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A Mathematical programming Model for Small Scale Family Farms in South Eastern South Dakota

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By

Herbert R. Allen and Rodney Gene De Smet*

FORWARD

This model was initially developed by Rodney G. De Smet as a master's thesis. The model remains essentially the same although it has been updated and modified as the result of experience through student use and personal experimentation. The research for this report was conducted under South Dakota Agricultural Experiment Station Project 099. A major objective of the study has been to provide additional forward planning tools for use by family farm operators.

The authors wish to express their appreciation to Dr. Wayne Ellingson for his programming assistance, Dr. Wallace Aanderud, Extension farm management specialist, for his helpful suggestions and to Erwin Anderson, Extension area farm management specialist, for his cooperative work in gathering basic data used in the study.

*Professor of Economics and former graduate student respectively.

A MATHEMATICAL MODEL FOR SMALL SCALE
FAMILY FARMS IN SOUTH EASTERN SOUTH DAKOTA

CONTENTS

LIST OF TABLES

A mathematical
programming model
for small scale family farms
in south eastern South Dakota

Many farm operators are anxious to use the very latest technological tools in forward planning their farming operations. Among those tools are the computer and mathematical programming models.

Small scale family farmers in southeastern South Dakota are as much in need of such technology as any businessman, industrialist, or large farm operator. Linear programming has proven useful for analyzing a large number of alternatives and for selecting the optimum farm business organization. However, the technical expertise necessary for developing and using a mathematical model has placed a limitation on its practical application.

This publication presents a model for small scale family farm operations in southeastern South Dakota along with data input-output procedures that may be used by any person not specially trained in linear programming. The computer program used is the IBM MPSX.

Methodology

Budgets for 15 crop activities and 52 livestock activities adapted to southeastern South Dakota were prepared. An activity is comparable to an enterprise except that an activity is more precisely defined. (A dairy operation producing 10,000 lb of milk per cow is one activity, while a dairy program producing 14,000 lb per cow is another.) Activities of this type were then incorporated into a "master" linear programming matrix.

In addition to activities, the linear programming matrix identifies the resources and the bounds or restraints placed upon the activities. The "resource supply section" is called a variety of names. It may be identified as the B_i column, supply column, or right hand side (RHS). The "bounds section" places upper or lower limits on the level at which an activity will be included in the farm plan.

Matrix coefficients for each activity were then stored in the computer. By using VSPC data processing procedures it is possible to select activities and combine them into an LP matrix (mathematical model) that would represent the alternatives for a specific farm operation.

To facilitate the construction of a mathematical model for a specific farm, a set of data input forms was specially prepared. In the preparation of these forms emphasis was placed upon ease of entry and clarity in defining the data to be entered. No technical understanding of programming procedures is necessary to complete these forms. Data from the input forms are entered into the computer and processed using the IBM MPSX program (6).

Entering the data into the computer requires some understanding of terminal use and VSPC procedures, understanding which may be quickly acquired. A complete set of instructions for processing the data from the input forms has also been prepared.

Sources of Information

Preliminary data for the selection of enterprises to be included in the model, data for budget preparation, and identification of management levels came from a farm records program conducted by the Economics Department at South Dakota State University. Various Extension Service publications dealing with southeastern South Dakota also served as a source of information.

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

7

Assumptions and Procedures

An average level of management on the family farm is assumed for all crop and livestock enterprises. It must be recognized that in actual practice the levels of skill, training, and experience will vary from farm to farm for each and every enterprise. The levels of management are reflected in the matrix coefficients including yield levels, pigs saved per litter, milk production per cow, labor requirements, etc.

The person trained in the technical procedures of mathematical modeling will find it very easy to modify these assumptions by altering the matrix coefficients. A complete copy of the matrix developed in this model is presented in the appendix of this report to facilitate such modifications.

Descriptive variable names have been employed to facilitate the use of the model. Product prices are input to the model by transferring products to a selling activity.

It is assumed that a "master" matrix may be developed which will be applicable to most farm operations without modification of all input-output coefficents. Only key items affecting the most profitable farm organization need be changed. They include such items as price received, resources available (land, labor, and capital), alternative activities, and other items as specified in a specially prepared input form.

The data input form and the accompanying set of enterprise work forms result in a rather non-technical procedure for building a model to simulate a specific farm operation.

Companion budgets, employed in this procedure, are not complete budgets in the traditional sense. Rather, they are supplementary work forms used in conjunction with traditional budgets to arrive at the value to be entered as a production coefficient in the objective function of a linear programming matrix.

After a model has been prepared it is usually necessary to "fine tune" it with several runs through the computer to reflect goals and values of the farm operator and/or remove conflicting restrictions that may produce infeasible solutions. The model may then be stored in the computer and re-run from time to time, with modifications as the user may choose.

It must be pointed out that the technical nature of the data planning process does not result in a foolproof farm plan. The management factor cannot be circumvented with the use of any technical developments currently available. The great advantage of programming as a management tool is that it provides the opportunity to test a wide range of alternative adjustments and compare the results without using unreasonable quantities of managerial time (3).

After a model has been constructed to simulate a specific farm operation it may be used to answer questions such as what would happen (a) if hogs were forced into the operation in place of beef cows? (b) if off farm employment were taken? (c) if $50,000 more capital were borrowed?

MODEL RESTRICTIONS

Restraints on the farm plan are imposed by entries in the RHS (right hand side) of the LP matrix and by bounds placed upon the activities. The RHS is synonymous with the supply side and level of resources available. Restraints include the land, labor, and capital available or the quantity of these resources that may be made available through farm loans, leasing, etc. There may also be restrictions imposed by government programs or special leasing arrangements.

The bounds section of this model permits the operator to identify other restrictions due to personal choices such

as conservation practices affecting land use patterns or dislike for certain enterprises.

The first step in building a mathematical model for an individual farm is to list the quantity of resources available.

Land Supply

Land supply is identified as either cropland owned or pasture land owned. It is possible to design a model to recognize variance in productivity by land classes. However, for expedience and practicality, one land class for the farm as an average is assumed in this model. This implies that farm planners should prepare budgets which reflect crop yields for the farm as an average.

Decisions regarding productivity due to land classes may be made outside of the model. For example, if a farm has a portion of land that is best suited for corn production, a budget reflecting corn production on this land may be prepared. When designing the field layout the operator may grow corn on the land best suited for this purpose.

Additional land may be acquired through cash rental. No provision is made in this model for crop share rented land. This would require an additional activity for each crop and greatly complicate the model.

As a practical approach, the farm planner may treat crop share rented land the same as cash rented land and enter a cash rent value that is commensurate with crop share rental arrangements. The total value of the landlord's share of the crop less the landlord's share of cash production costs, calculated on a per acre basis, is then entered as a cash rent charge. There is provision for entering the cash rent value in the activities section of the data input form.

Additional pasture land may be acquired through a cash rental activity.

Pasture land may be used by livestock for grazing purposes or for the production of native hay.

Labor Supply

A labor supply of 250 hours per month is included in the model to represent the labor of one full time operator. The hours of labor available from all family members (unpaid workers) must be listed in the data input form.

Labor for work off the farm is estimated on an annual basis. The model provides for two off farm activities (two family members). A farm wife (person 2) may have 40 hours per week available for a non farm job. If such employment is available and it is desired to construct a model to consider non farm employment vs. working on the farm, a labor supply of 2,080 hr would be entered for the farm wife (52 weeks x 40).

The same procedure would be used in calculating the off farm labor supply for person 1 (the farm operator). However, if the farm operator considers a non farm job that requires 50 hours of his time each month it will be necessary for him to reduce his farm labor supply from 250 to 200 hours per month.

If work off the farm is not to be included in the planning process a labor supply of zero will be entered for both persons 1 and 2.

Capital Supply

Capital restraints are difficult to deal with in mathematical modeling. The type of restraint employed must be tailored to the objectives and situation of the farm operator. A model using one capital row to restrict total capital use is not adequate for testing the profitability of investing in more beef cows or building additional swine feeding facilities.

However, in many instances the cash operating capital available will be the limiting factor, and it is assumed that capital in the form of machinery, buildings, and facilities is available for whatever plan is adopted. Thus, in most models, a capital row which represents the cash cost of production (operating capital) is sufficient as a capital restraint.

The model presented in this report employs restraints in the supply side of the matrix for operating capital and livestock capital only.

Operating Capital

Operating capital represents current assets in the form of "near cash" less any short term liabilities that must be paid out of the cash account. The entry in the data input form represents the supply of capital available for cash operating expenses such as seed, fuel, fertilizer, purchase of feeder livestock, etc.

Before an operator will borrow money he may have plans for selling some assets on hand such as butcher hogs, feeder cattle or grain. The value of such assets should be included in the supply of operating capital.

A most practical guideline in estimating the supply of operating capital would be for the farmer to ask himself "How many total dollars are available for operating expenses before it is necessary to borrow money?"

Livestock Capital

The supply of livestock capital in this model is defined as the current market value of all breeding livestock on hand less any debts or claims against the breeding livestock inventory. This capital supply represents only investment capital.

The purchase of feeder pigs, feeder cattle, turkey poults, and feeder lambs is made from operating capital. Additional livestock capital may be acquired through a borrowing activity.

Building Capital

No entry is made in the data input form for an initial supply of building capital. Restrictions on enterprise levels which are due to buildings and facilities are imposed by the use of bounds. No limitations on size of enterprise which are due to the supply of building capital are included in this model.

Activities that require building additional facilities are included, and capital for these facilities is borrowed. The model tabulates total building capital borrowed and subtracts an interest charge as a farm expense but does not employ valuation of fixed assets as a restraint in the supply side of the matrix.

Machinery Capital

Machinery capital is handled in the same manner as building capital. The level of investment in machinery is not employed as a restraint in the supply side of the matrix. Only additional borrowed capital enters into the planning procedure.

Suppose a farm operator is considering renting another 200 acres of land and will need to borrow another $30,000 for machinery. A model may be established that will add $30,000 of machinery capital to be borrowed and also add 200 acres of rented land. The optimal farm plan may then be calculated under this set of conditions.

Fixed Commitments

Fixed commitments represent fixed costs plus debt payments, living expenses, or other obligations that must be met during the planning period ahead. The

model subtracts these costs from farm receipts in a lump sum. The data entry form makes provision for specifying these amounts.

There is the option of not specifying debt payments or living expense and manually subtracting these amounts from the value of the plan after the computer results are received. But the planning model has provision for entering the quantities and letting the computer make the calculations if this is desired.

It is suggested that living expenses be entered when filling out the data input form. Living expenses occur day by day and are assumed to come out of operating capital for the farm business. This results in more borrowed money. Net farm income will be reduced by the amount of interest on the additional borrowed capital. This is not true for debt payments. It is assumed that debt payments will be made at the end of the planning period and will come out of net farm income.

Total depreciation on farm assets may be taken from the records of recent years. If additional investments are anticipated, an estimated allowance for the new investments should be added to the past years' records to arrive at total depreciation. An allowance for taxes and insurance may be calculated in the same manner. Insurance for crop production should not be included here since it is included as a variable cost in the crop production activities.

PRODUCTION ACTIVITIES

The preparation of complete budgets for each activity or enterprise is necessary before building a matrix.

Budgets are available from a variety of sources and any or all of them may serve as a reference to supply input data to be used in building an LP matrix. Reference crop budgets used in the preparation of this model are found in a separate publication (1).

The budgets in this section are not traditional budgets in the sense that they derive return above all costs in crop production. Rather, they are work forms to identify selected items of return and cost, to arrive at the value to be entered in the profit row linear programming matrix. They may be regarded as "companion budgets" to the traditional budget forms.

Crop Production Data

Entries in the profit row for each activity (i.e., the coefficients of the objective function) are derived by subtracting total cash costs from total cash receipts. However, adjustments are made to the return above cash cost if some or all of the production is transferred to another enterprise.

For example, corn is used as a feed crop and consequently it is transferred to inventory for use by other enterprises or for sale by a "sell corn" activity. Therefore, the total value of production becomes zero, as shown in Table 1, and the profit becomes -$113.00. This negative value is entered as the profit value in the objective function of the model. It represents the cost of production and becomes a negative profit value when all of the production is transferred to other activities.

Table 1 contains data showing how the model profit figure is calculated for all of the crop production activities in the model. Profit values shown in Table 1 are default values built into the model. If one can accept these calculations there is no need to make any changes in the model. Users of this planning procedure are encouraged to use Table 1 to modify any of the values in accordance with their own farm records or personal estimates.

The operating capital requirement of each crop production activity is assumed to be equal to the total cash costs as given in Table 1.

There is also a provision in the model for land set aside to participate in government programs. It is necessary to calculate the expected income per acre for land in a set aside program. Table 2 is a form employed for this purpose in 1983. Government programs will undoubtedly change and such a work form may not be applicable in future years. However, similar forms will be available through the Extension Service or through various computer services, etc.

Livestock Production Data

Livestock "companion" budgets shown in Tables 3-7 resemble the forecast of budgets in crop production. The purpose of the companion budgets is to provide detail necessary for calculating profit values if it is desired to change the values that have been built into the mathematical model as default values. Reference livestock budgets used in the preparation of matrix coefficients in this model are found in a separate publication (2).

Livestock budgets in this section do not contain costs for input items that are taken out of inventory (transferred from another activity). For example, the corn production activity transfers all corn into inventory. The cost of producing this corn is reflected in a negative $113 entered as a coefficient in the profit row (objective function). Therefore, livestock enterprises are not charged directly for the cost of home grown feeds since the cost of production has already been charged to the crop production activity. Charges are transferred by the computer to the appropriate livestock enterprise.

