

FARM INVESTMENT ANALYSIS--HAND-CALCULATED
COMPARATIVE BUDGETING AND COMPUTERIZED
FIVE-YEAR TRANSITIONAL BUDGETING

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FARM INVESTMENT ANALYSIS--HAND-CALCULATED COMPARATIVE
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TRANSITIONAL BUDGETING

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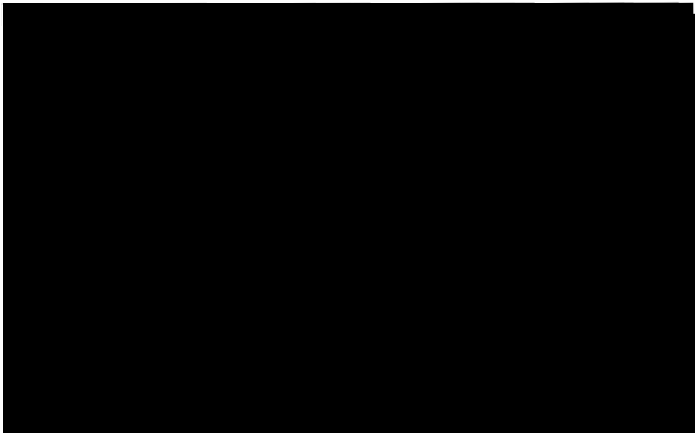


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CHAPTER I

INTRODUCTION

One of the most overworked themes involving today's modern farming points out the tremendous capital investments required to generate a satisfactory return to the farm owner-operator. The impact of the theme is felt throughout the agricultural industry and is no small problem for the farm operator in planning his investment program.

Farmers grossing over \$2,500 annually in Missouri will have \$81,076 invested in land, buildings and machinery.¹ This figure neither includes operating capital nor livestock investment. Investments of two to five times this amount are not uncommon on "full-time" operations grossing in excess of \$20,000 annually.

The timing and priorities of farm investments can have significant impact both on profitability and cash flows. It is not unreasonable to find an investment which may prove very profitable over an extended period of time; yet, cause a farm owner to get into a financial "pinch" as a result of a large short-term loan resulting from the

¹U.S. Department of Commerce, Bureau of the Census, 1969 Census of Agriculture: County Report Text for Missouri, pp. 3-5.

purchase of such a capital item.

Numerous computerized budgeting programs have been developed as an aid in investment analysis; however, most of these programs are written to assume a one-time change in investments without lags in enterprise response to investments. Increasing breeding herd size, terracing, or other investments may not result in immediate output responses at an optimum level. The timing of investment as well as responses can influence profitability, as well as cash flow consequences.

Purpose and Objective of the Study

The object of the research is to provide a systematic means of analyzing profitability and cash flow consequences, resulting from anticipated changes in farm investments. The investment changes are to be viewed from both transitional adjustments and long run financial consequences. Data processing will be carried out through use of the computer.

The thrust behind the miracle of the computer is the speed and complete accuracy of the equipment. In January, 1973, the newest computer available was installed at the University of Missouri to handle the four-campus network.²

²Ardath H. Emmons, Faculty Bulletin, (Vol. 8, No. 4, Nov. 3, 1972), p. 8.

The capacity of the machine exceeded several times the combined power of the six computers which it replaced, at less operating costs for the University. The computer will handle two billion pieces of information and two million instructions per second.

According to Harlan G. Hughes of the University of Wisconsin, "The computer, using advanced planning techniques, is not a substitute for management; it is, however, an impressive 'aid' to the good manager by enabling him to quickly obtain information about alternative courses of action and their impact on his farm business."³

Five-Year Planning Horizon

The proposal, set forth here, involves developing a computerized farm investment program which will provide for investments to be made periodically and enterprise responses to adjust accordingly. This might involve investments made on a five-year planning horizon, with corresponding annual profitability and cash flow changes.

A second unique feature of the program will be to determine the changes in profitability and cash flow consequences, should price levels increase or decrease by a certain percentage, as an example 20 percent.

³Harlan G. Hughes, Managing the Farm, (Vol. V, No. 5, April 1973), p. 6.

CHAPTER II

LITERATURE REVIEW

The review of literature includes both computer usage, particularly in agriculture, and investment analysis relating to farm financial management.

The miracle of computers is all around us. From banking to elections, or airlines to motel reservations, the computer is making our life easier and yet sometimes more frustrating. The superregister, an EDP P-O-S (electronic data processing point-of-sale terminal) can do everything a cash register can, only faster--plus much more.¹ New designs are being tested which can "read" prices, check to see if customers' credit is good, and print out a charge slip--all faster than a clerk used to be able to ring up the wrong amount. Meanwhile the terminal will transfer the data electronically to a computer which keeps a running account of purchased items and which, in turn, prints orders for resupplying the shelves in the store. The computer can provide instant information to the manager from how well Frisbees are selling to how much change is in the cashbox. This all can be done while you are able

¹John A. Prestbo, Wall Street Journal, Nov. 20, 1972, p. 1.

to move through the checkout line twenty to thirty percent faster.

The computers are essential as we move toward a cashless society where everything is bought and sold on credit while funds are transferred electronically.

It is foreseeable that one could order either a can of peas or a fur coat by punching out a code on the telephone. At the other end of the line, a superregister would record transactions, dispatch merchandise and send out a bill. Doctors could send prescriptions electronically to pharmacies with superregisters, instead of scribbling them illegibly.

To shorten shopping time for homemakers, the lady of the house could fill out a questionnaire about each member of her family--age, favorite foods, hated foods, dietary restrictions, and so on, and then feed it to a computer. When she went shopping, she could punch her code into a special terminal and it would print out a Jones family menu for the week, taking advantage of weekly price specials.

McCracken in his guide to Fortran IV programming points out other uses of computers.

The design of a new airplane consumes thousands of hours of computer time in the investigation of the interrelated requirements of structures, aerodynamics, power plants, and control systems, as they would operate under numerous flight conditions. The design of an electric transmission line calls for a study of the electrical loads that would be imposed on different

sections of the line as the consumption changed and as unusual conditions developed.

McCracken continues:

It may be noted...that the computer does not solve the problem. Instead, it helps to explore alternatives. We do not ask the computer, "How shall we build this new device?" but rather, "How would the device work under this set of conditions if we built it this way?" ...The computer cannot enumerate the design considerations, specify the operating conditions to be investigated, or determine the goals or the tradeoffs among the conflicting goals. It can usually offer us great assistance in predicting the consequences of our choices in these matters.²

The thrust behind the miracle of the computer is the speed and complete accuracy of the equipment. The computer at the University of Missouri-Columbia will handle two billion pieces of information and two million instructions per second.

In terms of accuracy, the computer does not make mistakes. If there are errors in the output from a computer it is because of incorrect programming. There is a favorite expression around computer facilities, "GI = GO," which means garbage in, results in garbage out. In the last election, while computers were being used as an aid in predicting the state and national winners, the Boone County, Missouri, election board obtained the use of a computer to count the results of balloting. Several hours of delay as

²Daniel D. McCracken, A Guide to Fortran IV Programming, (New York, London, Sydney: John Wiley & Sons, Inc., 1965), p. 1.

a result of "wrong answers" gave people at election headquarters embarrassing moments until it was discovered that the computer was programmed to re-add the subtotals into the grand total. One change in directions apparently solved this problem. This is an example of a human error causing a computer to calculate incorrectly.

One should quickly point out that this miracle machine is just a tool made up of wires, switches, lights and buttons which can only add and subtract very rapidly.

Early Uses in Agriculture

After Mr. Morse developed his telegraph in 1844, a number of people started to work on printing telegraph systems...As the age of the computer emerged and a gradual marriage occurred between data processing and data communication, the requirements for teletypewriters...or data terminals as they are now called...changed rapidly.³

Early usage of computers in agriculture is reported to have had its beginnings at Michigan State University where a computerized farm record system was started in mid-1950's.⁴ Dairy Herd Improvement Associations (DHIA) were early users of computers to process milk and butterfat

³Roger H. Klick, "Teletype Data Terminals for Computer satellite Systems in Agriculture," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 8-13.

