifer Calf, Liberal Roughage, Gain 550 Pounds in 9.5 Months on Feed	51
4-13. Finishing Yearling Steer, Liberal Roughage, Gain 500 Pounds in 7.5 Months on Feed	52
4-14. Feed Out Yearling Heifers, Liberal Corn Silage, Gain 450 Pounds in 7 Months on Feed	53
4-15. Assumed Values for the Swine Work Forms	55
4-16. Building and Equipment Repairs for Raising and Finishing Butcher Hogs	56
4-17. Building and Equipment Repairs for Producing and Selling Feeder Pigs	56
4-18. Building and Equipment Repairs for Buying and Finishing Feeder Pigs	56
4-19. Building and Equipment Repairs for Buying and Pasture Finishing Feeder Pigs	56
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	58
4-21. Sow and Two Litters, Producing Feeder Pigs, 16 Pigs Sold Per Sow, March and September Farrowing, One Saved for Replacement From March Litter, Sell 40-Pound Feeder Pigs	59

LIST OF TABLES (cont.)

Table	Page
4-22. Ten Purchased Feeder Pigs, 40 to 225 Pounds	60
4-23. Ten Purchased Feeder Pigs, Finished on Pasture for August-September Market, 40 to 225 Pounds	61
4-24. Assumed Values for the Sheep Work Forms	63
4-25. Ewe and Lambs, Sell 120% Lamb Crop in May-June as Feeders, 20% Replacement Ewes Purchased, 2% Ewe Death Loss	64
4-26. Ewe and Lambs, Sell 120% Lamb Crop in August as Feeders, 20% Replacement Ewes Purchased, 2% Ewe Death Loss	65
4-27. Ewes and Lambs, Sell 120% Lamb Crop in July as Market Lambs, 20% Replacement Ewes Purchased, 2% Ewe Death Loss	66
4-28. Ewe and Lambs, Sell 120% Crop in September as Half Feeders - Half Market Lambs, 20% Replacement Ewes Purchased, 2% Ewe Death Loss	67
4-29. Raising Replacement Ewes, Sell or Place in Own Breeding Flock, September 1	68
4-30. 100 Feeder Lambs, Drylot, 2 Month Feeding Period, Gain 30 Pounds Per Lamb	69
4-31. Assumed Values for the Dairy Work Forms	71
4-32. Assumed Costs for Various Processes	73
4-33. Dairy Cow, ___ Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased	74
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	75
4-35. Assumed Values for the Chicken and Turkey Work Forms	77
4-36. 100 Hen Farm Laying Flock	78
4-37. 100 Turkeys	79

LIST OF TABLES (cont.)

Table	Page
5-1. Estimated Monthly Farm Labor Supply	82
5-2. Profit of Off-Farm Employment	84
5-3. Estimated Total Family Living Costs Related to Number of Persons and Income	88
6-1. Profit and Price Input Sheet - Crops	92
6-2. Profit and Price Input Sheet - Beef	93
6-3. Profit and Price Input Sheet - Hogs	95
6-4. Profit and Price Input Sheet - Sheep	97
6-5. Profit and Price Input Sheet - Dairy	98
6-6. Profit and Price Input Sheet - Specialty Activities	100
6-7. Profit and Price Input Sheet - Specialty	101
6-8. Supplies of Available Resources	102
7-1. Cash-Crop Budget - Barley	108
7-2. Cash-Crop Budget - Spring Wheat	109
7-3. Cash-Crop Budget - Soybeans	110
7-4. Cash-Crop Budget - Grain Sorghum	111
7-5. Dryland Feed-Crop Budget - Corn	112
7-6. Dryland Feed-Crop Budget - Corn Silage	113
7-7. Dryland Feed-Crop Budget - Oats	114
7-8. Dryland Feed-Crop Budget - Alfalfa	115
7-9. Dryland Feed-Crop Budget - Grass Hay	116
7-10. Dairy Cow, 12500 Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased	117

LIST OF TABLES (cont.)

Table	Page
7-11. Dairy Cow, 14000 Pounds Manufacturing Milk Sold Per Cow, Replacements Purchased	118
7-12. Profit and Price Input Sheet - Crops	119
7-13. Profit and Price Input Sheet - Dairy	120
7-14. Profit and Price Input Sheet - Specialty	121
7-15. Profit of Off-Farm Employment	123
7-16. Estimated Monthly Farm Labor Supply	125
7-17. Supplies of Available Resources	126
7-18. Work Form for Deriving Net-Farm Income	128
7-19. Section 1 of the Output--The Rows Section	129
7-20. Section 2 of the Output--The Columns Section	130
A-1. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Corn	144
A-2. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Irrigated Corn	144
A-3. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Oats, Barley, and Spring Wheat . .	145
A-4. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Flax	145
A-5. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Soybeans	146
A-6. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Grain Sorghum	146
A-7. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Alfalfa	147
A-8. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Irrigated Alfalfa	147

LIST OF TABLES (cont.)

Table	Page
A-9. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Grass Hay	148
A-10. Assumed Machinery Complement used to Derive the Fuel and Lubricants Value for Corn Silage	148
A-11. Gallons of Fuel Per Hour by Horsepower Rating	149
A-12. Fuel and Lubricant Value Computational Worksheet	149
B-1. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow and Finish Butcher Hogs Using the Crate Method for 8 Sows	151
B-2. Building and Equipment Costs for Remodeling a Barn to Farrow and Finish Butcher Hogs Using the Pen Method for 8 Sows	152
B-3. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow 18 Sows with the Crate Method for Selling Feeder Pigs	153
B-4. Approximate Building and Equipment Costs for Remodeling a Barn to Farrow 18 Sows with the Pen Method for Selling Feeder Pigs	154
B-5. Approximate Building and Equipment Costs for Remodeling a Barn to Finish Feeder Pigs with the Pen Method	155
B-6. Approximate Building and Equipment Costs to Implement a Pasture Finish Operation	156
B-7. Approximate Building and Equipment Costs for Remodeling a Barn for Milking 10 Dairy Cows	157
C-1. The Complete Matrix for the Model	159
C-2. Stored Model Supply Values	177
D-1. Profit and Price Format for Mr. Johnson's Farm	181
D-2. RHS Format for Mr. Johnson's Farm	181

LIST OF TABLES (cont.)

Table	Page
E-1. The Fortran Program Used in the Model	183
E-2. The MPSX Program Used in the Model	189

LIST OF FIGURES

Figure	Page
1. Seven South Dakota Counties in this Study	9

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.

