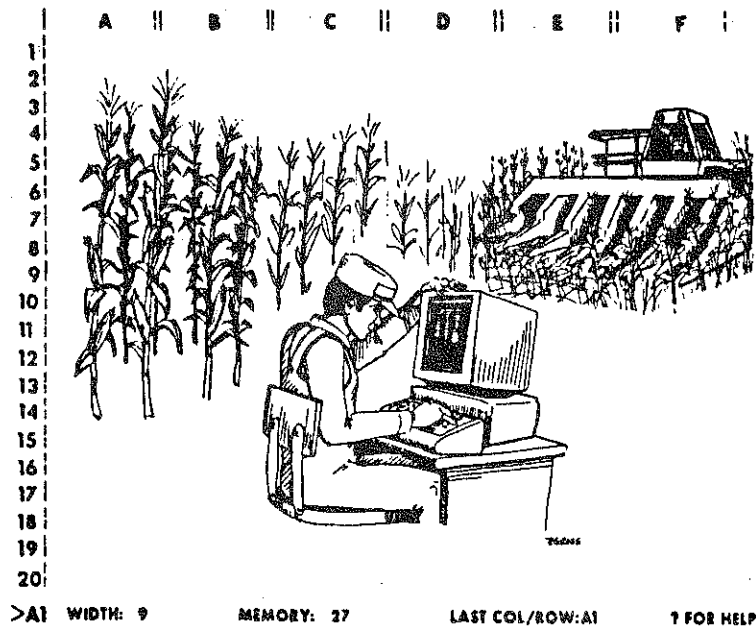


CROP AND LIVESTOCK DECISION ANALYSIS

A Spreadsheet Template and Forward Planning Concepts



by

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FOREWORD

This publication describes one of four related sets of Lotus 1-2-3 templates. They were developed primarily for calculating enterprise budgets and costs and returns for a mix of enterprises. Changes can be made in the size of an enterprise or any of its cost and return items, and capital items can be bought or sold. Impacts on total farm costs and returns can be observed. The sets are:

CROP MANAGEMENT DECISION ANALYSIS - this is a single template that calculates annual operating costs and returns for up to ten crop enterprises. It does not do any calculations of machinery operating costs. It calculates machinery ownership costs for up to five machines that are bought or sold as part of the change being analyzed. An earlier version of this template was used in teaching Ag. Econ. 302, Farm Business Management, in the spring of 1986. The user's manual is A.E. Extension 86-37.

CROP DECISION ANALYSIS WITH MACHINE CALCULATIONS - this is a three template set. It calculates annual hours of use and operating and ownership costs for tractors, implements and trucks, and transfers the summary data to up to five enterprise budgets. The crop cost and return calculations are similar to those in CROP MANAGEMENT DECISION ANALYSIS. These templates have been used mainly by researchers at Cornell to calculate crop costs and returns. The user's manual is A.E. Extension 86-39.

CROP DECISION ANALYSIS WITH MACHINE CALCULATIONS (EXPANDED) - this is similar to CROP DECISION ANALYSIS WITH MACHINE CALCULATIONS, but has room for up to ten crops. Growing and harvesting costs are not separated as they are in the other template sets. A separate user's manual was not written for the expanded version.

CROP AND LIVESTOCK DECISION ANALYSIS - this is a single template that calculates annual operating costs and returns for up to 10 crop enterprises and three livestock enterprises. It does not do any machinery annual operating cost calculations, but does calculate ownership costs. It allows you to balance home-grown feed produced and fed. The user's manual is A.E. Extension 86-38.

DISCLAIMER

Although these templates have been tested and the documentation reviewed, it is not possible to completely eliminate the possibility that errors still exist. Nor is it possible for the author to prevent you, the user, from modifying the formulas or text inadvertently or on purpose in such a way as to calculate incorrect results. Even if the results are calculated correctly, the assumptions of the analysis may limit their applicability to any particular decision. THEREFORE, the templates and documentation are provided on an "as is" basis. No warranty or representation, either express or implied, is made with respect to these templates, their quality, performance, merchantability, or fitness for a particular purpose. You, the user, assume the entire risk as to their quality and performance.

ACKNOWLEDGEMENT

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CROP AND LIVESTOCK DECISION ANALYSIS
A Spreadsheet Template and
Forward Planning Concepts

INTRODUCTION

The changing economic climate of the mid-1980's is leading many farm operators to analyze adjustment opportunities more carefully than in the past. This template is designed to help analyze such adjustments as:

1. Renting or purchasing additional cropland.
2. Expanding or reducing livestock numbers.
3. Changing the mix of crops grown.
4. Replacing machinery and equipment.
5. "Fine-tuning" amounts and types of feed, fertilizer and other annual crop inputs for cost control and increased production.
6. Participating in government acreage diversion programs.

Enterprise budgets and the partial budgeting technique are essential tools for analyzing individual changes with fairly straightforward impacts on the total business. They are also useful for simply increasing awareness of the costs and returns involved in producing crops. For more major changes where it is realized that interrelationships will cause impacts on several aspects of the business operation, total business budgeting should be used instead.

Budgeting with a pencil and paper or a hand calculator can be time-consuming and tedious. Microcomputers and electronic spreadsheet software can reduce greatly the time required for calculating budgets, especially when several alternatives are being analyzed.