⁴Buel F. Lanpher, "Use of Computer Remote Terminals in Agriculture Extension Programs," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 118.

records for dairymen on individual cows and herd averages. During the sixties, the Ohio State University Soil Testing laboratory reported the results of lime, phosphorus and potash tests to farmers. Agribusiness firms such as meat packing and feed companies have been using computers for planning and feed formulations for several years. In Europe, prior to 1965, virtually no application of computers could be found except for a few large feed companies.⁵

Thus, we find that the life of computer usage in agriculture is just in its teens while the great bulk of computer usage, particularly as a management tool, is just in its infancy.

Computer Systems and Equipment

In order for a computer to be of any service, methods of getting information to and from the unit is essential and several options are available, both for input and output. Computers are designed to take information from cards, paper tape, magnetic tape, magnetic discs or from electronic sound such as emitted from a touch-tone telephone.

Answers, or output as it is called in the industry,

⁵Rudolf P. Burke, "Computer Satellite Systems and Their Uses and Applications to Agriculture in Europe," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 81.

may be in the form of printout on paper, magnetic tape, magnetic discs, television tubes and even audio over-speakers or the telephone. "Computers have achieved the ability to talk; many times the user can choose between a male or female voice."⁶

Input and output equipment may be located beside the computer but more often than not one will only see the input and output equipment at a separate location from the computer.

Due to increased costs of the larger more sophisticated computers and the type of specialized personnel required for maximum efficiency in the use of the large computers, the industry has rapidly moved away from in-house computers to the use of terminals and time-sharing of the computers. Reed Taylor explained the use of terminals like this:

Terminals are normally the only piece of equipment one sees in a computer satellite system. They range in cost and sophistication from a push button telephone to a high speed line printer or television tube type of viewer (CRT). The lease cost of a terminal ranges from a few dollars a month to several thousand. Many operate over regular telephone systems while others require special high-quality lines. Terminals are located anywhere from right next to the computer to a distance of several thousand miles. As far as the user is concerned, the terminal

⁶Reed D. Taylor, "Computer Satellites in Agriculture-- An Overview," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 1.

represents the total system. Technology in remote access terminals is rapidly advancing.⁷

Time-sharing is involved when many firms, each with their own terminals, share a common central computer. Distance itself is not necessarily a problem. "A customer in Los Angeles, for example, can dial a local number and be using a computer physically located many thousands of miles away."⁸ Honeywell/G.E., the leading supplier in Europe are linked via satellite to the General Electric computer center in Cleveland, Ohio.⁹ Thus we see the international scope of some computer utility companies which are in the business of supplying computer power to customers.

J. Garrett Fitzgibbons, President, MRX Sales and Service Corporation reporting upon V.P.I.'s success says, "...within thirty minutes, the institute (V.P.I.) reports it can 'put a man in business' by teaching him how to call up the central processor, how to sign on and call up his proper program, and how to enter data. Then all he does is wait for his reply to be generated and fed back through the terminal." Fitzgibbons goes on to report that due to increasing line charges, telephone rates are the single biggest cost of the program--far exceeding computer time

⁷Ibid., p. 2.

⁸Ibid., p. 3.

⁹Burke, loc. cit.

according to V.P.I. reports.¹⁰

Current Computer Uses in Agriculture -
Aids to Management

Today, more than 15,000 farm enterprises throughout the United States rely on data processing services to resolve and simplify some phases of their operations. The potential, however, is much greater. According to Data Management Magazine, it is estimated that any farmer who grosses \$10,000 or more a year can justify some data processing services, putting potential users at around one million.¹¹

Current uses of computers in agriculture may be explained in several ways. The author has chosen three methods of doing so: first, to briefly describe the typical DHIA usage; second, to highlight some industry approaches; and, finally, to show some of the services provided by universities.

In August 1972, Dairy Herd Improvement Association (DHIA) of Utah processed records for 460,000 cows in 4,700

¹⁰J. Garrett Fitzgibbons, "The Benefits of High-Speed Printer Terminals in Agricultural Computer Satellites," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 8.

¹¹John W. Luke, "Remote Data Processing in Agriculture," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 40.

herds from seventeen states, Mexico and Colombia.¹² In this program, dairymen can include their own specific goals regarding management of their herds. The monthly printouts include updated individual cow records showing: value of product, income over feed costs, and income over total costs. The herd reports include: relative performance of each cow in the herd, feeding information, cows to be bred, cows to turn dry, lead feeding cows soon to calve, and cows to cull.

Beef production testing is a combination of programs offered by universities and Production Registry International. Generally, the information provided includes 205-day and yearly adjusted weight gains for each animal, plus indexing and ranking each against the herd average. The time consuming job which is eliminated by the computer is separating calves by sire group and updating individual cow production records.

Computone Systems, Inc. of Atlanta, Georgia provides least-cost formulas, product pricing and inventory control for production and nutritional management information.¹³

¹²Bliss H. Crandall, "Dairy Cows and Computers, A Dairy Herd Management Information System," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 57-58.

¹³Fitzgibbons, op. cit., p. 6.

The company has approximately 45 feed-formulating and meat-packing customers around the United States. In 1965, they installed fifteen-character-per-second terminals for each subscriber location. They have recently converted to sixty-character-per-second terminal printers. These new terminals have cut transmission time from five minutes to one minute per formula, resulting in a 60 percent to 70 percent reduction in telephone line charges for customers.

Kenneth H. Maddy, President of Maddy Associates, Inc. advocates the following summary of information that should be available for management control of animal production operations:

1. Availability, cost and current inventory of all raw materials.
2. Nutritional requirements for all animals being fed, not for maximum growth but for maximum profit return to the operation.
3. The LP formulations for all feeds to be produced.
4. A realistic economic evaluation of all raw materials in relation to projected price and availability of supply.
5. The economic value of essential nutrients in relation to their level of use for each type of animal being fed.
6. Future raw material requirements in relation to the animals being produced, the production and

storage capacities of the mill, and estimated future costs of each raw material.

7. The optimum allocation of raw material supplies to feed products for maximum profit for the total animal production operation.
8. The control of raw material quality through the adjustment of formulations to compensate for changes in nutrient variability between batches of any raw material.
9. Animal production record systems that will not only produce current production and economic data and comparisons, but also produce performance reference standards for future use.
10. The ability to produce from all data generated, clear concise reports that provide only the information essential for making the necessary management decisions.

Each of these ten requirements places additional demands on management to provide better control of all phases of animal production operations as well as to make decisions with greater precision in order to maintain profits. When animal production was a relatively simple situation where the farmer fed the number of animals required to consume excess feed supplies, or to utilize available manpower resources, and received in return whatever price the market would pay, there was little need for business judgment,

since few alternatives existed. Today, however, the production of animals for food is a highly complex, marginally profitable business.¹⁴

Estate planning is a service provided by Computone Systems, Inc. of Atlanta, Georgia.¹⁵ Their programs enable the large estate holder to clearly see the need for planning and enable him to determine the estate liquidity requirements as well as assist his attorney in evaluating alternative types of wills and trusts.

"Cattle-Fax" provides a marketing information service to member cattlemen.¹⁶ Data is collected from all feedlot members weekly or daily and twice yearly from cow-calf producers. Rapid compilation of inventories provides a weekly "cattle-on-feed" report. In addition data can be maintained on an individual, state, regional or national basis.

¹⁴Kenneth H. Maddy, "The Application of Computer Systems to the Animal Production Industry," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 62.

¹⁵Thomas C. Newbill, Jr., "Yesterday, Today, Tomorrow," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 73.

¹⁶Topper Thorpe, "Cattle-Fax," Proceedings of the First International Conference on Computer Satellites in Agriculture, (Columbus, Ohio, 1972), p. 78.

The first university to be discussed will be Michigan State University. Computers were being used in Michigan, for farm record keeping in the late 1950's. It appears to be a leader in the use of computerized programs for agricultural management purposes. Their major thrust began in 1967 when, with the help of financial support to the Agricultural Economics Department from the Kellogg Foundation, an experimental program was started to explore the use of computers in extension education, through telephone communications. They call their system "The Telplan System." Steven B. Harsh of Michigan State has prepared an overview much of which is produced below.

The Telplan System is a hardware-software computer package designed to answer specific farm management, agribusiness management, nutrition, engineering and family financial management questions. The programs in the system can be remotely accessed with either touch-tone telephones or printed terminals. Telplan has been in operation slightly more than two and one-half years. Initially, the use of the system was confined to extension specialists and field staff of Michigan. Since then, the usage has been expanded to include extension services of other states and some agribusinesses. Table 1 reflects the usage of the Telplan System during these two and one-half years. As can be noted, the usage has increased over time with the expectation that the number of analyses in

1972 will approach 9,000.