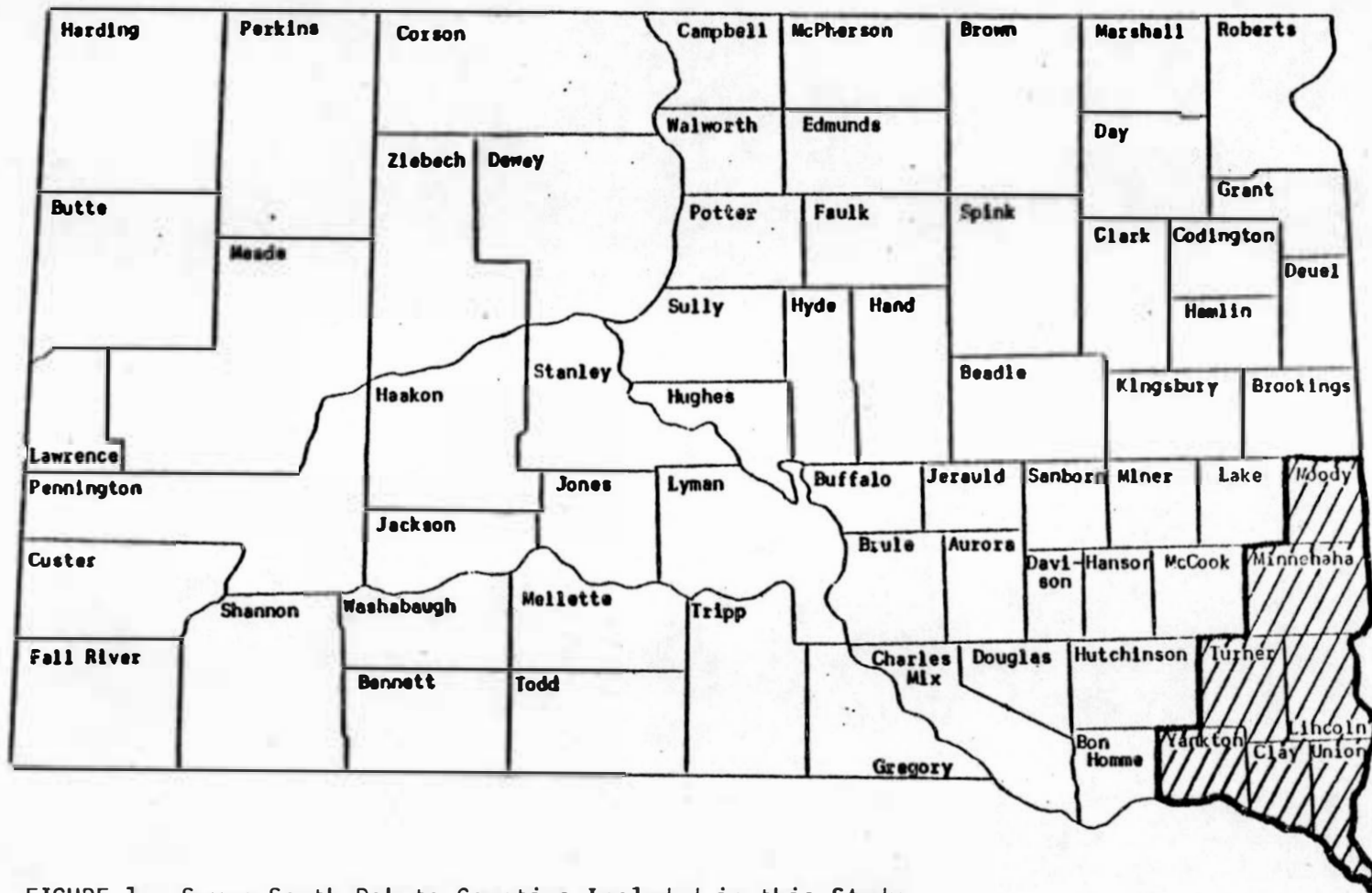


FIGURE 1. Seven South Dakota Counties Included in this Study

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

¹The approximate land in each crop, by county is an average of 1970-75.

²The wheat category includes Durum, Spring, and Winter Wheat.

³Approximate 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 Bu./Acre	Seed Costs per Acre
	Uncertified	Certified		
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 Cost/Acre
	Nitrogen	Phosphate	
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
<u>Projected Yield</u>	43.0	27.0	17.0	25.0	52.0
<u>Variable Costs:</u>					
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
<u>Fixed Costs:</u>					
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
<u>Projected Yield</u>	1200.0 doz.	3500.0 lbs.
<u>Variable Costs:</u>		
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
<u>Fixed Costs:</u>		
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
<u>Projected Yield</u>	75.0	70.0	3.5	9.0	2.8
<u>Variable Costs:</u>					
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
<u>Fixed Costs:</u>					
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
<u>Projected Yield</u>	130.0	6.0
<u>Variable Costs:</u>		
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
<u>Fixed Costs:</u>		
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		<input type="text"/> (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

<u>FEED INPUT</u>	<u>PRICE</u>
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

<u>BEEF</u>	<u>PRICE</u>
Beef Supplement	\$10.00/cwt
<u>SWINE</u>	
Pork Supplement	16.00/cwt
Creep Ration	17.70/cwt
<u>SHEEP</u>	
Sheep Supplement	10.00/cwt
<u>DAIRY</u>	
Dairy Supplement	10.00/cwt
Calf Starter	11.90/cwt
Calf Grower	14.25/cwt
Milk Starter	48.20/cwt
<u>TURKEYS & CHICKENS</u>	
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
<u>RECEIPTS</u>					
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
<u>SECTION A COSTS</u>					
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
<u>SECTION B COSTS</u>					
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

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)	<u> </u> (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	<u>90.00</u>
OTHER COSTS	<u>40.00</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>550.00</u> (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	<u>215.00</u> (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					
MINUS DEATH LOSS	[2.5% of	_____ cwt x _____	Price =	_____ (1)	
		_____ (1)]	=	_____ (2)	
TOTAL RECEIPTS (1 - 2)				_____	(3)

SECTION A COSTS:

VETERINARY & DRUGS	_____
EQUIPMENT REPAIRS	_____
BUILDING REPAIRS	_____
SECTION A TOTAL (PROFIT FIGURE)	<u> </u> (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	<u>35.00</u>
OTHER COSTS	<u>20.00</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>430.00</u> (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)	<u> </u> (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	<u>55.00</u>
OTHER COSTS	<u>25.00</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>455.00</u> (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	<u>275.00</u>
GRAIN & FORAGE	<u>45.00</u>
OTHER COSTS	<u>25.00</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>345.00 (8)</u>

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)	<u> </u> (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	<u>460.00</u> (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	<u>325.00</u> (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 METHOD¹
- 6 -- REMODEL BUILDING AND PURCHASE EQUIPMENT FOR THE PEN METHOD¹
- 7 -- USES EXISTING PASTURE SYSTEM
- 8 -- SET UP NEW PASTURE SYSTEM¹

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.

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

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

MODEL NAME WORK FORM NUMBER	RBUT HOG 4-20	PROD FDR 4-21	BU& FINF 4-22	PAST FINF 4-23
<u>RECEIPTS</u>				
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
<u>SECTION A COSTS</u>				
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
<u>SECTION B COSTS</u>				
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)	<input type="text"/> (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	<u>275.00</u> (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)	<u> </u> (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	<u>140.00</u>
GRAIN & FORAGE	<u>75.00</u>
OTHER COSTS	<u>55.00</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>270.00</u> (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, $\frac{1}{2}$ feeders-
 $\frac{1}{2}$ 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	MAYF LAMB	AUGF LAMB	JULM LAMB	FD&M KLAM	PREP EWES	DRYL OTFD
WORK FORM NUMBER	4-25	4-26	4-27	4-28	4-29	4-30
<u>RECEIPTS</u>						
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
<u>SECTION A COSTS</u>						
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
<u>SECTION B COSTS</u>						
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 METHOD²

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.

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

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

MODEL NAME	T0CWT MK	T2CWT MK	T4CWT MK	T6CWT 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	1825.00	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	100.75	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
<u>CONVENTIONAL BARN</u>						
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
<u>CONVERTED BARN</u>						
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
<u>RECEIPTS</u>		
Raised Livestock less death loss	---	990.00
Sale of Culls	39.00	---
Sale of Eggs	<u>855.40</u>	<u>---</u>
TOTAL RECEIPTS	894.40	990.00
<u>SECTION A COSTS</u>		
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	<u>12.00</u>	<u>10.00</u>
SECTION A TOTAL	98.00	89.50
PROFIT FIGURE	796.40	900.50
<u>SECTION B COSTS</u>		
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	<u>6.25</u>	<u>---</u>
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)	<input type="text"/> (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)	<u> </u> (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	<u>350.00</u>
OTHER COSTS	<u>40.00</u>
TOTAL OPERATING CAPITAL REQUIREMENTS	<u>455.00</u> (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**
<u>Hours/Month</u>						
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)	<input type="text"/> *	<input type="text"/> **

*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

<u>Activity Number</u>	<u>Crop Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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	BUYHHEIF	-430.00	___/HD
___ 42.	BUY YEARLING STEER	BUYYSTER	-565.00	___/HD

