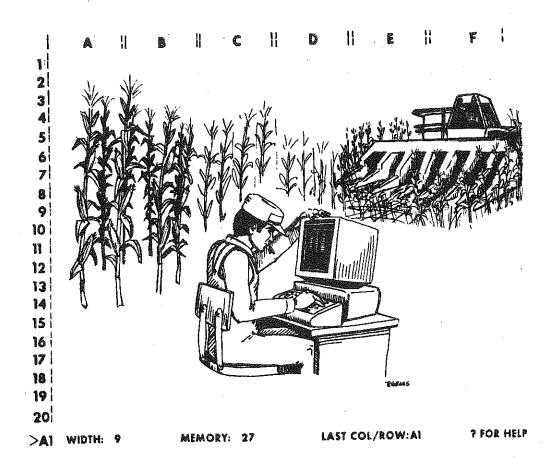# CROP BUDGET AND MACHINERY COST CALCULATOR
FOR ELECTRONIC SPREADSHEETS

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ACKNOWLEDGEMENT

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Crop Budget and Machinery Cost Calculator for
Electronic Spreadsheets

Budgets of crop enterprise costs and returns are useful sources of information to a crop producer and those working with him for such purposes as selecting crops, calculating input needs and projecting costs and returns. Ideally, budgets should be tailor-made for each specific situation and for each change being considered, such as a change in crop acres, fertilizer rates or machines. Budgeting with a pencil and paper or a hand calculator can be time-consuming and tedious. Decisions are therefore often made without any budgeting or with budgets for only one or two of the most promising choices. Microcomputers can reduce greatly the time required for calculating budgets.

Accurate estimates of machinery ownership and operating costs are essential for budgeting crop enterprise costs and returns, making machinery purchase decisions, evaluating crop acreage adjustments and setting custom rates.

Even with a microcomputer to do the calculations, machinery cost calculations require much input data that must be arranged in a logical order and checked. The time required to estimate machinery costs for a crop budget for the first time will be measured in hours, not minutes. Revising the original figures is much faster, however with programs that allow the original data set to be saved and revised. Then, only the changes need to be typed in.

PURPOSE

This paper presents a method for calculating a set of crop enterprise budgets for up to five crops grown using a specified set of farm machinery. Machinery ownership costs, operating costs and labor requirements are calculated. A set of templates for the Supercalc brand of electronic spreadsheet, version 1.12, on an Osborne 1 microcomputer is used. [1]

The templates are intended for use in teaching Extension staff and advanced farm managers about crop enterprise budgeting, economics of crop production and machinery management. They are also intended as an applied research tool and as an aid for Extension staff in counseling farmers.

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[1]This paper discusses one of many applications of an electronic spreadsheet. It is not intended to teach how to use the electronic spreadsheet itself. Readers are referred to H. Willson, Personal and Desktop Computing: A Short Course in Computer Literacy, "Lesson II, Spread Sheet Programs and Lesson III, Program Operation," Cooperative Extension, College of Agriculture and Life Sciences, Cornell University, 1982, or to the tutorial section of the spreadsheet manual for that purpose.

The paper is organized as follows: First, the concepts of an electronic spreadsheet and template are introduced. Hardware and software requirements are then listed. A general overview describing the organization of cost information on the spreadsheets is next, followed by a discussion of the methods used to calculate various budget items. The next section is a user's guide, providing step-by-step instructions for first-time users. Printouts of the templates, their formulas and formats, along with sample output and worksheets are included in the appendices.

DEFINITIONS

An electronic spreadsheet is a popular type of microcomputer software for business and agricultural applications. The name comes from similarity to a paper spreadsheet on which calculating tasks are set up as tables of columns and rows of figures. These rows and columns are titled, cross referenced and manipulated mathematically. An electronic spreadsheet arranges the computer's memory as an "electronic sheet". The computer's screen becomes a "window" which looks at a part of the spreadsheet. A template is a set of spreadsheet instructions to perform a specific task. The instructions are made up of labels, values and formulas. An execute file is a file containing a sequence of spreadsheet commands which are executed when the file name is entered as part of an "execute" command. Execute files are used to simplify use of large and multiple templates.

WHAT YOU NEED TO USE THE CALCULATOR

The task of calculating crop enterprise budgets including machinery ownership and operating costs is a relatively complex one to do on a microcomputer and electronic spreadsheet. There are many commercially available microcomputers, and as of the spring of 1983 there were reportedly about 60 different brands of electronic spreadsheets on the market. No attempt will be made here to evaluate the features of even the major brands and how suitable they would be for a specific application like calculating crop enterprise budgets.

The templates are discussed as they are set up on one specific spreadsheet and microcomputer for illustrations only. The potential user can type the templates into other spreadsheets using the printouts provided in the appendix.

To use a diskette copy of the set of templates discussed in this paper you will need:

1. An Osborne 1 microcomputer, double density version;

2. A printer for producing paper copies. The diskette is set up for printing in compressed type on a dot-matrix (Epson MX-80) printer connected to the parallel (Centronics) port.

3. A Supercalc version 1.12 electronic spreadsheet source program diskette and user manual. This version provides an execute (X) command not included in the earlier version 1.05.

4. At least two blank diskettes for storing completed budgets (one for the original and one as a backup).

OBTAINING A DISKETTE COPY OF THE TEMPLATE

A 5 1/4" diskette copy of the templates can be obtained for use with Supercalc version 1.12, on the Osborne 1. Contact your county Extension agent or William F. Lazarus, Department of Agricultural Economics, Cornell University, Ithaca, N.Y., 14853, for details on obtaining a diskette copy.

CROP BUDGET AND MACHINERY COST CALCULATOR: OVERVIEW

The crop budget and machinery cost calculator is a series of seven spreadsheet templates and ten execute files. Operating and ownership costs for tractors and other machines are calculated with the first five templates. Each of these templates are designed to accommodate a single tractor and all machinery and equipment operated with that tractor. The procedures for entering data and making cost calculations are repeated for each tractor owned and its associated machinery. The types of input data needed to set up the template include: purchase price and list price if different from purchase price; width of machine; average operation speed; field efficiency; age of machine at purchase and years owned; salvage value; interest, insurance and storage rates; fuel price; acreage of each crop; and number of times over the field by each machine for each crop. A self-propelled machine such as a combine is accommodated by entering the power unit in place of a tractor and entering the header attachments in place of pull-type machines. Refer to Table A2 in the appendix for a sample worksheet used for organizing the required input data.

The sixth template calculates operating and ownership costs for a single truck. Inputs for this template are similar to those required for machinery, with the exception that miles operated per year, average miles per hour and average miles per gallon, are required. A sample input worksheet is shown in Table A6.

The last template calculates costs and returns per acre for each of up to five crop enterprises, using the machinery operating and ownership costs calculated previously.

The templates provide information on:

1. Fuel costs per acre by machine and crop.

2. Repair and maintenance costs per acre for each machine on each crop as well as a total for all machines.

3. Labor hours per acre for each machine and crop.

4. Hours use per year for each machine as well as accumulated hours over the estimated life.

5. Proportion of hourly machine use by crop.

6. Crop enterprise costs and returns.

Sample template results are provided in Appendix tables: A1, for machinery operating costs, A5 for truck operating costs and A9 for crop enterprise costs and returns.

METHODS USED TO ESTIMATE COSTS

The "economic engineering" approach is used to calculate machinery ownership and operating costs and hours of machine operating labor per acre. In this approach, engineering formulas are used to calculate hours required to cover an acre for each machine based on width, speed and field efficiency. Other formulas are used to estimate fuel use and repair costs on an hourly and per acre basis.

Field Capacity

The time required to cover an acre is the first calculation for each machine. This is called its "field capacity". The field capacity of a machine is a function of the machine capacity, field efficiency and operating speed. Machine capacity is the width of the machine. For example, with a grain combine, it is the width of the grain head. For a corn planter, machine width is the number of rows times the row spacing.

Field efficiency is the percentage of the theoretical field work accomplished after deducting for losses resulting from failure to use the full width of the machines, turning and idle travel at the ends, clogging, filling and adjusting seed, fertilizer and spray materials, unloading harvested crops, machine adjustments and minor repairs, lubrication, and other minor interruptions. It excludes waiting for supplies, wagons or trucks, major breakdowns, and daily service activities. Field efficiency for a particular machine varies with the size and shape of the field, field obstructions, pattern of the field operation, crop yield, moisture and crop conditions. The size of the machine also influences the field efficiency. Efficiency is reduced as larger machines are used. For example, the efficiency of corn planters and corn tillage tools is reduced about one percent for each row added, discs about one percent for each 30 inches of added width and moldboard plows about two percent per bottom added.

The speed of the implement is influenced by the size of power unit, the draft of the implement, the physical characteristics of the land, and the dexterity of the operator. Generally, the effective speed of the implement determines the rate of travel.

The time required to cover an acre is computed by using the following formula:

$$\text{Hours/acre} = \frac{8.25 \times \text{times over the field}}{\text{width (ft.)} \times \text{speed (m.p.h.)} \times \text{field efficiency (decimal)}}$$

Typical speeds and field efficiencies are shown in Table 1.

Operating and Ownership Costs

Costs of using new or used machinery can be categorized into two groups, operating or variable costs and ownership or fixed costs. Operating costs include fuel and lubrication, repairs and labor. Ownership costs include depreciation, interest, taxes, insurance and housing.