TABLE 1
TELPLAN USAGE--TOUCH-TONE SYSTEM
NUMBER OF ANALYSES

User Group	1970	1971	First 6 Months Of 1972
M.S.U. Specialists	1,040	1,605	723
Michigan Field Staff	983	3,282	1,903
Univ. Spec. From Other States	159	770	1,187
Extension Field Staff From Other States	0	294	672
U.S.D.A., Agri- business And Others	<u>237</u>	<u>34</u>	<u>85</u>
TOTAL	2,419	5,985	4,570

The states involved--or those planning to be--in using the Telplan System in their Extension educational work are detailed in Table 2. All the university users are charged a fee (fee ranges from \$2 to \$3 for a first analysis and \$0.30 to \$1 for an adjusted analysis) for the operation of the programs. The fee is used to cover the variable operating costs of executing a program (e.g., connect charge, and an indirect labor cost charged by the Computing Center) plus an amount to cover some of the fixed costs associated with maintaining the system (e.g., storage

costs, minor improvements in operations, etc.). The source of funds used to pay the computer charges vary among the states and ranges from using special grant funds to passing the charge on to farmers. Furthermore, the users are responsible for their terminal rental fee (usually the fee for the touch-tone telephone is \$5 to \$10 per month).

Over 40 programs are available in the system. These programs encompass several disciplines. Furthermore, the development of the programs have not been confined to Michigan State University. Other universities which have contributed parts of programs to the system include the University of Wisconsin, University of Minnesota, University of Illinois, Ohio State University, University of New Hampshire, and Cornell University. Other universities are also encouraged to add programs to the system.

Several agribusiness firms have made inquiries on the possibility of using the Telplan System in their business to better serve their clientele. To date, the following firms are using, or are in the process of installing equipment to use, the Telplan System on an experimental basis:

TABLE 2
EXTENSION USE OF THE TELPLAN SYSTEM
SEPTEMBER 1, 1972

State	Campus Terminals	Field Terminals
Michigan	6	34*
Minnesota	2	7
Wisconsin	2	6
New York	2	0*
Illinois	2	6*
Indiana	1	0
New Hampshire	1	3
Oklahoma	1	0
Ohio	2	1
Kansas	0*	0
North Carolina	0*	0

*States have tentative plans to increase this number of units in the near future.

NOTE: Also CANFARM (Canada) is experimentally using the system.

FIRM	USED BY:
Wolverine State Bank Sandusky, Michigan	Loan officers in charge of agriculture loans to evaluate the economics of loan requests.
Farm Bureau Services Lansing, Michigan	Six district feed representa- tives to balance rations.
Wolverine Feed Company Martin, Michigan	Three feed representatives to balance rations.
Doane Agricultural Service St. Louis, Missouri	Head office management consultants in the manage- ment of farms.

Currently, the agribusiness firms using the system are paying all telephone costs, terminal rental and a fee to access the programs. This fee is similar to that charged other university users except it is approximately 25 percent higher. The extra 25 percent is used to cover some of the costs involved in developing and refining these programs. In addition, each agribusiness firm is being charged an annual fee which allows them access to the Telplan System. This fee is \$25 per project account which entitles them to one authorization code. For each additional authorization code under the project account an additional \$2 fee is charged.¹⁷

"Computerized Management Network" is the tag placed on the computer systems available from Virginia Polytechnic

¹⁷Stephen B. Harsh, "The Telplan System: An Overview." Michigan State University, 1972, p. 1-4. (Mimeographed)

Institute.¹⁸ A grant from Special Needs Funds, Extension Service, U.S.D.A. to the Department of Agricultural Economics lead to the major thrust being made by V.P.I. Their system includes the use of a telephone to connect a terminal to the central computer. The appendix includes a list of programs which were available in April of 1972. Five other programs scheduled to be available include:

DAIRY Dairy Cow Nutrition Program
 MACH1 Penn State Machinery Cost Program
 INVMO Missouri Investment Analysis Program
 GROCR Nutritional Grocery Shopping List
 SDREC Simplified Dairy Herd Record Program

V.P.I. also provides an information retrieval system. As an example, if a county agent wants information on control of insects or weeds in peanuts, he instructs the computer to list the titles of peanut related programs, then the terminal prints out the following:¹⁹

Control of Spider Mites on Peanuts
 Control of Thrips on Peanuts
 Florunner peanuts
 Broadleaf Weed Control in Peanuts

Following this listing, the agent can request detailed

¹⁸Harold W. Walker, "Computerized Management Network, A Brief Explanation." (Mimeographed) Virginia Polytechnic Institute, 1972, p. 2.

¹⁹Ibid., p. 8.

information on the particular problem of interest to him.

The Purdue history of computer use started with workshop sessions, most notably with groups of farmers. This workshop approach, sometimes involving specialists from several departments and utilizing the computer to do part of the teaching, appears to be a very powerful teaching tool.²⁰

Other states like Oklahoma, Ohio, Minnesota, Pennsylvania, and Wisconsin are in various stages of development and use of computer programs as aids for management decision making. Most of these include access to either Michigan State's or V.P.I.'s programs and computer.

In Missouri, farmers have access through their local Extension specialists to several computer programs:

DHIA for dairymen

Soil testing results and recommendations

Farm Record Keeping, including enterprise analyses and income tax depreciation schedules

Dairy, beef and swine least-cost feed formulations

Farm planning, using budgets of alternative plans

Investment analyses, including profitability plus cash-flow consequences.

²⁰Robert J. Rades, "Comprehensive Computer Management Systems," Proceedings of Seminar on Current Use and Immediate Potential of Remote Terminals in Extension Programs, (Blacksburg, Virginia, 1971), p. 72.

By summing up all of the computerized programs available from industry and universities, one can see that the computer programs currently available as aids in farm management decision making are impressive as to breadth and depth. Yet the surface appears to be hardly disturbed in terms of kinds of programs and methods of making them readily available to our nation's agriculture.

Investment Analysis Programs Relating
to Farm Financial Management

Generally, when someone mentions 'financial management', the first thing we think of is credit. But that is too narrow a conception. Financial management, as considered here, concerns not only credit, but all of the capital resources available to the business manager. Further, it concerns not only their acquisition, but also their use.²¹

Several computerized programs have been developed in this country as tools to aid in determining the consequences of changes in farm investments. As mentioned earlier, Michigan State University was one of the pioneers in developing computerized programs for agricultural purposes. At least three of their programs available via the Telplan Programs, using touch-tone telephone, relate to farm financial management. The "Capital Investment Model," which includes buying or custom hiring, evaluates the investment of capital to reduce or eliminate costs, or to

²¹Edward E. Carson, "Financial Management for Growth." Purdue University, January 23, 1973, p. 1. (Mimeographed)

generate new income. A second "Capital Investment Model Under Risk Conditions," evaluates the investment capital in situations where income and/or expenses are subject to substantial yearly fluctuations, including irrigation and frost control equipment. A third model is designed to select the best depreciation method considering one's tax bracket and other uses for capital.

Major programs from Virginia Polytechnic Institute relating to farm financial management include the Missouri Investment Analysis Program, Buy vs. Custom Hire, Cash Flow-Farm Planning System, and programs to evaluate the purchase of milk-bases by dairymen.

Economists at Purdue University have developed long-range swine and corn programs as well as a financial management budget. The corn and swine programs are designed to optimize equity after a five-year planning horizon.

Oklahoma has produced both a Crop Budget Generator and a Livestock Budget Generator for public use.²² These two programs are used for developing and maintaining enterprise budgets.

In Illinois, Baker has done considerable work using linear programming to research the financing and managing

²²Rodney L. Walker and Darrel D. Kletke, "The Application and Use of the Oklahoma State University Crop and Livestock Budget Generator." Research Report P-66, (Oklahoma State University, July, 1972), p. 1.

of farm firm growth.²³ His work includes: investments, credit, financing, plus other variables related to financing and managing the growing farm firm.

Most states have some sort of hand-calculated farm budgeting procedures to aid in determining the effects of major changes in farm investments.

²³C.B. Baker, "Financial Organization and Production Choices." American Journal of Agricultural Economics, 50(5), December 1968, pp. 1566-1579.