Table 6-2. Continued

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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	BUILD CAP	-.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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 83.	PRODUCE 10 CWT MILK--1	10CWTKM1	1256.10	___/HD
___ 84.	PRODUCE 12.5 CWT MILK--1	12CWTKM1	1549.85	___/HD
___ 85.	PRODUCE 14 CWT MILK--1	14CWTKM1	1721.10	___/HD
___ 86.	PRODUCE 16 CWT MILK--1	16CWTKM1	1915.10	___/HD
___ 87.	PRODUCE 10 CWT MILK--2	10CWTKM2	1270.65	___/HD
___ 88.	PRODUCE 12.5 CWT MILK--2	12CWTKM2	1564.40	___/HD
___ 89.	PRODUCE 14 CWT MILK--2	14CWTKM2	1735.65	___/HD
___ 90.	PRODUCE 16 CWT MILK--2	16CWTKM2	1965.65	___/HD
___ 91.	PRODUCE 10 CWT MILK--3	10CWTKM3	1270.65	___/HD
___ 92.	PRODUCE 12.5 CWT MILK--3	12CWTKM3	1564.40	___/HD
___ 93.	PRODUCE 14 CWT MILK--3	14CWTKM3	1735.65	___/HD
___ 94.	PRODUCE 16 CWT MILK--3	16CWTKM3	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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___ 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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___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

<u>Activity Number</u>	<u>Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
___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

<u>RESOURCE</u>	<u>MODEL NAME</u>	<u>MODEL SUPPLIES</u>	<u>YOUR ESTIMATE</u>
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	<u>5.35</u>
FERTILIZER	<u>18.10</u>
HERBICIDES	<u>.83</u>
INSECTICIDES	<u>1.15</u>
CROP INSURANCE	<u>2.65</u>
STORAGE & DRYING	<u>1.29</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>9.16</u>
MACHINERY REPAIRS	<u>4.54</u>

TOTAL VARIABLE COSTS 46.57(2)PROFIT VALUE FOR THE MODEL (1 - 2) 56.63(3)FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>10.80</u>
DEPRECIATION & INSURANCE	<u>13.25</u>
LABOR	<u>7.47</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS 41.02(4)PRODUCTION COSTS/ACRE (2 + 4) 87.59(5)PRODUCTION COSTS/UNIT (5 ÷ YIELD) 2.04LAND 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	<u>27.0</u> Yield x <u>3.50</u> Price/Unit	<u>94.50(1)</u>
--------------------	--	-----------------

VARIABLE COSTS:

SEED	<u>7.53</u>
FERTILIZER	<u>18.10</u>
HERBICIDES	<u>1.10</u>
INSECTICIDES	<u>1.15</u>
CROP INSURANCE	<u>2.50</u>
STORAGE & DRYING	<u>.81</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>9.16</u>
MACHINERY REPAIRS	<u>4.54</u>

TOTAL VARIABLE COSTS	<u>48.39(2)</u>
----------------------	-----------------

PROFIT VALUE FOR THE MODEL (1 - 2)	<u>46.11(3)</u>
------------------------------------	-----------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>10.85</u>
DEPRECIATION & INSURANCE	<u>13.25</u>
LABOR	<u>7.52</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>41.12(4)</u>
-------------------	-----------------

PRODUCTION COSTS/ACRE (2 + 4)	<u>89.51(5)</u>
-------------------------------	-----------------

PRODUCTION COSTS/UNIT (5 ÷ YIELD)	<u>3.31</u>
-----------------------------------	-------------

LAND CHARGES	<u>47.50(6)</u>
--------------	-----------------

TOTAL COSTS/ACRE (5 + 6)	<u>137.01(7)</u>
--------------------------	------------------

TOTAL COSTS/UNIT (7 ÷ YIELD)	<u>5.07</u>
------------------------------	-------------

Table 7-3. Cash-Crop Budget

Soybeans (Crop Name)RECEIPTS:

TOTAL REVENUE/ACRE	<u>25</u> Yield x <u>5.50</u> Price/Unit	<u>137.50</u> (1)
--------------------	--	-------------------

VARIABLE COSTS:

SEED	<u>11.75</u>
FERTILIZER	<u>6.36</u>
HERBICIDES	<u>11.20</u>
INSECTICIDES	<u>.33</u>
CROP INSURANCE	<u>2.75</u>
STORAGE & DRYING	<u>3.75</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>9.94</u>
MACHINERY REPAIRS	<u>4.48</u>

TOTAL VARIABLE COSTS	<u>54.06</u> (2)
----------------------	------------------

PROFIT VALUE FOR THE MODEL (1 - 2)	<u>83.44</u> (3)
------------------------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>10.60</u>
DEPRECIATION & INSURANCE	<u>12.15</u>
LABOR	<u>7.70</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>39.95</u> (4)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 4)	<u>94.01</u> (5)
-------------------------------	------------------

PRODUCTION COSTS/UNIT (5 ÷ YIELD)	<u>3.76</u>
-----------------------------------	-------------

LAND CHARGES	<u>47.50</u> (6)
--------------	------------------

TOTAL COSTS/ACRE (5 + 6)	<u>141.51</u> (7)
--------------------------	-------------------

TOTAL COSTS/UNIT (7 ÷ YIELD)	<u>5.66</u>
------------------------------	-------------

Table 7-4. Cash-Crop Budget

Grain Sorghum (Crop Name)RECEIPTS:

TOTAL REVENUE/ACRE	<u>52.0</u> Yield x <u>2.30</u> Price/Unit	<u>119.60</u> (1)
--------------------	--	-------------------

VARIABLE COSTS:

SEED	<u>1.75</u>
FERTILIZER	<u>25.60</u>
HERBICIDES	<u>2.42</u>
INSECTICIDES	<u>5.66</u>
CROP INSURANCE	<u>2.75</u>
STORAGE & DRYING	<u>7.80</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>11.05</u>
MACHINERY REPAIRS	<u>4.82</u>

TOTAL VARIABLE COSTS	<u>65.35</u> (2)
----------------------	------------------

PROFIT VALUE FOR THE MODEL (1 - 2)	<u>54.25</u> (3)
------------------------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>11.45</u>
DEPRECIATION & INSURANCE	<u>12.80</u>
LABOR	<u>8.40</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>42.15</u> (4)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 4)	<u>107.50</u> (5)
-------------------------------	-------------------

PRODUCTION COSTS/UNIT (5 ÷ YIELD)	<u>2.07</u>
-----------------------------------	-------------

LAND CHARGES	<u>47.50</u> (6)
--------------	------------------

TOTAL COSTS/ACRE (5 + 6)	<u>155.00</u> (7)
--------------------------	-------------------

TOTAL COSTS/UNIT (7 ÷ YIELD)	<u>2.98</u>
------------------------------	-------------

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

TOTAL REVENUE/ACRE	<u>75</u> Yield x <u>2.20</u> Price/Unit	<u>165.00</u> (1)
--------------------	--	-------------------

VARIABLE COSTS:

SEED	<u>10.70</u>
FERTILIZER	<u>25.60</u>
HERBICIDES	<u>8.58</u>
INSECTICIDES	<u>6.60</u>
CROP INSURANCE	<u>3.75</u>
STORAGE & DRYING	<u>11.25</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>11.00</u>
MACHINERY REPAIRS	<u>5.15</u>

TOTAL VARIABLE COSTS	<u>86.13</u> (2)
----------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>13.00</u>
DEPRECIATION & INSURANCE	<u>15.25</u>
LABOR	<u>8.75</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>46.50</u> (3)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 3)	<u>132.63</u> (4)
-------------------------------	-------------------

PRODUCTION COSTS/UNIT (4 ÷ YIELD)	<u>1.77</u>
-----------------------------------	-------------

LAND CHARGES	<u>47.50</u> (5)
--------------	------------------

TOTAL COSTS/ACRE (4 + 5)	<u>180.13</u> (6)
--------------------------	-------------------

TOTAL COSTS/UNIT (6 ÷ YIELD)	<u>2.40</u>
------------------------------	-------------

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

TOTAL REVENUE/ACRE	<u>9.0</u> Yield x <u>16.0</u> Price/Unit	<u>144.00</u> (1)
--------------------	---	-------------------

VARIABLE COSTS:

SEED	<u>8.84</u>
FERTILIZER	<u>20.40</u>
HERBICIDES	<u>6.00</u>
INSECTICIDES	<u>5.00</u>
CROP INSURANCE	<u>2.00</u>
STORAGE & DRYING	<u>2.85</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>11.77</u>
MACHINERY REPAIRS	<u>5.45</u>