Similarly, the sale of a product or the purchase of an input item may not appear in the companion budgets if the item is being transferred through a purchase or sale activity. Consequently, if modifications are made in the model profit figure it is important to adhere to the cost and return calculations as they are itemized in the companion budgets.

Items that do not appear in the cost structure of the companion budgets for livestock are accounted for either in the crop production activities or the non production activities that are discussed next.

Non Production Activities

To enter prices for the purchase and sale of major items it becomes expedient to transfer these items to a purchase or sale activity. Hiring labor, borrowing money, or buying feeder cattle may all be looked upon as purchase activities. Table 8 contains a list of all non production activities and their default prices.

TABLE 1. CROP BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

(Dryland Corn, Irrigated Corn, Irrigated Alfalfa, Dryland Alfalfa)

	Dryland Corn		Irrigated Corn		Irrigated Alfalfa		Dryland Alfalfa	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
YIELD	75	75	130	130	6	6	3.5	3.5
PRICE	2.20		2.20		37		37	
TOTAL VALUE	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00
COSTS:								
Seed	13.20		17.52		6.00		4.50	
Fertilizer	30.10		48.15		17.50		10.80	
Herbicides	12.50		12.50					
Insecticides	11.50		11.50		1.60		1.60	
Crop Insurance	3.50		8.00		(twine) 6.00		(twine) 3.50	
Storage & Drying	17.00		24.74		4.80		2.96	
Overhead	4.50		7.80		4.50		4.50	
Fuel & Lubricants	13.55		14.00		18.70		11.95	
Machinery Repairs	7.15		7.15		16.30		12.95	
Irrigation Fuel or Power			16.35		16.35			
Irrigation Lubricant			0.14		0.14			
Irrigation Repair			5.98		5.98			
TOTAL CASH COSTS	113.00		173.83		97.87		52.76	
MODEL PROFIT	-113.00		-173.83		-97.87		-52.76	

TABLE 1. CROP BUDGETS (continued)
          (Oats, Barley, Spring Wheat, Flax)

	Oats		Barley		Spring Wheat		Flax	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
YIELD	70	70	50		34		20	
PRICE	1.35		2.00		3.80		5.00	
TOTAL VALUE	000.00	000.00	100.00		129.20		100.00	
COSTS:								
Seed	10.40		5.60		8.45		12.00	
Fertilizer	15.00		15.00		15.00		12.45	
Herbicides	2.00		1.80		1.80		3.00	
Insecticides	1.10		1.10		1.10		0.20	
Crop Insurance	2.25		2.50		2.25		2.50	
Storage & Drying	3.20		1.90		1.30		0.75	
Overhead	4.50		4.50		4.50		4.50	
Fuel & Lubricants	11.15		11.30		11.30		10.90	
Machinery Repairs	4.70		4.75		4.75		4.60	
Irrigation Fuel or Power								
Irrigation Lubricant								
Irrigation Repair								
TOTAL CASH COSTS	54.30		48.45		50.45		50.90	
MODEL PROFIT	-54.30		51.55		78.75		49.10	

TABLE 1.   CROP BUDGETS (continued)

(Soybeans, Grain Sorghum, Corn Silage, Native Hay)

	Soybeans		Grain Sorghum		Corn Silage		Native Hay	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
YIELD	30		65		12 T		1.8	
PRICE	6.00		2.25		16.00		30.0	
TOTAL VALUE	180.00		146.25		000.00	000.00	000.00	000.00
COSTS:								
Seed	12.50		3.60		13.20			
Fertilizer	8.10		24.60		30.10			
Insecticides	0.50		5.00		11.50			
Herbicides	6.35		6.35		12.50			
Crop Insurance	2.50		2.50		3.50		(twine) 1.80	
Storage, Drying, & Marketing	6.65		13.00		17.00		1.70	
Overhead	4.50		4.50		4.50			
Fuel & Lubricants	11.75		12.60		15.05		9.04	
Machinery Repairs	5.40		5.70		14.32		9.80	
TOTAL CASH COSTS	58.25		77.85		121.67		22.34	
MODEL PROFIT	121.75		68.40		-121.67		-22.34	

TABLE 1. CROP BUDGETS (continued)
         (Sweet Corn, Sunflowers)

	Sweet Corn		Sunflowers	
	Model Values	Your Values	Model Values	Your Values
YIELD	1200 doz.	_____	14 cwt.	_____
PRICE	0.75	_____	9.43	_____
TOTAL VALUE	900.0	_____	132.02	_____
COSTS:				
Seed	45.00	_____	4.60	_____
Fertilizer	49.30	_____	27.30	_____
Insecticides	7.50	_____	15.00	_____
Herbicides	10.00	_____	6.50	_____
Crop Insurance	4.00	_____	2.50	_____
Storage, Drying, & Marketing	15.00	_____	9.10	_____
Overhead	3.50	_____	4.50	_____
Fuel & Lubricants	9.00	_____	10.70	_____
Machinery Repairs	4.25	_____	5.45	_____
TOTAL CASH COSTS	147.55	_____	85.65	_____
MODEL PROFIT	752.45	_____	46.35	_____

TABLE 2.   WORKSHEET FOR 1983 AGRICULTURAL PROGRAM OPTIONS

		Non Compliance	RAP Program	RAP + 30% PIK	Whole base bid (90% PIK)
1.	ASCS base yield per acre _____	KIND OF CROP _____			
2.	Estimated harvest price ($/bu.) ======				
3.	Deficiency payment ($/bu.) ======				
4.	Variable production costs per acre _____				
5.	Cover crop costs per acre ======				
6.	County loan rate ($/bu.) ======				
7.	Base acres				
8.	Expected actual yield per acre				none
9.	Required paid diverted acres (line 7 x 10%)	0			
10.	Required RAP acres (line 7 x 10%, except last column)				0.0
11.	PIK acres (line 7 x percent PIK participation)	0	0		
12.	Acres available for planting (line 7 minus line 9, 10 and 11)				0.0

INCOME

		Non Compliance	RAP Program	RAP + 30% PIK	Whole base bid (90% PIK)
13.	Production income (line 12 x line 8 x line 2 or loan rate in line 6 if applicable)				0.0
14.	PIK income (line 11 x line 2 x line 1 x 80% or bid)	0	0		
15.	Paid diversion income (line 9 x line 1 x $1.50)	0			
16.	Deficiency payments (line 12 x line 3 x line 1)	0			0.0
17.	TOTAL INCOME				

COSTS

		Non Compliance	RAP Program	RAP + 30% PIK	Whole base bid (90% PIK)
18.	Cash production costs (line 12 x line 4)				0.0
19.	Cover crop costs (add line 9, 10, 11 x line 5)	0			
20.	TOTAL COSTS (add lines 18 and 19)				

NET RETURNS

		Non Compliance	RAP Program	RAP + 30% PIK	Whole base bid (90% PIK)
21.	Line 17 minus line 20				
22.	Total acres diverted (add lines 9, 10, and 11)				
23.	Gross income from government payments (add lines 14, 15, & 16)				
24.	Net income from set aside acres (line 23 less line 19)				

Based on data prepared by R. W. Jolly and R. N. Wisner, Iowa State University

TABLE 3.   BEEF CATTLE BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

1. Beef cows, sell calves October
2. Beef cows, creep feed calves
3. Raise replacement heifers
4. Winter steers, 5 months

5. Winter heifers, 5 months
6. Summer graze steers, 5½ months
7. Winter and summer graze steers
8. Full feed steer calf

	1. BEEFCOWF (Tbl.B1)		2. BEEFCOWC (Tbl.B2)		3. RREPHEIF (Tbl.B5)		4. WINTSTER (Tbl.B8)	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
TOTAL RECEIPTS	000.0	_____	000.0	_____	000.0	_____	000.0	_____
COSTS:								
Breeding Charge	12.00	_____	12.00	_____	12.00	_____	XXX	XXX
Veterinary & Drugs	10.00	_____	10.00	_____	7.50	_____	3.00	_____
Equipment Repairs	.96	_____	.96	_____	1.88	_____	1.05	_____
Building Repairs	.75	_____	.75	_____	.65	_____	.50	_____
TOTAL COSTS	23.71	_____	23.71	_____	22.03	_____	4.55	_____
MODEL PROFIT	-23.71	_____	-23.71	_____	-22.03	_____	-4.55	_____

	5. WINTHEIF (Tbl.B9)		6. SUMMSTER (Tbl.B10A)		7. WSUMSTER (Tbl.B6)		8. FINFSTER (Tbl.B11)	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
TOTAL RECEIPTS	000.0	_____	500.00	_____	494.33	_____	684.77	_____
COSTS:								
Breeding Charge	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Veterinary & Drugs	3.00	_____	2.51	_____	6.00	_____	8.00	_____
Equipment Repairs	1.05	_____	.30	_____	1.70	_____	1.94	_____
Building Repairs	.45	_____			.45	_____	2.50	_____
Transportation & Mktg.	XXX	XXX	9.50	_____	9.50	_____	13.50	_____
TOTAL COSTS	4.45	_____	12.30	_____	17.65	_____	25.94	_____
MODEL PROFIT	-4.45	_____	487.69	_____	476.68	_____	658.83	_____

TABLE 3. BEEF CATTLE BUDGETS (continued)

9. Full feed heifer calf
10. Finish yearling steer, 7½ months
11. Finish yearling heifer, 7 months

	9.		10.		11.	
	FULFHEIF (Tbl.B14)		FINYSTER (Tbl.B15)		FINYHEIF (Tbl.B16)	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
TOTAL RECEIPTS	552.96		740.02		644.49	
COSTS:						
Veterinary & Drugs	8.00		3.00		3.00	
Equipment Repairs	1.94		1.94		1.94	
Building Repairs	2.25		2.25		2.25	
Transportation & Mktg.	13.00		14.00		13.50	
TOTAL COST	25.19		21.19		20.69	
MODEL PROFIT	527.77		718.83		623.80	

19

TABLE 4. DAIRY BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

(Model values are in hundredweights, for example, CWT1OMK is 10 cwt milk.)

| | Have a Milk Parlor System | | | | | Have Stanchions in a Barn | | | | |
| | Model Values | | | | Your | Model Values | | | | Your |
	CWT10MK1	CWT12MK1	CWT14MK1	CWT16MK1	Values	CWT10MK2	CWT12MK2	CWT14MK2	CWT16MK2	Values
Milk Sales	1250.	1562.	1750.	2000.		1250.	1562.	1750.	2000.	
Calves & Culls Sold	168.40	174.70	195.50	204.50		168.40	174.70	195.50	204.50	
TOTAL RECEIPTS	1418.40	1736.70	1945.50	2204.50		1418.40	1736.70	1945.50	2204.50	
COSTS:										
Breeding Charge	15.00	15.00	20.00	20.00		15.00	15.00	20.00	20.00	
Equipment Repairs	14.00	14.00	14.00	14.00		4.70	4.70	4.70	4.70	
Buiding Repairs	8.75	8.75	8.75	8.75		3.50	3.50	3.50	3.50	
Veterinary & Drugs	15.00	15.00	15.00	15.00		15.00	15.00	15.00	15.00	
Milk Hauling	45.00	56.25	63.00	72.00		45.00	56.25	63.00	72.00	
Records & Herd Testing	30.00	30.00	35.00	35.00		30.00	30.00	35.00	35.00	
Transportation & Mktg.	6.00	6.00	6.00	6.00		6.00	6.00	6.00	6.00	
TOTAL COSTS	133.75	145.00	161.75	170.75		119.20	130.45	147.20	156.20	
MODEL PROFIT	1284.65	1591.70	1783.75	2033.75		1299.20	1606.25	1798.30	2048.30	

TABLE 4. DAIRY BUDGETS (continued)

| | Will Remodel with Stanchions | | | | | RDAIRREP (Tbl.D37)* | |
| | Model Values | | | | Your | Model | Your |
	CWT10MK3	CWT12MK3	CWT14MK3	CWT16MK3	Values	Values	Values
Milk Sales	1250.	1562.	1750.	2000.	_____	XXX	XXX
Calves & Culls Sold	168.40	174.70	195.50	204.50	_____	XXX	XXX
TOTAL RECEIPTS	1418.40	1736.70	1945.50	2204.50	_____	878.72	_____
COSTS:							
Breeding Charge	15.00	15.00	20.00	20.00	_____	20.00	_____
Equipment Repairs	4.70	4.70	4.70	4.70	_____	2.55	_____
Building Repairs	3.50	3.50	3.50	3.50	_____	3.50	_____
Veterinary & Drugs	15.00	15.00	15.00	15.00	_____	12.00	_____
MIlk Hauling	45.00	56.25	63.00	72.00	_____	XXX	_____
Records & Herd Testing	30.00	30.00	35.00	35.00	_____	XXX	_____
Transportation & Mktg.	6.00	6.00	6.00	6.00	_____	8.50	_____
TOTAL COSTS	119.20	130.45	147.20	156.20	_____	46.55	_____
MODEL PROFIT	1299.20	1606.25	1798.30	2048.30	_____	832.15	_____