Operating Costs

Accumulated repair costs for different types of machines at any point in their useful lives is estimated in a formula. Years owned are first multiplied by annual hours of use to give accumulated hours of use. List price of the machine is used to relate repair cost to the cost of the machine. The formula is:

$$\text{accumulated repair cost} = 0.01 \times P \times a \times \left(\frac{H \times 100}{u}\right)^b$$

P = List price
H = Accumulated hours of use
u = Estimated wearout life in hours (from Table 1)
a = Repair coefficient 1 (from Table 2)
b = Repair coefficient 2 (from Table 2)

For used machines, repair cost over years owned is calculated by subtracting accumulated repairs at purchase from accumulated repairs at end of years owned. The repair cost over years owned is then divided by hours of use to get an average repair cost per hour. Values for Repair 1 and Repair 2 are given in Table 2 for different types of machines.

Fuel and lubrication costs depend on the nature of the job being performed, the size of the unit, and the type of fuel used. Average annual fuel consumption in gallons per hour, based on University of Nebraska tractor test data, was estimated as follows (Sprague, et al.):

gasoline = 0.06 x maximum p.t.o.h.p.
diesel fuel = 0.0438 x maximum p.t.o.h.p.
L.P. gas = 0.072 x maximum p.t.o.h.p.

For individual operations, fuel consumption may vary considerably from the average. For plowing the consumption may be increased by about one-third. Costs of oil, lubricants, and oil filters approach about 15 percent of the fuel cost.

Table 1. Farm Machinery Characteristics

	Speed (mph)	Field Efficiency (decimal)	Estimated Life (hours)
Moldboard or disc plow	3.5-6.0	0.70-0.90	2,500
Chisel plow	4.0-6.5	0.70-0.90	2,500
Subsoiler	3.0-5.0	0.70-0.90	
Land plane			2,500
Powered rotary tiller			
3-4 inch increment of cut	1.0-5.0	0.70-0.90	2,500
Harrow, single disc	3.0-6.0	0.70-0.90	2,500
Harrow, tandem disc	3.0-6.0	0.70-0.90	2,500
Harrow, offset or heavy tandem disc	3.0-6.0	0.70-0.90	2,500
Harrow, spring tooth	3.0-6.0	0.70-0.90	2,500
Harrow, spike tooth	3.0-6.0	0.70-0.90	2,500
Cultipacker	4.5-7.5	0.70-0.90	2,500
Rotary hoe	5.0-10	0.70-0.85	2,500
Rod weeder	4.0-6.0	0.70-0.90	2,500
Field cultivator	3.0-8.0	0.70-0.90	2,500
Field cultivator - heavy clay	3.0-8.0	0.70-0.90	2,500
Row crop cultivator	3.0-6.0	0.70-0.90	2,500
Fertilizer spreader			
Pull type	3.0-5.0	0.60-0.75	1,200
Anhydrous ammonia applicator	3.0-6.0	0.60-0.75	
Field sprayer	3.0-5.0	0.50-0.80	
Manure spreader, beaters			2,500
Manure spreader, chain flails			2,500
Manure spreader, liquid			2,500
Corn or soybean planter, drilling seed only	3.0-6.0	0.50-0.85	1,200
Corn or soybean planter with all attachments	3.0-6.0	0.50-0.85	1,200
No-till corn planter	3.0-5.0	0.50-0.75	1,200
Grain drill	2.5-6.0	0.65-0.85	1,000
Mower	5.0-7.0	0.75-0.85	2,500
Mower-conditioner (cutterbar)	4.0-6.0	0.60-0.85	2,000
Mower-conditioner (flail)	4.0-6.0	0.60-0.85	2,000
S.P. mower-conditioner	3.0-6.0	0.55-0.85	2,500
Rotary mower; horizontal blade	3.0-8.0	0.75-0.85	2,000
Conditioner only	5.0-7.0	0.75-0.85	2,500
Side Delivery Rake	4.0-5.0	0.70-0.85	2,500
Baler, pto	2.0-4.0	0.60-0.85	2,500

Table 1. Farm Machinery Characteristics (cont.)

	Speed (mph)	Field Efficiency (decimal)	Estimated Life (hours)
Flail type forage harvester in green forage	2-4.5	0.50-0.75	2,000
Forage harvester (pull-type)			2,000
Green forage	2-4.5	0.50-0.75	
Wilted forage	2-4.5	0.50-0.75	
Dry Hay	2-4.5	0.50-0.75	
Corn silage	2-4.5	0.50-0.85	
Recutter & wilted forage	2-4.5	0.50-0.75	
S.P. forage harvester windrower, small grain	5-7	0.75-0.85	2,000
PTO combine, wheat	2-4	0.65-0.80	2,000
S.P. Combine	2-4	0.65-0.80	2,000
Corn head			2,000
Corn Picker			2,000
1-row trailed	2-4	0.60-0.80	
2-row trailed	2-4	0.60-0.80	
Beet Topper	2-3	0.60-0.80	2,000
Sugar beet harvester	3-5	0.60-0.80	2,500
Forage blower			2,000
wilted hay crop	20-30T/hr.		
corn or grass silage	20-50T/hr.		
Tractor, 2-wheel drive			12,000
Tractor, 4-wheel drive			12,000
Tractor, crawler			12,000
Truck, farm			2,000
Truck, pickup			2,000
Front end loader			2,500
Wagon and box			5,000
Wagon, feed			2,500

SOURCE: P. R. Sprague, W. A. Knoblauch, and R. A. Milligan. _Profitable Combinations of Cash Crop Enterprises - Objectives and Procedures of a Sequential School Extension Program._ A.E. Extension 80-7, Department of Agricultural Economics, Cornell University, March 1980, and American Society of Agricultural Engineers, 1975. _Agricultural Engineers Yearbook,_ pp. 347-54, St. Joseph, Michigan.

Table 2. Repair and Maintenance Cost Coefficients for Farm Machinery

Repair Group #	Machine	Repair 1	Repair 2
1	2-Wheel Drive Tractors	.120	1.5
2	4-Wheel Drive & Crawler Tractors	.100	1.5
3	Tillage Tools, Rotary Hoe, Cutterbar, Mower, Cultivator, Cultipacker	.301	1.3
4	Fertilizer Equipment	.191	1.4
5	Self-Propelled Combine, Self-Propelled Forage Harvester, Pickup Truck, Manure Spreader, Front End Loader	.096	1.4
6	P.T.O. Baler, Corn Picker, Forage Blower, Sprayer, Pull Type Forage Harvester	.127	1.4
7	Corn Planter, Grain Drill, Mower Conditioner, Rake, Wagon	.159	1.4

SOURCE: American Society of Agricultural Engineers, 1975 Agricultural Engineers Yearbook, pp. 347-54. St. Joseph, Michigan.

The costs of fuel, oil and lubricants per hour are calculated as follows:

fuel and lubricants = fuel coefficient x maximum p.t.o.h.p. x fuel cost x fuel multiplier

where the fuel coefficient is entered for the type of fuel used by the tractor or self-propelled power unit and the fuel multiplier is used to adjust fuel consumption up or down for a particular operation. Estimated fuel coefficients based on the Nebraska data and the 15 percent allowance for lubricants are:

gasoline and lubricants   0.0690
diesel fuel and lubricants   0.0504
L.P. gas and lubricants   0.0828

Suppose a diesel tractor is used for plowing, planting corn and raking hay. Enter a fuel coefficient of 0.0504 for the tractor. To increase fuel consumption for plowing, enter 1.33 as a fuel multiplier for the plow. Enter a fuel multiplier of 1.0 for normal fuel use in planting corn. To decrease fuel consumption for raking hay, enter a multiplier less than 1.0, such as 0.67.

Truck Operating Costs

Many of the calculations for estimating truck operating costs are the same as those used for figuring machinery costs. Hours of use and fuel usage are different in that these costs are based on miles driven per year, typical speed in miles per hour and the average rating of miles per gallon. Truck ownership expenses are allocated among various crops based on crop acreage. Fuel cost, repair and maintenance expense and labor are divided equally among crops and between growing and harvesting periods.

The following formulas are used for these items:

$$\text{hours per acre} = \frac{\text{miles per year}}{\text{miles per hour x acres}}$$

$$\text{fuel cost per acre} = \frac{\text{miles per year x fuel price}}{\text{miles per gallon x acres}}$$

Ownership Costs

Depreciation is the decline in value over the life of the machine. For tax purposes depreciation can be computed by the straight line method, the sum of digits method or the declining balance method. Assuming a reasonable salvage value, which method of depreciation will give the greatest amount of depreciation over the life of the machine? Each method will give the same amount of depreciation for the life of the machine. Furthermore, if a farmer depreciates a machine to a very low salvage value and then trades for another machine, the new machine will have a lower cost to be depreciated over its life. However, the actual total depreciation can never be known until the machine is sold or traded. With recent price increases for new machinery, many used items sell for prices greater than their original purchase price. Straight-line depreciation is the method used in the template.

Interest on investment is the annual interest charge on the undepreciated value of machinery. Many farmers do not think of interest as a cost unless they borrow money to purchase a machine. Even though money is not borrowed, interest charges should be considered because funds could be invested elsewhere and earn a return.

Insurance must be included as a cost of operation. Liability coverage should be included because tractors and other machinery may be involved in accidents resulting in liability claims. There may also be losses as a result of fire or high winds. Generally farmers do not insure individual machines, but have a blanket policy. A common rate is $5 per $1000 valuation or 0.5 percent of the remaining value at the beginning of each year.

Housing is another cost of using machinery. Some machinery repair indicate that housing may increase the life of the machine, which in turn

may be reflected in the trade-in value. Typical housing costs are 1.5% of the beginning yearly value.

Taxes are levied against personal property in some states. New York does not have a personal property tax.

A WORD OF CAUTION

Electronic spreadsheets, like other computerized decision aids, perform calculations. They do not eliminate the need for the user to check the results carefully to make sure that the data has been entered correctly and the operations performed in the proper order. Use common sense, print out the results, and spot-check with a calculator occasionally.