Description

The CROPLIV (CROP AND LIVESTOCK DECISION ANALYSIS) TEMPLATE calculates annual operating costs and returns for each of up to ten crop enterprises, up to three livestock enterprises, and farm totals. It calculates the balance between home-grown feeds produced and fed. It does not do any calculations of machinery operating costs (fuel, oil and grease; and repairs and maintenance). These must be obtained from the farm operator's past records, if available, or from an off-farm source such as a set of published enterprise budgets calculated for typical situations. Operating costs are entered on the basis of dollars per acre in each crop enterprise budget. These per acre estimates can be checked for accuracy by comparing the totals for all crops against the totals from the farm's accounting records (see FARM menu option). Machinery ownership costs are calculated for up to five machines that are bought or sold as part of the change being analyzed. This is consistent with the partial budgeting technique, where only those costs and returns that change with the proposed adjustment are examined.

More than five machines can be included by grouping them based on years owned and salvage value. A second template, CROPLIVD, is the same as CROPLIV but with sample data stored for a corn grain budget and a dairy budget.

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.

What You Need to Use the Template

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

1. A Lotus 1-2-3 electronic spreadsheet program diskette and user manual.
2. An IBM-compatible microcomputer with at least 320K of internal memory, if using version 1A of Lotus 1-2-3.
3. A 132-column printer for producing paper copies.
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 Templates

The templates can be obtained from your county Extension agent or William F. Lazarus, Department of Agricultural Economics, Cornell University, Ithaca, N.Y., 14853. A nominal handling fee may be charged to cover diskette duplicating and mailing costs.

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.

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 overridden. The user bears responsibility for seeing that any changes are done properly.

TEMPLATE USERS MANUAL

Making Backup Copies

Before starting your first CROPLIV session you should protect your CROPLIV program diskette by making a backup copy of it. Making this backup is important for two reasons. One, your original distribution diskette will give you a write protect error if you try to save your work on it. And two, if your diskette develops a fatal error you will always have the original diskette. The original CROPLIV program diskette should be put in a safe location and never used for day-to-day work.

Making a backup copy on a computer with two floppy disk drives is easy when following these simple step-by-step instructions:

- 1- Put your 1-2-3 Utility Diskette in drive A (left side) and turn the power on. If the power is already on press <CTRL> <ALT> keys simultaneously.
- 2- Label a blank diskette as "CROPLIV - Working Copy" and put this diskette in drive B (right side). For single drive users 1-2-3 will prompt you to appropriately swap disks as needed.
- 3- Use the arrow keys to select the Disk Manager option and press <ENTER>.
- 4- Use the arrow keys again to select the Disk Copy option and press <ENTER>.
- 5- When prompted, remove the Utility Disk from drive A, insert your original CROPLIV program diskette and press the <ENTER> key.
- 6- When the copy is complete remove the original CROPLIV disk from drive A and put it in a safe location.
- 7- Use your working copy of CROPLIV as the daily working copy.

Starting Up CROPLIV

Load the CROPLIVD or CROPLIV template by starting the Lotus 1-2-3 program and inserting the diskette. Use the

/File Directory

command to select the drive containing the template, and

/File Retrieve CROPLIVD

(The file name is capitalized here for emphasis, but lower case letters work just as well.) You should see Figure 1 appear on your screen. The top three lines on your screen containing the Lotus menu and the row and column headings are not shown in Figure 1 and the other figures.

FIGURE 1. Introductory Screen (B61..G80)

```

                                Crop & Livestock Decision Analysis
                                22-Oct-86

V1.2                                October 17, 1986
                                Crop & Livestock Decision Analysis
                                -----
Purpose - budgetting impacts of changes in crop acres,
          livestock numbers, production, prices and inputs,
          and machinery & equipment ownership costs.

          Developed by William F. Lazarus
          Programmed by William F. Lazarus and Paul L. Eddie
          Department of Agricultural Economics
          New York College of Agriculture and Life Sciences
          Cornell University

NAME:      Sam Farmer
LOCATION:    Farmtown, NY

          FOR COMMAND BAR MENU PRESS Alt M

```

Enter a name and location for the analysis, for future reference. The template is menu driven through a number of command bar menus that appear at the top of the screen. They are based on Lotus 1-2-3 macros. Macros take effect when you hold down the [Alt] key located in the lower left area of the keyboard, and press the proper letter key. To get the first menu, hold down [Alt] and press M, abbreviated as

Alt M

At this time, press Alt M and you should see the menu appear as in Figure 1. The screen should show columns B through G and rows 61 through 80, as the range (B61..G80) in Figure 1's title shows.

The template is divided into eight areas (Figure 2). They can be reached by making selections from the menu. CROPS is where the crop yields and annual costs are entered. ACRES/ANIMALS & FEED is where a description of each crop and acres grown and livestock descriptions and numbers are entered. The feed balance is also calculated here. CAPITAL contains space for capital asset purchase prices and ownership cost factors. FARM shows total crop value, expenses and net returns for all of the crops included in the analysis. INPUTS is a place to enter commonly used operating input names, measurement units and prices. You can save some data entry time by entering an input like nitrogen fertilizer once here and then copying it to a number of enterprise budgets using a macro. The last two areas of the template contain the introductory screen and macros used to create the menus.

Figure 2. Layout of GROPLIV Template

CROPS	LIVESTOCK	ACRES/ANIMALS & FEED	FARM	CAPITAL	INPUTS
INTRODUCTION & Macros				Macros	

Some data entry is done by using 1-2-3's "range input" facility. A "CMD READY" will show in the upper right corner when you are in range input mode. This mode allows you to move the cursor only to the high intensity cells, or contrasting color cells for color monitors, to enter data. High intensity cells, as the name implies, appear brighter than low or normal intensity cells. The difference in intensities for monochrome monitors and color for color monitors is easily distinguishable on the monitor display.

You can leave the "range input" mode by pressing <ENTER> an extra time. The cursors will move to the upper left of the data entry area. Now you can move the cursor anywhere, so that you can review the results. Pressing <ENTER> one more time returns you to the menu.