*RDAIRREP is raise dairy replacements

TABLE 5.   SHEEP BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

1.   Raise and sell May feeder lambs
2.   Raise and sell July fat lambs
3.   Raise and sell August feeder lambs
4.   Raise and sell half feeders and half fats

| | 1. MAYFLAMB(Tbl.S20) | | 2. JULMLAMB(Tbl.S21) | | 3. AUGFLAMB(Tbl.S22) | | 4. FDMKLAMB(Tbl.S23) | |
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
SALES:								
Fat Lamb	XXX	XXX	61.75	___	XXX	XXX	30.88	___
Lamb Wool Incentive	1.26	___	1.71	___	1.26	___	1.49	___
Shorn Wool	7.20	___	7.20	___	7.20	___	7.20	___
Wool Incentive Payment	7.80	___	7.80	___	7.80	___	7.80	___
Cull Ewe	2.34	___	2.34	___	2.16	___	2.16	___
TOTAL RECEIPTS	18.60	___	80.80	___	18.42	___	49.53	___
COSTS:								
Breeding Charge	2.25	___	2.25	___	2.25	___	2.25	___
Veterinary & drugs	3.00	___	3.20	___	3.00	___	3.00	___
Shearing	2.00	___	2.00	___	2.00	___	2.00	___
Equipment Repair	.52	___	.50	___	.50	___	.50	___
Building Repair	.30	___	.30	___	.30	___	.30	___
Transportation & marketing	1.80	___	2.40	___	1.80	___	1.90	___
TOTAL COSTS	9.87	___	10.65	___	9.85	___	9.95	___
MODEL PROFIT	8.73	___	70.15	___	8.57	___	39.58	___

TABLE 5.   SHEEP BUDGETS (continued)

5.   Raise replacement ewes
6.   Dry lot 100 feeder lambs

| | 5. | | 6. | |
| | RREPEWES(Tbl.S24) | | DRYLOTFD(Tbl.S25) | |
	Model Values	Your Values	Model Values	Your Values
			100 hd.	
SALES:				
Market Lambs			6,825.00	_____
Open Ewes	85.00	_____		
Shorn Wool	5.40	_____		
Wool Incentive Payment	5.85	_____	63.00	_____
Minus Death Loss	-1.70	_____	-137.76	_____
TOTAL RECEIPTS	94.55	_____	6,750.24	_____
COSTS:				
Veterinary & drugs	1.50	_____	110.00	_____
Shearing	1.70	_____	190.00	_____
Equipment Repairs	.25	_____	19.40	_____
Building Repairs	.15	_____	29.75	_____
Transportation & marketing	1.80	_____	160.00	_____
TOTAL COSTS	5.40	_____	509.15	_____
MODEL PROFIT	89.15	_____	6,241.09	_____

TABLE 6. SWINE BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

	Raise and Finish Butcher Hogs (Tbl.H27)		Producing Feeder Pigs (Tbl.H28)		Buy and Finish 10 Feeder Pigs (Tbl.H31)		Pasture Finish 10 Feeder Pigs	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
RECEIPTS:								
Sow	202.50	____	202.50	____	XXX	XXX	XXX	XXX
Minus death loss	-4.05	____	-4.50	____	XXX	XXX	XXX	XXX
TOTAL RECEIPTS	198.45	____	198.45	____	XXX	XXX	XXX	XXX
COSTS:								
Breeding Charge	8.00	____	8.00	____	XXX	XXX	XXX	XXX
Veterinary & drugs	57.60	____	48.00	____	28.00		28.00	
Equipment & Building Repairs (select one item from below)	____	____	____	____	____	____	1.60	____
Transportation & Marketing	47.80	____	20.00	____	30.95	____	30.95	____
TOTAL COSTS	____	____	____	____	____	____	60.55	____
MODEL PROFIT	____	____	____	____	____	____	-60.55	____
Number of Hogs sold from 2 litters	15.0	____	16.0	____	XXX	XXX	XXX	XXX

Equipment & Building
 Repairs:

Have facilities available for:
(a) Confinement System   18.50 (RBUTHOG1)   14.35 (PRODFDR1)   13.35 (BUYFINF1)   1.60 (PASTFNF7)
(b) Barn Stalls   21.50 (RBUTHOG2)   13.50 (PRODFDR2)   XXX   XXX   1.60 (PASTFNF8)
(c) Barn Pens   14.70 (RBUTHOG3)   5.40 (PORDFDR3)   2.20 (BUYFINF3)

Will invest in facilities for:
(d) Confinement System   18.50 (RBUTHOG4)   14.35 (PRODFDR4)   13.35 (BUYFINF4)
(e) Barn Stalls   21.50 (RBUTHOG5)   13.50 (PRODFDR5)   XXX   XXX
(f) Barn Pens   14.70 (RBUTHOG6)   5.40 (PRODFDR6)   2.20 (BUYFINF6)

TABLE 7. POULTRY BUDGETS FOR MATHEMATICAL PROGRAMMING MODEL

	100 Hens (Tbl.C40)		1000 Hens (Tbl.C41)		100 Turkeys (Tbl.T43)		100 Geese (Tbl.G42)	
	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values	Model Values	Your Values
RECEIPTS:								
Eggs	930.60	_____	11,844.00	_____				
Hens	35.20	_____	316.80	_____				
Cull Pullets	3.20	_____						
Turkey Sales					1,010.20	_____		
Market Geese							731.50	_____
TOTAL RECEIPTS	969.00	_____	12,160.80	_____	1,019.20	_____	731.50	_____
COSTS:								
Goslings							250.00	_____
Pullets			2,350.00					
Medication	55.00	_____	160.00	_____	25.00	_____	181.60	_____
Electricity, fuel, litter	30.00		220.00	_____	20.00	_____	6.00	_____
Machine & truck	4.00		150.00	_____				
Supplies	4.00	_____	100.00	_____	6.00	_____	6.00	_____
Marketing	6.00	_____	200.00	_____	12.00	_____	7.00	_____
Building & Equipment Repair	17.90	_____	235.50	_____	11.00	_____	11.00	_____
TOTAL COSTS	116.90	_____	3,415.50	_____	74.00	_____	461.60	_____
MODEL PROFIT	852.10	_____	8,745.30	_____	945.20	_____	269.90	_____
Operating Capital Required	427.00		5,044.00		458.00		187.00	
Building & Equipment Invest.	490.00		7,000.00		530.00		460.00	
Home Grown Feeds Used:								
Corn	100 bu.				100 bu.		50 bu.	
Oats	50 bu.							
Alfalfa Hay					5 ton			
Pasture							6.7 AUM	

TABLE 8. Default Prices Used in Buying and Selling Activities*

Item	Price	Unit	Item	Price	Unit
Buy corn	$2.25	bu	Buy calf starter	12.00	cwt
Sell corn	2.20	bu	Buy calf grower	14.00	cwt
Buy oats	1.40	bu	Buy dairy heifer calf	120.00	head
Sell oats	1.35	bu	Buy sheep supplement	11.00	cwt
Buy alfalfa	40.00	ton	Sell 70 lb feeder lamb	47.60	head
Sell alfalfa	37.00	ton	Buy 70 lb feeder lamb	48.00	head
Buy corn silage	17.00	ton	Buy hog supplement	15.00	cwt
Sell corn silage	16.00	ton	Buy pig creep	20.00	cwt
Buy native hay	31.00	ton	Buy 40 lb feeder pig	46.00	cwt
Sell native hay	30.00	ton	Sell 40 lb feeder pig	45.00	cwt
Rent pasture land	50.00	acre	Sell butcher hogs	123.75	head
Rent crop land	100.00	acre	Buy sexed chicks	.80	head
Buy beef supplement	11.00	cwt	Buy chick mash	12.00	cwt
Buy yearling steers	422.50	head	Buy laying mash	10.00	cwt
Sell yearling steers	415.00	head	Buy oyster shells	4.00	cwt
Buy yearling heifers	372.00	head	Buy turkey supplement	12.00	cwt
Sell yearling heifers	365.00	head	Buy turkey poults	1.50	head
Buy steer calf	340.00	head	Buy salt and mineral	7.00	cwt
Sell 425 lb steer calf	335.00	head	Wage rate for off farm work	4.25	hour
Sell 475 lb steer calf	380.00	head	Wage rate for hired labor	875.00	month
Buy heifer calf	262.50	head	Annual interest rate for:		
Sell 375 lb heifer calf	255.00	head	Operating capital	12.00	percent
Sell 425 lb heifer calf	297.50	head	Livestock capital	11.00	percent
Buy dairy supplement	11.00	cwt	Building capital	10.00	percent
Buy milk starter	39.00	cwt	Machinery capital	10.00	percent

*It is important that the selling price be slightly less than the purchase price
 to prevent the computer from buying and selling an infinite quantity of an item.

PREPARING THE INPUT DATA

Mathematical programming requires a detailed set of information regarding the farm business being programmed. Data input forms provide a means for specifying the needed information in three steps:

(a) the supply of resources
(b) the activities to be considered
(c) the prices to be used

Entering Resource Supplies

Land Supply

The land supply, as listed in Table 9, has a default value (model supply) of zero. The number of cropland acres owned and the number of pasture land acres owned are entered separately. Pasture land does not include tame grass pasture that is produced on tillable cropland. Only permanent pasture or native grass pasture used for grazing should be entered here. Permanent grassland harvested as hay should be included.

Labor Supply

The labor supply has a default value of 250 hours per month. This is based on a 10-hr day for 25 days per month as the labor supplied by one full time operator. The default values should be changed in accordance with the individual farm situation. Additional labor supplied by other family members should be estimated and added to the default values in the month when the labor is available. If the farm operator (person 1) wishes to consider off farm employment it will be necessary to reduce the default values by the number of hours spent in off farm work. If off farm employment by any member of the farm family is not to be considered in the planning process, the default values in the model should remain at zero.

Operating Capital

Equity capital for operating expenses is the current cash available less any short term liabilities that must be paid out of the cash account. The amount to be entered in step 1 should represent "the total dollars available to pay for cash operating expenses before it will become necessary to borrow". This will include the current inventory value of market livestock on hand less notes and claims against the livestock. A good figure to use, as taken from the net worth statement, would be total current assets less current liabilities.

Livestock Capital

The supply of livestock capital represents the inventory value of all breeding livestock on hand less all debts or claims against the livestock. Only animals held for breeding purposes are included here. Cash flows for the purchase of feeder cattle, feeder pigs, turkey poults, etc. come out of operating capital.

Fixed Commitments

Depreciation for the recent past year plus estimated depreciation on new investments is entered in a lump sum. Total taxes and insurance for the farm as a unit is also entered in Step 1. Insurance includes all insurance payments except crop insurance. Crop insurance is included in the crop production budgets. Farm records or income tax schedule F may be helpful in the determination of the values to be entered here.

Debt payments represent the total principal payments that must be made during the coming year. This amount, along with estimated family living expenses, is optional as an entry in Step 1. These cash flows must come out of net farm income and may be subtracted (manually)

from the computer results if they are not listed in the entry form.

Selecting Activities

All production activities prepared for use in the model are listed in Step 2 (Table 10) of the data entry procedure. To select activities it is only necessary to review the list and place a check mark following the activities to be included. Care should be exercised in automatically ruling out an alternative. Likewise, an activity should not be checked if it is not a realistic alternative.

Model profit values (default values) are listed in the entry form for each production activity. The default values will be used unless a revised profit figure is entered. Companion budget work forms, as discussed in preceding sections of this report, may be used in revising the profit figures.

Bounding Activities

Special restrictions or "bounds" may be placed upon production activities to reflect personal preferences or special conditions existing on the farm. Instruction C in Step 2 explains how to make the entry. An individual enterprise may be restricted in size by placing an upper limit on the number of units produced or, conversely, it may have a lower limit placed upon it.

It is also possible to test the results of a specific plan by requesting a fixed number of units to be produced for each enterprise that is wanted. If participation in a government program is part of the planning procedure it will be necessary to fix the acres of set aside and place a maximum on the acres of corn produced.

Other combinations of bounding activities may be employed to identify the individual farm situation.

Price Specification

Default prices for major items that are bought and sold are listed in Step 3 (Table 11) of the data input forms. These values may be revised by entering the preferred price on the appropriate line of step 3. Prices not appearing in this list may also be changed by using the companion budgets and changing the profit figure. For example, a change in milk prices will result in a change in the total value of milk receipts as given in the budget. This, in turn, will alter the profit value to be used.