TOTAL VARIABLE COSTS	<u>65.81</u> (2)
----------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>12.75</u>
DEPRECIATION & INSURANCE	<u>14.40</u>
LABOR	<u>10.50</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>47.15</u> (3)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 3)	<u>112.96</u> (4)
-------------------------------	-------------------

PRODUCTION COSTS/UNIT (4 ÷ YIELD)	<u>12.55</u>
-----------------------------------	--------------

LAND CHARGES	<u>47.50</u> (5)
--------------	------------------

TOTAL COSTS/ACRE (4 + 5)	<u>160.46</u> (6)
--------------------------	-------------------

TOTAL COSTS/UNIT (6 ÷ YIELD)	<u>17.83</u>
------------------------------	--------------

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

TOTAL REVENUE/ACRE	<u>70</u> Yield x <u>1.35</u> Price/Unit	<u>94.50</u> (1)
--------------------	--	------------------

VARIABLE COSTS:

SEED	<u>9.09</u>
FERTILIZER	<u>18.10</u>
HERBICIDES	<u>1.10</u>
INSECTICIDES	<u>1.15</u>
CROP INSURANCE	<u>2.50</u>
STORAGE & DRYING	<u>2.10</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>9.16</u>
MACHINERY REPAIRS	<u>4.54</u>

TOTAL VARIABLE COSTS	<u>51.24</u> (2)
----------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>10.80</u>
DEPRECIATION & INSURANCE	<u>13.25</u>
LABOR	<u>7.41</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>40.96</u> (3)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 3)	<u>92.20</u> (4)
-------------------------------	------------------

PRODUCTION COSTS/UNIT (4 ÷ YIELD)	<u>1.32</u>
-----------------------------------	-------------

LAND CHARGES	<u>47.50</u> (5)
--------------	------------------

TOTAL COSTS/ACRE (4 + 5)	<u>139.70</u> (6)
--------------------------	-------------------

TOTAL COSTS/UNIT (6 ÷ YIELD)	<u>2.00</u>
------------------------------	-------------

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

TOTAL REVENUE/ACRE	<u>3.5</u> Yield x <u>20.00</u> Price/Unit	<u>70.00</u> (1)
--------------------	--	------------------

VARIABLE COSTS:

SEED	<u>4.40</u>
FERTILIZER	<u>5.40</u>
HERBICIDES	<u>----</u>
INSECTICIDES	<u>.57</u>
CROP INSURANCE	<u>----</u>
STORAGE & DRYING	<u>----</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>10.86</u>
MACHINERY REPAIRS	<u>13.73</u>

TOTAL VARIABLE COSTS	<u>38.46</u> (2)
----------------------	------------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>9.10</u>
DEPRECIATION & INSURANCE	<u>11.35</u>
LABOR	<u>18.20</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>48.15</u> (3)
-------------------	------------------

PRODUCTION COSTS/ACRE (2 + 3)	<u>86.61</u> (4)
-------------------------------	------------------

PRODUCTION COSTS/UNIT (4 ÷ YIELD)	<u>24.75</u>
-----------------------------------	--------------

LAND CHARGES	<u>47.50</u> (5)
--------------	------------------

TOTAL COSTS/ACRE (4 + 5)	<u>134.11</u> (6)
--------------------------	-------------------

TOTAL COSTS/UNIT (6 ÷ YIELD)	<u>38.32</u>
------------------------------	--------------

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

TOTAL REVENUE/ACRE	<u>2.8</u> Yield x <u>30.0</u> Price/Unit	<u>84.00(1)</u>
--------------------	---	-----------------

VARIABLE COSTS:

SEED	<u>1.00</u>
FERTILIZER	<u>5.40</u>
HERBICIDES	<u>----</u>
INSECTICIDES	<u>----</u>
CROP INSURANCE	<u>----</u>
STORAGE & DRYING	<u>----</u>
OVERHEAD	<u>3.50</u>
FUEL & LUBRICANTS	<u>6.45</u>
MACHINERY REPAIRS	<u>10.48</u>

TOTAL VARIABLE COSTS	<u>26.83(2)</u>
----------------------	-----------------

FIXED COSTS:

INTEREST ON CAP. & INVESTMENT	<u>8.25</u>
DEPRECIATION & INSURANCE	<u>10.35</u>
LABOR	<u>15.45</u>
REAL ESTATE TAX	<u>9.50</u>

TOTAL FIXED COSTS	<u>43.55(3)</u>
-------------------	-----------------

PRODUCTION COSTS/ACRE (2 + 3)	<u>70.38(4)</u>
-------------------------------	-----------------

PRODUCTION COSTS/UNIT (4 ÷ YIELD)	<u>25.13</u>
-----------------------------------	--------------

LAND CHARGES	<u>38.00(5)</u>
--------------	-----------------

TOTAL COSTS/ACRE (4 + 5)	<u>108.38(6)</u>
--------------------------	------------------

TOTAL COSTS/UNIT (6 ÷ YIELD)	<u>38.71</u>
------------------------------	--------------

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

RECEIPTS:

MILK	125 cwt x 11.00	Price 1375.00
SALE OF CALVES & CULLS		<u>275.00</u>
TOTAL RECEIPTS		<u>1650.00(1)</u>

SECTION A COSTS:

BREEDING CHARGE	15.00
EQUIPMENT REPAIRS	<u>14.00</u>
BUILDING REPAIRS	<u>8.75</u>
VETERINARY & DRUGS	<u>10.50</u>
MILK HAULING	<u>31.25</u>
RECORDS & HERD TESTING	<u>15.00</u>
TRANSPORTATION & MARKETING COSTS	<u>5.65</u>
SECTION A TOTAL	<u>100.15(2)</u>
PROFIT FIGURE (1 - 2)	<u>1549.85(3)</u>

SECTION B COSTS:

REPLACEMENT CHARGE	(25% of 1000)	250.00
CORN	52 bu @ 2.20	<u>250.00</u>
OATS	54 bu @ 1.35	<u>114.40</u>
CORN SILAGE	4.8 ton @ 16.00	<u>72.90</u>
ALFALFA HAY	2 ton @ 37.00	<u>74.00</u>
PRAIRIE HAY	.25 ton @ 30.00	<u>7.50</u>
PASTURE	2 AUM @ 10.00	<u>20.00</u>
DAIRY SUPPLEMENT	4 cwt @ 10.00	<u>40.00</u>
SALT & MINERAL	.8 cwt @ 7.00	<u>5.60</u>
SECTION B TOTAL		<u>661.20(4)</u>
TOTAL COSTS (2 + 4)		<u>761.35(5)</u>

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE VALUE OF COW	850.00
REPLACEMENT VALUE PER COW	<u>250.00</u>
GRAIN & FORAGE	<u>112.75</u>
OTHER COSTS	<u>72.90</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>1285.65(6)</u>

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		<u>285.00</u>
TOTAL RECEIPTS		<u>1825.00(1)</u>

SECTION A COSTS:

BREEDING CHARGE		15.00
EQUIPMENT REPAIRS		<u>14.00</u>
BUILDING REPAIRS		<u>8.75</u>
VETERINARY & DRUGS		<u>10.50</u>
MILK HAULING		<u>35.00</u>
RECORDS & HERD TESTING		<u>15.00</u>
TRANSPORTATION & MARKETING COSTS		<u>5.65</u>
SECTION A TOTAL		<u>103.90(2)</u>
PROFIT FIGURE (1 - 2)		<u>1721.10(3)</u>

SECTION B COSTS:

REPLACEMENT CHARGE	(25% of 1100)	275.00
CORN	60 bu @ 2.20	<u>132.00</u>
OATS	55 bu @ 1.35	<u>74.25</u>
CORN SILAGE	4.75ton @16.00	<u>76.00</u>
ALFALFA HAY	3.0 ton @37.00	<u>111.00</u>
PRAIRIE HAY	--- ton @ ---	<u>---</u>
PASTURE	1.0 AUM @10.00	<u>10.00</u>
DAIRY SUPPLEMENT	4 cwt @10.00	<u>40.00</u>
SALT & MINERAL	1.0 cwt @ 7.00	<u>7.00</u>
SECTION B TOTAL		<u>725.25(4)</u>
TOTAL COSTS (2 + 4)		<u>829.15(5)</u>