CHAPTER III

COMPLETE FARM BUDGETING

Analytical procedures and forms will be discussed in this chapter. Comparison between the "complete farm budgets" currently used in Missouri and the new "complete farm budgets" developed during the course of this research will be made.

From the beginning of the Balanced Farming Program in Missouri, more than thirty years ago, complete farm budgeting was an essential procedure in comparing the potential economic returns from alternative farming systems. The early-day conventional budgeting included very detailed estimates of total cash income, total cash expenses, net cash receipts, specific inputs and investments required, etc. for each alternative plan under consideration. This method proved to be quite time-consuming and easier approaches were developed in later years as described below.

The new "complete farm budgets" resulting from this study were generated in part from the budgets currently in use in Missouri; hence, the combining of the "current" and the "new" in this chapter. A complete set of the new forms can be found in Appendix I.

Two systems of complete farm budgeting are currently used in Missouri and will be described and discussed as forerunners to budgets developed in the third section. The first is a block budgeting system designed for hand calculations while the second is a computerized system to compare alternative farm plans.

Current Block Budgeting

The block budgeting method emerged from a complete farm budgeting process which accompanied the Balanced Farming Program popularized in Missouri over the past three decades. Block budgeting is designed as a method for quickly comparing several alternative farm management plans which an individual farmer may wish to consider. Both crop and livestock budgets use a simple but effective "income-over-variable costs" approach. Investment capital per unit of livestock is included in the livestock budgets. Interest on variable crop costs per acre are included in the crop budgets for simple comparisons.

More specifically, only two figures are needed once the correct crop budget is selected: income-over-variable costs per acre and total hours of labor required per crop acre (Appendix II). The crop block budget begins with the projected or estimated yield per acre times a projected or estimate price to arrive at a total gross income per acre. From this figure, the following variable costs are

subtracted: lime and fertilizer; machinery costs; custom machine hire; seed; herbicides; insecticides; drying; irrigation; and interest on the above variable costs. The residual is called "income-over-variable costs" and does provide for placing a value on pasture whether used completely or not.

Livestock block budgets are developed around the livestock unit concept which generally considers one animal to be a unit with the exception of one beef cow and calf, one litter of pigs, one thousand laying hens, ten thousand broilers, or one thousand turkeys defined as an animal unit. The beginning point is the gross receipts per animal unit. (For breeding animals a proportion of a cull animal is included in gross receipts). From gross receipts is subtracted: cost of feeder-type animals; values of grain, hay, silage, and pasture required to feed the animal unit through the production period; protein, minerals, and feed additives; veterinary and drugs; marketing and transportation charges; sire depreciation on breeding animal units; personal property tax and insurance; and a miscellaneous charge. For breeding animal units, these charges are all calculated to include sires and replacement animals. Samples of livestock block budgets and a livestock budgeting summary form are included in Appendix II.

Again, the residual figure is the income-over-variable cost to be transferred to the livestock planning form used in the complete block budgeting procedure. Feed costs are included without regard to where they are grown (that is either from off or on the farm). Hours per animal unit and total animal unit investments are provided for transfer to the animal planning form.

The block budgets outlined above for crop and livestock enterprises ease the task of comparing alternative farm plans. Additional summary worksheets are provided to summarize all of the relevant calculations essential for complete farm budgeting and analysis. In this block budgeting procedure, undistributed costs on land, buildings, improvements, machinery, and equipment are removed from total income-over-variable crop and livestock costs.

Farm Business and Financial Management Computer Budgeting

The computerized budgeting procedure developed at Purdue University by Dr. E. E. Carson and modified at the University of Missouri-Columbia by Dr. Herman Workman, forms the basis for the new transitional computerized farm budget. In contrast with block budgeting, the computerized version uses total cash receipts and total cash costs in developing crop and livestock budgets.

Unique features of the computerized procedure include: comparing alternatives to the present system; an

income tax and social security subroutine; and calculations of the values of surplus grain and forages about livestock needs. The computerized method is based on a five-year average for each of the alternatives considered. Depreciation, interest, and net worth are calculated on a five-year planning horizon. Each alternative plan includes a comparison of changes between the present system and the particular plan under consideration. Each plan allows for investments actually required to update farm assets, liabilities, debt payments, and depreciation.

After the farmer determines the major changes needed to make a certain alternative plan feasible for his farm, he estimates the productivity levels for the enterprises included, records his current assets and liabilities, and sends the plan to the computer. A few seconds of computer time, at less cost than a box of cheap cigars, provides comparisons to aid a farmer in decision making. Appendix IV show the printouts received from the computerized system.

New Farm Budgeting Methods

This research led to the development of two new farm budgeting procedures. The first is a hand budgeting procedure where total gross receipts and cash costs are incorporated into the block budgeting procedure. The actual figures are obtained from the existing block budgets.

The second new budgeting procedure developed involves a computerized five-year transitional farm budget. After a suitable alternative plan is reached, the new computerized budget carries the new plan forward with appropriate investment and balance sheet changes in each succeeding year.

Hand Farm Budgeting--Cash Method

As indicated earlier, an acceptable method of comparing alternative farm plans was developed using block budgeting and the income-over-variable costs approach. In two farm management courses, both the block budgeting and the Farm Business and Financial Management Computerized Budgeting systems were used on the same alternative farm plans. Some small differences showed up in the results, primarily due to the different methods of calculation. For this reason, it seemed desirable to investigate the construction of both a hand budgeting procedure and a computerized program which would give essentially the same results.

The first form of the new system consists of a map of the whole farm with each field numbered or lettered for later reference. The second form provides for a scale drawing of the main farmstead area for ease in locating new facilities needed for alternative farm plans. Neither of the beginning forms was changed from the original block

budgeting method. Form 3, (Appendix I), was developed to aid in classifying the land resources and determining the total land value, excluding buildings and improvements.

Two methods of computing the land values are provided: the first includes a summation of the acreage of each class of land and multiplying the total by its estimated value per acre; the second involves an estimation of the current sale value of the total farm real estate and then deducting the value of the residence and other farm buildings and improvements. This gives a residual value for the land which may be more easily computed.

A knowledge of a farm operator's investments and equity position is essential in order to analyze effectively the consequences of alternative plans under consideration. This becomes crucial in determining how much additional debt a farm operator is able to "take on."

A summary of Resources and Financial Statement is recorded on Form 4 (Appendix I). Farm assets, as well as non-farm assets and liabilities, are drawn from the individual's personal records or the supplemental forms described next. Farm liabilities are included to complete the net worth statement on Form 4.

Form 4A (Appendix I), Machinery and Equipment Inventory, was developed for those operations without an inventory of crop and livestock machinery. This form includes a separate listing for crop as well as livestock

machinery and equipment and space for computing annual depreciation charges.

Form 4B (Appendix I), Buildings and Improvements and Grain, Feed, Fertilizer, and Supplies inventory, also is designed for those operators without current inventories. Allowance for annual depreciation is provided for buildings and improvements. Form 4C (Appendix I), provides an inventory of livestock including depreciation for purchased breeding animals. Non-farm assets and liabilities are recorded on Form 4D (Appendix I).

Since most of the investment in many farm operations evolves around the land, the Cropping System Summary is recorded on Form 5 (Appendix I). In addition to a listing of the major crops grown in Missouri, acres, yields, variable costs, and direct labor are calculated and totaled for the entire farm plan. Provision is made to convert feed grains to a corn equivalent basis for ease of determining the balance between livestock feed requirements and home grown grains. Variable costs and direct hours of labor can be obtained directly from the crop budgets developed by the Area Extension Farm Management Specialists. Totals are then transferred to subsequent forms for further use.

Form 6 is designed to assemble the livestock enterprise information. Coefficients on Form 6 (Appendix I) include feed, labor, and non-feed variable costs per unit

of livestock as well as the gross receipts expected per unit of livestock. Coefficients can be taken directly from the livestock block budgets found in the "Missouri Farm Planning Handbook" with any modifications considered necessary for the particular situation. Total feed requirements are transferred to Form 7 (Appendix I) while other totals are transferred to Forms 8 and 9 (Appendix I).

Form 7 is provided for computing the feed balance and crop income. Here total crop production from Form 5 (Appendix I) and total livestock feed requirements from Form 6 (Appendix I) are combined to determine either the total feed deficits or the surpluses available for cash sales. If a particular feed need is deficient from farm crop production, a negative value is placed in Column 6 to be added algebraically to the total value of crop production for sale. The total from Line 21 is transferred to Form 9 (Appendix I) for subsequent use.