Table 9. LIST YOUR SUPPLY OF AVAILABLE RESOURCES (Step 1)

ROW NUMBER	RESOURCE	MODEL NAME	MODEL SUPPLIES	YOUR FARM	
3001	CROPLAND OWNED	CROPLAND	0	_____	acres
3002	PASTURE LAND OWNED	PASTLAND	0	_____	acres
3003	FARM LABOR FOR JANUARY	FARMLJAN	250.0	_____	hours
3004	FARM LABOR FOR FEBRUARY	FARMLFEB	250.0	_____	hours
3005	FARM LABOR FOR MARCH	FARMLMAR	250.0	_____	hours
3006	FARM LABOR FOR APRIL	FARMLAPR	250.0	_____	hours
3007	FARM LABOR FOR MAY	FARMLMAY	250.0	_____	hours
3008	FARM LABOR FOR JUNE	FARMLJUN	250.0	_____	hours
3009	FARM LABOR FOR JULY	FARMLJUL	250.0	_____	hours
3010	FARM LABOR FOR AUGUST	FARMLAUT	250.0	_____	hours
3011	FARM LABOR FOR SEPTEMBER	FARMLSEP	250.0	_____	hours
3012	FARM LABOR FOR OCTOBER	FARMLOCT	250.0	_____	hours
3013	FARM LABOR FOR NOVEMBER	FARMLNOV	250.0	_____	hours
3014	FARM LABOR FOR DECEMBER	FARMLDEC	250.0	_____	hours
3015	LABOR FOR OFF FARM WORK (person 1)	OFFMJ-D1	0.0	_____	hrs/yr
3016	LABOR FOR OFF FARM WORK (person 2)	OFFMJ-D1	0.0	_____	hrs/yr

EQUITY CAPITAL

3017	FOR OPERATING EXPENSES	OPCAPINV	0	$_____
3018	FOR LIVESTOCK	LICAPINV	0	$_____

FIXED COMMITMENTS

	Deprec. this past year		$0.0	_____
	Deprec. for new invest.		$0.0	_____
3513	TOTAL DEPRECIATION	DEPREC	$0.0	_____
3514	TAXES AND INSURANCE	TAX&INS	$0.0	_____
3515	DEBT PAYMENTS	DEBTPAY	$0.0	_____
3516	ESTIMATED LIVING EXP.	FAMILYEX	0	_____

29

Table 10.   IDENTIFY THE PRODUCTION ACTIVITIES TO BE CONSIDERED
            IN YOUR FARM PLAN (Step 2)

A.   Place a check mark in column A if you want the activity considered.

B.   Enter your own profit figure in column B or leave it blank and the model
     profit figure will be used. Use the budget work forms to develop your
     own profit figure.

C.   If you wish to specify special conditions on the quantity produced you may
     do so with an entry in column C. For example, if facilities limit you to 30
     head of dairy cows you may enter "30=UP" in column C. This will result in
     the preparation of a plan that does not include more than 30 dairy cows.
     It is also possible to specify, for the same plan, a lower limit such
     as "20=LO". If it is desired to have exactly 30 head of dairy cows in our
     plan the entry in column C would be "30=FX".

     NOTE!! Making too many restrictions on the quantity produced takes away
     the purpose of mathematical programming, i.e., to let the computer identify
     the most profitable combination of enterprises.

ROW NUMBER	ENTERPRISE	A CHECK ( ) IF WANTED	MODEL PROFIT	B YOUR PROFIT	C UPPER=UP FIXED=FX LOWER=LO
	CROPS			$	No. Acres
200:204	Dryland corn (CORN)		-113.00		
205:210	Irrigated corn (IRRCORN)		-173.83		
211:216	Oats (OATS)		- 54.30		
217:221	Barley (BARLEY)		51.55		
222:226	Spring Wheat (SPWHEAT)		78.75		
227:231	Flax (FLAX)		49.10		
232:236	Soybeans (SOYBEANS)		121.75		
237:241	Grain Sorghum (GRAINSOR)		68.40		
242:247	Corn Silage (CORNSILG)		-121.67		
248:251	Grass Hay (GRASSHAY)		- 22.34		
252:256	Alfalfa Hay (ALFALFA)		- 52.76		
257:262	Irrigated Alfalfa (IRRALF)		- 97.87		
263:264	Set Aside Acres (SETASIDE)		0.0		
265:269	Sweet Corn (SWEETCON)		752.45		
270:278	Sunflowers (SUNFLOWR)		46.35		
279:280	Rent Cropland (RENTCROP)		-100.00		
350:399	Crop Prices (CROPRICE)	XXX			
	BEEF				No. Head
400:412	Beef cows, sell calves Oct. (BEEFCOWF)		- 23.71		
413:425	Beef Cows Creep Feed Calves (BEEFCOWC)		- 23.71		
426:437	Raise Replacement Heifers (RREPHEIF)		- 22.03		

STEP 2. (Continued)

ROW NUMBER	ENTERPRISE	A CHECK ( ) IF WANTED	MODEL PROFIT	B YOUR PROFIT $	C UPPER=UP FIXED=FX LOWER=LO No. Head
438:445	Winter Steers, 5 mos. (WINTSTER)		- 4.55		
446:453	Winter Heifers, 5 mos. (WINTHEIF)		- 4.45		
454:459	Summer graze steers, 5½ mos. (SUMMSTER)		487.69		
460:470	Winter & Summer Graze Strs. (WSUMSTER)		476.68		
471:481	Full Feed Steer Calf (FINSTER)		658.83		
482:491	Full Feed Heifer Calf (FULFHEIF)		527.77		
492:500	Finish Yrlg. Str., 7½ mos. (FINYSTER)		718.83		
501:508	Finish Yrlg. Hfr., 7 mos. (FINYHEIF)		623.80		
550:599	Beef Prices	XXX			

DAIRY

Have a Milk Parlor System:

600:611	10 cwt milk (CWT10MK1)		1284.65		
612:623	12 cwt milk (CWT12MK1)		1591.70		
624:634	14 cwt milk (CWT14MK1)		1783.75		
635:645	16 cwt milk (CWT16MK1)		2033.75		

Have Stanchions in a Barn:

646:657	10 cwt milk (CWT10MK2)		1299.20		
658:669	12 cwt milk (CWT12MK2)		1606.25		
670:680	14 cwt milk (CWT14MK2)		1798.30		
681:691	16 cwt milk (CWT16MK2)		2048.30		

Will Remodel with Stanchions:

692:703	10 cwt milk (CWT10MK3)		1299.20		
704:715	12 cwt milk (CWT12MK3)		1606.25		
716:727	14 cwt milk (CWT14MK3)		1798.30		
728:739	16 cwt milk (CWT16MK3)		2048.30		
740:751	Raise Dairy Replacements (RDAIRREP)		832.15		
850:899	Dairy Prices	XXX			

SHEEP

900:910	Raise-Sell May Feeder Lambs (MAYFLAMB)		8.73		
911:921	Raise-Sell July Fat Lambs (JULMLAMB)		70.15		
922:932	Raise-Sell Aug. Feeder Lamb (AUGFLAMB)		8.57		
933:943	Raise-Sell ½ Feeders - Fats (FDMKLAMB)		39.58		
944:950	Raise Replacement Ewes (RREPEWES)		89.15		
951:955	Dry Lot 100 Feeder Lambs (DRYLOTFD)		6241.09		
1050:1099	Sheep Prices (SHEEPRIC)	XXX			

31

ROW NUMBER	ENTERPRISE	A CHECK ( ) IF WANTED	MODEL PROFIT	B YOUR PROFIT	C UPPER=UP FIXED=FX LOWER=LO
				$	No. Head
	SWINE				
	Raise and Finish Butcher Hogs:				
1100:1111	Have a Confinement System (RBUTHOG1)		66.55		
1112:1123	Farrowing Stalls in Barn (RBUTHOG2)		63.55		
1124:1135	Barn Remodeled, Use Pens (RBUTHOG3)		70.35		
1136:1147	Will Build Confin System (RBUTHOG4)		66.55		
1148:1159	Will Remodel: Use Stalls (RBUTHOG5)		63.55		
1160:1171	Will Remodel: Use Pens (RBUTHOG6)		70.35		
	Produce Feeder Pigs:				
1172:1183	Have Confinement System (PRODFDR1)		108.10		
1184:1195	Farrowing Stalls in Barn (PRODFDR2)		108.95		
1196:1207	Barn Remodeled, Use Pens (PRODFDR3)		117.05		
1208:1219	Will Build Confin System (PRODFDR4)		108.10		
1220:1231	Will Remodel: Use Stalls (PRODFDR5)		108.95		
1232:1243	Will Remodel: Use Pens (PRODFDR6)		117.05		
	Buy and Finish Feeder Pigs:				
1244:1254	Have Confinement System (BUYFINF1)		- 72.30		
1255:1265	Have Pen System (BUYFINF3)		- 61.15		
1266:1276	Will Build Confin System (BUYFINF4)		- 72.30		
1277:1287	Will Remodel: Use Pens (BUYFINF6)		- 61.15		
1288:1294	Have a Pasture System (PASTFNF7)		- 60.55		
1295:1301	Will Set Up Pasture Syst. (PASTFNF8)		- 60.55		
1450:1499	Hog Prices (HOGPRICE)	XXX			
	POULTRY				
1500:1509	Small Laying Flock (HENS100)		852.10		
1510:1518	Commercial Laying Flock (HENS1000)		8745.30		
1519:1524	Geese (GEESE100)		269.90		
1525:1534	Turkeys (TURKEYS)		945.20		
1650:1699	Poultry Prices (POLTPRIC)	XXX			
					Max. No. of Men
	LABOR HIRED (Load Bounds)				
3501	January (HIRELJAN)				
3502	February (HIRELFEB)				
3503	March (HIRELMAR)				
3504	April (HIRELAPR)				
3505	May (HIRELMAY)				
3506	June (HIRELJUN)				
3507	July (HIRELJUL)				
3508	August (HIRELAUG)				
3509	September (HIRELSEP)				
3510	October (HIRELOCT)				
3511	November (HIRELNOV)				
3512	December (HIRELDEC)				

ROW NUMBER	ENTERPRISE	A CHECK ( ) IF WANTED	MODEL PROFIT	B YOUR PROFIT	C UPPER=UP FIXED=FX LOWER=LO
			Hourly Wage	Your Wage	
1750	WORK OFF THE FARM Non Farm Work; Person 1 (OFFARM1)		4.25		
1751	Non Farm Work; Person 2 (OFFARM2)		4.75		
			Annual Intrst Rate	Your Intrst Rate	Maximum Dollars
1800:1801	CAPITAL BORROWING Operating Capital (OPERCAP)		0.12		
1802:1803	Capital for Livestock (LIVECAP)		0.11		
1804:1805	Capital for Buildings (BUILDCAP)		0.10		
1806:1807	Capital for Machinery (MACHCAP)		0.10		

33

Table 11. ENTER THE PRICES YOU WISH TO USE (Step 3)

ROW NUMBER	ITEM	MODEL PRICE	YOUR PRICE	UNIT
	CROPS (CROPRICE)			
350:351	Buy Corn (BUYCORN)	- 2.25	_____	bu.
352	Sell Corn (SELLCORN)	2.20	_____	bu.
353:354	Buy Oats (BUYOATS)	- 1.40	_____	bu.
355	Sell Oats (SELLOATS)	1.35	_____	bu.
356:357	Buy Alfalfa (BUYALF)	- 40.00	_____	ton
358	Sell Alfalfa (SELLALF)	37.00	_____	ton
359:360	Buy Corn Silage (BUYCSILG)	- 17.00	_____	ton
361	Sell Corn Silage (SELLCSIL)	16.00	_____	ton
364	Buy Grass Hay (BUYGRHAY)	- 31.00	_____	ton
362:363	Sell Grass Hay (SELGRHAY)	30.00	_____	ton
365:366	Rent Pasture on acre basis (RENTPAST)	- 50.00	_____	acre
	BEEF (BEEFPRIC)			
550:551	Buy Beef Supplement (BUYBEEFS)	- 11.00	_____	cwt
552:553	Buy 650 lb Yrlg. Steer (BYYSTER)	-422.50	_____	Head
554:555	Buy 600 lb Yrlg. Heifer (BUYYHEIF)	-372.00	_____	Head
556:557	Buy 425 lb Steer Calf (BUYSTCF)	-340.00	_____	Head
558:559	Buy 375 lb Heifer Calf (BUYHFCF)	-262.00	_____	Head
560	Sell 1000 lb Cull Cow (SELLCULL)	400.00	_____	Head
561	Sell 650 lb Yrlg Steer (SELYSTER)	415.00	_____	Head
562	Sell 600 lb Yrlg Heifer (SELYHEIF)	365.00	_____	Head
563	Sell Steer Calf (SELLSTCF)	335.00	_____	Head
564	Sell Heifer Calf (SELHFCF)	255.00	_____	Head
565	Sell Replacement Heifer (SELREPHF)	670.00	_____	Head
566	Sell 425 lb Heifer Calf (SELL425H)	297.50	_____	Head
567	Sell 475 lb Steer Calf (SELL475S)	380.00	_____	Head
	DAIRY (DAIRPRIC)			
850:851	Buy Dairy Cow Supplement (BUYDAIRS)	- 11.00	_____	cwt
852:853	Buy Milk Starter (BUYMKST)	- 39.00	_____	cwt
854:855	Buy Calf Starter (BUYCAFST)	- 12.00	_____	cwt
856:857	Buy Calf Grower (BUYCAFGR)	- 14.00	_____	cwt
858:859	Buy Dairy Heifer Calf(BUYDARHF)	-120.00	_____	Head

STEP 3. (Continued)

ROW NUMBER	ITEM	MODEL PRICE	YOUR PRICE	UNIT
	SHEEP (SHEEPRIC)			
1050:1051	Buy Sheep Supplement (BUYSHEPS)	- 11.00	_____	cwt
1052	Sell Feeder Lamb (SELLLAMB)	47.60	_____	Head
1053:1054	Buy Feeder Lamb (BUYFLAMB)	- 48.00	_____	Head
	SWINE (HOGPRICE)			
1450:1451	Buy Hog Supplement (BUYPORKS)	- 15.00	_____	cwt
1452:1453	Buy Pig Creep (BUYPIGCP)	- 20.00	_____	cwt
1454:1455	Buy Feeder Pig (BUYFDPIG)	- 46.00	_____	Head
1456	Sell Butcher Hogs (SELLHOG)	123.75	_____	Head
1457	Sell Feeder Pigs (SELLFPIG)	45.00	_____	Head
	POULTRY (POLTPRIC)			
1650:1651	Buy Sexed Chick (BUYSEXCH)	- 0.80	_____	Head
1652:1653	Buy Chick Mash (BUYCMASH)	- 12.00	_____	cwt
1654:1655	Buy Laying Mash (BUYLMASH)	- 10.00	_____	cwt
1656:1657	Buy Oyster Shell (BUYOSHEL)	- 4.00	_____	cwt
1658:1659	Buy Turkey Supplement (BUYTSUPP)	- 12.00	_____	cwt
1660:1661	Buy Young Turkeys (BUYYTURK)	- 1.50	_____	cwt

The following price sets do not need to be merged into the data for processing.
These price sets are already included as part of the data file named SFMODEL and
it is only necessary to refer to the line number to make a price change.