AVERAGE OPERATING CAPITAL REQUIREMENTS:

AVERAGE VALUE OF COW	903.00
REPLACEMENT VALUE PER COW	<u>275.00</u>
GRAIN & FORAGE	<u>122.50</u>
OTHER COSTS	<u>68.25</u>
TOTAL AVERAGE CAPITAL REQUIREMENTS	<u>1368.75(6)</u>

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

<u>Activity Number</u>	<u>Crop Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
<u>X</u> 01.	CORN	CORN	-86.13	____/ACRE
___ 02.	IRRIGATED CORN	IRRCORN	-72.19	____/ACRE
<u>X</u> 03.	CORN SILAGE	CORNSILG	-65.81	____/ACRE
<u>X</u> 04.	OATS	OATS	-51.24	____/ACRE
<u>X</u> 05.	BARLEY	BARLEY	56.63	____/ACRE
<u>X</u> 06.	SPRING WHEAT	SPWHEAT	46.11	____/ACRE
<u>X</u> 07.	ALFALFA	ALFALFA	-38.46	____/ACRE
___ 08.	IRRIGATED ALFALFA	IRRALF	-87.12	____/ACRE
___ 09.	FLAX	FLAX	70.87	____/ACRE
<u>X</u> 10.	SOYBEANS	SOYBEANS	95.94	<u>83.44/ACRE</u>
<u>X</u> 11.	GRAIN SORGHUM	GRAINSOR	54.25	____/ACRE
<u>X</u> 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	<u>20.00/TON</u>
___ 19.	SELL GRASS HAY	SELLGRHAY	30.00	____/TON

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

<u>Activity Number</u>	<u>Livestock Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
<u>83.</u>	PRODUCE 10 CWT MILK--1	10CWTKM1	1256.10	<u> </u> /HD
<u>X 84.</u>	PRODUCE 12.5 CWT MILK--1	12CWTKM1	1549.85	<u> </u> /HD
<u>X 85.</u>	PRODUCE 14 CWT MILK--1	14CWTKM1	1721.10	<u> </u> /HD
<u>86.</u>	PRODUCE 16 CWT MILK--1	16CWTKM1	1915.10	<u> </u> /HD
<u>87.</u>	PRODUCE 10 CWT MILK--2	10CWTKM2	1270.65	<u> </u> /HD
<u>88.</u>	PRODUCE 12.5 CWT MILK--2	12CWTKM2	1564.40	<u> </u> /HD
<u>89.</u>	PRODUCE 14 CWT MILK--2	14CWTKM2	1735.65	<u> </u> /HD
<u>90.</u>	PRODUCE 16 CWT MILK--2	16CWTKM2	1965.65	<u> </u> /HD
<u>91.</u>	PRODUCE 10 CWT MILK--3	10CWTKM3	1270.65	<u> </u> /HD
<u>92.</u>	PRODUCE 12.5 CWT MILK--3	12CWTKM3	1564.40	<u> </u> /HD
<u>93.</u>	PRODUCE 14 CWT MILK--3	14CWTKM3	1735.65	<u> </u> /HD
<u>94.</u>	PRODUCE 16 CWT MILK--3	16CWTKM3	1965.65	<u> </u> /HD
<u>95.</u>	RAISE DAIRY REPLACEMENTS	RDAIRREP	873.10	<u> </u> /HD
<u>31.</u>	BUY CORN	BUYCORN	-2.25	<u> </u> /BU
<u>32.</u>	BUY OATS	BUYOATS	-1.40	<u> </u> /BU
<u>X 33.</u>	BUY ALFALFA	BUYALF	-40.00	<u>-23.00</u> /TON
<u>34.</u>	BUY GRASS HAY	BUYGRHAY	-31.00	<u> </u> /TON
<u>X 35.</u>	BUY CORN SILAGE	BUYCSILG	-17.00	<u>-999.00</u> /TON
<u>37.</u>	BUY SALT & MINERAL	BUYS&MIN	-7.00	<u> </u> /CWT
<u>38.</u>	ANIMAL UNIT MONTHS	AUM	-10.00	<u> </u> /AUM
<u>49.</u>	OPERATING CAPITAL	OPERCAP	-.12	<u> </u> /
<u>50.</u>	LIVESTOCK CAPITAL	LIVECAP	-.11	<u> </u> /
<u>71.</u>	BUILDING CAPITAL	BUILDCAP	-.10	<u> </u> /

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

<u>Activity Number</u>	<u>Activity</u>	<u>Model Name</u>	<u>Model Profit</u>	<u>Your Estimate</u>
<u>X</u> 109.	OFF-FARM EMPLOYMENT--1	OFF-FME1	4.25	<u>3.75</u> /HOUR
<u> </u> 110.	OFF-FARM EMPLOYMENT--2	OFF-FME2	4.75	<u> </u> /HOUR
<u> </u> 111.	RENT CROP LAND	RENTCROP	-100.00	<u> </u> /ACRE
<u> </u> 112.	RENT PASTURE LAND	RENTPAST	-50.00	<u> </u> /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	<u>735.00</u> (1)	<u> </u> (1)
LESS POSSIBLE EXPENSES:		
Meals/month	<u>75.00</u>	<u> </u>
Gas/month	<u>50.00</u>	<u> </u>
Auto Repairs/month	<u>10.00</u>	<u> </u>
Babysitter/month	<u> </u>	<u> </u>
SUBTOTAL	<u>135.00</u> (2)	<u> </u> (2)
MONTHLY PROFIT (1 - 2)	<u>600.00</u> (3)	<u> </u> (3)
HOURLY PROFIT FOR MODEL (3 ÷ Hours Worked/month)	<u>3.75</u> *	<u> </u> **

*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**
<u>Hours/Month</u>						
January	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>
February	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>
March	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>
April	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>
May	<u>250</u>	<u> </u>	<u>75</u>	<u>75</u>	<u> </u>	<u>400</u>
June	<u>250</u>	<u> </u>	<u>125</u>	<u>125</u>	<u> </u>	<u>500</u>
July	<u>250</u>	<u> </u>	<u>125</u>	<u>125</u>	<u> </u>	<u>500</u>
August	<u>250</u>	<u> </u>	<u>100</u>	<u>100</u>	<u> </u>	<u>450</u>
September	<u>250</u>	<u> </u>	<u>75</u>	<u>75</u>	<u> </u>	<u>400</u>
October	<u>250</u>	<u> </u>	<u>50</u>	<u>50</u>	<u> </u>	<u>350</u>
November	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>
December	<u>250</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>250</u>

*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

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

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	SALT&MIN	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.

LITERATURE CITED

- (1) Jack Lenton, "Case Study of Limited Resource Farmers in Lawrence County, Alabama," Proceedings of the Workshop on Methods of Working with Limited Resource Farmers, Bulletin Y-44, Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972.
- (2) Granville King, "The Trigg County, Kentucky, Limited Resource Farm Project," Proceedings of the Workshop on Methods of Working with Limited Resource Farmers, Bulletin Y-44, Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972.
- (3) Ernest Brazzle, "Methods Used in Working with Limited Resource Farmers in Shelby County, Tennessee," Proceedings of the Workshop on Methods of Working with Limited Resource Farmers, Bulletin Y-44, Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972.
- (4) Howard W. Ladewign and Vance W. Edmondson, "Use of Agricultural Aides in Texas," Proceedings of the Workshop on Methods of Working with Limited Resource Farmers, Bulletin Y-44, Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972.
- (5) U.S. Department of Agriculture, Agricultural Research Service, Raising Livestock on Small Farms, Washington: Government Printing Office, 1966.
- (6) John E. Brockett, Farm Management for Part-Time Farmers, Special Circular 203, University Park: College of Agriculture, Extension Service, Pennsylvania State University.
- (7) Fred J. Stewart, Harry H. Hall and Eldon D. Smith, The Potential for Increasing Net Incomes on Limited-Resource Farms in Eastern Kentucky, Research Report 24, Lexington: College of Agriculture, University of Kentucky, 1976.
- (8) Willard F. Woolf, Fred H. Wiegmann and Lonnie L. Fielder, Farm Planning Guides for Small Farms in the Mississippi River Delta Area of Louisiana, Baton Rouge: Department of Agricultural Economics and Agribusiness, Agricultural Experiment Station, Louisiana State University, 1963.