There are seven options in the menu. Select one by placing the cursor over the desired option and pressing the return key. As the cursor is placed over each option, a brief description of that selection is displayed on the line below. You can also make a selection from the menu by typing the first letter of the option instead of moving the cursor. A description of each option is shown on the following pages. Figure 3 shows the menus in the template.

Figure 3. Menus in CROPLIV Template

Main Menu	Sub-Menus
NAME/ACRES/ANIMALS-----	--NAME --ACRES --ANIMALS --QUIT
CROP/LIVESTOCK/FEED-	--INPUTS --CROPS----- --1 --2 --3 --4 --5 --6 --CROP7-10-- --7 --8 --9 --10 --CROP1-6 --QUIT --QUIT
	--LIVESTOCK---- --1 --2 --3 --QUIT
	--FEED----- --COPY]---- --QUANTITIES --SKIP --PRICE/UNIT --MOVEFEEDS --QUIT --QUIT
	--NAMES --QUIT
CAPITAL-----	--NON-LIVESTOCK --EXPANSION LIVESTOCK --QUIT

LAND

FARM

(continued on next page)

Figure 3. . Menus in CROPLIV Template (continued)

```

UTILITY-----|--SAVE
                |--BASE
                |--PRINT-----|--SUMMARY
                                |--CROP-----|--1
                                    |--2
                                    |--3
                                    |--4
                                    |--5
                                    |--ALL
                                    |--CROP6-10--|--6
                                        |--7
                                        |--8
                                        |--9
                                        |--10
                                        |--ALL
                                        |--CROP1-5
                                        |--QUIT
                                |--QUIT
                                |--LIVESTOCK--|--1
                                    |--2
                                    |--3
                                    |--ALL
                                    |--QUIT
                                |--FEED
                                |--QUIT
                |--QUIT

```

QUIT

NAME/ACRES/ANIMALS

Select the first option, NAME/ACRES/ANIMALS. A second menu lets you select NAME, ACRES or ANIMALS or QUIT back to the main menu. NAME takes you back to the introductory screen to enter the analysis name and location, if you didn't do that before. ACRES takes you to the screen in Figure 4. Enter a description for each crop, and acres grown. The Product, Units and Quantity Produced columns will be transferred from the enterprise budgets later, so ignore them for now. The CROPLIV template is similar to this except that all of the data entry areas are blank or contain zeros. In ACRES/ANIMAL, CROPS/LIVESTOCK, CAPITAL and LAND, the cursor will move only to the cells where data entry is allowed. Headings and formulas will be skipped over. pressing the return key without making an entry will then allow you to move the cursor to any cell, not just the data entry cells. Pressing return a second time will bring up the menu again so you can select another option.

FIGURE 4. Crop Descriptions and Acreages CA1..CI20)

Crop & Livestock Decision Analysis				22-Oct-86
ACRES OF EACH CROP				
=====				
Crop No.	Crop Description	Acres	Feed or Crop Product	Quantity Units produced
1	Corn silage	100		0
				0
2	Hay crop silage	150		0
				0
3		0		0
				0
4		0		0
				0
5		0		0
				0
6		0		0
				0
7		0		0
				0
8		0		0
				0

CROPS brings up a menu listing the crop numbers, from which you can go to each crop enterprise budget as in Figure 7. Item descriptions are entered in column A. Units of measurement, quantity per acre and price per unit are entered in B, C and D. The price per unit for crop value is not entered in the crop enterprise budgets. Prices are entered under the FEED menu, after feed purchased and fed are compared. This is so you can decide whether a buying or selling price is appropriate. Crop value or expense per acre for each item is calculated in column E, and column F shows a total for all acres of the crop. This column is protected from accidentally changing the formulas, as are the column and row headings. Use the cursor keys or [PgDn] to see the bottom half of the budget.

FIGURE 7. Crop Enterprise Budget (Al..F20)

		CROP 1			100
		Corn silage			ACRES
=====					
	UNITS	RATE/A	PRICE/UNIT	\$/ACRE	\$/CROP
CROP VALUE					
corn silage	t dm	5	\$0.00	\$0.00	\$0.00
		0	0.00	0.00	0.00
TOTAL VALUE				\$0.00	\$0.00
ANNUAL OPERATING EXPENSES					
GROWING					
Seed					
Pioneer 3901	bag	0.31	70.00	\$21.70	\$2,170.00
				0.00	0.00
Fertilizer					
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
Lime					
		0	0.00	0.00	0.00
Chemicals					

Press Alt W to open a window at the bottom of the screen showing the list of common operating inputs you entered with the inputs option. To use one of these, first move the cursor to the left column of the budget, column A, for crop budget 1. Move down to the row where you want the input entered. Then press Alt C to select an input. The macro assigns a range name to this cell, then moves to the second window. Now scroll up or down to the input you want, and press <Enter>. The input description, units and price will be copied to the budget, leaving you to enter the quantity applied. Press the F9 key if you want to see the cost per acre.

LIVESTOCK acts the same way as CROPS, taking you to one of the three livestock enterprise budgets, as in Figure 8. One of the expense items for livestock is for replacement livestock purchases. This item is for purchases that are made routinely every year, as opposed to one-time expansion purchases. The entire cost of these replacement purchases is deducted to calculate net returns. One-time expansion purchases, on the other hand, are entered under CAPITAL, discussed below. Costs of expansion purchases are annualized, with only straight-line depreciation subtracted to calculate net returns.