Care is in order especially when the user modifies the formulas to suit his or her problem. Most of the formulas have been protected from accidental changes, but this protection can be overriden. The user bears responsibility for seeing that any changes are done properly.

TEMPLATE USER'S GUIDE

The machinery cost calculator is a set of seven templates and ten execute files stored on a 5 1/4" diskette.

Templates	Execute Files
MACH1	T1
MACH2	T2
MACH3	P1
MACH4	P2
MACH5	P3
TRUCK	P4
CROP	P5
	PT
	PC
	PALL

The templates require most of a 5 1/4" double density, single sided diskette for storage. It works best to use one diskette per set of budgets. Be sure to label the diskette appropriately. The first five templates, MACH1, MACH2, MACH3, MACH4 and MACH5, each calculates field capacity and operating and ownership costs for up to nine machines used with each of five tractors. Data for one tractor and its machines are entered in MACH1, the second tractor and machines in MACH2, etc. The sixth template, TRUCK, calculates costs for a truck. Ownership costs are allocated to up to five crops on the basis of hours of use. The names MACH1, etc. and TRUCK are the file names under which the templates are saved on diskettes.

The first step in using the machinery cost templates is to organize the input data. Worksheets have been set up for this purpose and are included in the Appendix. For now, refer to the completed set of sample worksheets provided in Tables A2, A5 and A8 in the Appendix.

The second step is to <u>make a backup copy</u> of the diskette, using the CP/M COPY program. Keep the original diskette for later use. Enter your data in the backup templates, replacing the example entries.

After organizing your data and making a backup diskette, you are ready to enter the data into the templates. Load the Supercalc source diskette into drive A and your backup copy of the templates in drive B, and load Supercalc. When the display of rows and columns appears, load MACH1 by typing

/LB:MACH1,A .

In transferring data from MACH1, etc. to CROP, the execute files look for data in a specified part of the template. <u>Don't insert or delete rows or columns</u> in MACH1, MACH2, MACH3, MACH4, MACH5 or TRUCK. Doing so will cause errors.

<u>Machinery Costs - MACH1</u>

The upper left portion of MACH1, shown as Table A1 in the Appendix, will appear on the screen. For illustration, MACH1 has been filled in with the entries shown on the sample worksheet. To use the template, type in your own machine information in place of the sample entries. The Supercalc automatic recalculation feature has been turned off on all templates to avoid excessive calculation time. <u>After entering new data and before saving a template, type an exclamation point ! to recalculate.</u>

All data for a machine is grouped in a single column. Rows 7-24 are for input data. Enter the machine name in rows 6 and 7, abbreviated to no more than 8 spaces. The purchase price, used in calculating ownership costs is entered in row 8. The list price if different than purchase price should be entered in row 9 and is used for calculating repair cost. Width, speed and field efficiency go in rows 10-12. The fuel multiplier in row 13 should be 1.00 for a machine which uses an average amount of fuel. Increase the fuel multiplier for operations such as plowing which use fuel at a higher rate, or reduce it to reduce calculated fuel use. Enter the repair group number from Table 2 in row 14. LOOKUP tables are used to provide repair coefficients 1 and 2. The LOOKUP tables are stored in columns Q and R. Enter the estimated life in hours from Table 1 in row 17. If the machine was purchased used, enter the age at purchase in row 18. Enter in row 19 the number of years the machine is expected to be owned. Enter the expected salvage value of the machine, as a proportion of the list price, in line 20. Elements D22 to D24 are for an interest rate charged on the average investment in the machine over its useful life, and for an insurance and storage cost rate charged on the purchase price. Enter these rates as decimals, not percentages.

The ownership costs, depreciation, interest on investment, insurance and storage are calculated on a yearly basis for each machine and summed to get total ownership cost per year for the farm. This total annual figure is useful for partial budgeting of machinery purchase decisions. For some uses such as calculating total production costs per acre for a

crop, it is useful to allocate ownership costs among crops. MACH1 allo-
cates total annual ownership cost for each machine to each of up to five
crops based on the proportion of total annual hours of use used on that
crop.

The templates are set up to calculate costs for a farm with up to
five crops, with operations divided into growing and harvesting. Enter
the number of times each machine covers the field per year in rows 30-
39. Example: the 1.00 in D32 indicates that the plow is used once in
growing corn. A four-year hay stand is plowed only once every four years
which works out to 0.25 trips per year.

Enter the acres of each crop in column A, rows 30-38, in the rows
for growing operations. These acres times hours per acre give total
annual hours of use for each machine. Make sure you enter the acres only
once for each crop. Zeros have been entered in rows 31, 33, 35, 37 and
39 to prevent double-entering acres.

You may have noticed that some of the template entries are brighter
than others. The darker entries are headings and calculated values,
protected against overwriting by the

$$\boxed{/P}$$

command to prevent you from accidentally erasing them.

The MACH1 spreadsheet has sample data for a corn planter, forage
harvester, plow, disc harrow, and a 90 horsepower tractor. The tractor
data is in column N. The rest of the columns, I-L are titled (blank) and
are left for the user to enter the data for additional machines.

The tractor input data is slightly different from that for the other
machines. Row 10 is for the tractor horsepower. Enter the fuel price
per gallon in row 11. Row 12 is blank. The fuel coefficient in row 13
should be entered for the type of fuel used by the tractor.

Let's return to the columns headed (blank) for a moment. These
columns have a set of input data which was selected to give calculated
costs of zero for these columns. The first thought is to simply enter
zeros as input data. Entering all zeros will give errors. Some input
items are used as divisors and dividing by zero results in errors in all
later calculations.

To use the template, enter your own data by typing over the sample
data. Start from the left and use as many columns as you need up to the
maximum of 9. To recalculate and save the data you have entered, type

$$\boxed{!} \quad \boxed{/SB:MACH1,OA} .$$

Note: Be sure to zap the current screen,

$$\boxed{/ZY} ,$$

between templates, after saving the current copy back into the file and before loading the next.

Supercalc allows data to be transferred from one spreadsheet to another. This feature is used to transfer calculated costs from MACH1, etc. and TRUCK to CROP where operating and ownership costs are summed for all tractors and trucks and transferred into the crop enterprise budgets.[2]

The execute command in Supercalc allows you to execute a series of commands with a single command. All of the commands needed to carry out a specific task, such as transferring parts of templates or printing several pages of output, are stored in the execute file. When the execute command is typed in with a filename, all the commands in that file are performed sequentially as if they were actually being typed from the keyboard. The execute commands to transfer costs for the tractors, machinery and truck into the crop budget template and to print the output are described below.

Changing Common Machine Data (Optional)

Crop acreage and interest and storage cost rates should usually be the same in each template MACH1,...,MACH5 and TRUCK. Insurance rates should usually also be the same for MACH1,...,MACH5. It would be convenient to enter these numbers only once and have it be transferred to the other templates. The first execute command is used to do this. First, enter the data in MACH1 and save it with

/SB:MACH1,OA .

Then type the execute command

/XB:T1 .

The computer will take a few minutes to complete this step since it is loading and saving five files and recalculating each.

Other Tractors - MACH2, ..., MACH5

The MACH2 through MACH5 templates are identical to MACH1, except that all columns used for machine entries are 'blank', i.e., sample entries are not included.

These templates are provided for recording data for additional tractors or power units and their machinery complements using the same procedures and commands as with MACH1.

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[2]The transfers are needed because the calculations in MACH1, etc., TRUCK, and CROP will not all fit in 64K of memory. For machines with sufficient memory, combine the calculations into one spreadsheet.

Truck Operating Costs — TRUCK

Referring to the sample worksheet for TRUCK, Table A6, you can see that many of the items required as inputs are the same as those for machinery. The items that are different are those used for figuring hours of use, total fuel usage and insurance. Miles travelled per year is recorded in line 8, followed by average miles per gallon in line 9. The price of fuel is required in line 10 and the average speed in miles per hour goes in line 13. Insurance is entered in line 17 in dollars per year.

Acres of each crop are entered in column A and are used for allocating the truck ownership costs among crops.

Load the truck template now by typing

```
/LB:TRUCK,A
```

and examine the full template. A sample output is also shown in Table A5. Substitute your own values in the input rows described above by typing over the sample data. The repair coefficients and the estimated life have been provided based on the information shown in Table 2 for a pickup truck. A repair group number is not required as an input item for the truck as it is for machinery since it will always be the same.

If you don't want to include a truck in the machinery set, enter zeros for purchase price, list price and fuel price. Enter a one for miles/year, not zero, because this is used as a divisor in the calculations. Recalculate and save your truck input data with the command

```
!    /SB:TRUCK,OA   .
```

Crop Enterprise Income and Expense Budget—CROP

The crop budget template, CROP, uses this information on machinery expenses for calculating total variable and fixed expenses for up to five crops. Load the crop budget template by typing the command

```
/LB:CROP,A   .
```

The upper left portion of CROP, shown as Table A9, in the Appendix, will appear on the screen.

An example corn silage budget is shown. Make any necessary changes by typing the new values over the old. Now you will need to use the second of the execute commands to transfer the machinery cost data into CROP. Do this by typing the command

```
/XB:T2   .
```

When the job is completed, you should be able to scroll across the top of CROP and see the operating and ownership cost totals that you had calculated in MACH1, etc. and TRUCK.

CROP is a template for up to five crop budgets. The first is made up of columns for item descriptions, units of measurement, price per unit, quantity per acre and total expense or income per acre. This information takes up rows in columns N to S. The remaining four budgets are identical, and are located in columns U to AQ.