1700:1701	Buy Salt and Mineral	7.00	_____	cwt
2000:2023	Monthly wage for labor	875.00	_____	dollars

PROCESSING THE DATA

When the data entry forms are completed they are processed via terminal using the set of instructions as given in Table 12. The processing instructions are for computer facilities on an IBM/370 main frame computer using a model 3278 display terminal and VSPC data processing procedures.

Reading the Output

The computer output is in the format of that presented by the IBM Mathematical Programming System Extended (MPSX). For detail on this system consult the manual identified in the list of references (6). For convenience purposes an abbreviated explanation of the example output shown in Table 13 is presented here.

Variable names up to eight characters in length are used to identify resources and production activities. Names that are descriptive of the enterprise enable the printout to be interpreted without much difficulty. There are two sections to the report; a ROWS section and a COLUMNS section.

SECTION 1 - ROWS

The row name is identified in the ROW column, Table 13.

The amount shown in the profit row is frequently referred to as the value of the farm plan. The value under the "activity" heading in the profit row represents net farm income adjusted for debt principal payments and living expenses depending upon how these items were handled in step 1 of the entry form.

Table 14 contains the procedure for adjusting the value of the farm plan to arrive at net farm income. This must be interpreted as an estimated net farm income since the entire programming procedure is a forward planning tool. All

input and output coefficients represent future expectations.

The ACTIVITY column (Table 13) indicates the amount of each resource used in the farm plan. The situation regarding the quantity of each resource used is identified under the column headed AT. Printout codes found in the AT column are defined as follows:

UL = upper limit
EQ = equal to
LL = lower limit
BS = somewhere between the upper and lower limit

Asterisks in the AT column usually indicate that some conflicting bounds or restrictions have been placed upon the use of that resource. For example, suppose the activity for buying feeder cattle is not included and also suppose that a beef cow herd for producing feeder calves is not included.

If an enterprise for cattle feeding is forced into the plan by specifying a lower limit it will result in an infeasible plan. The specifications conflict because the entry in the data form did not provide a way to acquire feeder cattle for the cattle feeding operation.

The SLACK ACTIVITY represents the amount of a resource not used.

The amount in the ACTIVITY column plus the amount in the slack activity column equals the amount in the upper limit column.

The DUAL ACTIVITY column gives you a clue as to the value of the resources used. For example, if the DUAL ACTIVITY value of the cropland row is 14.16, it means that one more acre of cropland, if it were available, would increase profits by $14.16. Negative signs follow the number rather than precede it.

SECTION 2 - COLUMN

All possible activities are identified under the COLUMN heading. No more

than 8 characters may be used to name an activity so the names are abbreviated in many instances.

The ACTIVITY column summarizes the farm plan. It tells you the size of each crop and livestock activity included in the plan. The items under the column headed AT have the same meaning as described for rows.

The INPUT COST represents the price placed on each unit of an activity. It may be negative (meaning cost) or positive (meaning profit). A minus sign follows the figure if the value is negative. The values are in terms of cost per acre to produce a crop, profit per acre of a crop, profit per head sold, price per bushel sold, cost per head to purchase, etc.

LOWER LIMIT . . . UPPER LIMIT columns identify the restrictions placed on an activity by either you or the computer. If 140 acres of corn to be produced were specified, then this activity has an upper limit of 140 and a lower limit of 140.

This means the result must be equal to 140.

The REDUCED COST is sometimes referred to as a "shadow price". It gives a hint as to what activity will add the most to profit. Values with negative signs mean that one more unit of the activity will reduce profits by that amount. Positive figures indicate how much profit will be increased if one more unit of that activity is added. NOTE! This is true only for the next few units added; it is not necessarily true for an infinite number of units. Hence, it is only an "indication" of what is the most profitable activity to add or to expand.

Table 14 is an optional form that may be used in presenting computer results to the farm operator. However, experience with high school students at summer short courses and its use in the college classroom has shown that there is very little problem in understanding and interpreting section 1 and section 2 of the MPSX computer program printout.

Table 12. PROCESSING PROCEDURE FOR THE SOUTH DAKOTA SMALL FAMILY FARM
MATHEMATICAL PROGRAMMING MODEL.

_____ Enter the special bounds or restrictions as given
in step 2, column C, into the following form.
Always enter a decimal in the quanity.

1	2	3	4	5	6	7	8	9	10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Input Column Number

U F L	P X O								Enterprise Name		Quantity
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					
		L	I	M	I	T					

Explanation

_____ Logon to the computer by entering your assigned VSPC
ID number. Load the matrix.

_____ View line 1 and use the cursor to enter your job
number in place of the x's in line 1.

_____ Input the data from the above form as follows:

a. View the last row of the bounds section

b. Use the cursor to enter an R in place of the
leftmost digit space of the row number.

c. The last row of the bounds section will be
duplicated. Use the cursor to change this
new row to correspond to what is desired.

d. Repeat this procedure to enter all the re-
strictions entered in the above form.

_____ Input the resource levels as given in step 1 of the
input form. Use the VIEW command to locate the row
and the cursor to make changes. The row number (from
1-4 digits) is represented by nn.

VSPC Commands

VSPC ID=
LOAD 71074 SFMATRIX

VIEW 1

VIEW 3516

press the enter key

VIEW nn

Table 12.   (Continued)

	Explanation	VSPC Commands

_____ Merge the enterprises that are wanted as identified
in step 2 of the input form. Use the enterprise model
name from the input form, as given in parentheses,
when typing the command. The quotation marks are not
typed. The overlay command is very important. It
causes the lines to be maintained in proper numerical
sequence.   MERGE 71074 'name' OVERLAY

_____ Merge the price data sets needed from step 3.
                                              MERGE 71074 'name' OVERLAY

_____ Input new profit values from step 2 of the input form.   VIEW nn
Use the VIEW command to locate the row. Place the
cursor under the values to be changed and enter the
changes.

_____ Input the upper limit for hired labor (in no. of   VIEW nn
men) from step 2 of the input form. If no hired
labor is wanted there is no need to input any
data. The model assumes a zero quantity of hired
labor unless otherwise specified.

_____ Input "your prices" from step 3 of the data input
form. Use the VSPC change row command. The command
is typed in as follows:
                                   CHANGE 225:231 '1.31' '1.45'

This command will search rows 225 through 231 and
change all characters in the 1.31 sequence to 1.45.
Be careful that you have the same number of
characters in each quote. Periods and spaces are
included in the count.

_____ Save the data. It should be saved under any name of   SAVE name
your choice (8 characters or less). This will permit
future changes and re-runs with a minimum of effort.

_____ Submit the job for processing. The computer will   SUBMIT
assign a job number such as R7197416. Make a note
of this job number for future reference.

_____ When the job is completed the output may be loaded
out at the terminal. Check on the status of the
job as frequently as you wish by typing the command   STATUS nn
STATUS. The nn in the load out command represents
the last 2 digits of the job number assigned by   LOAD OUT nn D 105
the computer. When typing the FIND 'SOLUTION '   VIEW
command it is necessary to type the quotation   FIND 'SOLUTION '
marks and leave 2 blank spaces following the N.

_____ If a printed copy is wanted the data may be routed   ROUTE nn
to the printer

_____ Log off the computer when you are done. Simply type   OFF
the word OFF

Table 13. EXAMPLE OUTPUT

NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
1	PROFIT	BS	10268.85709	10268.85709-	NONE	NONE	1.00000
2	CROPLAND	UL	40.00000	.	NONE	40.00000	14.16015-
3	PASTLAND	UL	25.00000	.	NONE	25.00000	28.96513-
4	FARMLJAN	BS	36.74555	213.25445	NONE	250.00000	.
5	FARMLFEB	BS	36.74555	213.25445	NONE	250.00000	.
6	FARMLMAR	BS	56.95637	193.04363	NONE	250.00000	.
7	FARMLAPR	BS	64.39013	185.60987	NONE	250.00000	.
8	FARMLMAY	BS	114.86914	135.13086	NONE	250.00000	.
9	FARMLJUN	BS	127.60017	122.39983	NONE	250.00000	.
10	FARMLJUL	BS	56.22849	193.77151	NONE	250.00000	.
11	FARMLAUG	BS	51.22849	198.77151	NONE	250.00000	.
12	FARMLSEP	BS	183.10543	66.89457	NONE	250.00000	.
13	FARMLOCT	BS	108.24873	141.75127	NONE	250.00000	.
14	FARMLNOV	BS	36.74555	13.25445	NONE	50.00000	.
15	FARMLDEC	BS	36.74555	13.25445	NONE	50.00000	.
16	CORNINV	EQ	.	.	.	.	2.92035-
17	OATSINV	EQ	.	.	.	.	1.60864-
18	GRHAYINV	EQ	.	.	.	.	38.59273-
19	ALFINV	EQ	.	.	.	.	37.00000-
20	AUMINV	EQ	.	.	.	.	24.13761-
21	SILAGINV	EQ	.	.	.	.	19.87605-
22	SALT&MIN	EQ	.	.	.	.	12.69080-
23	BEEFSUPP	EQ	.	.	.	.	19.94269-
24	CULLCOW	EQ	.	.	.	.	400.00000-
25	REPLHEIF	EQ	.	.	.	.	670.00000-
26	YEARSTER	EQ	.	.	.	.	416.27120-
27	YEARHEIF	EQ	.	.	.	.	365.00000-
28	STERCALF	EQ	.	.	.	.	335.00000-
29	HEIFCALF	EQ	.	.	.	.	455.86917-
30	DAIRYSUP	EQ	.	.	.	.	19.94269-
31	MILSTART	EQ	.	.	.	.	70.70590-
32	CALSTART	EQ	.	.	.	.	21.75566-
33	CALFGROW	EQ	.	.	.	.	25.38160-
34	DAIRHEIF	EQ	.	.	.	.	120.00000-
35	FEEDLAMB	EQ	.	.	.	.	47.60000-
36	SHEEPSUP	EQ	.	.	.	.	19.94269-
37	CHICKINV	EQ	.	.	.	.	3.29151
38	CMASHINV	EQ	.	.	.	.	21.75566-
39	LMASHINV	EQ	.	.	.	.	18.12972-
40	SHELLINV	EQ	.	.	.	.	7.25189-
41	PORXSUPP	EQ	.	.	.	.	27.19458-
42	PIGCREEP	EQ	.	.	.	.	36.25943-
43	FEEDPIG	EQ	.	.	.	.	83.39670-
44	OFFMJ-01	BS	400.00000	.	NONE	400.00000	.
45	OFFMJ-02	UL	.	.	NONE	.	4.75000-
46	OPCAPINV	UL	8000.00000	.	NONE	8000.00000	.81297-
47	LICAPINV	BS	4536.92975	26463.07025	NONE	31000.00000	.
48	BUCAPINV	UL	.	.	NONE	.	1.38017-
49	BARRCAP	BS	35000.00000	35000.00000-	NONE	NONE	.