A summary of the particular farm plan under consideration (whether it be the present one or one of several alternative plans) can now be made. Labor and expenses are summarized on Form 8 (Appendix I). The labor summary draws total direct labor requirements for the crops (Form 5, Appendix I) or the livestock (Form 6, Appendix I) and provides opportunity to estimate indirect labor needs for such items as repairs and maintenance. Surplus or deficit labor needs are then determined. Total cash expenses,

including those charged to crops as well as to livestock, and undistributed costs, such as hired labor, rent, interest, and miscellaneous, are summarized on Line 21 of Form 8 (Appendix I). Since labor distribution could be crucial for the success or failure of any particular farm plan, Form 8A (Appendix I) was inserted unchanged from the block budgeting series of forms.

A cash summary is developed on Form 9 (Appendix I). This summary consists of total cash revenue from crop and livestock sales minus total cash expenses, the result is net cash operating income as a residual. From the latter, return to operator's and family labor, returns to total farm investment, returns to operator's net worth, and finally cash available for replacements and alternative uses can be computed. The information from this summary provides data for measuring and comparing alternative farm plans.

The farm planner can retrace the previously outlined steps for each alternative plan under consideration with major emphasis placed upon the changes in new investments on Form 10 (Appendix I), and changes resulting from different livestock and crop combinations. Changes in investments are transferred to Forms 3, 4A, 4B, and 4C (Appendix I), as additions to previously calculated asset values. Liability changes are updated on Form 4 (Appendix I).

Form 10 (Appendix I) is used only for alternative systems unless major investments are required to maintain the present plan as a viable alternative. Sections are provided for buildings and fences, land improvements, crop machinery and equipment, animal machinery and equipment, and livestock needs. Columns on Form 10 (Appendix I) provide space for assembling investments, and for computing the total investments and the annual depreciation charges for each. Thus, an effective method of farm budgeting by hand using total gross receipts less total cash costs concept can be used in comparing various farm plans.

Computerized Five-Year Transition Farm Budgeting

Once an alternative plan has been selected by the previously described method, or by any of several other methods, it is desirable to determine the short-run effects during a transition period. For this reason, a computerized program originally designed at Purdue and modified at Missouri was used as a basis for developing a transitional Farm Investment Analysis Budget.

Initially, the computer budget provided space for comparing the present system with up to four alternative plans. For this transitional budgeting, the program was modified greatly to allow one starting plan to be updated each year for five years to determine what might be expected during the transition period. The Farm Investment Analysis

Form 1 (FIA Form 1--Appendix III), permits the farm planner to enter the crops selected for the new plan for each of the next five years along with expected yields, prices, variable costs, and direct labor requirements. Variable costs and labor requirements can be obtained from the Extension-developed crop budgets (Appendix II) if the farmer's own records do not provide specific enough information. Non-farm business costs and returns can be included in the information provided on FIA Form 1 (Appendix III). It should be observed that the acres, yields, and prices need not be repeated each year if there is no change from previous years' estimates.

Livestock Budgets are prepared on FIA Forms 2, 3, and 4 (Appendix III). Coefficients can be obtained directly from the block budgets found in the "Missouri Farm Planning Handbook." Again, once a set of coefficients is "written in" for a given year, unless changes are anticipated only the livestock code need be inserted for remaining years.

Present farm and non-farm assets and liabilities are reported on FIA Form 5 (Appendix III). Should the farmer's own records not provide this information, Forms 3, 4A, 4B, and 4C (Appendix I) developed for hand calculated budgets and described in the previous section can be used as worksheets. Annual balance sheet information will be calculated and updated by the computer.

Changes in investments are recorded on FIA Form 6 (Appendix III) and include the following information: the years investments are to be made, the amount of investment, the expected life, the property tax rate, the insurance rate, the annual repair rate for buildings, and the loan information. All new investments are assumed to carry a 100 percent loan for planning purposes; this becomes clear when the computer output is explained. One should remember that in actual practice loans may or may not be required; however, for planning purposes a clearer total picture results when this assumption is utilized.

The final input information required for the computer includes undistributed costs--such as cash rent, hired labor, building repairs, property taxes, insurance, miscellaneous costs as an option, and finally depreciation on the current assets. FIA Form 7 (Appendix III) includes four items of miscellaneous information needed for the income tax and social security subroutine as well as for computing some key indicators for comparative purposes.

The input forms for the computer have been developed to reduce any unnecessary repetition of writing, in regard to entering the coefficients for crops, livestock, and undistributed costs.

Computer Output

The computer printout presents detailed information, starting with the present and including the expected results for each of the next five years (Appendix IV). The first page presents the acres of crops and units of livestock to be produced each year. Each year's feed surplus or deficit is reported, as are the hours of direct labor requirements. Page 1 also gives a Farm Profit Summary including key figures for comparative purposes.

A projected profit or loss statement is presented in Table 1 (Appendix IV). Here cash income from each crop or type of livestock is presented along with the variable cash expenses for each enterprise. Undistributed costs are presented with each being updated annually as described below.

Of the undistributed costs, building repairs, taxes, and insurance are increased depending upon the requirement of the new investments. Interest on debt is based upon two variables, outstanding debt and cash operating expenses. Interest is calculated on the outstanding balance of each debt calculated at each interest rate given. All variable cash expenses and undistributed cash expenses are charged at the rate of 4 percent (the assumption is that these costs are incurred for approximately one-half year at 8 percent annual interest). Regarding the miscellaneous charge, the farm planner has the option of estimating the miscellaneous expense for the present year's plan. In

the other option, the computer calculates miscellaneous expenses by taking the income over variable cash expenses and multiplies the residual times 2 percent. Finally, the greater of the two figures is printed out as miscellaneous expense. Thus, the total cash expenses are determined.

The residual of total cash income less total cash expenses is termed the net cash operating income. Depreciation, which is updated annually due to investment changes, is removed from the latter to determine the net farm profit before taxes. The non-farm profit is added to farm profit. Income taxes and social security then are deducted from total profit with the residual being net profit after tax. Income tax and social security taxes are computed on the basis of the number of families and dependents which share the total net profit before tax. Several key figures are reported in Table I for comparative purposes.

Profitability, Debt Servicing, and Payback are reported in Table 2 (Appendix IV). Profitability analysis includes: return to farm investment, rate earned on farm investment, return and rate earned on operator's net worth. Line 7, on Table 2, shows the annual change in farm investments, considering the annual reduction due to depreciation as well as new investments.

In determining debt servicing, the computer starts with net cash income from Table 1 (Appendix IV) and subtracts income tax and social security payments and the

estimated family living costs to determine the cash available for debt servicing; machinery, equipment and building replacements; and alternative uses. Next, current loan payments, total scheduled principal payments, and a replacement allowance are removed with the residual being the cash available for alternative uses. This final figure indicates whether there is sufficient cash generated to pay all of the farm expenses plus taxes and family living costs without "living off" the depreciation.

A calculation is also made to determine how many years would be required to pay off all intermediate and long-term debts if all cash available were diverted to debt payment. The final figure reported in Table 2 (Appendix IV) is the net change in liabilities after both annual principal payments and new investments are considered.

Thus, several key analytical figures are presented in Table 2 regarding profitability and debt servicing.

Table 3 (Appendix IV) consists of both a balance sheet and four ratios for analysis.

The cash portion of assets in the balance sheet includes cash in the farm account at the beginning of the year plus cash available for alternative uses, Table 2, Line 17 (Appendix IV). Cash accumulates each succeeding year.

The three remaining assets include: current, intermediate, and long-term assets less depreciation. New

investments are added to the latter three items less their annual depreciation. All of the latter three asset items include farm as well as non-farm assets.

Three items are included in total liabilities-- current, intermediate, and long-term farm and non-farm debts, less the annual principal payments. Current loans are assumed to be paid off each year (Table 2, Line 14), except when cash is insufficient. Net worth is the usual figure representing total assets less total liabilities. This is a key comparative variable to aid in evaluating the feasibility of a particular farm plan.