The enterprise budget information is provided in the following five categories:

VARIABLE EXPENSES
FIXED EXPENSES
CROP VALUE
NET RETURN
BREAKEVEN PRICES

The VARIABLE EXPENSES are separated into growing, harvesting, selling, interest on operating expenses and family and hired labor. Growing expenses include the input costs and variable costs associated with tillage. Harvesting costs include the variable costs associated with harvest and the variable costs associated with moving feed crops from the field. Interest on operating expenses is the charge for the use of the capital required for growing, harvesting and selling the crop. The template calculates interest on total growing and harvesting expenses, rather than trying to keep track of purchase dates for individual items. The figure which appears in the quantity column for interest on operating expenses is the sum of growing and harvesting expenses. The annual interest rate entered in the price column is adjusted for the fraction of a year represented by the number of months specified.

The final variable expense is labor. Labor costs are difficult to allocate since they are both fixed and variable; however, for enterprise budgeting, they are best included as a variable cost. Labor hours are calculated as a proportion of tractor and truck hours. The number in L34, presently 2.0, sets labor hours to twice tractor and truck hours. This value can be adjusted up or down for specific situations.

The FIXED EXPENSES section includes the usual fixed costs associated with owning land, buildings and machinery. All of the machinery ownership costs are charged to the crop enterprises.

TOTAL VARIABLE AND FIXED EXPENSES is simply the sum of total variable expenses and total fixed expenses. This figure represents the total cost of producing one acre of the crop at the indicated yield under the specific conditions. The only expense item that is not charged is management.

In the CROP VALUE section, total income is yield per acre times price. Two lines are provided to allow space for a primary crop product, in row 96, and a by-product, in row 97.

The two profitability measures presented in the NET RETURN section are net return over variable expenses and return to management. Return over variable expenses is income minus variable expenses including labor and interest on operating expenses. Return to management is income minus

total expenses, including variable expenses, machinery ownership costs, a land charge and property taxes.

The BREAKEVEN section gives prices for the primary crop product at which variable expenses, row 84, and total variable and fixed expenses, row 93, are covered. Value of the by-product in row 97, if any, is subtracted from expenses before calculating breakeven prices.

BLANK WORKSHEETS

Tables A4, A8, and A12 in the Appendix are blank worksheets for organizing your own data.

PRINTING OUTPUT

Seven additional execute files have been set up for printing each of the templates described above. Printer controls for lining up the printer and printing the correct lines per page are contained in these files.

Save the template you are working on to the diskette before using the print files below. Each print file must load the tempate to be printed so any template already there is erased first.

The execute commands for printing each of the templates individually are:

| /XB:P1 | to print MACH1 |

| /XB:P2 | to print MACH2 |

| /XB:P3 | to print MACH3 |

| /XB:P4 | to print MACH4 |

| /XB:P5 | to print MACH5 |

| /XB:PT | to print TRUCK |

| /XB:PC | to print CROP |

Alternatively, if you wish to print all the templates at once, type

| /XB:PALL | .

This execute command simply issues each of the commands above in sequence to print the entire set of output.

Appendix Table A13 is a printout of execute files T1 and T2 and a typed version of P1. P1 and the other print files cannot be printed because of the print commands they contain, but can be viewed using a word processing package.

REFERENCES

American Society of Agricultural Engineers, 1975 Agricultural Engineers Yearbook, St. Joseph, Michigan, pp. 347-54.

Sprague, Philip, Wayne Knoblauch and Robert Milligan. Profitable Combinations of Cash Crop Enterprises – Objectives and Procedures of a Sequential School Extension Program. A.E. Ext. 80-7, Department of Agricultural Economics, Cornell University, March 1980.

Appendix Table A1.

```
 |  A  || B  || C  || D  || E  || F  || G  || H  || I  || J  || K  || L  || M  || N  |
 1|MACH1: MACHINERY COST AND LABOR TEMPLATE          CAPACITY: 9 MACHINES
 2| FOR A TRACTOR OR OTHER POWER UNIT                COL. A IS FOR ACRES BY CROP
 3|  AND MACHINES USED WITH IT
 4|
 5|  INPUT VARIABLES
 6|     FOR EACH MACHINE:        disc    corn    forage                                                 90 hp
 7|        Machine Name     plow harrow planter harvest blank   blank   blank   blank   blank   tractors tractor
 8|        Purchase Price   5300.00 4400.00 6950.00 13300.00  .00     .00     .00     .00     .00            26400.00
 9|        List Price       5300.00 4400.00 6950.00 13300.00  .00     .00     .00     .00     .00            26400.00
10|        Width in Feet      5.33  12.00  12.00    6.00 99999.00 99999.00 99999.00 99999.00 99999.00 PTO HP   90.00
11|        Speed in MPH       4.75   4.50   4.50    3.25   5.00   5.00   5.00   5.00   5.00 Fuel pr    1.31
12|        Field Efficiency    .80    .80    .67     .67    .73    .73    .73    .73    .73
13|        Fuel Multiplier    1.33   1.00   1.00    1.33   1.00   1.00   1.00   1.00   1.00 Fuel co   .0504
14|        Repair Group #        3      3      7       6      0      0      0      0      0              1
15|          repair coef 1    .301   .301   .159    .127    .01    .01    .01    .01    .01            .12
16|          repair coef 2     1.3    1.3    1.4     1.4 .00001 .00001 .00001 .00001 .00001            1.5
17|        Estim life (hrs)   2500   2500   1200    2000    .01    .01    .01    .01    .01          12000
18|        Years Old at Purch  .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
19|        Years Owned        9.00   9.00   9.00    9.00   9.00   9.00   9.00   9.00   9.00           9.00
20|        Salvage Rate        .10    .10    .10     .10    .10    .10    .10    .10    .10            .10
21|     FOR ALL MACHINES:
22|        Interest Rate       .15
23|        Insurance Rate     .015
24|        Storage Rate       .005
25|
26|        HOURS PER ACRE PER TRIP
27|        Hrs/A               .41    .19    .23     .63    .00    .00    .00    .00    .00
28|
29|=ACRES=  INSERT TIMES OVER FIELD BY CROP
30| 120.00Crop 1 Grow        1.00   1.00   1.00            .01    .01    .01    .01    .01
31|    .00Crop 1 Harv                              1.00
32| 150.00Crop 2 Grow         .25    .25                   .00    .00    .00    .00    .00
33|    .00Crop 2 Harv                              1.00    .00    .00    .00    .00    .00
34|  30.00Crop 3 Grow         .10    .10                   .00    .00    .00    .00    .00
35|    .00Crop 3 Harv
36|    .00Crop 4 Grow
37|    .00Crop 4 Harv
38|    .00Crop 5 Grow
39|    .00Crop 5 Harv
40| 300.00total
41|
42|        HOURS PER ACRE BY CROP
43|        Crop 1 Grow         .41    .19    .23     .00    .00    .00    .00    .00    .00            .83
44|        Crop 1 Harv         .00    .00    .00     .63    .00    .00    .00    .00    .00            .63
45|        Crop 2 Grow         .10    .05    .00     .00    .00    .00    .00    .00    .00            .15
46|        Crop 2 Harv         .00    .00    .00     .63    .00    .00    .00    .00    .00            .63
47|        Crop 3 Grow         .04    .02    .00     .00    .00    .00    .00    .00    .00            .06
48|        Crop 3 Harv         .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
49|        Crop 4 Grow         .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
50|        Crop 4 Harv         .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
51|        Crop 5 Grow         .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
52|        Crop 5 Harv         .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
53|
54|        SUMMARY DATA
55|        Hours use per yr   65.38  30.65  27.36  170.49   .00    .00    .00    .00    .00          293.88
56|        Accum Hrs at Purch  .00    .00    .00     .00    .00    .00    .00    .00    .00            .00
57|        Accum Hrs Over Lif 588.38 275.86 246.27 1534.44  .00    .00    .00    .00    .00         2644.96
58|        R&M Cost/Hr-% of P .0310558 .0247429 .0443718 .0360365 40.68458 40.68458 40.68458 40.68458 40.68458  .0046948
59|        R&M Cost/Hr        1.65   1.09   3.08    4.79    .00    .00    .00    .00    .00           1.24
60|
```

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
61	FUEL COST PER ACRE													
62	Crop 1 Grow			3.22	1.13	1.35	.00	.00	.00	.00	.00	.00		
63	Crop 1 Harv			.00	.00	.00	4.99	.00	.00	.00	.00	.00		
64	Crop 2 Grow			.80	.28	.00	.00	.00	.00	.00	.00	.00		
65	Crop 2 Harv			.00	.00	.00	4.99	.00	.00	.00	.00	.00		
66	Crop 3 Grow			.32	.11	.00	.00	.00	.00	.00	.00	.00		
67	Crop 3 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		
68	Crop 4 Grow			.00	.00	.00	.00	.00	.00	.00	.00	.00		
69	Crop 4 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		
70	Crop 5 Grow			.00	.00	.00	.00	.00	.00	.00	.00	.00		
71	Crop 5 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		
72														
73	R&M COST PER ACRE													
74	Crop 1 Grow			.67	.21	.70	.00	.00	.00	.00	.00	.00		1.02
75	Crop 1 Harv			.00	.00	.00	3.03	.00	.00	.00	.00	.00		.78
76	Crop 2 Grow			.17	.05	.00	.00	.00	.00	.00	.00	.00		.19
77	Crop 2 Harv			.00	.00	.00	3.03	.00	.00	.00	.00	.00		.78
78	Crop 3 Grow			.07	.02	.00	.00	.00	.00	.00	.00	.00		.07
79	Crop 3 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
80	Crop 4 Grow			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
81	Crop 4 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
82	Crop 5 Grow			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
83	Crop 5 Harv			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
84														
85	PROPORTION OF HOURLY USE BY CROP													
86	Crop 1			.75	.75	1.00	.44	1.00	1.00	1.00	1.00	1.00		.60
87	Crop 2			.23	.23	.00	.56	.00	.00	.00	.00	.00		.40
88	Crop 3			.02	.02	.00	.00	.00	.00	.00	.00	.00		.01
89	Crop 4			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
90	Crop 5			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
91														
92	TOTAL OWNERSHIP COSTS													
93	% OF PRICE			.2025	.2025	.2025	.2025	.2025	.2025	.2025	.2025	.2025		.2025
94														
95	OWNERSHIP COST BY CROP													
96	Crop 1			802.43	666.17	1407.38	1197.00	.00	.00	.00	.00	.00		3182.20
97	Crop 2			250.76	208.18	.00	1496.25	.00	.00	.00	.00	.00		2131.15
98	Crop 3			20.06	16.65	.00	.00	.00	.00	.00	.00	.00		32.65
99	Crop 4			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00
100	Crop 5			.00	.00	.00	.00	.00	.00	.00	.00	.00		.00