FIGURE 8. Livestock Enterprise Budget (BI1..BN20)

		LIVESTOCK 1		70	
		cow & replace.		ANIMALS	
		UNITS	RATE/ PRICE/ ANIMAL UNIT	\$/ANIMAL	\$/ENTERPRISE
VALUE OF PRODUCTION					
milk		cwt	170	\$11.60	\$1,972.00
cull cows .25 @ 14 cwt		cwt	3.5	40	140.00
					9,800.00
				0.00	0.00
				0.00	0.00
TOTAL VALUE				\$2,112.00	\$147,840.00
ANNUAL OPERATING EXPENSES					
LIVESTOCK					
Purchased Bedding				\$0.00	\$0.00
Breeding				0.00	0.00
Vet & Medicine				0.00	0.00
Marketing				0.00	0.00
Supplies				0.00	0.00
Utilities				0.00	0.00

FEED, the fourth option, performs the fairly complex task of putting the crops produced into a list from which you can specify which crop products are used by the livestock enterprises. It then calculates a feed balance with purchases and sales, and copies the crop product description into the livestock budget. The first step is COPY. This copies the descriptions of the crop products you entered in the crop enterprise budget to the feed balance screen. SKIP this time-consuming step if you haven't made any changes to the crop enterprise budget since the last time you selected COPY. Then you should see a menu with options QUANTITIES, PRICE/UNIT, MOVE FEEDS and QUIT.

QUANTITIES takes you to Figure 9. The feeds or other crop products such as straw should appear at the left, with the quantities of each produced. You can now enter the quantity of each feed fed per year to each type of livestock on a per head basis, in columns CI, CK and CM. Make sure you enter the quantity fed using the same units of measurement you used in the crop enterprise budget, shown in column CF.

FIGURE 9. Quantities Fed Per Head Per Day (CE4..CN23)

Crop & Livestock Decision Analysis

22-Oct-86

Feed or Crop Product	Units produced	Quantity Fed per Head by Livestock Type	
		cow	& replace
corn silage	t dm	500	3
		0	
1st cut hay	t dm	240	2
2nd cut hay	t dm	180	1
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	
		0	

PRICE/UNIT moves a few columns to the right where purchase or sale prices per unit are entered for each feed. A second window shows the deficit or surplus of production over consumption of each feed.

It is very important that you select MOVE FEEDS next. This moves the feed information into the livestock budgets, using Lotus' database functions.

NAMES

This option copies the crop and livestock enterprise names you entered in ACRES and ANIMALS into a macro so that when you select CROPS or LIVESTOCK above, the enterprise descriptions will show up on the second "prompt" line at the top of your screen. This step is time-consuming and not absolutely necessary, but it might help you find your way around the spreadsheet.

CAPITAL

This option allows you to enter either NON-LIVESTOCK or LIVESTOCK capital purchases. NON-LIVESTOCK takes you to Figure 10, where, as the name implies, machinery, equipment and other non-livestock capital purchases or sales can be entered.

FIGURE 10. Non-livestock Capital Items Bought, Sold or Traded (DC1..DJ20)

NON-LVSTK CAPITAL ITEMS BOUGHT, SOLD OR TRADED (MACH & EQUIP, ETC.)					
Machine type	manure spreader	machine name	machine name	machine name	machine name
Purchase price	\$4,000	\$0	\$0	\$0	\$0
Years owned	0	0	0	0	0
Salvage rate (%)	34%	0%	0%	0%	0%
FOR ALL MACHINES:					
Interest rate (%)	10.00%	0.00%	0.00%	0.00%	0.00%
Insurance rate(%)	10.00%	0.00%	0.00%	0.00%	0.00%
TOTAL OWNERSHIP COSTS					
Depreciation	\$0	\$0	\$0	\$0	\$0
Interest	268	0	0	0	0
Insurance	268	0	0	0	0
TOTAL ANNUALIZED					
COST/YR.	\$536	\$0	\$0	\$0	\$0

LIVESTOCK takes you to Figure 11. This screen is designed to enter one-time livestock investments to expand the herd. These expansion investments are annualized over the years owned. Keep the number of purchased animals separate from the number of raised animals. Depreciation is handled differently, with depreciation on raised animals subtracted from gross income. Depreciation on purchased animals is added to expenses. When done with entering data, press <ENTER> once and then scroll down to see the total annualized cost per year for each type of livestock.

FIGURE 11. Livestock Expansion Investments (DC21..DJ40)

```

LIVESTOCK EXPANSION INVESTMENTS MADE ONCE & ANNUALIZED OVER YEARS OWNED

      Livestock type          LVST.   LVST.   LVST.   LVST.   LVST.
                               name     name     name     name     name
No. of purchased animals          0       0       0       0       0
No. of raised animals             0       0       0       0       0
Purchase or transfer price
      ($/animal)                  $0      $0      $0      $0      $0
Years owned                       0       0       0       0       0
Salvage price ($/animal)          $0      $0      $0      $0      $0

FOR ALL ANIMALS
Interest rate                     0.00%
Insurance rate                    0.00%

TOTAL INVESTMENT
Cash                               $0      $0      $0      $0      $0
Non-cash                          $0      $0      $0      $0      $0

TOTAL OWNERSHIP COSTS
Depreciation

```

LAND

This takes you to a screen where other undistributed cost items such as land rent, property taxes, operator labor that can not be easily allocated to enterprises, or other items can be entered (Figure 12).

FIGURE 12. Other Undistributed Costs (CR41..CV60)

```

CHANGES IN LAND OR OTHER EXPENSES, OTHER THAN
ANNUAL OPERATING EXPENSES OR MACHINERY OWNERSHIP COSTS
=====
Item                               Farm Total
-----
Land                               $0
Taxes                              0
Fixed operator labor                0
Miscellaneous                       0
TOTAL                               $0

```

FARM

This takes you to the screen showing total value of production, gross income, and expenses summed over all enterprises. The value of feeds and other crop products that are fed rather than sold are included in the value of production but not in gross income, expenses or net returns. The total value of raised animals used for replacements is included in value of production but not in gross income (Figure 13).