The first of the summary ratios is debt to net worth which indicates the amount of borrower capital per dollar of owner capital. The income to expenses ratio indicates the cash income generated per dollar of cash expenses. Debt servicing compares principal and interest payments to net cash income or, stated in another way, it is the percent of total cash income which is required to meet debt obligations. The final ratio is capital turnover which indicates the number of years needed to produce income equal to the farm investment. Hence, as was true of other tables, the Balance Sheet and Analysis Table provide several key indices for evaluating the merit of a particular farm plan.

Farming, like other types of business, is not completely predictable regarding expected future prices. For

this reason, two additional tables (Tables 4 and 5, Appendix IV) were added. With this program, the computer will automatically recalculate farm income by increasing 20 percent and by decreasing 20 percent both crop and livestock price levels. Then several key indicators are calculated and printed out for further evaluation. It is interesting to note the changes in the net cash operating income, net worth, and cash available for alternative uses, as well as the eleven other key figures. The farm operator has the option of changing the percentage of price increase or decrease for the five-year period, since some types of major farm enterprises may tend to fluctuate at a rate predicted to be other than 20 percent.

The above transition period analysis could be valuable in helping an individual or a lender determine the worth of a contemplated farm investment. One must keep in mind that the output will be of no greater quality than the information put together for the computer to analyze.

CHAPTER IV

NEW HAND BUDGETING FORMS DEMONSTRATED

Proposing the use of a new series of farm budgeting procedures and obtaining acceptable results from using the proposed systems are two different things. It is important to demonstrate the latter if the systems are to be used outside of the course of research and study for this dissertation.

In this chapter the new hand budgeting procedure will be demonstrated on a farm selected from among those on the Missouri Main-In Record Program, with records extending back over six years.

The example farm is a "family farm" located on some of the better upland soil in Saline County, Missouri. The farm, totaling about 300 acres, is primarily a grain-hog and cattle feeding operation. Nearly one-half of the land is devoted to the production of corn with soybeans primarily rounding out the cash crop production. Production of wheat and oats has declined over the past few years. Fifty to 70 acres of pasture have been maintained over the past few years. Approximately 100 head of cattle are purchased each fall, wintered on silage and some grain, and either fed out or sold as heavy feeders. Six years ago, 73 litters of hogs

were farrowed and finished. The swine enterprise has increased to nearly 150 litters farrowed and finished with most of the feed requirements being produced on the farm.

Most of the labor to operate the farm comes from the operator and his son, plus a minimum of help from other family members.

Much of the depreciation on buildings had been claimed prior to 1964. During the last nine years, considerable amounts of grain storage and feed handling facilities have been constructed. A new farrowing house and a modern swine finishing building were added recently. Details on these new facilities will be discussed later in this chapter.

In the next few sections of this chapter, the farm enterprises for the year 1967 will be discussed, as entered on the new hand budgeting forms in the Appendix, to represent what might be called the "base year" or "present system."

New Hand Calculated Budgets Used with Example Farm

One of the first steps in developing a complete farm plan is to obtain a field layout map and a scale drawing of the farmstead. Forms 1 and 2 (Appendix I) are provided for this purpose. A field layout map and a scale drawing for the example farm are included in Appendix I.

Land value is determined on Form 3 (Appendix I) in

one of two manners: (1) either by evaluating each field by land class and selecting a per acre value for each class of land or (2) by using the alternative method on Lines 22-24 of Form 3. Both methods are illustrated in the example, but the second alternative method will be used. Line 22 indicates an estimated total farm value of \$157,000. By subtracting the estimated value of buildings and improvements (\$19,255), the residual is the total value of land (\$137,745) on Line 24. The major contribution of Form 3 is to provide the total land value for later usage. The total on either Line 21 or 24 is transferred to Form 4, Line 1 (Appendix I).

Early in the farm planning process, a summary of resources and a financial statement must be prepared on the farm business. Total assets, liabilities, and net worth are summarized and computed on Form 4. A summary of the farm assets and liabilities generally is available from the farmer's own records. Should this information not be readily available, supplemental Forms 4A, 4B, 4C, and 4D (Appendix I) can be used to obtain the information for Form 4. These are illustrated for the example farm.

The farm liabilities are first introduced on Form 4 and provide for annual interest and principal payment calculations. Total assets (Line 24) less total liabilities (Line 28) leave a net worth of \$197,698 in 1967 for the example farm as shown.

The cropping pattern for the "present" plan is developed on Form 5 (Appendix I). Total production of corn equivalents (13,580 bushels) from feed grains, 175 tons of silage, and 102 animal unit months (AUM) of pasture are transferred to Form 7 (Appendix I) to determine the surplus (deficit) over feed requirements in order that cash income from surplus (deficit) crop production can be determined. Total variable crop costs of \$11,340 and direct crop labor requirements of 1,244 hours are transferred to Form 8, Lines 9 and 1 respectively (Appendix I).

Livestock production plans are summarized on Form 6 (Appendix I). For this example, 73 litters of hogs on a farrow-to-finish program were produced. Feed requirements, labor, non-feed variable costs, and gross receipts per litter were taken from Table 10-1 (Appendix II) of the Missouri Farm Planning Handbook. One hundred cattle were purchased and fed. The per steer requirements of feed, etc., were obtained from Table 12-5 (Appendix II) of the handbook. Total livestock requirements were obtained by multiplying the units of livestock times the appropriate per unit requirement for each of the variables. Feed requirements were transferred to Form 7, while total labor requirements of 1,568 hours and non-feed variable costs of \$29,719 were transferred to Form 8, Lines 2 and 10 respectively (Appendix I). Total gross receipts from livestock of \$60,983 are transferred to the Cash Summary, Form

9, Line 2 (Appendix I).

Feed balance for the base year and the crop income were computed on Form 7. Entries for Column 2 are drawn from Form 5. Grains intended for direct livestock feeding are converted to corn equivalents and transferred to Form 7. Total production of grains is recorded on the same form without conversion to a corn equivalent basis. Total tons of hay production and total AUM's of pasture also are carried forward from Line 22 of Form 5. After subtracting total livestock feed needs, which were summarized and transferred from Form 6, the crops available for sale are multiplied by their respective prices to get the total cash income from the sale of each crop. Crop production available for sale as obtained for the example farm represents a value of \$8,044.70.

Labor requirements and expenses are summarized by using Form 8. The labor summary aggregates the total direct labor requirements for crops and livestock then adds to it an allowance of 10 percent for indirect labor needed for items such as weed mowing, repairs, and upkeep of buildings. A determination is then made, after allowing for operator and family labor, of hired labor requirements. In the example, 200 hours or one month is estimated to be the extent of additional labor needed.

To begin the cash expense summary, variable crop and non-feed variable livestock expenses are obtained from

Forms 5 and 6, respectively. Total distributed variable expenses amount to \$41,059 for the example. Next undistributed costs are summarized. Real estate taxes, insurance, and building repairs are estimated to be approximately 1.5 percent of total investments. Cash rent and hired labor are entered at the cost which the operator expects to pay. A miscellaneous charge is estimated to be 3 percent of the total distributed variable expenses (Line 11 of Form 7). Three entries are made for interest costs. The first is to cover interest on capital required for current operating expenses. Here 4 percent is charged against both the distributed and undistributed cash expenses. No additional interest is charged for current (less than one year) operating loans since an 8 percent annual rate (4 percent assumed for one-half year's operating capital) is charged for current operating capital. The second entry for interest is the actual payment made on intermediate and long-term debts. Finally, interest charges for new investments are added when applicable. Total cash expenses of \$48,494 on the example farm are then transferred to Line 4 of Form 9 (Appendix I).

A cash summary is incorporated into Form 9. Total cash expenses are subtracted from total cash farm income to get the net cash operating income of \$20,534. A return to operator and family labor and management of \$6,770 is obtained by subtracting depreciation and a 5 percent

interest charge on equity from the net cash operating income.

Other key figures obtained for the example farm on Form 9 include: \$15,172 return to total farm investment; \$12,555 return to operator's net worth; \$20,534 net cash operating income; and \$2,326 as cash available for replacements and alternative uses. To find the latter, income taxes, social security, family living costs, and loan payments are deducted from net cash income.

New investments or changes in investments are summarized on Form 10 (Appendix I). Appropriate subsections are provided for buildings and fences, other land improvements, crop machinery and equipment, animal machinery and equipment, and livestock needs. Columns on Form 10 allow for recording the year the investment is scheduled, the annual depreciation, and various cost breakdowns. Each subsection is totaled; then investments are accumulated on Line 30 while annual depreciation is accumulated on Line 31. Form 10 is to be used when changes in investments are anticipated for a new farm plan; hence, the form is generally not used with the present plan. Totals of each subsection should be transferred to Form 4, Line 7, to update the asset inventory for a new plan.