	O	‖	P	‖	Q	‖	R	‖	S	‖	T	
1												
2												
3												
4				MACHINERY REPAIR								
5				COEFFICIENTS								
6												
7				0		.01						
8				1		.12						
9				2		.1						
10				3		.301						
11				4		.191						
12				5		.096						
13				6		.127						
14				7		.159						
15												
16				0		.00001						
17				1		1.5						
18				2		1.5						
19				3		1.3						
20				4		1.4						
21				5		1.4						
22				6		1.4						
23				7		1.4						
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
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52												
53												
54												
55												
56												
57												
58												
59		Total 1										
60												

	O	‖	P	
59		Total 1	
60			
61		-FUEL-	
62		5.71	
63		4.99	
64		1.09	
65		4.99	
66		.44	
67		.00	
68		.00	
69		.00	
70		.00	
71		.00	
72			
73		-R&M-	
74		2.605725	
75		3.809132	
76		.4049757	
77		3.809132	
78		.1619903	
79		0	
80		0	
81		0	
82		0	
83		0	
84			
85		-LABOR-	
86		1.46	
87		.78	
88		.06	
89		.00	
90		.00	
91			
92			
93			
94			
95		-TOT OWN	
96		7255.17	
97		4086.33	
98		69.37	
99		.00	
100		.00	

Appendix Table A2.

```
|  A  ||  B  ||  C  ||  D  ||  E  ||  F  ||  G  ||  H  ||  I  ||  J  ||  K  ||  L  ||  M  ||  N  |
```

1| MACH1-5 WORKSHEET
2| MACHINERY COST AND LABOR TEMPLATE   CAPACITY: 9 MACHINES
3| FOR A TRACTOR OR OTHER POWER UNIT AND MACHINES USED WITH IT   COL. A IS FOR ACRES BY CROP
4|
5| INPUT VARIABLES
6| FOR EACH MACHINE: *disc corn forage*   *90 hp*
7| Machine Name   *plow harrow planter harv.*   __ __ __ __ __   tractors *tractor*
8| Purchase Price   5300   4400   6950   13300   26400
9| List Price
10| (1)   Width in Feet   5.33   12   12   6   PTO HP   90
11| (1)   Speed in MPH   4.75   4.5   4.5   3.25   Fuel pric 1.31
12| (1)   Field Efficiency   .8   .8   .67   .67
13| Fuel Multiplier   1.33   1   1   1.33   Fuel coef .0504
14| (2)   Repair Group #   3   3   7   6   1
15| repair coef 1   (From LOOKUP)
16| repair coef 2   "   "
17| Estim Life (hrs) 2500   2500   1200   2000   12000
18| Years Old at Purch 0   0   0   0   0
19| Years Owned   9   9   9   9   9
20| Salvage Rate   .1   .1   .1   .1   .1
21| FOR ALL MACHINES:
22| Interest Rate   .15
23| Insurance Rate   .015
24| Storage Rate   .005
25|
26| (1) Refer to Table 1.   (2) Refer to Table 2.
27|
28|
29| =ACRES= INSERT TIMES OVER FIELD BY CROP
30| 120   Crop 1 Grow *corn*   1   1   1
31| 0   Crop 1 Harv   1
32| 150   Crop 2 Grow *hay*   .25   .25
33| 0   Crop 2 Harv   1
34| 30   Crop 3 Grow *pasture* .1   .1
35| Crop 3 Harv
36| Crop 4 Grow
37| 0   Crop 4 Harv
38| Crop 5 Grow
39| 0   Crop 5 Harv

Appendix Table A3.

	A	B	C
1	MACH1: MACHINERY COST AND LABOR TEMPLATE		
2	FOR A TRACTOR OR OTHER POWER UNIT		
3	AND MACHINES USED WITH IT		
4			
5	INPUT VARIABLES		
6	FOR EACH MACHINE:		
7	Machine Name	plow	
8	Purchase Price	5300	
9	List Price	D8	
10	Width in Feet	5.33	
11	Speed in MPH	4.75	
12	Field Efficiency	.8	
13	Fuel Multiplier	1.33	
14	Repair Group #	3	
15	repair coef 1	LOOKUP(D14,Q7:Q14)	
16	repair coef 2	LOOKUP(D14,Q16:Q23)	
17	Estim life (hrs)	2500	
18	Years Old at Purch	0	
19	Years Owned	9	
20	Salvage Rate	.1	
21	FOR ALL MACHINES:		
22	Interest Rate	.15	
23	Insurance Rate	.015	
24	Storage Rate	.005	
25			
26	HOURS PER ACRE PER TRIP		
27	Hrs/A	8.25/(D10*D11*D12)	
28			
29	=ACRES= INSERT TIMES OVER FIELD BY CROP		
30	120	Crop 1 Grow	1
31	0	Crop 1 Harv	
32	150	Crop 2 Grow	.25
33	0	Crop 2 Harv	
34	30	Crop 3 Grow	.1
35	0	Crop 3 Harv	
36	0	Crop 4 Grow	
37	0	Crop 4 Harv	
38	0	Crop 5 Grow	
39	0	Crop 5 Harv	
40	SUM(A30:total		
41			
42	HOURS PER ACRE BY CROP		
43	Crop 1 Grow	D27*D30	
44	Crop 1 Harv	D27*D31	
45	Crop 2 Grow	D27*D32	
46	Crop 2 Harv	D27*D33	
47	Crop 3 Grow	D27*D34	
48	Crop 3 Harv	D27*D35	
49	Crop 4 Grow	D27*D36	
50	Crop 4 Harv	D27*D37	
51	Crop 5 Grow	D27*D38	
52	Crop 5 Harv	D27*D39	
53			
54	SUMMARY DATA		
55	Hours use per yr	A30*(D43+D44)+A32*(D45+D46)+A34*(D47+D48)+A36*(D49+D50)+A38*(D51+D52)	
56	Accum Hrs at Purch	D18*D55	
57	Accum Hrs Over Lif	D55*(D18+D19)	
58	R&M Cost/Hr-% of P	((D15*((100*D57/D17)^D16))-(D15*((100*D56/D17)^D16)))/(D55*D19)	
59	R&M Cost/Hr	D8*D58/100	
60			

	A	B	C	D
61	FUEL COST PER ACRE			
62	Crop 1 Grow	N10*N11*N13*D13*D43		
63	Crop 1 Harv	N10*N11*N13*D13*D44		
64	Crop 2 Grow	N10*N11*N13*D13*D45		
65	Crop 2 Harv	N10*N11*N13*D13*D46		
66	Crop 3 Grow	N10*N11*N13*D13*D47		
67	Crop 3 Harv	N10*N11*N13*D13*D48		
68	Crop 4 Grow	N10*N11*N13*D13*D49		
69	Crop 4 Harv	N10*N11*N13*D13*D50		
70	Crop 5 Grow	N10*N11*N13*D13*D51		
71	Crop 5 Harv	N10*N11*N13*D13*D52		
72				
73	R&M COST PER ACRE			
74	Crop 1 Grow	D59*D43		
75	Crop 1 Harv	D59*D44		
76	Crop 2 Grow	D59*D45		
77	Crop 2 Harv	D59*D46		
78	Crop 3 Grow	D59*D47		
79	Crop 3 Harv	D59*D48		
80	Crop 4 Grow	D59*D49		
81	Crop 4 Harv	D59*D50		
82	Crop 5 Grow	D59*D51		
83	Crop 5 Harv	D59*D52		
84				
85	PROPORTION OF HOURLY USE BY CROP			
86	Crop 1	A30*(D43+D44)/D55		
87	Crop 2	A32*(D45+D46)/D55		
88	Crop 3	A34*(D47+D48)/D55		
89	Crop 4	A36*(D49+D50)/D55		
90	Crop 5	A38*(D51+D52)/D55		
91				
92	TOTAL OWNERSHIP COSTS			
93	% OF PRICE	D23+D24+(1+D20)*D22/2+(1-D20)/D19		
94				
95	OWNERSHIP COST BY CROP			
96	Crop 1	D8*D86*D93		
97	Crop 2	D8*D87*D93		
98	Crop 3	D8*D88*D93		
99	Crop 4	D8*D89*D93		
100	Crop 5	D8*D90*D93		