FIGURE 13. Total Value of Production, Gross Income and Expenses
(CW1..DB20)

TOTAL ALL ENTERPRISES	THIS ANALYSIS	BASE	CHANGE
=====	=====	=====	=====
VALUE OF PRODUCTION			
Crops	\$35,000		\$35,000
Livestock	147,840		\$147,840
TOTAL VALUE	\$182,840		\$182,840
GROSS INCOME			
	\$165,240		\$165,240

ANNUAL OPERATING EXPENSES			
Labor	\$0		\$0
Purchased feed	1,400		1,400
Purchased bedding	0		0
Breeding	0		0
Vet & medicine	0		0
Livestock marketing	0		0

UTILITY

This option brings up a second menu. The first option, SAVE, allows you to save the completed budget under your own file name. The second option, BASE, erases column AN of the crop totals area and prompts you for the name of a file containing a base or first analysis that you wish to compare to this analysis. Then it loads the crop totals from that file into the BASE column and calculates the change in each item, displayed in the CHANGE column.

The third option, PRINT, prints the crop descriptions and acres, the crop totals, machinery cost calculations and total crop quantities. Then it calls a menu where you select crop enterprise budgets to be printed. Each enterprise budget can be printed individually. Or selecting ALL prints all five budgets. Figure 14 is a sample printout. The last option, QUIT, returns you to the main menu.

QUIT

This option returns you to normal mode.

HOW TO UNDERSTAND MACROS

CROPLIV and many other templates have a complicated set of macros. They do such things as providing menus and move feed descriptions from the crop enterprise budgets to the feed balance and livestock budgets. You do not have to concern yourself with how the macros do what they do as long as everything works. On the other hand, if something goes wrong (as it occasionally does), or you want to modify the template or are just curious, this section may be helpful.

A macro is a sequence of keystrokes stored as text in a range of cells. A good way to figure out what a macro does is to print this range. Then type the keystrokes exactly as printed. The template should do the same thing as when the macro executes. Selections from the Lotus menu will show up in a menu as a slash / followed by the first letter of the menu option. For example, /wtb means / Worksheet Titles Both, and fixes horizontal and vertical title rows at the top and left. One important note: print one column at a time. Most macros are wider than a single column, so that part is hidden behind the next column to the right.

Each macro has a name made up of the backslash \ and a letter, like \M for the main menu. Find \M by typing the (Go To) function key (F5) and (Name) (F3). A list of range names appears at the top. Type the left cursor key to see the macro names, which Lotus puts at the end of the alphabetical list. Select \M to see that macro.

The tree-structured menus in CROPLIV use the \XG (go to) and \XM (menu) commands. These and other \X commands can not be repeated from the keyboard. They branch to a range name or cell following the command. (Go to) this range name or cell, and you will see the rest of the macro.

Figure 14. Sample Printout

Crop & Livestock Decision Analysis

22-Oct-86

NAME: Sam Farmer
 LOCATION: Farmtown, NY

TOTAL ALL ENTERPRISES	THIS ANALYSIS	BASE	CHANGE
=====	=====	=====	=====
VALUE OF PRODUCTION			
Crops	\$69,200	\$0	\$69,200
Livestock	138,040	0	\$138,040
TOTAL VALUE	\$207,240	\$0	\$207,240
GROSS INCOME			
	\$175,740	\$0	\$175,740

ANNUAL OPERATING EXPENSES			
Labor	\$0	\$0	\$0
Purchased feed	0	0	0
Purchased bedding	0	0	0
Breeding	0	0	0
Vet & medicine	0	0	0
Livestock marketing	0	0	0
Other livestock expenses	0	0	0
Machine repairs	0	0	0
Fuel, oil & grease	0	0	0
Lime & fertilizer	0	0	0
Seeds & plants	2,170	0	2,170
Chemicals	0	0	0
Other crop & expenses	0	0	0
Land, bldg. & equip. repair	0	0	0
Utilities	0	0	0
Interest, operating	0	0	0
TOTAL ANNUAL OPERATING EXPENSES	\$2,170	\$0	\$2,170
OTHER EXPENSES			
Livestock replcmnt&interest	\$0	\$0	\$0
Machine & equip. interest & deprec.	820	0	820
Land & livestock own/lease/rent	0	0	0
Insurance	13	0	13
Taxes	0	0	0
Miscellaneous	0	0	0
TOTAL OTHER	\$833	\$0	\$833
TOTAL INCLUDED EXPENSES	\$3,003	\$0	\$3,003
RETURN OVER INCLUDED EXPENSES			
	\$172,737	\$0	\$172,737

Crop & Livestock Decision Analysis

22-Oct-86

ACRES OF EACH CROP

=====

Crop No.	Crop Description	Acres	Feed or Crop Product	Units	Quantity produced
1	Corn silage	100	corn silage	t dm	500
					0
2	Hay crop silage	150	1st cut hay	t dm	240
			2nd cut hay	t dm	180
3		0			0
4		0			0
5		0			0
6		0			0
7		0			0
8		0			0
9		0			0
10		0			0
					0
TOTAL ACRES		250			

Compared to Base Analysis

ACRES OF EACH CROP

=====

Crop No.	Crop Description	Acres
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0
10		0
TOTAL ACRES		0