The next four forms (4A, 4B, 4C, and 4D) are optional. These are available should the farm operator not have current information on inventories, assets, and

liabilities. Form 4A provides space to record current value and annual depreciation charges for crop and livestock machinery, as well as related equipment. In this example, crop machinery and livestock machinery and equipment values of \$17,728 with annual depreciation of \$3,082 were taken from the Mail-In Record Report. A total machinery and equipment value of \$17,728 on Line 44 is transferred to Form 4, Line 2, along with the total annual depreciation of \$3,082 (Line 45).

Buildings and improvements are listed on the top half of Form 4B. Here space is provided for current value of \$9,255 as well as annual depreciation amounting to \$1,297. The totals on Lines 23 and 24 are transferred to Form 4, Line 3. Inventory of grain, feed, fertilizer, supplies, fuel, and other items are summarized at the bottom of Form B. In addition to listing the item, units of each item (whether tons, bushels, gallons, pounds, or cases) are recorded and multiplied by the unit value to get totals for each item. The \$19,614 from Line 39 is transferred to Form 4, Line 4.

Market and breeding livestock values are set forth on Form 4C. Columns under the market livestock subsection provide for listing the type of livestock, the numbers or weight (whichever is easier to obtain), the value per unit, and the totals for each. In addition, the subsection for breeding animals provides for recording annual depreciation.

Line 19 is a summary of the total depreciation to be transferred to Form 4, Line 5. The subsection totals from Lines 10 and 18 are added to obtain the total value of livestock for Line 20. The latter (\$23,076) is also transferred to Form 4, Line 5.

To get a complete picture of the farm operator's resources, it is desirable to include non-farm assets and liabilities. Form 4D provides for recording various assets and liabilities not directly a part of the farm business, including the personal residence of the operator. Should other houses on the farm be kept for farm workers, they may, depending upon bookkeeping procedures, be included as farm business assets. Non-farm assets (\$10,000), and liabilities (\$0) (Lines 13 and 20) are transferred to Form 4, Lines 23 and 27 respectively.

The final optional form to be discussed (Form 8A, Appendix I) in the proposed hand budgeting system is designed to analyze closely the labor distribution for the particular farm plan under consideration. Form 8A summarizes the labor requirements for crop and livestock production which was developed in Forms 5 and 6 respectively. From Form 8A, an operator can determine periods of high labor requirements. Generally, planting and harvesting periods are the two crucial times during the year when extra labor is needed and may require hiring seasonal labor or necessitate "long hours" for the farm operator, his

family, and available hired labor. The crop budgets which in the Missouri Farm Planning Handbook give a seasonal breakdown for each crop. This crop information along with the distribution of labor aids in determining the labor feasibility of a particular farm plan under consideration.

Up to now, the author has shown by example how the proposed hand budgeting forms can be used in analyzing a farm plan. For this example the year 1967 was used for the "present" year of the example farm. The next step in farm planning involves a critical look at alternative plans which will meet the goals set by the farm operator.

An Alternative Plan for Expansion

For the example farm, it will be assumed that the operator decided in 1967, that one of the alternatives worthy of his consideration included expansion of the swine enterprise. For this plan to be carried out, additional corn must be produced and stored. New farrowing and finishing facilities would need to be constructed since present facilities were getting obsolete and he wanted to double the size of the swine enterprise. During 1967 (considered as the present year), grain storage and handling facilities had been added, as well as a cattle feeding barn.

The five-year goal for the farm operator was to continue feeding 100 head of cattle and to double the swine enterprise. The number of litters farrowed and finished

would be increased to approximately 140 litters annually. Corn production would be increased to 150 acres; soybean plantings would drop to 50 acres; small grain production would be eliminated; pasture and corn silage production would be maintained at current levels; and 10 acres of hay would be added to the cropping enterprises.

An estimated \$28,000 would be required for new buildings over the next five years. The plan calls for some new hog houses (\$1,200) and a replacement for the cattle barn (\$2,700) during 1968 and 1969. A new farrowing house (\$11,000) and a hog finishing building (\$13,000) would be required during the latter part of the five-year plan. To maintain the cropping enterprises at the planned levels would require two new trucks and a tractor plus some tillage tools within the first two years at an estimated cost of \$13,500. A new corn planter and combine along with additional tillage tools costing an estimated \$20,000 would be required in the latter half of the five-year plan. Livestock related equipment such as a feed mill, hog trailer, feeders, and a manure spreader would also be required within a few years (\$7,000). Since the sow herd would be increased by saving gilts from the market hogs, only boars would be purchased at an estimated cost of \$300 annually.

The above plan was evaluated with a second set of hand budget forms with the results summarized in Table 3.

TABLE 3
PRESENT FARM PLAN AND ALTERNATIVE PLAN
(SWINE ENTERPRISE EXPANSION)

Item	Present Plan	Alternative Plan	Actual for 1972
1. Total labor require- ments	3,093 hrs.	4,127 hrs.	6,860 hrs.
2. Total cash farm income	\$69,028	\$85,576	\$111,011
3. Total cash expenses	48,494	58,567	74,598
4. Net cash operating income	20,534	27,009	36,413
5. Depreciation	4,379	9,686	10,254
6. Net farm profit before taxes	16,155	17,323	26,159
7. Interest on equity	9,385	14,164	8,018
8. Return to operator labor and manage- ment	6,770	3,159	18,141
9. Return to total farm investment	15,172	13,987	22,213
10. Return to operator's net worth	12,555	11,323	18,659
11. Operating loan and principal pay- ments	10,580	2,914	7,000 est
12. Cash available for replacements and alternatives	2,326	13,820	18,197

The alternative plan shows increases over the present plan in labor requirements, cash income and expenses, as well as depreciation. Depreciation nearly doubles from \$4,379 to \$9,686, while net cash operating income increases about one-third from \$20,534 to \$27,009.

Based upon projections for this alternative plan, returns to operator and family labor and management fall from \$6,770 to \$3,159. Returns to total farm investment and to the operator's net worth both decreased. A \$9,000 decrease in annual loan repayment from \$10,580 to \$914 increases annual cash flow. Cash available for replacements and alternative uses increases from \$2,326 to \$13,820.

The drastic reduction in loan payments in the alternative plan is due to the assumption that enough cash is generated during the transition period to enable all new investments with only a 10 percent loan. The remainder of the purchase price would be paid with cash accumulated from past years' profits and non-farm income.

Actual records for 1972 are shown in Table 3. Since farm prices in 1972 were considerably improved over estimates made at the beginning of the planning period (1967 base), profits and most other indicators were improved over the predictions made for the alternative plan. Total labor requirements are estimated to be considerably higher from 1972 farm records 6,860 hours as compared to 4,127

from the alternative plan). Part of this difference is due to methods of calculating labor requirements between the two systems. In the alternative plan, hours of direct labor is used as a base while "productive man work units" (PMWU) is the measuring factor in the Mail-In Record Program.

Both cash income (\$111,011) and cash expenses (\$74,598) were considerably higher in 1972 than indicated for the alternative plan. This resulted in a net cash operating income for 1972 of \$36,413 as compared to the prediction by the alternative plan of \$27,009. Actual depreciation (\$10,254) for 1972 was close to that predicted in the alternative plan (\$9,686).

Returns to the operator's labor and management (\$18,141), total farm investment (\$22,213), and operator's net worth (\$18,659) were all considerably higher, according to the 1972 actual records, than predicted by the alternative plan. This primarily is due to a one-third increase in net cash operating income in 1972 over the estimate for the alternative plan (\$36,413 actual as compared to \$27,009). The estimated \$7,000 operating loan and principal payment for 1972 is based on three assumptions: first, that there is a \$50,000 loan for intermediate and long-term debts; second, that 10 percent of these debts would be paid off annually; and, finally, that a \$2,000 annual operating loan would be incurred.

The increase in "cash available" from 1972 actual records of \$18,197 as compared to \$13,820 predicted by the alternative plan is due primarily to the higher livestock and crop prices in 1972 than previously anticipated.