BIBLIOGRAPHY

- Aanderud, Wallace, Ronald Thaden, John Maher, Francis Crandall and Herbert Allen. Livestock Budgets and Planning Prices for Ten Steps Planning. EMC 666. Brookings: Cooperative Extension Service, South Dakota State University, 1979.
- _____, Ronald Thaden, John N. Maher and Francis Crandall. Management Guide for Planning a Farm or Ranch Business. EC 716 rev. Brookings: Cooperative Extension Service, South Dakota State University, U.S. Department of Agriculture, 1979.
- Allen, Herbert R. Costs per Hour and per Acre for Machine Operations. Brookings: Economics Department, South Dakota State University, 1980.
- _____, and David Jibben. Budgets for Major Livestock Enterprises in South Dakota. C 220. Brookings: Economics Department, Agriculture Experiment Station, South Dakota State University, 1977.
- _____, Lyle A. Derscheid, Wallace G. Aanderud and Thomas D. Zeman. Budgets for Major Crop Enterprises in South Dakota. C 226. Brookings: Economics Department, Agricultural Experiment Station, South Dakota State University, 1979.
- Allen, Stephen Q., Wilmer Browning, Charles L. Moore, Sr. and David L. Debertin. Estimated Costs and Returns for Production of Various Crops and Livestock in Kentucky During 1980. Lexington: Agricultural Economics Extension, University of Kentucky, 1979.
- Bay, Ovid. Guidelines for Small Farm Enterprises. The Delles, Oregon: Extension Short Course, 1978.
- Beneke, Raymond R. and Ronald Winterboer. Linear Programming Applications to Agriculture. Ames, Iowa: Iowa State University Press, 1973.
- _____. Managing the Farm Business. New York: John Wiley and Sons, Inc., 1955.
- Bishop, W. D., et. al. Proceedings of the Workshop on Methods of Working with Limited Resource Farmers. Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972.
- Breimyer, Harold F., et. al. Can the Family Farm Survive? Special Report 219. Columbia, Missouri: Agricultural Experiment Station, University of Missouri-Columbia, 1978.

BIBLIOGRAPHY (cont.)

- Brockett, John E. Farm Management for Part-Time Farmers. Special Circular 203. University Park: College of Agriculture, Extension Service, Pennsylvania State University.
- Derscheid, Lyle A., Wallace G. Aanderud and Herbert R. Allen. Market Prices for Net Profit. EMC 723. Brookings: Cooperative Extension Service, South Dakota State University, U.S. Department of Agriculture, 1976.
- Efferson, J. Norman. Farm Records and Accounts. New York: John Wiley and Sons, Inc., 1949.
- French, Forest. Management for Maine Small and Part-Time Farmers. Bulletin 602. Orono, Maine: Cooperative Extension Service, University of Maine.
- Hanson, Ronald J. and R. G. F. "Increasing Incomes of Farm Families Through Dual Employment," Agricultural Financial Review. Volume 35, October, 1974.
- Heady, Earl O. and Wilfred Candler. Linear Programming Methods. Ames, Iowa: Iowa State College Press, 1958.
- _____ and Harald R. Jensen. Farm Management Economics. New York: Prentice-Hall, Inc., 1954.
- _____ and Steven T. Sonka. American Farm-Size Structure in Relation to Income and Employment Opportunities of Farms, Rural Communities and Other Sectors. Card Report 48. Ames, Iowa: The Center for Agricultural and Rural Development, 1974.
- _____ and Steven T. Sonka. Farm-Size Structure and Off-Farm Income and Employment Generation in the North Central Region. Ames, Iowa: North Central Regional Center for Rural Development, 1975.
- _____ and Steven T. Sonka. Income and Structure of American Agriculture Under Future Alternatives of Farm Size, Policies and Exports. Card Report 53. Ames, Iowa: The Center for Agricultural and Rural Development, 1975.
- Hinton, R. A. Farm Management Manual. Urbana-Champaign: College of Agriculture, University of Illinois, 1979.
- James, Sydney C. Midwest Farm Planning Manual. Ames, Iowa: College of Agriculture, Iowa State University Press, 1968.
- Larson, Donald K. "Impact of Off-Farm Income on Farm Family Income Levels," Agricultural Finance Review. Volume 36, April, 1976.

BIBLIOGRAPHY (cont.)

- Loftsgard, Laurel D. and Earl O. Heady. "Application of Dynamic Linear Programming Models for Optimum Farm and Home Plans," Journal of Farm Economics. 41:51-62.
- Luening, Robert A. and William P. Mortenson. The Farm Management Handbook. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1979.
- Nikolitch, Radoje. "The Adequate Family Farm--Mainstay of the Farm Economy," American Agriculture--The Changing Structure. Lexington, Massachusetts: D. C. Heath and Company, 1969.
- Osburn, Donald D. and Kenneth C. Schneeberger. Modern Agriculture Management. Reston, Virginia: Reston Publishing Company, Inc., 1978.
- Reinsel, Edward I. "Farm Family Incomes and Farmers' Incomes Improve at Different Rates," Agricultural Finance Review. Volume 35, October, 1974.
- Saunders, F. B., C. E. Perry and O. L. Brooks. Costs and Returns for Selected Crop Enterprises at the Southeast Georgia Branch Station, 1975-77, with a Summary for the 15-Year Period, 1963-77. Research Report 297. Athens: Department of Agricultural Economics, Agricultural Experiment Station, The University of Georgia, 1978.
- Stewart, Fred J., Harry H. Hall and Eldon D. Smith. The Potential for Increasing Net Incomes on Limited-Resource Farms in Eastern Kentucky. Research Report 24. Lexington: College of Agriculture, University of Kentucky, 1976.
- U.S. Department of Agriculture. Agricultural Research Service. Agricultural Statistics--1978. Washington: Government Printing Office, 1978.
- U.S. Department of Agriculture. Economic Research Service. Agricultural Statistics--1978. Washington: Government Printing Office, 1978.
- U.S. Department of Agriculture. Economic Research Service. Concepts Involved in Defining and Identifying Farms. Washington: Government Printing Office, 1970.
- U.S. Department of Agriculture. Economic Research Service. Small Farm Issues: Proceedings of the ESCS Small-Farm Workshop, May, 1978. Washington: Government Printing Office, 1979.

BIBLIOGRAPHY (cont.)

Westin, Fred C., Leo F. Puhr and George J. Buntley. Soils of South Dakota. Brookings: Agronomy Department, Agricultural Experiment Station, South Dakota State University, 1967.

Woolf, Willard F., Fred H. Wiegmann and Lonnie L. Fielder. Farm Planning Guides for Small Farms in the Mississippi River Delta Area of Louisiana. Baton Rouge: Department of Agricultural Economics and Agribusiness, Agricultural Experiment Station, Louisiana State University, 1963.