Appendix Table A4.

```
  !  A  !!  B  !!  C  !!  D  !!  E  !!  F  !!  G  !!  H  !!  I  !!  J  !!  K  !!  L  !!  M  !!  N  !
 1!MACH1-5 WORKSHEET
 2!MACHINERY COST AND LABOR TEMPLATE                          CAPACITY: 9 MACHINES
 3! FOR A TRACTOR OR OTHER POWER UNIT AND MACHINES USED WITH IT    COL. A IS FOR ACRES BY CROP
 4!
 5!   INPUT VARIABLES
 6!      FOR EACH MACHINE:
 7!         Machine Name     _____ _____ _____ _____ _____ _____ _____ _____ _____  tractors _____
 8!         Purchase Price   _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
 9!         List Price       _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
10!  (1)    Width in Feet    _____ _____ _____ _____ _____ _____ _____ _____ _____  PTO HP   _____
11!  (1)    Speed in MPH     _____ _____ _____ _____ _____ _____ _____ _____ _____  Fuel pric_____
12!  (1)    Field Efficiency _____ _____ _____ _____ _____ _____ _____ _____ _____
13!         Fuel Multiplier  _____ _____ _____ _____ _____ _____ _____ _____ _____  Fuel coef_____
14!  (2)    Repair Group #   _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
15!            repair coef 1     (From LOOKUP)
16!            repair coef 2      "       "
17!         Estim Life (hrs) _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
18!         Years Old at Purch_____ _____ _____ _____ _____ _____ _____ _____ _____          _____
19!         Years Owned      _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
20!         Salvage Rate     _____ _____ _____ _____ _____ _____ _____ _____ _____           _____
21!      FOR ALL MACHINES:
22!         Interest Rate    _____
23!         Insurance Rate   _____
24!         Storage Rate     _____
25!
26!         (1) Refer to Table 1.          (2) Refer to Table 2.
27!
28!
29!=ACRES=  INSERT TIMES OVER FIELD BY CROP
30!_____Crop 1 Grow      _____ _____ _____ _____ _____ _____ _____ _____ _____
31!       0Crop 1 Harv      _____ _____ _____ _____ _____ _____ _____ _____ _____
32!_____Crop 2 Grow      _____ _____ _____ _____ _____ _____ _____ _____ _____
33!       0Crop 2 Harv      _____ _____ _____ _____ _____ _____ _____ _____ _____
34!_____Crop 3 Grow      _____ _____ _____ _____ _____ _____ _____ _____ _____
35!       0Crop 3 Harv      _____ _____ _____ _____ _____ _____ _____ _____ _____
36!_____|__Crop 4 Grow      _____ _____ _____ _____ _____ _____ _____ _____ _____
37!       0Crop 4 Harv      _____ _____ _____ _____ _____ _____ _____ _____ _____
38!_____Crop 5 Grow      _____ _____ _____ _____ _____ _____ _____ _____ _____
39!       0Crop 5 Harv      _____ _____ _____ _____ _____ _____ _____ _____ _____
```

Appendix Table A5.

```
 !  A  !!  B  !!  C  !!  D  !!  E  !!  F  !!  G  !!  H  !!  I  !!  J  !!  K  !!  L  !
 1!TRUCK: TRUCK COST TEMPLATE
 2!
 3!    INPUT VARIABLES                    truck
 4!         Purchase Price                7400
 5!         List Price                    7400
 6!         Miles/yr                      6000
 7!         MPG                             15
 8!         Fuel price                    1.32
 9!         Miles/Hr                        35
10!         Repair Coef 1                 .096
11!         Repair Coef 2                  1.4
12!         Estim Life (hrs)              2000
13!         Years Old at Purchase            0
14!         Years Owned                      9
15!         Salvage Rate                    .1
16!         Interest Rate                  .15
17!         Insurance Cost ($/yr)          242
18!         Storage Rate                  .015
19!
```

20!=ACRES= CROP ACREAGE ALLOCATIONS					FUEL COST PER ACRE		
21!	120Crop 1 Grow		.01		Crop 1 Grow		.88
22!	0Crop 1 Harv				Crop 1 Harv		.88
23!	150Crop 2 Grow				Crop 2 Grow		.88
24!	0Crop 2 Harv				Crop 2 Harv		.88
25!	30Crop 3 Grow				Crop 3 Grow		.88
26!	0Crop 3 Harv				Crop 3 Harv		.88
27!	0Crop 4 Grow				Crop 4 Grow		.88
28!	0Crop 4 Harv				Crop 4 Harv		.88
29!	0Crop 5 Grow				Crop 5 Grow		.88
30!	0Crop 5 Harv				Crop 5 Harv		.88
31!	300						
32! HOURS PER ACRE BY CROP					R&M COST PER ACRE		
33!	Crop 1 Grow		.29		Crop 1 Grow		.58
34!	Crop 1 Harv		.29		Crop 1 Harv		.58
35!	Crop 2 Grow		.29		Crop 2 Grow		.58
36!	Crop 2 Harv		.29		Crop 2 Harv		.58
37!	Crop 3 Grow		.29		Crop 3 Grow		.58
38!	Crop 3 Harv		.29		Crop 3 Harv		.58
39!	Crop 4 Grow		.29		Crop 4 Grow		.58
40!	Crop 4 Harv		.29		Crop 4 Harv		.58
41!	Crop 5 Grow		.29		Crop 5 Grow		.58
42!	Crop 5 Harv		.29		Crop 5 Harv		.58
43!							
44! SUMMARY DATA					LABOR HOURS BY CROP		
45!	Hours use per yr	171.43			Crop 1		.57
46!	Accum Hrs at Purch	.00			Crop 2		.57
47!	Accum Hrs Over Life	1542.86			Crop 3		.57
48!	R&M Cost/Hr-% of Price	.0272998			Crop 4		.57
49!	R&M Cost/Hr	2.02			Crop 5		.57
50!							
51! PROPORTION OF HOURLY USE BY CROP					TOTAL OWNERSHIP COSTS		
52!	Crop 1	.40			% OF PRICE		.23
53!	Crop 2	.50					
54!	Crop 3	.10			OWNERSHIP COST BY CROP		
55!	Crop 4	.00			Crop 1		681.40
56!	Crop 5	.00			Crop 2		851.75
57!					Crop 3		170.35
58!					Crop 4		.00
59!					Crop 5		.00
60!							

Appendix Table A6.

	A		B		C		D		E		F	

1 | TRUCK WORKSHEET

Row		
2		
3	INPUT VARIABLES	truck
4	Purchase Price	7400
5	List Price	7400
6	Miles/yr	6000
7	MPG	15
8	Fuel price	1.32
9	Miles/Hr	35
10	Repair Coef 1	.096
11	Repair Coef 2	1.4
12	Estim Life (hrs)	2000
13	Years Old at Purchase	0
14	Years Owned	9
15	Salvage Rate	.1
16	Interest Rate	.15
17	Insurance Cost ($/yr)	242
18	Storage Rate	.015
19		
20	=ACRES= CROP ACREAGE ALLOCATIONS	
21	120	Crop 1 Grow
22		Crop 1 Harv
23	150	Crop 2 Grow
24		Crop 2 Harv
25	30	Crop 3 Grow
26		Crop 3 Harv
27		Crop 4 Grow
28		Crop 4 Harv
29		Crop 5 Grow
30		Crop 5 Harv

Appendix Table A7.

```
   !  A  !!  B  !!  C  !!  D  !!                    E                              !
 1!TRUCK: TRUCK COST TEMPLATE       !
 2!
 3!      INPUT VARIABLES            ;truck
 4!          Purchase Price         '      7400
 5!          List Price                    7400
 6!          Miles/yr               |      6000
 7!          MPG        |                    15
 8!    .     Fuel price              |      1.32
 9!          Miles/Hr               |        35
10!          Repair Coef 1          .      .096
11!          Repair Coef 2          |       1.4
12!          Estim Life (hrs)              2000
13!          Years Old at Purchase  |         0
14!          Years Owned            |         9
15!          Salvage Rate           |        .1
16!          Interest Rate          |       .15
17!          Insurance Cost ($/yr)           242
18!          Storage Rate                   .015
19!
20!=ACRES=   CROP ACREAGE ALLOCATIONS
21! 120      Crop 1 Grow                  .01
22! 0        Crop 1 Harv
23! 150      Crop 2 Grow
24! 0        Crop 2 Harv
25! 30       Crop 3 Grow
26! 0        Crop 3 Harv
27! 0        Crop 4 Grow
28! 0        Crop 4 Harv
29! 0        Crop 5 Grow
30! 0        Crop 5 Harv
31! SUM(A21:A30)    |
32!          HOURS PER ACRE BY CROP
33!          Crop 1 Grow            E6*.5/(E9*A31)
34!          Crop 1 Harv            E6*.5/(E9*A31)
35!          Crop 2 Grow            E6*.5/(E9*A31)
36!          Crop 2 Harv            E6*.5/(E9*A31)
37!          Crop 3 Grow            E6*.5/(E9*A31)
38!          Crop 3 Harv            E6*.5/(E9*A31)
39!          Crop 4 Grow            E6*.5/(E9*A31)
40!          Crop 4 Harv            E6*.5/(E9*A31)
41!          Crop 5 Grow            E6*.5/(E9*A31)
42!          Crop 5 Harv            E6*.5/(E9*A31)
43!
44!          SUMMARY DATA
45!          Hours use per yr       A21*(E33+E34)+A23*(E35+E36)+A25*(E37+E38)+A27*(E39+E40)+A29*(E41+E42)
46!          Accum Hrs at Purch     0
47!          Accum Hrs Over Life    E45*(E13+E14)
48!          R&M Cost/Hr-% of Price ((E10*((100*E47/E12)^E11))-(E10*((100*E46/E12)^E11)))/(E45*E14)
49!          R&M Cost/Hr            E5*E48/100
50!
51!          PROPORTION OF HOURLY USE BY CROP
52!          Crop 1                 A21*(E33+E34)/E45
53!          Crop 2                 A23*(E35+E36)/E45
54!          Crop 3                 A25*(E37+E38)/E45
55!          Crop 4                 A27*(E39+E40)/E45
56!          Crop 5                 A29*(E41+E42)/E45
```

```
  | H   ||   I   ||   J   ||   K   ||   L   ||   M   ||   N   ||   O   |
 1|
 2|
 3|
 4|
 5|
 6|
 7|
 8|
 9|
10|
11|
12|
13|
14|
15|
16|
17|
18|
19|
20|FUEL COST PER ACRE
21|Crop 1 Grow          E6*E8*.5/(E7*A31)
22|Crop 1 Harv          E6*E8*.5/(E7*A31)
23|Crop 2 Grow          E6*E8*.5/(E7*A31)
24|Crop 2 Harv          E6*E8*.5/(E7*A31)
25|Crop 3 Grow          E6*E8*.5/(E7*A31)
26|Crop 3 Harv          E6*E8*.5/(E7*A31)
27|Crop 4 Grow          E6*E8*.5/(E7*A31)
28|Crop 4 Harv          E6*E8*.5/(E7*A31)
29|Crop 5 Grow          E6*E8*.5/(E7*A31)
30|Crop 5 Harv          E6*E8*.5/(E7*A31)
31|
32|R&M COST PER ACRE
33|Crop 1 Grow          E49*E33
34|Crop 1 Harv          E49*E34
35|Crop 2 Grow          E49*E35
36|Crop 2 Harv          E49*E36
37|Crop 3 Grow          E49*E37
38|Crop 3 Harv          E49*E38
39|Crop 4 Grow          E49*E39
40|Crop 4 Harv          E49*E40
41|Crop 5 Grow          E49*E41
42|Crop 5 Harv          E49*E42
43|
44|LABOR HOURS BY CROP
45|Crop 1               E33+E34
46|Crop 2               E35+E36
47|Crop 3               E37+E38
48|Crop 4               E39+E40
49|Crop 5               E41+E42
50|
51|TOTAL OWNERSHIP COSTS
52| % OF PRICE          (E17/E4)+E18+((1+E15)*E16/2+(1-E15)/E14
53|
54|OWNERSHIP COST BY CROP
55|Crop 1               E4*E52*K52
56|Crop 2               E4*E53*K52
57|Crop 3               E4*E54*K52
58|Crop 4               E4*E55*K52
59|Crop 5               E4*E56*K52
```