Crop & Livestock Decision Analysis

22-Oct-86

Livestock	Description	No. of animals				
No.						
1	cow & replace.	70				*This Analysis*
2		0				
3		0				
TOTAL ANIMALS		70				
Livestock	Description	No. of animals				
No.						*Base Analysis*
1		0				
2		0				
3		0				
TOTAL ANIMALS		0				
NON-LVSTK CAPITAL ITEMS BOUGHT, SOLD OR TRADED (MACH & EQUIP, ETC.)						
Machine type	manure spreader	machine name	machine name	machine name	machine name	machine name
Purchase price	\$4,000	\$0	\$0	\$0	\$0	\$0
Years owned	5	0	0	0	0	0
Salvage rate (%)	30%	0%	0%	0%	0%	0%
FOR ALL MACHINES:						
Interest rate (%)	10.00%					
Insurance rate (%)	0.50%					
TOTAL OWNERSHIP COSTS						
Depreciation	\$560	\$0	\$0	\$0	\$0	\$0
Interest	260	0	0	0	0	0
Insurance	13	0	0	0	0	0
TOTAL ANNUALIZED COST/YR.	\$833	\$0	\$0	\$0	\$0	\$0
LIVESTOCK EXPANSION INVESTMENTS MADE ONCE & ANNUALIZED OVER YEARS OWNED						
Livestock type	livestk name	livestk name	livestk name	livestk name	livestk name	livestk name
No. of purchased animals	0	0	0	0	0	0
No. of raised animals	0	0	0	0	0	0
Purchase or transfer price (\$/animal)	\$0	\$0	\$0	\$0	\$0	\$0
Years owned	0	0	0	0	0	0
Salvage price (\$/animal)	\$0	\$0	\$0	\$0	\$0	\$0
FOR ALL ANIMALS						
Interest rate	0.00%					
Insurance rate	0.00%					
TOTAL INVESTMENT						
Cash	\$0	\$0	\$0	\$0	\$0	\$0
Non-cash	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL OWNERSHIP COSTS						
Depreciation						
Cash	\$0	\$0	\$0	\$0	\$0	\$0
Non-cash	0	0	0	0	0	0
Interest	0	0	0	0	0	0
Insurance	0	0	0	0	0	0
TOTAL ANNUALIZED COST/YR.	\$0	\$0	\$0	\$0	\$0	\$0

Crop & Livestock Decision Analysis

22-Oct-86

		CROP 1			100
		Corn silage			ACRES
=====					
	UNITS	RATE/A	PRICE/UNIT	\$/ACRE	\$/CROP
CROP VALUE					
corn silage	t dm	5	\$70.00	\$350.00	\$35,000.00
		0	0.00	0.00	0.00
TOTAL VALUE				\$350.00	\$35,000.00
ANNUAL OPERATING EXPENSES					
GROWING					
Seed					
Pioneer 3901	bag	0.31	70.00	\$21.70	\$2,170.00
				0.00	0.00
Fertilizer					
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
Lime					
		0	0.00	0.00	0.00
Chemicals					
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
		0	0.00	0.00	0.00
Power, equipment					
Fuel, oil & grease		0	0.00	0.00	0.00
Repair, main.		0	0.00	0.00	0.00
Other		0	0.00	0.00	0.00
Interest, operating					
		\$22	Rate/yr		
Months		8	10.00%	0.00	0.00
Labor	Hour	0.0	0.00	0.00	0.00
TOTAL GROWING				\$21.70	\$2,170.00
HARVESTING & SELLING					
Power, equipment					
Fuel, oil & grease		0	\$0.00	0.00	\$0.00
Repair, main.		0	0.00	0.00	0.00
Storage, drying & other		0	0.00	0.00	0.00
Interest, operating					
		\$0	Rate/yr		
Months		0	0.00%	0.00	0.00
Labor	Hour	0.0	0.00	0.00	0.00
TOTAL HARVESTING & SELLING				\$0.00	\$0.00
TOTAL ANNUAL OPERATING EXPENSES				\$21.70	\$2,170.00
NET OVER ANNUAL OPERATING EXPENSES				\$328.30	\$32,830.00

Crop & Livestock Decision Analysis

22-Oct-86

		LIVESTOCK 1		70		
		cow & replace.		ANIMALS		
		UNITS	RATE/ ANIMAL UNIT	PRICE/ ANIMAL UNIT	\$/ANIMAL	\$/ENTERPRISE
VALUE OF PRODUCTION						
milk	cwt	170		\$11.80	\$1,972.00	\$138,040.00
cull cows .25 @ 14 cwt	cwt	0		40.00	0.00	0.00
					0.00	0.00
					0.00	0.00
TOTAL VALUE					\$1,972.00	\$138,040.00
ANNUAL OPERATING EXPENSES						
LIVESTOCK						
Purchased Bedding					\$0.00	\$0.00
Breeding					0.00	0.00
Vet & Medicine					0.00	0.00
Marketing					0.00	0.00
Supplies					0.00	0.00
Utilities					0.00	0.00
Replacement livestock						
Purchased					0.00	0.00
Raised					0.00	0.00
Insurance					0.00	0.00
Other					0.00	0.00
TOTAL LIVESTOCK COSTS					\$0.00	\$0.00
PURCHASED FEED						
1					\$0.00	\$0.00
2					0.00	0.00
3					0.00	0.00
4					0.00	0.00
					\$0.00	\$0.00
RAISED FEED						
corn silage	t dm	3		\$70.00	\$210.00	\$14,700.00
1st cut hay	t dm	2		75.00	150.00	10,500.00
2nd cut hay	t dm	1		90.00	90.00	6,300.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
TOTAL FEED PRODUCED					\$450.00	\$31,500.00
BUILDINGS, FEED STORAGE, & EQUIPMENT						
Repairs & Maintenance					\$0.00	\$0.00
Fuel, Oil & Grease					0.00	0.00
TOTAL B.F.S. & E.					\$0.00	\$0.00
LABOR						
	Hour				\$0.00	\$0.00
INTEREST, OPERATING						
	Months	\$450		Rate/Yr		
		0		0.00%	\$0.00	\$0.00
TOTAL ANNUAL OPERATING EXPENSES					\$450.00	\$31,500.00
NET OVER ANNUAL					\$	\$1,522.00
OPERATING EXPENSES						\$106,540.00