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: $\text{total hours/acre} \times \text{gal. of fuel/hour} \times 1.15 \times \text{price of fuel}$. 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
							<u>1.3972</u>

$$1.3972 \times 6.534 \times 1.15 \times 1.00 = 10.50 + .50 \text{ for trucking} = 11.00$$

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
							<u>1.6091</u>

$$1.6091 \times 6.534 \times 1.15 \times 1.00 = 12.09 + 1.00 \text{ for trucking} = 13.09$$

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
							<u>1.153</u>

$$1.153 \times 6.534 \times 1.15 \times 1.00 = 8.66 + .50 \text{ for trucking} = 9.16$$

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
							<u>1.1155</u>

$$1.1155 \times 6.534 \times 1.15 \times 1.00 = 8.38 + .50 \text{ for trucking} = 8.88$$

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
							<u>1.2565</u>

$$1.2565 \times 6.534 \times 1.15 \times 1.00 = 9.44 + .50 \text{ for trucking} = 9.94$$

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
							<u>1.4039</u>

$$1.4039 \times 6.534 \times 1.15 \times 1.00 = 10.54 + .50 \text{ for trucking} = 11.05$$

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
							<u>1.4450</u>

$$1.445 \times 6.534 \times 1.15 \times 1.00 = 10.86$$

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
							<u>1.7736</u>

$$1.7736 \times 6.534 \times 1.15 \times 1.00 = 13.33$$

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
							<u>.8587</u>

$$.8587 \times 6.534 \times 1.15 \times 1.00 = 6.45$$

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
							<u>1.567</u>

$$1.567 \times 6.534 \times 1.15 \times 1.00 = 11.77$$

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		<u>150.00</u>	
LUMBER		<u>300.00</u>	
REMOVE & REPLACE FIXTURES		<u>375.00</u>	
MISCELLANEOUS EXPENSES		<u>200.00</u>	
LABOR		<u>225.00</u>	
TOTAL BUILDING COSTS			<u>1600.00</u>
PER SOW			<u>200.00</u>

EQUIPMENT COSTS:

FURNACE		400.00	
HEAT LAMPS	8 @ 4.35	<u>35.00</u>	
WATERERS	6 @ 70.00	<u>420.00</u>	
FEEDERS	3 @ 70.00	<u>210.00</u>	
FARROWING CRATES	8 @ 230.00	<u>1840.00</u>	
TOTAL EQUIPMENT COSTS			<u>2905.00</u>
PER SOW			<u>363.15</u>

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		<u>350.00</u>	
INSTALLING INSULATION		<u>150.00</u>	
LUMBER		<u>500.00</u>	
REMOVE & REPLACE FIXTURES		<u>400.00</u>	
MISCELLANEOUS EXPENSES		<u>250.00</u>	
LABOR		<u>300.00</u>	
TOTAL BUILDING COSTS			<u>1950.00</u>
PER SOW			<u>243.75</u>

EQUIPMENT COSTS:

FURNACE		<u>400.00</u>	
HEAT LAMPS	8 @ 4.35	<u>35.00</u>	
WATERERS	6 @ 70.00	<u>420.00</u>	
FEEDERS	3 @ 70.00	<u>210.00</u>	
WATER PANS	8 @ 2.00	<u>16.00</u>	
FEED PANS	8 @ 2.00	<u>16.00</u>	
MISCELLANEOUS		<u>33.00</u>	
TOTAL EQUIPMENT COSTS			<u>1130.00</u>
PER SOW			<u>141.25</u>

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		<u>350.00</u>	
INSTALLING INSULATION		<u>150.00</u>	
LUMBER		<u>150.00</u>	
REMOVE & REPLACE FIXTURES		<u>250.00</u>	
MISCELLANEOUS EXPENSES		<u>300.00</u>	
LABOR		<u>150.00</u>	
TOTAL BUILDING COSTS			<u>1350.00</u>
PER SOW			<u>75.00</u>

EQUIPMENT COSTS:

FURNACE			<u>400.00</u>	
HEAT LAMPS	18 @	4.00	<u>70.00</u>	
WATERERS	2 @	70.00	<u>140.00</u>	
FEEDERS	2 @	70.00	<u>140.00</u>	
FARROWING CRATES	18 @	230.00	<u>4140.00</u>	
TOTAL EQUIPMENT COSTS				<u>4890.00</u>
PER SOW				<u>271.70</u>

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		<u>150.00</u>	
LUMBER		600.00	
REMOVE FIXTURES		<u>250.00</u>	
MISCELLANEOUS EXPENSES		200.00	
LABOR		<u>250.00</u>	
TOTAL BUILDING COSTS			<u>1800.00</u>
PER SOW			<u>100.00</u>

EQUIPMENT COSTS:

FURNACE		400.00	
HEAT LAMPS	18 @ 4.00	<u>70.00</u>	
WATERERS	2 @ 70.00	<u>140.00</u>	
FEEDERS	2 @ 70.00	<u>140.00</u>	
WATER PANS	18 @ 2.00	<u>36.00</u>	
FEED PANS	18 @ 2.00	<u>36.00</u>	
MISCELLANEOUS		<u>28.00</u>	
TOTAL EQUIPMENT COSTS			<u>850.00</u>
PER SOW			<u>47.25</u>

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

BUILDING COSTS:

INSULATION		<u>350.00</u>	
INSTALLING INSULATION		<u>150.00</u>	
LUMBER		<u>250.00</u>	
REMOVE & REPLACE FIXTURES		<u>400.00</u>	
MISCELLANEOUS EXPENSES		<u>150.00</u>	
LABOR		<u>200.00</u>	
TOTAL BUILDING COSTS			<u>1500.00</u>
PER SET OF FEEDERS			<u>31.25</u>

EQUIPMENT COSTS:

FURNACE		<u>400.00</u>	
HEAT LAMPS	10 @ 4.00	<u>40.00</u>	
WATERERS	6 @ 70.00	<u>420.00</u>	
FEEDERS	6 @ 70.00	<u>420.00</u>	
MISCELLANEOUS		<u>20.00</u>	
TOTAL EQUIPMENT COSTS			<u>1300.00</u>
PER SET OF FEEDERS			<u>27.10</u>

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

BUILDING COSTS:

SMALL SHED	<u>200.00</u>	
TOTAL BUILDING COSTS		<u>200.00</u>
PER SET OF FEEDERS		<u>10.00</u>

EQUIPMENT COSTS:

FEEDERS	3 @ 70.00	<u>210.00</u>	
WATERERS	3 @ 70.00	<u>210.00</u>	
FENCE		<u>180.00</u>	
TOTAL EQUIPMENT COSTS			<u>600.00</u>
PER SET OF FEEDERS			<u>30.00</u>

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

BUILDING COSTS:

REMOVE FIXTURES	<u>200.00</u>	
CARPENTRY	<u>150.00</u>	
ELECTRICAL HOOKUP	<u>300.00</u>	
PLUMBING	<u>150.00</u>	
GENERAL LABOR & HOOKUP	<u>200.00</u>	
TOTAL BUILDING COSTS		<u>1000.00</u>
PER COW		<u>100.00</u>

EQUIPMENT COSTS:

WATER TANK	<u>200.00</u>	
STANCHIONS	<u>350.00</u>	
VACUUM PUMP	<u>225.00</u>	
BUCKETS & PIPE	<u>100.00</u>	
MISCELLANEOUS	<u>50.00</u>	
LABOR	<u>50.00</u>	
BULK TANK & HOOKUP	<u>225.00</u>	
TOTAL EQUIPMENT COSTS		<u>1175.00</u>
PER COW		<u>117.50</u>

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

	BUY&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	WASSTEER	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

	BUYSTER	SELYSTER	BUYHEIF	SELYHEIG	BUYSTCF	SELLSTCF	BUYHCF	SELHCF	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

	TOCWTHK1	T2CWTHK1	T4CWTHK1	T6CWTHK1	TOCWTHK2	T2CWTHK2	T4CWTHK2	T6CWTHK2
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
FARMLOEC	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	SELLAMB
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			
FARML OCT	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

	T0CWTK3	T2CWTK3	T4CWTK3	T6CWTK3	RDAIRREP	BUYDARHF	BUYFLAMB	SELLAMB
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	JULFLAMB	AUGFLAMB	FD&MKLAM	RREPEWES	DRYLOTFO	FEEDFLAMB
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
GRUAYINV	.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
FEEDFLAMB						100.0	-1.2

Table C-1. Continued

	RBUTHOG1	PROOFDR1	BU&FINF1	RBUTHOG2	PROOFDR2	RBUTHOG3	PROOFDR3	BU&FINF3
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
FARML OCT	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
FARML OEC	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	
ALF INV	.4	.3	.2	.4	.3	.4	.3	.2
ALUMINV	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	PRODFOR2	RBUTHOG3	PRODFOR3	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
FARML OCT	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
ALUMINV	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	BUYFDP1G
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	BUYBIRD	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	BUYBIRD	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	BUILDAP	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-D2							1.0			
PASTLAND										-1.0

Table C-2. Stored Model Supply Values

<u>ROW NAME</u>	<u>SUPPLY</u>
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.