NUMBER	.COLUMN.	AT	...ACTIVITY...	...INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	.REDUCED COST.
56	CORN	BS	12.09343	113.00000-	.	NONE	.
57	OATS	BS	6.03937	54.30000-	.	NONE	.
58	BARLEY	LL	.	48.45000	.	NONE	5.09863-
59	SPWHEAT	LL	.	50.45000	.	NONE	4.72458-
60	FLAX	LL	.	50.90000	.	NONE	4.64041-
61	SOYBEANS	LL	.	58.25000	.	50.00000	3.26576-
62	GRAINSOR	BS	130.33733	77.45000	.	NONE	.
63	CORNSILG	BS	1.52987	65.81000-	.	NONE	.
64	GRASSHAY	BS	.97956	22.34000-	.	NONE	.
65	ALFALFA	UL	50.00000	47.80000-	.	50.00000	24.64746
66	SETASIDE	UL	80.00000	95.00000	.	80.00000	80.83985
67	RENTCROP	EQ	240.00000	60.00000-	240.00000	240.00000	94.61815-
68	BUYCORN	LL	.	2.55000	.	NONE	1.70273-
69	SELLCORN	LL	.	2.50000	.	NONE	.42035-
70	BUYOATS	LL	.	1.65000	.	NONE	1.38277-
71	SELLOATS	LL	.	1.60000	.	NONE	.00864-
72	BUYALF	LL	.	40.00000-	.	NONE	35.51887-
73	SELLALF	BS	164.95932	37.00000	.	NONE	.
74	BUYCSILG	LL	.	17.00000-	.	NONE	10.94447-
75	SELLCSIL	LL	.	16.00000	.	NONE	3.87605-
76	BUYGRHAY	LL	.	31.00000-	.	NONE	17.60939-
77	SELGRHAY	LL	.	30.00000	.	NONE	8.59273-
78	RENTPAST	LL	.	25.00000-	.	NONE	16.35916-
79	AUM	BS	24.02044	.	.	NONE	.
80	BEEFCOWF	BS	.	23.71000-	.	NONE	.
81	WINTSTER	BS	.	4.55000-	.	NONE	.
82	SUMMSTER	LL	.	487.69000	.	NONE	21.91771-
83	BUYBEEFS	BS	.	11.00000-	.	NONE	.
84	BUYYSTER	LL	.	422.50000-	.	NONE	349.70933-
85	BUYYHEIF	LL	.	372.00000-	.	NONE	309.42547-
86	BUYSTCF	LL	.	340.00000-	.	NONE	281.41037-
87	BUYHFCF	LL	.	262.50000-	.	NONE	20.03589-
88	SELLCULL	BS	.	400.00000	.	NONE	.
89	SELYSTER	LL	.	415.00000	.	NONE	1.27120-
90	SELYHEIF	BS	.	365.00000	.	NONE	.
91	SELLSTCF	BS	.	335.00000	.	NONE	.
92	SELHFCF	LL	.	255.00000	.	NONE	200.36917-
93	SELREPHF	BS	.	670.00000	.	NONE	.
94	SELL425M	BS	.	297.50000	.	NONE	.
95	SELL475S	BS	.	380.20000	.	NONE	.
96	CWT12MK2	BS	2.86850	1475.00000	.	NONE	.
97	BUYOAIRS	BS	11.47399	11.00000-	.	NONE	.
98	BUYMKST	BS	.	39.00000-	.	NONE	.
99	BUYCAFST	BS	.	12.00000-	.	NONE	.
100	BUYCAFCR	BS	.	14.00000-	.	NONE	.
101	BUYOARHF	BS	.	120.00000-	.	NONE	.
102	MAYFLAMB	BS	5.23039	8.73000	.	NONE	.
103	JULMLAMB	LL	.	70.15000	.	NONE	.49224-
104	BUYSHEPS	BS	1.30760	11.00000-	.	NONE	.

40

Table 14. OUTPUT REPORT FORM
for
South Dakota Mathematical Programming Model

		Amount
1.	Profit figure from computer printout	$_____
2.	Income from off farm work (OFFARM1 + OFFARM2)	$_____
3.	Adjusted profit figure (line 1 less line 2)	$_____
4.	Living expenses (as entered)	$_____
5.	Debt payments (as entered)	$_____
6.	NET FARM INCOME (add lines 3, 4 and 5)	$_____
7.	Off farm income from line 2 above	$_____
8.	CASH AVAILABLE FOR NEW INVESTMENTS, SPENDING AND SAVING (add lines 6 & 7)	$_____

CROPS PRODUCED: No. Acres

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

CROPS SOLD: No. Units

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

LIVESTOCK PRODUCTION:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

41

Table 14. (Continued)

LIVESTOCK PURCHASED: No. of Units

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

LIVESTOCK SOLD:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

FEED PURCHASED:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

CAPITAL BORROWED:

    Operating Capital (OPERCAP) $_____
    Livestock Capital (LIVECAP) $_____
    Building Capital (BUILDCAP) $_____
    Machinery Capital (MACHCAP) $_____
    Total Interest Paid (INTPAID) $_____

42   MONTHS OF LABOR HIRED   _____

APPENDIX

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4. Cooper, Leon and Stenberg, D., <u>Introduction to Methods of Optimization</u>, W. B. Saunders Company, West Washington Square, Philadelphia, PA, 1970.

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8. Stanton, B. F., <u>Notes on the Use of the IBM MPSX Linear Programming Package</u> A.E. Res 77-14, Dept. of Ag. Econ., Cornell University, Ithaca, New York 14853, Sept. 1977.

.MPSX-PTF17.   EXECUTOR.   MPSX   RELEASE 1   MOD LEVEL 6

BOUND	CORN LOWER	IRRCORN LOWER	OATS LOWER	BARLEY LOWER	SPWHEAT LOWER	FLAX LOWER	SOYBEANS LOWER	BOUND
PROFIT	113.00000-	173.83000-	54.30000-	51.55000	78.75000	49.10000	121.75000	PROFIT
CROPLAND	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	CROPLAND
FARMLAPR	.20000	.30000	.10000	.15000	.15000	.	.20000	FARMLAPR
FARMLMAY	.30000	.40000	.25000	.25000	.25000	.30000	.30000	FARMLMAY
FARMLJUN	.25000	.70000	.30000	.30000	.30000	.30000	.30000	FARMLJUN
FARMLJUL	.	.40000	.50000	.50000	.50000	.50000	.	FARMLJUL
FARMLAUG	.	.80000	.50000	.50000	.50000	.50000	.	FARMLAUG
FARMLSEP	.70000	1.00000	.25000	.25000	.25000	.25000	.70000	FARMLSEP
FARMLOCT	.80000	.35000	.	.	.	.	.50000	FARMLOCT
CORNINV	75.00000-	130.00000-	.	.	.	.	.	CORNINV
OATSINV	.	.	70.00000-	.	.	.	.	OATSINV
OPCAPINV	113.00000	173.83000	54.30000	48.45000	50.45000	50.90000	58.25000	OPCAPINV

BOUND	GRAINSOR LOWER	CORNSILG LOWER	GRASSHAY LOWER	ALFALFA LOWER	IRRALF LOWER	SETASIDE LOWER	SWEETCON LOWER	BOUND
PROFIT	68.40000	121.67000-	22.34000-	52.76000-	97.87000-	.	752.45000	PROFIT
CROPLAND	1.00000	1.00000	.	1.00000	1.00000	1.00000	1.00000	CROPLAND
PASTLAND	.	.	1.00000	.	.	.	.	PASTLAND
FARMLAPR	.10000	.20000	.	.	.06000	.	1.00000	FARMLAPR
FARMLMAY	.40000	.30000	.40000	.40000	.45000	.	1.00000	FARMLMAY
FARMLJUN	.50000	.30000	.40000	.40000	.90000	.	3.00000	FARMLJUN
FARMLJUL	.	.	.40000	.50000	.80000	.	10.00000	FARMLJUL
FARMLAUG	.	.	.40000	.40000	.60000	.	20.00000	FARMLAUG
FARMLSEP	.90000	.80000	.	.	.	.	5.00000	FARMLSEP
FARMLOCT	.40000	.50000	.	.	.10000	.	.	FARMLOCT
GRHAYINV	.	.	1.80000-	.	.	.	.	GRHAYINV
ALFINV	.	.	.	3.50000-	6.00000-	.	.	ALFINV
SILAGINV	.	9.00000-	.	.	.	.	.	SILAGINV
OPCAPINV	77.85000	121.67000	22.34000	52.76000	97.87000	.	147.55000	OPCAPINV

BOUND	SUNFLOWR LOWER	RENTCROP LOWER	BUYCORN LOWER	SELLCORN LOWER	BUYOATS LOWER	SELLOATS LOWER	BUYALF LOWER	BOUND
PROFIT	46.35000	100.00000-	2.25000-	2.20000	1.40000-	1.35000	40.00000-	PROFIT
CROPLAND	1.00000	1.00000-	.	.	.	.	.	CROPLAND
FARMLMAY	.30000	.	.	.	.	.	.	FARMLMAY
FARMLJUN	.25000	.	.	.	.	.	.	FARMLJUN
FARMLJUL	.30000	.	.	.	.	.	.	FARMLJUL
FARMLAUG	.30000	.	.	.	.	.	.	FARMLAUG
FARMLSEP	.20000	.	.	.	.	.	.	FARMLSEP
FARMLOCT	.34000	.	.	.	.	.	.	FARMLOCT
CORNINV	.	.	1.00000-	1.00000	.	.	.	CORNINV
OATSINV	.	.	.	.	1.00000-	1.00000	.	OATSINV
ALFINV	.	.	.	.	.	.	1.00000-	ALFINV
OPCAPINV	85.65000	100.00000	2.25000	.	1.40000	.	40.00000	OPCAPINV

BOUND	SELLALF LOWER	BUYCSILG LOWER	SELLCSIL LOWER	BUYGRHAY LOWER	SELGRHAY LOWER	RENTPAST LOWER	AUM LOWER	BOUND
PROFIT	37.00000	17.00000-	16.00000	31.00000-	30.00000	50.00000-	.	PROFIT
PASTLAND	.	.	.	.	.	1.00000-	1.00000	PASTLAND
GRHAYINV	.	.	.	1.00000-	1.00000	.	.	GRHAYINV
ALFINV	1.00000	.	.	.	.	.	.	ALFINV
AUMINV	.	.	.	.	.	.	1.20000-	AUMINV
SILAGINV	.	1.00000-	1.00000	.	.	.	.	SILAGINV
OPCAPINV	.	17.00000	.	31.00000	.	50.00000	.	OPCAPINV

BOUND	BEEFCOWF LOWER	BEEFCOWC LOWER	RREPHEIF LOWER	WINTSTER LOWER	WINTHEIF LOWER	SUMMSTER LOWER	WSUMSTER LOWER	BOUND
PROFIT	23.71000-	23.71000-	22.03000-	4.55000-	4.45000-	487.69000	476.68000	PROFIT
FARMLJAN	.60000	.50000	1.00000	.70000	.70000	.	.60000	FARMLJAN
FARMLFEB	.60000	.50000	1.00000	.70000	.70000	.	.60000	FARMLFEB
FARMLMAR	1.10000	.75000	.75000	.	.	.	.50000	FARMLMAR
FARMLAPR	1.10000	975.00000	.75000	.	.	.30000	.50000	FARMLAPR
FARMLMAY	.50000	.75000	.50000	.	.	.30000	.50000	FARMLMAY
FARMLJUN	.50000	.75000	.50000	.	.	.30000	.50000	FARMLJUN
FARMLJUL	.10000	.40000	.50000	.	.	.30000	.20000	FARMLJUL
FARMLAUG	.10000	.40000	.50000	.	.	.30000	.20000	FARMLAUG
FARMLSEP	.25000	.60000	.75000	.30000	.30000	.40000	.30000	FARMLSEP
FARMLOCT	.25000	.60000	.75000	.40000	.40000	.	.30000	FARMLOCT
FARMLNOV	.60000	.50000	1.00000	.70000	.70000	.	.60000	FARMLNOV
FARMLDEC	.60000	.50000	1.00000	.70000	.70000	.	.60000	FARMLDEC
CORNINV	2.00000	9.00000	.	8.00000	8.00000	.	.	CORNINV
OATSINV	4.00000	4.00000	24.00000	14.00000	13.00000	.	.	OATSINV
GRHAYINV	1.30000	1.30000	.90000	.	.	.	.75000	GRHAYINV
ALFINV	.40000	.40000	.30000	.35000	.30000	.	.	ALFINV
AUMINV	8.00000	8.00000	1.00000	.	.	3.40000	3.20000	AUMINV
SILAGINV	.	.	.	.65000	.60000	.	.	SILAGINV
SALT&MIN	.60000	.60000	.30000	.10000	.10000	.10000	.20000	SALT&MIN
BEEFSUPP	1.50000	1.50000	2.00000	.	.	.	2.00000	BEEFSUPP
CULLCOW	.15000-	.15000-	.	.	.	.	.	CULLCOW
REPLHEIF	.	.	1.00000-	.	.	.	.	REPLHEIF
YEARSTER	.	.	.	1.00000-	.	1.00000	.	YEARSTER
YEARHEIF	.	.	.	.	1.00000-	.	.	YEARHEIF
STERCALF	.46000-	.	1.00000	1.00000	.	.	1.00000	STERCALF
HEIFCALF	.30000-	.	1.00000	.	1.00000	.	.	HEIFCALF
OPCAPINV	23.71000	23.71000	22.03000	4.55000	4.45000	12.30000	17.65000	OPCAPINV
LICAPINV	792.00000	792.00000	.	.	.	.	.	LICAPINV
TRAN475S	.	.46000-	.	.	.	.	.	TRAN475S
TRAN425H	.	.30000-	.	.	.	.	.	TRAN425H

BOUND	FINFSTER LOWER	FULFHEIF LOWER	FINYSTER LOWER	FINYHEIF LOWER	BUYBEEFS LOWER	BUYYSTER LOWER	BUYYHEIF LOWER	BOUND
PROFIT	658.83000	527.77000	718.83000	623.80000	11.00000-	422.50000-	372.00000-	PROFIT
FARMLJAN	.20000	.20000	.20000	.20000	.	.	.	FARMLJAN
FARMLFEB	.20000	.20000	.20000	.20000	.	.	.	FARMLFEB
FARMLMAR	.20000	.20000	.20000	.20000	.	.	.	FARMLMAR
FARMLAPR	.20000	.20000	.20000	.20000	.	.	.	FARMLAPR
FARMLMAY	.20000	.20000	.20000	.20000	.	.	.	FARMLMAY
FARMLJUN	.20000	.20000	.20000	.20000	.	.	.	FARMLJUN
FARMLJUL	.20000	.20000	.20000	.	.	.	.	FARMLJUL
FARMLAUG	.20000	.20000	.	.	.	.	.	FARMLAUG
FARMLSEP	.20000	.20000	.	.	.	.	.	FARMLSEP
FARMLOCT	.20000	.20000	.	.	.	.	.	FARMLOCT
FARMLNOV	.20000	.	.20000	.	.	.	.	FARMLNOV
FARMLDEC	.	.	.20000	.20000	.	.	.	FARMLDEC
CORNINV	48.00000	40.00000	44.00000	32.00000	.	.	.	CORNINV
OATSINV	10.00000	8.00000	.	.	.	.	.	OATSINV
GRHAYINV	.40000	.20000	.96000	.	.	.	.	GRHAYINV
ALFINV	.90000	.80000	.40000	.30000	.	.	.	ALFINV
SILAGINV	.	.	.	2.50000	.	.	.	SILAGINV
SALT&MIN	.30000	.25000	.15000	.15000	.	.	.	SALT&MIN
BEEFSUPP	2.25000	2.00000	1.10000	2.00000	1.00000-	.	.	BEEFSUPP
YEARSTER	.	.	1.00000	.	.	1.00000-	.	YEARSTER
YEARHEIF	.	.	.	1.00000	.	.	1.00000-	YEARHEIF
STERCALF	1.00000	.	.	.	.	.	.	STERCALF
HEIFCALF	.	1.00000	.	.	.	.	.	HEIFCALF
OPCAPINV	25.94000	25.19000	21.19000	20.69000	11.00000	422.50000	372.00000	OPCAPINV