Crop & Livestock Decision Analysis

NAME: _____
 LOCATION: _____
 ACRES OF EACH CROP
 =====

Crop No.	Crop Description	Acres
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Livestock No.	Description	No. of animals
1	_____	_____
2	_____	_____
3	_____	_____

Crop & Livestock Decision Analysis

CROP 1

	UNITS	RATE/A	PRICE/UNIT
CROP VALUE			\$0.00
			0.00
TOTAL VALUE			
ANNUAL OPERATING EXPENSES			
GROWING			
Seed			\$
Fertilizer			
Lime			
Chemicals			
Power, equipment			
Fuel, oil & grease			
Repair, main.			
Other			
Interest, operating		\$0	Rate/yr
Months			%
Labor	Hour		%
TOTAL GROWING			
HARVESTING & SELLING			
Power, equipment			
Fuel, oil & grease			\$
Repair, main.			
Storage, drying & other			
Interest, operating		\$0	Rate/yr
Months			%
Labor	Hour		%
TOTAL HARVESTING & SELLING			
TOTAL ANNUAL OPERATING EXPENSES			
NET OVER ANNUAL OPERATING EXPENSES			

Crop & Livestock Decision Analysis

LIVESTOCK #1

	O ANIMALS			
	UNITS	RATE/ ANIMAL	PRICE/ UNIT	\$/ANIMAL \$/ENTERPRISE
VALUE OF PRODUCTION				
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
TOTAL VALUE				

ANNUAL OPERATING EXPENSES

LIVESTOCK				
Purchased Bedding	-----	-----	-----	-----
Breeding	-----	-----	-----	-----
Vet & Medicine	-----	-----	-----	-----
Marketing	-----	-----	-----	-----
Supplies	-----	-----	-----	-----
Utilities	-----	-----	-----	-----
Replacement livestock				
Purchased	-----	-----	-----	-----
Raised	-----	-----	-----	-----
Insurance	-----	-----	-----	-----
Other	-----	-----	-----	-----
TOTAL LIVESTOCK COSTS				

PURCHASED FEED				
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----

TOTAL FEED PRODUCED				
BUILDINGS, FEED STORAGE, & EQUIPMENT				
Repairs & Maintenance			-----	
Fuel, Oil & Grease			-----	
TOTAL B.F.S. & E.				

LABOR	Hour		-----	
INTEREST, OPERATING		\$0	Rate/Yr	
Months		-----	-----	

TOTAL ANNUAL OPERATING EXPENSES

NET OVER ANNUAL	\$			
OPERATING EXPENSES				

TOTAL ANIMALS 0
 NON-LVSTK CAPITAL ITEMS BOUGHT, SOLD OR TRADED (MACH & EQUIP, ETC.)

Machine type	-----	-----	-----	-----	-----
Purchase price	\$-----	\$-----	\$-----	\$-----	\$-----
Years owned	-----	-----	-----	-----	-----
Salvage rate (%)	-----%	-----%	-----%	-----%	-----%
FOR ALL MACHINES:					
Interest rate (%)	-----%				
Insurance rate (%)	-----%				

LIVESTOCK EXPANSION INVESTMENTS MADE ONCE & ANNUALIZED OVER YEARS OWNED

Livestock type	-----	-----	-----	-----	-----
No. of purchased animals	-----	-----	-----	-----	-----
No. of raised animals	-----	-----	-----	-----	-----
Purchase or transfer price (\$/animal)	\$-----	\$-----	\$-----	\$-----	\$-----
Years owned	-----	-----	-----	-----	-----
Salvage price (\$/animal)	\$-----	\$-----	\$-----	\$-----	\$-----
FOR ALL ANIMALS					
Interest rate	-----%				
Insurance rate	-----%				

FORWARD PLANNING CONCEPTS

Managing a business is similar to charting a course for a ship. The manager does the charting. To be effective, he must have goals. He must continually gather and analyze facts. On the basis of his analysis, he must make decisions and carry them out. The process is never ending. New information and analyses require alterations just as a change of wind and weather requires the captain of the ship to make frequent changes in guiding his vessel.¹

Different types of analyses can be performed on a farm business. A descriptive analysis attempts to determine the current situation of the business. A second type is a diagnostic analysis that is concerned with detecting strengths and areas for improvement in the business. The Dairy Farm Business Summary Program conducted by Cornell University combines these two types of analyses, by analyzing financial statements and calculating analysis factors such as feed cost per cow and capital turnover ratio. Some managers do not go beyond this point. The third analysis type, predictive analysis, combines information from the descriptive and diagnostic analysis plus projected changes in farm size (acres or number of livestock) and production prices and costs. A predictive analysis or forward planning forms the basis for planning the future of the business and is a key to successful farm management. The templates are an aid to predictive analyses of the cropping program.

There are seven distinct but interrelated steps in forward farm planning:²

1. Appraisal of goals and objectives.
2. Inventory of resource availability.
3. Selection of alternatives to be analyzed.
4. Selection of input/output information to be used in the analysis process.
5. Selection of prices to be used in the analysis process.
6. Organization of input/output and price information into an appropriate analysis structure.
7. Analysis of alternatives.