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 RUNAM(100),NAM(2),V(2),CNAME,CLNAME(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     RUNAM(IR)=NAM(1)
380     GO TO 90
390     120 CONTINUE
400 C
410 C     COLUMNS SECTION

```

```

420 C
430     NROW=IR
440     NC=0
450 125 READ(IK,130) C1,CNAM,NAM(1),V(1),NAM(2),V(2)
460 130 FORMAT(A3,1X,AB,2X,AB,2X,F12.0,3X,AB,2X,F12.0)
470     GO TO 140
480 135 READ(IK,130) C1,CNAM,NAM(1),V(1),NAM(2),V(2)
490     IF (C1.EQ.RHS) GO TO 190
500     IF (CNAM.EQ.OLDCOL) GO TO 150
510 140 NC=NC+1
520     OLDCOL=CNAM
530     CLNAM(NC)=CNAM
540     IR=0
550 150 CONTINUE
560     DO 170 I1=1,2
570     IF (NAM(I1).EQ.BLK) GO TO 170
580     DO 160 J=1,NROW
590     IR=IR+1
600     IF (IR.GT.NROW) IR=1
610     IF (NAM(I1).NE.RUNAM(IR)) GO TO 160
620     NELT(NC)=NELT(NC)+1
630     IN=NELT(NC)
640     VAL(IN,NC)=V(I1)
650     IND(IN,NC)=IR
660     GO TO 170
670 160 CONTINUE
680 C     ERROR: CAN NOT FIND ROW NAME IN COLUMNS SECTION
690 170 CONTINUE
700     GO TO 135
710 190 CONTINUE
720 C
730 C     RHS SECTION
740 C
750     IR=0
760 200 READ(IK,130) C1,RHSN,NAM(1),V(1),NAM(2),V(2)
770     IF (C1.EQ.END) GO TO 300
780 C     FIND ROW NAME AND ASSIGN VALUE
790     DO 250 I1=1,2
800     IF (NAM(I1).EQ.BLK) GO TO 250
810     DO 230 I=1,NROW
820     IR=IR+1
840     IF (IJ.EQ.0) GO TO 350
850     IF (NAM(I1).EQ.RUNAM(IR)) GO TO 240
860 230 CONTINUE
870 C     ERROR: CAN NOT ROW NAME FOR RHS
880 240 RHSV(IR)=V(I1)
890 250 CONTINUE
900     GO TO 200
910 300 CONTINUE
920     WRITE(12) NROW,NC,(RWYTP(I),I=1,NROW),(NELT(J),J=1,NC)
930     WRITE(12) (RUNAM(I),I=1,NROW),(RHSV(I),I=2,NROW),

```



```

940      * (CLNAM(I),I=1,NC)
950      DO 305 I=1,30
960      305 WRITE(12) (VAL(I,J),J=1,NC),(IND(I,J),J=1,NC)
962      GO TO 350
965      306 CONTINUE
980      READ(12) NROW,NC,(RWTP(I),I=1,NROW),(NELT(J),J=1,NC)
990      READ(12) (RWNAM(I),I=1,NROW),(RHSV(I),I=2,NROW),
1000     * (CLNAM(I),I=1,NC)
1010     DO 310 I=1,30
1020     310 READ(12) (VAL(I,J),J=1,NC),(IND(I,J),J=1,NC)
1030     350 CONTINUE
1040     490 READ(15,500) CNAM,CLS
1050     500 FORMAT(AB,1BI4)
1060     IF (CNAM.EQ.LAST) GO TO 560
1070 C
1080 C     COUNT NON ZERO ITEMS IN CLS
1090 C
1100     NZ=0
1110     DO 510 I=1,18
1120     IF (CLS(I).EQ.0) GO TO 520
1130     NZ=NZ+1
1140     510 CONTINUE
1150     520 CONTINUE
1160 C     FIND CNAM COLUMN NUMBER
1170     DO 530 J=1,NC
1180     IF (CNAM.EQ.CLNAM(J)) GO TO 540
1190     530 CONTINUE
1200 C     ERROR: CAN NOT FIND ACTIVITY NAME
1202     WRITE(6,9000) CNAM
1203     9000 FORMAT(' CAN NOT FIND NAME***',AB)
1210     540 CONTINUE
1220     DO 550 I=1,NZ
1230     550 INDC(I,J)=CLS(I)
1240     LST(J)=NZ
1250     GO TO 490
1260     560 CONTINUE
1270 C
1280 C     SELECT ACTIVITIES TO BE INCLUDED
1290 C
1300     590 READ(15,600) IC,CNAM,VALUE
1301     WRITE(6,601) IC,CNAM,VALUE
1302     601 FORMAT(' ',I3,AB,F12.0)
1310     600 FORMAT(I3,AB,F12.0)
1320     IF (IC.LT.0) GO TO 700
1330     DO 610 J=1,NC
1340     IF (CNAM.EQ.CLNAM(J)) GO TO 620
1350     610 CONTINUE
1360 C     ERROR IF GET HERE
1365     WRITE(6,9000) CNAM
1370     620 CONTINUE
1380     ICNUT(J)=1

```

Table E-1. Continued

```

1390      NR=NELT(J)
1400      DO 625 I=1,NR
1410        IR=IND(I,J)
1420      625 IRNUT(IR)=1
1430        IF (VALUE.NE.0.0) VAL(1,J)=VALUE
1440        NZ=LST(J)
1445        IF (NZ.EQ.0) GO TO 590
1450        DO 640 I=1,NZ
1460          J1=INDC(I,J)
1470          ICNUT(J1)=1
1480          NR=NELT(J1)
1490          DO 630 I1=1,NR
1500            IR=IND(I1,J1)
1510      630 IRNUT(IR)=1
1520      640 CONTINUE
1530        GO TO 590
1540      700 CONTINUE
1550 C
1560 C      CHANGE RHS
1570 C
1580      710 READ(I5,720) CNAM,VALUE
1590      720 FORMAT(3X,AB,F12.0)
1600        IF (CNAM.EQ.LAST) GO TO 750
1610        DO 730 I=1,NROW
1620          IF (CNAM.EQ.RUNAM(I)) GO TO 740
1630      730 CONTINUE
1640 C      ERROR IF GET HERE: CAN NOT FIND ROW NAME TO UPDATE
1645        WRITE(6,9000) CNAM
1650      740 RHSV(I)=VALUE
1660        GO TO 710
1670      750 CONTINUE
1680 C
1690 C      WRITE BCDOUT
1700 C
1710        WRITE(I11,800)
1720      800 FORMAT('NAME',10X,'FARM')
1730        WRITE(I11,810)
1740      810 FORMAT('ROWS')
1750        DO 830 I=1,NROW
1760          IF (IRNUT(I).EQ.0) GO TO 830
1770          WRITE(I11,820) RUTYP(I),RUNAM(I)
1780      820 FORMAT(1X,A1,2X,AB)
1790      830 CONTINUE
1800        WRITE(I11,840)
1810      840 FORMAT('COLUMNS')
1820        DO 870 I=1,NC
1830          IF (ICNUT(I).EQ.0) GO TO 870
1840          NR=NELT(I)
1850          DO 860 J=1,NR
1860            IR=IND(J,I)
1870            WRITE(I11,850) CLNAM(I),RUNAM(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) RUNAM(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 SPUHEAT 101
2147 ALFALFA 91 101
2157 IRRALF 91 101
2167 FLAX 101
2177 SOYBEANS 101
2187 GRAINSOR 101
2197 GRASSHAY 93 101
2207 RBUTH061 63 64 65 66 69 101 102 85 86
2217 RBUTH062 63 64 65 66 69 101 102 85 86
2227 RBUTH063 63 64 65 66 69 101 102 85 86
2237 RBUTH064 63 64 65 66 69 101 102 103 85 86
2247 RBUTH065 63 64 65 66 69 101 102 103 85 86
2257 RBUTH066 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 RREPEUES 63 64 66 68 69 101 102

```

[illegible]

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

```

10 //ROD JOB 71072099,'ROD',MSGLEVEL=1,CLASS=J
20 //JOB LIB DD DSN=MPSX.SYSTH360,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 //SYSHLCP 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(XPNAME,'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 //SYSHLCP DD DSN=*.MPSCOMP.SYSHLCP,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 //

```