BOUND	BUYSTCF LOWER	BUYHFCF LOWER	SELLCULL LOWER	SELYSTER LOWER	SELYHEIF LOWER	SELLSTCF LOWER	SELHFCF LOWER	BOUND
PROFIT	340.00000-	262.50000-	400.00000	415.00000	365.00000	335.00000	255.00000	PROFIT
CULLCOW	.	.	1.00000	.	.	.	.	CULLCOW
YEARSTER	.	.	.	1.00000	.	.	.	YEARSTER
YEARHEIF	.	.	.	.	1.00000	.	.	YEARHEIF
STERCALF	1.00000-	.	.	.	.	1.00000	.	STERCALF
HEIFCALF	.	1.00000-	.	.	.	.	1.00000	HEIFCALF
OPCAPINV	340.00000	262.50000	.	.	.	.	.	OPCAPINV

BOUND	SELREPHF LOWER	SELL425H LOWER	SELL475S LOWER	CWT10MK1 LOWER	CWT12MK1 LOWER	CWT14MK1 LOWER	CWT16MK1 LOWER	BOUND
PROFIT	670.00000	297.50000	380.00000	1284.6500	1591.7000	1783.7500	2033.7500	PROFIT
FARMLJAN	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLJAN
FARMLFEB	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLFEB
FARMLMAR	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLMAR
FARMLAPR	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLAPR
FARMLMAY	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLMAY
FARMLJUN	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLJUN
FARMLJUL	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLJUL
FARMLAUG	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLAUG
FARMLSEP	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLSEP
FARMLOCT	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLOCT
FARMLNOV	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLNOV
FARMLDEC	.	.	.	5.00000	5.00000	5.00000	5.00000	FARMLDEC
CORNINV	.	.	.	45.00000	52.00000	60.00000	75.00000	CORNINV
OATSINV	.	.	.	50.00000	54.00000	55.00000	60.00000	OATSINV
GRHAYINV	.	.	.	.25000	.25000	.	.	GRHAYINV
ALFINV	.	.	.	2.00000	2.00000	3.00000	3.00000	ALFINV
AUMINV	.	.	.	4.00000	2.00000	1.00000	1.00000	AUMINV
SILAGINV	.	.	.	2.50000	4.80000	4.75000	4.75000	SILAGINV
SALT&MIN	.	.	.	.60000	.80000	1.00000	1.00000	SALT&MIN
REPLHEIF	1.00000							REPLHEIF
DAIRYSUP	.	.	.	4.00000	4.00000	4.00000	4.50000	DAIRYSUP
OPCAPINV	.	.	.	133.75000	145.00000	161.75000	170.75000	OPCAPINV
LICAPINV	.	.	.	800.00000	1000.0000	1100.0000	1200.0000	LICAPINV
TRAN475S	.	.	1.00000	.	.	.	.	TRAN475S
TRAN425H	.	1.00000	.	.	.	.	.	TRAN425H

BOUND	CWT10MK2 LOWER	CWT12MK2 LOWER	CWT14MK2 LOWER	CWT16MK2 LOWER	CWT10MK3 LOWER	CWT12MK3 LOWER	CWT14MK3 LOWER	BOUND
PROFIT	1299.2000	1606.2500	1798.3000	2048.3000	1299.2000	1606.2500	1798.3000	PROFIT
FARMLJAN	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLJAN
FARMLFEB	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLFEB
FARMLMAR	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLMAR
FARMLAPR	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLAPR
FARMLMAY	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLMAY
FARMLJUN	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLJUN
FARMLJUL	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLJUL
FARMLAUG	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLAUG
FARMLSEP	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLSEP
FARMLOCT	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLOCT
FARMLNOV	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLNOV
FARMLDEC	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	6.00000	FARMLDEC
CORNINV	45.00000	52.00000	60.00000	75.00000	45.00000	52.00000	60.00000	CORNINV
OATSINV	50.00000	54.00000	55.00000	60.00000	50.00000	54.00000	55.00000	OATSINV
GRHAYINV	.25000	.25000	.	.	.25000	.25000	.	GRHAYINV
ALFINV	2.00000	2.00000	3.00000	3.00000	2.00000	2.00000	3.00000	ALFINV
AUMINV	4.00000	2.00000	1.00000	1.00000	4.00000	2.00000	1.00000	AUMINV
SILAGINV	2.50000	4.80000	4.75000	4.75000	2.50000	4.80000	4.75000	SILAGINV
SALT&MIN	.60000	.80000	1.00000	1.00000	.60000	.80000	1.00000	SALT&MIN
DAIRYSUP	4.00000	4.00000	4.00000	4.50000	4.00000	4.00000	4.00000	DAIRYSUP
OPCAPINV	119.20000	1130.4500	147.20000	156.20000	119.20000	130.45000	147.20000	OPCAPINV
LICAPINV	800.00000	1000.0000	1100.0000	1200.0000	800.00000	1000.0000	1100.0000	LICAPINV
BUCAPINV	.	.	.	.	200.00000	200.00000	200.00000	BUCAPINV

BOUND	CWT16MK3 LOWER	RDAIRREP LOWER	BUYDAIRS LOWER	BUYMKST LOWER	BUYCAFST LOWER	BUYCAFGR LOWER	BUYDARHF LOWER	BOUND
PROFIT	2048.3000	832.15000	11.00000-	39.00000-	12.00000-	14.00000-	120.00000-	PROFIT
FARMLJAN	6.00000	2.00000	.	.	.	.	.	FARMLJAN
FARMLFEB	6.00000	2.00000	.	.	.	.	.	FARMLFEB
FARMLMAR	6.00000	2.00000	.	.	.	.	.	FARMLMAR
FARMLAPR	6.00000	2.00000	.	.	.	.	.	FARMLAPR
FARMLMAY	6.00000	1.00000	.	.	.	.	.	FARMLMAY
FARMLJUN	6.00000	1.00000	.	.	.	.	.	FARMLJUN
FARMLJUL	6.00000	1.00000	.	.	.	.	.	FARMLJUL
FARMLAUG	6.00000	1.00000	.	.	.	.	.	FARMLAUG
FARMLSEP	6.00000	2.00000	.	.	.	.	.	FARMLSEP
FARMLOCT	6.00000	2.00000	.	.	.	.	.	FARMLOCT
FARMLNOV	6.00000	2.00000	.	.	.	.	.	FARMLNOV
FARMLDEC	6.00000	2.00000	.	.	.	.	.	FARMLDEC
CORNINV	75.00000	3.00000	.	.	.	.	.	CORNINV
OATSINV	60.00000	7.00000	.	.	.	.	.	OATSINV
GRHAYINV	.	2.20000	.	.	.	.	.	GRHAYINV
ALFINV	3.00000	1.10000	.	.	.	.	.	ALFINV
AUMINV	1.00000	7.00000	.	.	.	.	.	AUMINV
SILAGINV	4.75000	.	.	.	.	.	.	SILAGINV
SALT&MIN	1.00000	.30000	.	.	.	.	.	SALT&MIN
DAIRYSUP	4.50000	1.20000	1.00000-	.	.	.	.	DAIRYSUP
MILSTART	.	.35000	.	1.00000-	.	.	.	MILSTART
CALSTART	.	2.40000	.	.	1.00000-	.	.	CALSTART
CALFGROW	.	2.90000	.	.	.	1.00000-	.	CALFGROW
DAIRHEIF	.	1.00000	.	.	.	.	1.00000-	DAIRHEIF
OPCAPINV	156.20000	46.55000	11.00000	39.00000	12.00000	14.00000	.	OPCAPINV
LICAPINV	1200.0000	.	.	.	.	.	120.00000	LICAPINV
BUCAPINV	200.00000	.	.	.	.	.	.	BUCAPINV

BOUND	MAYFLAMB LOWER	JULMLAMB LOWER	AUGFLAMB LOWER	FDMKLAMB LOWER	RREPEWES LOWER	DRYLOTFD LOWER	BUYSHEPS LOWER	BOUND
PROFIT	8.73000	70.15000	8.57000	39.58000	89.15000	6241.0900	11.00000-	PROFIT
FARMLJAN	.15000	.15000	.15000	.20000	.	.	.	FARMLJAN
FARMLFEB	.15000	.15000	.15000	.20000	.	.	.	FARMLFEB
FARMLMAR	.60000	.70000	.15000	.30000	.25000	.	.	FARMLMAR
FARMLAPR	.60000	.70000	.15000	.30000	.25000	.	.	FARMLAPR
FARMLMAY	.15000	.15000	.20000	.10000	.35000	.	.	FARMLMAY
FARMLJUN	.15000	.15000	.20000	.10000	.35000	.	.	FARMLJUN
FARMLJUL	.15000	.15000	.20000	.20000	.35000	9.00000	.	FARMLJUL
FARMLAUG	.15000	.15000	.20000	.20000	.35000	9.00000	.	FARMLAUG
FARMLSEP	.15000	.15000	.15000	.20000	.	.	.	FARMLSEP
FARMLOCT	.15000	.15000	.15000	.20000	.	.	.	FARMLOCT
FARMLNOV	.15000	.15000	.15000	.20000	.	.	.	FARMLNOV
FARMLDEC	.15000	.15000	.15000	.20000	.	.	.	FARMLDEC
CORNINV	1.50000	5.00000	.50000	.70000	.	240.00000	.	CORNINV
GRHAYINV	.20000	.20000	.20000	.30000	.16000	.50000	.	GRHAYINV
ALFINV	.14000	.23000	.15000	.16000	.40000	6.00000	.	ALFINV
AUMINV	1.00000	1.00000	1.20000	1.20000	.20000	.	.	AUMINV
SALT&MIN	.15000	.16000	.15000	.16000	.16000	5.00000	.	SALT&MIN
FEEDLAMB	1.00000-	.	1.00000-	.50000-	.	100.00000	.	FEEDLAMB
SHEEPSUP	.25000	.25000	.40000	.40000	.70000	.	1.00000-	SHEEPSUP
OPCAPINV	9.87000	10.65000	9.85000	9.95000	5.40000	509.15000	11.00000	OPCAPINV
LICAPINV	80.00000	80.00000	80.00000	80.00000	55.00000	.	.	LICAPINV

BOUND	SELLLAMB LOWER	BUYFLAMB LOWER	RBUTHOG1 LOWER	RBUTHOG2 LOWER	RBUTHOG3 LOWER	RBUTHOG4 LOWER	RBUTHOG5 LOWER	BOUND
PROFIT	47.60000	48.00000-	66.55000	63.55000	70.35000	66.55000	63.55000	PROFIT
FARMLJAN	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLJAN
FARMLFEB	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLFEB
FARMLMAR	.	.	4.00000	4.10000	4.20000	4.00000	4.10000	FARMLMAR
FARMLAPR	.	.	3.00000	3.10000	3.20000	3.00000	3.10000	FARMLAPR
FARMLMAY	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLMAY
FARMLJUN	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLJUN
FARMLJUL	.	.	1.00000	1.10000	1.10000	1.00000	1.10000	FARMLJUL
FARMLAUG	.	.	1.00000	1.10000	1.10000	1.00000	1.10000	FARMLAUG
FARMLSEP	.	.	4.00000	4.10000	4.20000	4.00000	4.10000	FARMLSEP
FARMLOCT	.	.	3.00000	3.10000	3.20000	3.00000	3.10000	FARMLOCT
FARMLNOV	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLNOV
FARMLDEC	.	.	2.00000	2.10000	2.10000	2.00000	2.10000	FARMLDEC
CORNINV	.	.	184.00000	84.00000	184.00000	184.00000	84.00000	CORNINV
OATSINV	.	.	30.00000	30.00000	30.00000	30.00000	30.00000	OATSINV
ALFINV	.	.	.40000	.40000	.40000	.40000	.40000	ALFINV
AUMINV	.	.	2.00000	2.00000	2.00000	2.00000	2.00000	AUMINV
SALT&MIN	.	.	1.70000	1.70000	1.70000	1.70000	1.70000	SALT&MIN
FEEDLAMB	1.00000	1.00000-	.	.	.	.	.	FEEDLAMB
PORKSUPP	.	.	16.50000	16.50000	16.50000	16.50000	16.50000	PORKSUPP
PIGCREEP	.	.	5.80000	5.80000	5.80000	5.80000	5.80000	PIGCREEP
OPCAPINV	.	48.00000	131.90000	134.90000	128.10000	131.90000	134.90000	OPCAPINV
LICAPINV	.	.	140.00000	140.00000	140.00000	140.00000	140.00000	LICAPINV
BUCAPINV	.	.	.	.	.	825.00000	560.00000	BUCAPINV
HOGINV	.	.	15.00000-	15.00000-	15.00000-	15.00000-	15.00000-	HOGINV