Appendix Table A8.

```
  |   A   ||    B    ||    C    ||    D    ||   E   ||   F   |
 1|TRUCK WORKSHEET
 2|
 3|            INPUT VARIABLES             truck
 4|            Purchase Price              _____
 5|            List Price                  _____
 6|            Miles/yr                    _____
 7|            MPG                         _____
 8|            Fuel price                  _____
 9|            Miles/Hr                    _____
10|            Repair Coef 1                  .096
11|            Repair Coef 2                   1.4
12|            Estim Life (hrs)              2000
13|            Years Old at Purchase       _____
14|            Years Owned                 _____
15|            Salvage Rate                _____
16|            Interest Rate               _____
17|            Insurance Cost ($/yr)       _____
18|            Storage Rate                _____
19|
20|=ACRES=     CROP ACREAGE ALLOCATIONS
21|_____    Crop 1 Grow
22|            Crop 1 Harv
23|_____    Crop 2 Grow
24|            Crop 2 Harv
25|_____    Crop 3 Grow
26|            Crop 3 Harv
27|_____    Crop 4 Grow
28|            Crop 4 Harv
29|_____    Crop 5 Grow
30|            Crop 5 Harv
```

Appendix Table A9.

```
  |  N  ||  O || P||  Q  ||  R  ||  S  ||  T  ||  U  ||  V  ||  W  ||  X  ||  Y  |
```


46|

47|CROP BUDGET TEMPLATE,CROP 1 CORN SILAGE,7/11/83   CROP 2

48| ============================   ============================

49| UNIT QUAN PRICE COST/ACRE   QUAN   PRICE   COST/ACRE

50|VARIABLE EXPENSES

	UNIT	QUAN	PRICE	COST/ACRE		QUAN	PRICE	COST/ACRE
51| GROWING					GROWING			
52| Seed					Seed			
53| Corn	Kern	25000.00	.000624	15.60	Corn			.00
54|				.00				.00
55| Fertilizer					Fertilizer			
56| Nitrogen	Lbs.	100.00	.32	32.00	Nitrogen-lbs			.00
57| Phosphorus	Lbs.	50.00	.28	14.00	Phosphorus-lbs			.00
58| Potassium	Lbs.	50.00	.16	8.00	Potassium-lbs			.00
59| Lime	Tons	.50	22.50	11.25	Lime -tons			.00
60| Chemicals					Chemicals			
61| Lasso	Qts.	2.50	4.82	12.05	Lasso			.00
62| Atrazine	Qts.	1.00	3.08	3.08	Atrazine			.00
63| Furadan	Lbs.	10.00	1.05	10.50	Furadan			.00
64|				.00				.00
65| Power,equip					Power,equip			
66| Fuel,oil				6.59	Fuel,oil			1.97
67| Repair,main.				3.18	Repair,main.			.98
68| Other				2.00	Other			.00
69| TOTAL GROWING				118.25	TOTAL GROWING			2.95
70|								
71| HARVESTING					HARVESTING			
72| Power,equip.					Power,equip.			
73| Fuel.oil				5.87	Fuel.oil			5.87
74| Repair,main.				4.39	Repair,main.			4.39
75| Drying				.00	Drying			.00
76| Twine				.00	Twine			.00
77| Other				7.00	Other			.00
78| TOTAL HARVESTING				17.26	TOTAL HARVESTING			10.26
79|								
80| INTEREST,OPER. $		135.51	Rate/yr		INTEREST,OPER.	13.21	Rate/yr	
81| MONTHS		6	.13	8.81	MONTHS	6	.13	.86
82| LABOR	Hour	4.06	4.00	16.23	LABOR	2.70		.00
83|								
84|TOTAL VARIABLE				160.55	TOTAL VARIABLE			14.07
85|								
86|FIXED EXPENSES					FIXED EXPENSES			
87| Power,equip.				66.14	Power,equip.			32.92
88| Land				24.00	Land			.00
89| Taxes				.00	Taxes			.00
90|								
91| TOTAL FIXED				90.14	TOTAL FIXED			32.92
92|								
93|TOTAL EXPENSES				250.69	TOTAL EXPENSES			46.99
94|								
95|CROP VALUE					CROP VALUE			
96| Silage	Tons	18.00	20.00	360.00	Silage	1.00		.00
97| Bedding	Tons			.00	Bedding			.00
98| TOTAL VALUE				360.00	TOTAL VALUE			.00
99|								
100|NET OVER VAR	$/Acre			199.45	NET OVER VAR			-14.07
101| EXPENSES					EXPENSES			
102|RETURN TO	$/Acre			109.31	RETURN TO			-46.99
103| MANAGEMENT					MANAGEMENT			
104|BREAKEVEN,VAR	$/Ton			8.92	BREAKEVEN,VAR			14.07
105|								
106|BREAKEVEN,ALL	$/Ton			13.93	BREAKEVEN,ALL			46.99

	A		B		C		D		E		F		G		H		I		J		K		L		M	

1¦TRACTOR AND MACHINERY EXPENSES

2¦

3¦

4¦   Total 1   Total 2   Total 3   Total 4   Total 5   Truck   ALL MACHINES

5¦

		Total 1	Total 2	Total 3	Total 4	Total 5	Truck	ALL MACHINES
6¦=ACRES=	FUEL COST PER ACRE	-FUEL-	-FUEL-	-FUEL-	-FUEL-	-FUEL-		TOTAL FUEL EXP
7¦ 120.00	Crop 1 Grow	5.71	.00	.00	.00	.00	.88	6.59
8¦ .00	Crop 1 Harv	4.99	.00	.00	.00	.00	.88	5.87
9¦ 150.00	Crop 2 Grow	1.09	.00	.00	.00	.00	.88	1.97
10¦ .00	Crop 2 Harv	4.99	.00	.00	.00	.00	.88	5.87
11¦ 30.00	Crop 3 Grow	.44	.00	.00	.00	.00	.88	1.32
12¦ .00	Crop 3 Harv	.00	.00	.00	.00	.00	.88	.88
13¦ .00	Crop 4 Grow	.00	.00	.00	.00	.00	.88	.88
14¦ .00	Crop 4 Harv	.00	.00	.00	.00	.00	.88	.88
15¦ .00	Crop 5 Grow	.00	.00	.00	.00	.00	.88	.88
16¦ .00	Crop 5 Harv	.00	.00	.00	.00	.00	.88	.88
17¦								
18¦	R&M COST PER ACRE	-R&M-	-R&M-	-R&M-	-R&M-	-R&M-		TOTAL R&M EXP
19¦	Crop 1 Grow	2.61	.00	.00	.00	.00	.58	3.18
20¦	Crop 1 Harv	3.81	.00	.00	.00	.00	.58	4.39
21¦	Crop 2 Grow	.40	.00	.00	.00	.00	.58	.98
22¦	Crop 2 Harv	3.81	.00	.00	.00	.00	.58	4.39
23¦	Crop 3 Grow	.16	.00	.00	.00	.00	.58	.74
24¦	Crop 3 Harv	.00	.00	.00	.00	.00	.58	.58
25¦	Crop 4 Grow	.00	.00	.00	.00	.00	.58	.58
26¦	Crop 4 Harv	.00	.00	.00	.00	.00	.58	.58
27¦	Crop 5 Grow	.00	.00	.00	.00	.00	.58	.58
28¦	Crop 5 Harv	.00	.00	.00	.00	.00	.58	.58
29¦								
30¦	LABOR HOURS PER ACRE	-LABOR-	-LABOR-	-LABOR-	-LABOR-	-LABOR-		TOTAL LABOR HOURS
31¦	Crop 1	1.46	.00	.00	.00	.00	.57	2.03
32¦	Crop 2	.78	.00	.00	.00	.00	.57	1.35 Labor
33¦	Crop 3	.06	.00	.00	.00	.00	.57	.63 Multiplier
34¦	Crop 4	.00	.00	.00	.00	.00	.57	.57 2.00
35¦	Crop 5	.00	.00	.00	.00	.00	.57	.57
36¦								
37¦	TOTAL OWNERSHIP COSTS							
38¦	% OF PRICE						.23	
39¦								
40¦	OWNERSHIP COST BY CROP	-TOT OWN	-TOT OWN	-TOT OWN	-TOT OWN	-TOT OWN-		OWNERSHIP EXPENSES
41¦	Crop 1	7255.17	.00	.00	.00	.00	681.40	7936.57
42¦	Crop 2	4086.33	.00	.00	.00	.00	851.75	4938.08
43¦	Crop 3	69.37	.00	.00	.00	.00	170.35	239.72
44¦	Crop 4	.00	.00	.00	.00	.00	.00	.00
45¦	Crop 5	.00	.00	.00	.00	.00	.00	.00

Appendix Table A10.