Each step is discussed in detail by Harsh, et al. and in a number of other farm management texts. The first five steps may be the most difficult, but many farm managers may be reluctant to begin the process without a way to easily organize the information and use it to analyze their alternatives. The templates are tools for performing these organization and analysis steps.

¹L. H. Brown and J. A. Speicher, "Business Analysis for Dairy Farms," Extension Bulletin E-685, Michigan State University, East Lansing, Michigan, June 1970.

²S. B. Harsh, L. J. Connor and G. D. Schwab, Managing the Farm Business (Englewood Cliffs, N.J.: Prentice-Hall, 1981), p. 178.

Fixed and Variable Costs

With the cost-price squeeze in agriculture becoming more severe, farmers often express concern for minimizing costs. It is important from a managerial viewpoint that the specific type of cost being discussed be clarified. It should also be stressed that minimizing costs does not necessarily lead to maximizing profits.

The distinction between fixed and variable costs is fundamental to economics. Unfortunately, it is often one of the most misunderstood and misused distinctions. By definition, fixed costs do not change with the volume of output for a particular enterprise. Fixed costs normally include such items as depreciation, interest on investment, taxes, insurance and some repairs (sometimes referred to as the DIRT-5). While the total dollar amount of fixed costs does not change with volume of output, the average fixed cost per unit (acre or unit of crop output) declines as output increases. Variable costs, on the other hand, do change with the volume of output.

The breakdown of specific cost items as variable or fixed depends on the time period considered, however. In the long run, as all inputs become variable, all costs also become variable. Put another way, whether a specific cost item should be considered variable or fixed depends on the decision at hand. If the decision is a long run one such as whether to purchase a complete farm business, then all of the costs involved can be avoided by deciding not to make the purchase (and of course the potential profits are avoided as well). All costs would vary, at least in that they would be incurred or avoided.

Contrast this with a situation where a crop has been planted, and a drought occurred so that yields are very low. The decision is whether to harvest, which will only be done if the reduced yield is enough to cover harvesting costs. Then, the only variable costs are for harvesting - none of the growing costs can vary at that point in time.

Many published crop enterprise planning budgets include a breakdown showing seed, fertilizer, chemicals, machinery operating, labor and interest on operating capital as variable expenses, and costs for ownership or rental of capital items such as machinery, equipment, buildings and land as fixed. This breakdown is usually appropriate for making year-to-year changes in crop acreages. However, it should be clear from this discussion that for many other short- and longer-run decisions, some of these "fixed" costs may really vary, and vice versa. One example is for a change in crop acreage where machinery purchases are made.

Unlike many enterprise budgets, land costs and machinery equipment or building ownership costs are not allocated to individual crops. These costs are included only in the totals for all crops. For analyzing specific decisions, an allocation of costs for capital items to individual crops adds complexity and is arbitrary and irrelevant at best. At worst, focusing on return over such allocated costs on a per acre basis rather than the impact on total farm profitability could lead to wrong conclusions about profitability.

For example, suppose that a 130 horsepower tractor is used to grow 100 acres of corn and 100 acres of hay. Its annual ownership cost is estimated to be \$5000. It is used two hours per acre on the corn, or 200 hours, and three hours per acre on the hay, or 300 hours, for a total of 500 hours per year or \$10 per hour. Allocating the cost on an hourly basis would give a charge of \$20 per acre for corn and \$30 per acre for hay. This has been the practice followed by the author and others, and is useful as a general guide. One could also argue for an allocation on a straight acreage basis, giving \$25 per acre for each crop. But suppose an 80 horsepower tractor with a cost of \$3500 per year is sufficient for hay while the larger tractor is required to perform corn tillage in a timely fashion. What then is an economically rational allocation of the \$5000 cost between corn and hay? The total ownership cost of \$5000 is fairly clear and should be considered in an analysis where alternatives include purchasing or not purchasing the tractor.

Suppose further that the alternative to purchasing the tractor and growing the 100 acres of corn and 100 acres of hay is to use machinery already on hand to grow hay on all 200 acres. The net return from growing hay apart from the tractor ownership cost is \$40 per acre, and \$35 per acre for corn.

	Hay	Corn
Net over other costs	\$40	\$35
Tractor ownership	- 30	- 20
Net	\$10	\$15

If we look only at the per acre costs, and allocate the tractor ownership cost on the basis of hours of use, we might draw the conclusion that shifting to corn and purchasing the tractor would be the more profitable choice. However, look at the farm totals.

	200 A. Hay	100 A. Hay & 100 A. Corn
Net over other costs	\$8000	\$7500
Tractor ownership	- 3500	- 5000
Net	\$4500	\$2500

It is clear from comparing the farm totals that growing all hay and not purchasing the tractor is the more profitable option.

Partial Budgeting

Crop inputs used, yields and price information must be organized for analysis. Partial budgeting is a forward planning technique for organizing this information to project costs and returns that change with a proposed adjustment in a segment of the business. Other costs and returns that do not change are ignored.

Enterprise budgets are commonly used to simplify partial budgeting. Enterprise budgets are prepared by stating the income, expenses, and resource needs of a productive activity, such as a particular crop, on a per unit basis (usually an acre). The income, expenses, and resource needs are treated as a package in examining changes.

The procedure for doing a partial budgeting analysis is a three-step process. The first step is identifying those factors that will (1) increase income or (2) reduce costs. The second step is concerned with those factors that (1) decrease income or (2) increase costs. Finally, the gains identified in the first step are compared to the losses identified in the second step.