BOUND	RBUTHOG6 LOWER	PRODFDR1 LOWER	PRODFDR2 LOWER	PRODFDR3 LOWER	PRODFDR4 LOWER	PRODFDR5 LOWER	PRODFDR6 LOWER	BOUND
PROFIT	70.35000	108.10000	108.95000	117.05000	108.10000	108.95000	117.05000	PROFIT
FARMLJAN	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLJAN
FARMLFEB	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLFEB
FARMLMAR	4.20000	4.50000	4.60000	4.70000	4.50000	4.60000	4.70000	FARMLMAR
FARMLAPR	3.20000	3.50000	3.60000	3.70000	3.50000	3.60000	3.70000	FARMLAPR
FARMLMAY	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLMAY
FARMLJUN	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLJUN
FARMLJUL	1.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLJUL
FARMLAUG	1.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLAUG
FARMLSEP	4.20000	5.00000	5.10000	5.20000	5.00000	5.10000	5.20000	FARMLSEP
FARMLOCT	3.20000	4.00000	4.10000	4.20000	4.00000	4.10000	4.20000	FARMLOCT
FARMLNOV	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLNOV
FARMLDEC	2.10000	1.00000	1.10000	1.10000	1.00000	1.10000	1.10000	FARMLDEC
CORNINV	184.00000	40.00000	40.00000	40.00000	40.00000	40.00000	40.00000	CORNINV
OATSINV	30.00000	30.00000	30.00000	30.00000	30.00000	30.00000	30.00000	OATSINV
ALFINV	.40000	.30000	.30000	.30000	.30000	.30000	.30000	ALFINV
AUMINV	2.00000	.50000	.50000	.50000	.50000	.50000	.50000	AUMINV
SALT&MIN	1.70000	.50000	.50000	.50000	.50000	.50000	.50000	SALT&MIN
PORKSUPP	16.50000	3.60000	3.60000	3.60000	3.60000	3.60000	3.60000	PORKSUPP
PIGCREEP	5.80000	6.20000	6.20000	6.20000	6.20000	6.20000	6.20000	PIGCREEP
OPCAPINV	128.10000	90.35000	89.50000	81.40000	90.35000	89.50000	81.40000	OPCAPINV
LICAPINV	140.00000	140.00000	140.00000	140.00000	140.00000	140.00000	140.00000	LICAPINV
BUCAPINV	385.00000	.	.	.	825.00000	370.00000	150.00000	BUCAPINV
HOGINV	15.00000-	.	.	.	.	.	.	HOGINV
FPIGINV	.	16.00000-	16.00000-	16.00000-	16.00000-	16.00000-	16.00000-	FPIGINV

BOUND	BUYFINF1 LOWER	BUYFINF3 LOWER	BUYFINF4 LOWER	BUYFINF6 LOWER	PASTFNF7 LOWER	PASTFNF8 LOWER	BUYPORKS LOWER	BOUND
PROFIT	72.30000-	61.15000-	72.30000-	61.15000-	60.55000-	60.55000-	15.00000-	PROFIT
FARMLJAN	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLJAN
FARMLFEB	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLFEB
FARMLMAR	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLMAR
FARMLAPR	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLAPR
FARMLMAY	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLMAY
FARMLJUN	1.00000	1.10000	1.00000	1.10000	1.20000	1.20000	.	FARMLJUN
FARMLJUL	1.00000	1.10000	1.00000	1.10000	1.30000	1.30000	.	FARMLJUL
FARMLAUG	1.00000	1.10000	1.00000	1.10000	1.40000	1.40000	.	FARMLAUG
FARMLSEP	1.00000	1.10000	1.00000	1.10000	1.30000	1.30000	.	FARMLSEP
FARMLOCT	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLOCT
FARMLNOV	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLNOV
FARMLDEC	1.00000	1.10000	1.00000	1.10000	.	.	.	FARMLDEC
CORNINV	105.00000	105.00000	105.00000	105.00000	100.00000	100.00000	.	CORNINV
ALFINV	.20000	.20000	.20000	.20000	.	.	.	ALFINV
AUMINV	.	.	.	.	2.00000	2.00000	.	AUMINV
SALT&MIN	.80000	.80000	.80000	.80000	.70000	.70000	.	SALT&MIN
PORKSUPP	9.50000	9.50000	9.50000	9.50000	8.00000	8.00000	1.00000-	PORKSUPP
FEEDPIG	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000	.	FEEDPIG
OPCAPINV	72.30000	61.15000	72.30000	61.15000	60.55000	60.55000	15.00000	OPCAPINV
BUCAPINV	.	.	460.00000	60.00000	.	40.00000	.	BUCAPINV
HOGINV	9.75000-	9.75000-	9.75000-	9.75000-	9.85000-	9.85000-	.	HOGINV

BOUND	BUYPIGCP LOWER	BUYFDPIG LOWER	SELLHOG LOWER	SELLFPIG LOWER	HENS100 LOWER	HENS1000 LOWER	GEESE100 LOWER	BOUND
PROFIT	20.00000-	46.00000-	123.75000	45.00000	852.10000	8745.3000	269.90000	PROFIT
FARMLJAN	.	.	.	.	20.00000	40.00000	.	FARMLJAN
FARMLFEB	.	.	.	.	20.00000	40.00000	.	FARMLFEB
FARMLMAR	.	.	.	.	20.00000	40.00000	.	FARMLMAR
FARMLAPR	.	.	.	.	20.00000	40.00000	.	FARMLAPR
FARMLMAY	.	.	.	.	10.00000	40.00000	8.00000	FARMLMAY
FARMLJUN	.	.	.	.	10.00000	40.00000	8.00000	FARMLJUN
FARMLJUL	.	.	.	.	10.00000	40.00000	8.00000	FARMLJUL
FARMLAUG	.	.	.	.	10.00000	40.00000	8.00000	FARMLAUG
FARMLSEP	.	.	.	.	20.00000	40.00000	8.00000	FARMLSEP
FARMLOCT	.	.	.	.	20.00000	40.00000	8.00000	FARMLOCT
FARMLNOV	.	.	.	.	20.00000	40.00000	8.00000	FARMLNOV
FARMLDEC	.	.	.	.	20.00000	40.00000	.	FARMLDEC
CORNINV	.	.	.	.	100.00000	.	50.00000	CORNINV
OATSINV	.	.	.	.	50.00000	.	.	OATSINV
AUMINV	.	.	.	.	.	.	6.70000	AUMINV
CHICKINV	.	.	.	.	120.00000	.	.	CHICKINV
CMASHINV	.	.	.	.	10.00000	.	.	CMASHINV
LMASHINV	.	.	.	.	30.00000	845.00000	.	LMASHINV
SHELLINV	.	.	.	.	2.50000	25.00000	.	SHELLINV
PIGCREEP	1.00000-	.	.	.	.	.	.	PIGCREEP
FEEDPIG	.	1.00000-	.	.	.	.	.	FEEDPIG
OPCAPINV	20.00000	46.00000	.	.	116.90000	3415.5000	461.60000	OPCAPINV
HOGINV	.	.	1.00000	.	.	.	.	HOGINV
FPIGINV	.	.	.	1.00000	.	.	.	FPIGINV

BOUND	TURKEYS LOWER	BUYSEXCH LOWER	BUYCMASH LOWER	BUYLMASH LOWER	BUYOSHEL LOWER	BUYTSUPP LOWER	BUYYTURK LOWER	BOUND
PROFIT	945.20000	.80000-	12.00000-	10.00000-	4.00000-	12.00000-	1.50000-	PROFIT
FARMLJAN	8.00000	.	.	.	.	.	.	FARMLJAN
FARMLFEB	8.00000	.	.	.	.	.	.	FARMLFEB
FARMLMAR	8.00000	.	.	.	.	.	.	FARMLMAR
FARMLAPR	8.00000	.	.	.	.	.	.	FARMLAPR
FARMLMAY	8.00000	.	.	.	.	.	.	FARMLMAY
FARMLJUN	8.00000	.	.	.	.	.	.	FARMLJUN
FARMLJUL	8.00000	.	.	.	.	.	.	FARMLJUL
FARMLAUG	8.00000	.	.	.	.	.	.	FARMLAUG
FARMLSEP	8.00000	.	.	.	.	.	.	FARMLSEP
FARMLOCT	8.00000	.	.	.	.	.	.	FARMLOCT
FARMLNOV	8.00000	.	.	.	.	.	.	FARMLNOV
FARMLDEC	8.00000	.	.	.	.	.	.	FARMLDEC
CORNINV	100.00000	.	.	.	.	.	.	CORNINV
ALFINV	5.00000	.	.	.	.	.	.	ALFINV
CHICKINV	.	1.00000-	.	.	.	.	.	CHICKINV
CMASHINV	.	.	1.00000-	.	.	.	.	CMASHINV
LMASHINV	.	.	.	1.00000-	.	.	.	LMASHINV
SHELLINV	.	.	.	.	1.00000-	.	.	SHELLINV
OPCAPINV	74.00000	.80000	12.00000	10.00000	4.00000	12.00000	1.50000	OPCAPINV
TURKSUPP	25.50000	.	.	.	.	1.00000-	.	TURKSUPP
BIRDINV	100.00000	.	.	.	.	.	1.00000-	BIRDINV

BOUND	BUYMIN LOWER	OFFARM1 LOWER	OFFARM2 LOWER	OPERCAP LOWER	LIVECAP LOWER	BUILDCAP LOWER	MACHCAP LOWER	BOUND
PROFIT	7.00000-	4.25000	4.75000	.12000-	.11000-	.10000-	.10000-	PROFIT
SALT&MIN	1.00000-	.	.	.	.	.	.	SALT&MIN
OFFMJ-D1	.	1.00000	.	.	.	.	.	OFFMJ-D1
OFFMJ-D2	.	.	1.00000	.	.	.	.	OFFMJ-D2
OPCAPINV	7.00000	.	.	1.00000-	.	.	.	OPCAPINV
LICAPINV	.	.	.	.	1.00000-	.	.	LICAPINV
BUCAPINV	.	.	.	.	.	1.00000-	.	BUCAPINV
BARRCAP	.	.	.	1.00000	1.00000	1.00000	1.00000	BARRCAP
INTPAID	.	.	.	.12000	.11000	.10000	.10000	INTPAID

BOUND	HIRELJAN	HIRELFEB	HIRELMAR	HIRELAPR	HIRELMAY	HIRELJUN	HIRELJUL	BOUND
PROFIT	875.00000-	875.00000-	875.00000-	875.00000-	875.00000-	875.00000-	875.00000-	PROFIT
FARMLJAN	250.00000-	.	.	.	.	.	.	FARMLJAN
FARMLFEB	.	250.00000-	.	.	.	.	.	FARMLFEB
FARMLMAR	.	.	250.00000-	.	.	.	.	FARMLMAR
FARMLAPR	.	.	.	250.00000-	.	.	.	FARMLAPR
FARMLMAY	.	.	.	.	250.00000-	.	.	FARMLMAY
FARMLJUN	.	.	.	.	.	250.00000-	.	FARMLJUN
FARMLJUL	.	.	.	.	.	.	250.00000-	FARMLJUL
OPCAPINV	875.00000	875.00000	875.00000	875.00000	875.00000	875.00000	875.00000	OPCAPINV

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BOUND	HIRELAUG	HIRELSEP	HIRELOCT	HIRELNOV	HIRELDEC	DEPREC	TAX&INS	BOUND
PROFIT	875.00000-	875.00000-	875.00000-	875.00000-	875.00000-	1.00000-	1.00000-	PROFIT
FARMLAUG	250.00000-	.	.	.	.	.	.	FARMLAUG
FARMLSEP	.	250.00000-	.	.	.	.	.	FARMLSEP
FARMLOCT	.	.	250.00000-	.	.	.	.	FARMLOCT
FARMLNOV	.	.	.	250.00000-	.	.	.	FARMLNOV
FARMLDEC	.	.	.	.	250.00000-	.	.	FARMLDEC
OPCAPINV	875.00000	875.00000	875.00000	875.00000	875.00000	.	1.00000	OPCAPINV

BOUND	DEBTPAY	FAMILYEX	SUPPLY	BOUND
PROFIT	1.00000-	1.00000-	.	PROFIT
CROPLAND	.	.	315.00000	CROPLAND
PASTLAND	.	.	45.00000	PASTLAND
FARMLJAN	.	.	250.00000	FARMLJAN
FARMLFEB	.	.	250.00000	FARMLFEB
FARMLMAR	.	.	250.00000	FARMLMAR
FARMLAPR	.	.	250.00000	FARMLAPR
FARMLMAY	.	.	250.00000	FARMLMAY
FARMLJUN	.	.	250.00000	FARMLJUN
FARMLJUL	.	.	250.00000	FARMLJUL
FARMLAUG	.	.	250.00000	FARMLAUG
FARMLSEP	.	.	250.00000	FARMLSEP
FARMLOCT	.	.	250.00000	FARMLOCT
FARMLNOV	.	.	250.00000	FARMLNOV
FARMLDEC	.	.	250.00000	FARMLDEC
OPCAPINV	.	1.00000	10000.000	OPCAPINV
LICAPINV	.	.	50000.000	LICAPINV