	A	B	C	D	E	F
1	CROP BUDGET WORKSHEET			CROP	1 Corn Silage	
2				=================================		
3		UNITS		QUAN	PRICE	COST/ACRE
4	VARIABLE EXPENSES					
5	GROWING					
6	Seed					
7	corn	Kernels		25000	49.92/80,000	0
8						0
9	Fertilizer					
10	Nitrogen	Lbs.		100	.32	0
11	Phosphorus	Lbs.		50	.28	0
12	Potassium	Lbs.		50	.16	0
13	Lime	Tons		.5	22.50	0
14	Chemicals					
15	Lasso	Qts		2.50	4.82	0
16	Atrazine	Qts		1.00	3.08	0
17	Furadan	Lbs		10	1.05	0
18						0
19	Power,equip					
20	Fuel,oil					
21	Repair,main.					
22	Other				2.00	
23	TOTAL GROWING					0
24						
25	HARVESTING					
26	Power,equip.					
27	Fuel.oil					0
28	Repair,main.					0
29	Drying				0	
30	Twine				0	
31	Other				7.00	
32	TOTAL HARVESTING					0
33						
34	INTEREST,OPER.	$			Rate/yr	
35	MONTHS			6	.13	0
36	LABOR	$		per hour:	4	0
37						
38	TOTAL VARIABLE					0
39						
40	FIXED EXPENSES					
41	Power,equip.					0
42	Land				24	
43	Taxes				0	
44						
45	TOTAL FIXED					0
46						
47	TOTAL EXPENSES					0
48						
49	CROP VALUE					
50	Silage	Tons		18	20	0
51						0
52	TOTAL VALUE					0

Appendix Table A11.

```
    | N || D ||P|| Q || R ||      S      || T || U || V || W || X ||      Y      |
46|
47|CROP BUDGET TEMPLATE,CROP 1 CORN SILAGE,7/11/83                              CROP 2
48|           =============================               =============================
49|           UNIT QUAN  PRICE  COST/ACRE                  QUAN    PRICE   COST/ACRE
50|VARIABLE EXPENSES
51| GROWING                                      GROWING
52|  Seed                                         Seed
53|   Corn     Kern 25000 .000624 Q53*R53          Corn                     W53*X53
54|                               Q54*R54                                   W54*X54
55|  Fertilizer                                   Fertilizer
56|   Nitrogen Lbs. 100   .32     Q56*R56           Nitrogen-lbs            W56*X56
57|   Phosphorus Lbs. 50  .28     Q57*R57           Phosphorus-lbs          W57*X57
58|   Potassium Lbs. 50   .16     Q58*R58           Potassium-lbs           W58*X58
59|  Lime      Tons .5    22.5    Q59*R59          Lime -tons               W59*X59
60|  Chemicals                                    Chemicals
61|   Lasso    Qts. 2.5   4.82    Q61*R61           Lasso                   W61*X61
62|   Atrazine Qts. 1     3.08    Q62*R62           Atrazine                W62*X62
63|   Furadan  Lbs. 10    1.05    Q63*R63           Furadan                 W63*X63
64|                               Q64*R64                                   W64*X64
65|  Power,equip                                  Power,equip
66|   Fuel,oil                    K7               Fuel,oil                 K9
67|   Repair,main.                K19              Repair,main.             K21
68|   Other                       2                Other                    0
69|  TOTAL GROWING                SUM(S53:S68)     TOTAL GROWING            SUM(Y53:Y68)
70|
71| HARVESTING                                    HARVESTING
72|  Power,equip.                                  Power,equip.
73|   Fuel.oil                    K8               Fuel.oil                 K10
74|   Repair,main.                K20              Repair,main.             K22
75|  Drying                       0                Drying                   0
76|  Twine                        0                Twine                    0
77|  Other                        7                Other                    0
78|  TOTAL HARVESTING             SUM(S73:S77)     TOTAL HARVESTING         SUM(Y73:Y77)
79|
80| INTEREST,OPER.  $  S69+S78  Rate/yr            INTEREST,OPER.  Y69+Y78  Rate/yr
81|   MONTHS           6        .13  Q80*(R81*(Q81/12))  MONTHS    6       .13  W80*(X81*(W81/12))
82| LABOR       Hour K31*L34 4       Q82*R82       LABOR     K32*L34           W82*X82
83|
84|TOTAL VARIABLE                  S69+S78+S81+S82  TOTAL VARIABLE           Y69+Y78+Y81+Y82
85|
86|FIXED EXPENSES                                 FIXED EXPENSES
87| Power,equip.                   K41/(A7+.00001)  Power,equip.            K42/(A9+.00001)
88| Land                           24              Land                     0
89| Taxes                          0               Taxes                    0
90|
91| TOTAL FIXED                    SUM(S87:S90)    TOTAL FIXED              SUM(Y87:Y90)
92|
93|TOTAL EXPENSES                  S84+S91         TOTAL EXPENSES           Y84+Y91
94|
95|CROP VALUE                                     CROP VALUE
96| Silage     Tons 18    20       Q96*R96         Silage          1        0
97| Bedding    Tons               Q97*R97         Bedding                  W97*X97
98| TOTAL VALUE                    SUM(S96:S97)    TOTAL VALUE              SUM(Y96:Y97)
99|
100|NET OVER VAR  $/Acre           S98-S84         NET OVER VAR             Y98-Y84
101|  EXPENSES                                      EXPENSES
102|RETURN TO     $/Acre           S98-S93         RETURN TO                Y98-Y93
103|  MANAGEMENT                                    MANAGEMENT
104|BREAKEVEN,VAR $/Ton            SUM(S84-S97)/Q96  BREAKEVEN,VAR          SUM(Y84-Y97)/W96
105|
106|BREAKEVEN,ALL $/Ton            SUM(S93-S97)/Q96  BREAKEVEN,ALL          SUM(Y93-Y97)/W96
```

Appendix Table A12.

	A	B	C	D	E	F
1	CROP BUDGET WORKSHEET			CROP _____		
2				================================		
3		UNITS		QUAN	PRICE	COST/ACRE
4	VARIABLE EXPENSES					
5	GROWING					
6	Seed					
7						O
8	_____	_____		_____	_____	O
9	Fertilizer	_____		_____	_____	
10	Nitrogen	Lbs.				O
11	Phosphorus	Lbs.		_____	_____	O
12	Potassium	Lbs.		_____	_____	O
13	Lime	Tons		_____	_____	O
14	Chemicals			_____	_____	
15		_____		_____	_____	O
16	_____	_____		_____	_____	O
17	_____	_____		_____	_____	O
18	_____	_____		_____	_____	O
19	Power,equip					
20	Fuel,oil					
21	Repair,main.					
22	Other				_____	
23	TOTAL GROWING					O
24						
25	HARVESTING					
26	Power,equip.					
27	Fuel.oil					O
28	Repair,main.					O
29	Drying					_____
30	Twine					_____
31	Other					_____
32	TOTAL HARVESTING					O
33						
34	INTEREST,OPER.	$			Rate/yr	
35	MONTHS				_____	O
36	LABOR	$		per hour:	_____	O
37						
38	TOTAL VARIABLE					O
39						
40	FIXED EXPENSES					
41	Power,equip.					O
42	Land					_____
43	Taxes					_____
44						
45	TOTAL FIXED					O
46						
47	TOTAL EXPENSES					O
48						
49	CROP VALUE					
50	_____	_____		_____	_____	O
51	_____	_____		_____	_____	O
52	TOTAL VALUE					O

Appendix Table A13.

T1: Execute file to transfer data from MACH1 to MACH2-5 and TRUCK

```
/zy
/lb:mach1,pd22:d24,d22,v
/lb:mach1,pa30:a39,a30,v
/sb:tfile,oa
/zy
/lb:mach2,a
/lb:tfile,a
=al
/sb:mach2,oa
/zy
/lb:mach3,a
/lb:tfile,a
=al
/sb:mach3,oa
/zy
/lb:mach4,a
/lb:tfile,a
=al
/sb:mach4,oa
/zy
/lb:mach5,a
/lb:tfile,a
=al
/sb:mach5,oa
/zy
/lb:truck,a
/lb:tfile,pd22,e16,v
/lb:tfile,pd24,e18,v
/lb:tfile,pa30:a39,a21,v
=al
/sb:truck,oa
/zy
```

T2: Execute file to transfer data from MACH1-5 and TRUCK to CROP

```
/ua7:j45
/lb:mach1,pp59:p100,e4,v
/lb:mach1,pa30:a39,a7,v
/lb:mach2,pp59:p100,f4,v
/lb:mach3,pp59:p100,g4,v
/lb:mach4,pp59:p100,h4,v
/lb:mach5,pp59:p100,i4,v
/lb:truck,pk21:k59,j7,v
!
```

P1: Execute file to print MACH1

```
/zy
/lb:mach1,a
/oda1:n60,ss^O^L
p
/oda61:n100,ss^L
p
```