Summary

An example farm was selected from the Mail-In Record Program to demonstrate the use of the new hand budget forms which have been developed. The steps in completing each new form were shown for the 1967 farm year, also called the "present plan." In addition, an alternative plan was completed (not included in the appendix) with the major results of both plans presented in Table 3. The operator can use the same procedures for comparing other alternative plans with the one currently in use.

The actual 1972 farm records were obtained from the Mail-In Record Program and several "key" figures were included in Table 3. Both farm expenses and farm income were considerably higher in 1972 than anticipated when the alternative plan was formulated. For this reason, most indicators were improved over the alternative plan.

The alternative plan expectations seem to indicate that doubling the swine farrow-to-finish enterprise and eliminating small grains with an increase in corn production would prove more profitable than the present plan. The 1972 actual records seem to "prove this out," granting that part

of the 1972 success is due to higher prices for farm products.

This chapter has consisted of a demonstration of the new hand budgeting techniques developed during the research and study for this dissertation. The new hand budgets appear to be a useful tool in comparing alternative plans with the present farming system.

CHAPTER V

A DEMONSTRATION OF THE NEW COMPUTERIZED FIVE-YEAR FARM INVESTMENT ANALYSIS PROGRAM

The second major task of this study (in addition to developing a new hand-calculated farm budgeting system) was to develop a computerized five-year farm investment analysis program.

It should be made clear at this point that the two budgeting systems are quite different in purpose and design. The hand budgeting procedure illustrated in the previous chapter was developed as a tool for long run planning in which the economic consequences of alternative plans for farm organization can be evaluated and compared, before committing resources to making adjustments. It was designed specifically to coincide rather closely with computer budgeting procedures currently available for long run planning. It provides a way of projecting the consequences of the "present system" of farm organization by applying selected crop and livestock enterprise standards which also are used in computing each alternative plan chosen for comparisons. In each case, computations are based upon some typical future year in which the plan is presumed to be implemented fully, with all changes and investments

completed and with the projected performance levels of all enterprises fully achieved.

The computerized farm investment analysis program illustrated in this chapter was designed for an entirely different purpose. It provides a way of evaluating the expected performance of the selected long run farming system during each year of the developmental period. It is a transitional process which permits an analysis of the economic consequences of year-by-year adjustments or changes in assets, liabilities, net worth, cash flow, and other key measurements. Experience indicates that the most troublesome years in making major changes in a farming system are in the transition period--the years when substantial major investments are made (and usually with borrowed capital) but also years in which the expected higher production and cash income have not yet been generated. This procedure is designed to help identify in advance some of the pitfalls and financial problems which may be encountered when changes are in progress.

It should also be pointed out that any budgeting system can be used in selecting the particular long run plan to analyze through the computerized farm investment analysis program. Once a particular plan has been selected for further analysis of the short run economic consequences, a proper input form can be completed for submission to the computer.

In this chapter, the computer input forms and the computer printout sheet will be demonstrated for the same example farm described and used in Chapter IV. To do this, certain figures were obtained from the Mail-In Record data from 1967 through 1972. The "present year plan" was for 1967 and the transitional years were for the five succeeding years.

Input Forms

The first page (see Appendix III) of the input forms provides for entering a name and address either of the person completing the forms or for the farm owner. Space also is provided for the farm or ranch name, a brief description of the proposed changes, the number of years (up to five beyond the present) of computations desired, including the present year and the current date. In addition, the farmer can have the key figures recalculated for his farm plan, under the assumption that farm prices increase or decrease by a predetermined percentage. If the farmer elects to omit this information, the computer will automatically calculate 20 percent increases and decreases in prices for the extra information provided.

The crop budget information is inserted in FIA Form I (Appendix III) with the same variables used in the hand calculations previously described in Chapter IV. Non-farm business information is excluded for the example farm. This budget includes information for five years beyond the

present year. For this example farm, actual acreages and yields from 1967 through 1972 were used, as obtained from the Missouri Mail-In Record Program. Crop prices, variable costs per acre and labor requirements were obtained from the crop budgets prepared for the "Show-Me Area Extension Program" (Appendix II).

Livestock budgeting information is entered on FIA Forms 2, 3, and 4 (Appendix III). The livestock enterprise data for each of the six years (present plus five in transition) are recorded. As in the crop budgets, the same livestock variables used in hand budgeting were inserted into the computer program. In the example farm, the number of units of livestock fluctuated during the six years but none of the other variables were changed. Hence, the variables were included on the first year's plan and are automatically carried forward in succeeding years.

Balance sheet data were inserted on FIA Form 5 (Appendix III). Assets included the following amounts: \$19,613 grain, feed and supplies; \$23,076 livestock inventory; \$17,739 machinery inventory; \$7,725 as current value on buildings; and \$144,750 land value. Again, these were the same figures used previously in handling the calculations of Chapter IV. No non-farm liabilities were included for the example farm. Farm liabilities, interest rates on those loans, and annual principal payment requirements were entered to complete FIA Form 5.

Investment changes for the plan under consideration are entered on FIA Form 6 (Appendix III). Since all changes usually are not made simultaneously, but are spread out over several years, the farm operator can indicate in which year investments will be made. For the example farm, the investments actually made from 1967 through 1972 were entered in column 11 of FIA Form 6. Entries in columns 21 through 51 (columns numbered as such for key-punching) were estimated for the example farm since this information was not available. Two FIA Form 6's were required for the example farm.

The final input form (FIA Form 7, Appendix III) required for the computer program includes undistributed costs and miscellaneous information. Expected expenditures for cash rent and hired labor are entered for each year of the plan. If blanks are left, the previous year's entry is carried forward. For the example farm, no cash rent was expected for several years. Hence, rather than inserting a zero, \$1.00 was entered for computational purposes. The remaining undistributed costs are entered for the present year only. The computer automatically updates the information in accordance with investment changes entered on the previous form. The four items of miscellaneous information can either be entered for each year of the plan or the computer will use the preceeding year's data. The input sheets then must be converted to computer language

via keypunched computer cards.

Computerized Printout of the Five-Year Transition Plan

The computerized printout of the example farm begins with a summary of the five-year plan, starting with present year, 1967 (Appendix IV). The crop acreages and units of livestock for each year are shown on the first page. The corn acreage has increased from 139 to 150 acres while the acres planted to soybeans have decreased from 87 to approximately 50 (60 in 1971 and 46 in 1972). Wheat and oats (indicated as "Other Crops") have been eliminated from the cropping system. The number of fed cattle has been maintained near the goal of 100 head annually. Swine production has nearly doubled, increasing from 73 litters in 1967 to 152 in 1971 and 132 in 1972. Production surpluses (deficits) of the major feed crops is also reported on the first page of the printout (Appendix IV). Corn will need to be purchased since insufficient feed grain is produced on the farm. Approximately 5,000 bushels of corn or its equivalent will need to be purchased when the farm plan gets into "full swing." Neither corn silage nor hay production will meet the livestock feed requirements even in the early years of the five-year transition period. Direct hours of labor needed for both crops and livestock shows an increase of about 25 percent (2810 hours to 3573 hours).

A farm profit summary is included at the bottom of the first page of the printout (Appendix IV), with the corresponding data generated in Tables I, II and III of the printout (Appendix IV). Note that net farm profit fluctuates considerably during the five transitional years, as does net worth. More discussion of the printout results will be developed as each of the following tables are discussed.

An estimated profit and loss statement is presented in Table I (Appendix IV), beginning with the estimated gross cash income from crop and livestock sales. Total cash income does increase in all but one of the years over the base year of 1967. Variable cash expenses for crops and livestock also increase as might be expected (Table 1, item 2). Undistributed costs (item 10) show considerable increases primarily due to higher labor and interest charges. Depreciation as reported by item 13 in Table 2 increases due to large fixed investments added to the present system. Net profit after taxes (Table 1, item 18) are down three of the five years which succeed 1967. The two years when expected profits are considerably higher than average show up in 1968 when 113 acres of soybeans and 102 litters of hogs are produced; and also in 1971 when 60 acres of soybeans and 152 litters of hogs are raised.

Profitability, debt servicing, and payback are reported in Table 2 (Appendix IV). Planned farm investment

(item 5) decrease in each succeeding year with the exception of the last year when \$33,000 in machinery and buildings are added to the farm operation. The anticipated return to farm investment (item 4), rate earned on farm investment (item 6), as well as rate and return to the operator's net worth (items 9 and 8 respectively) show increases in only two years (1968 and 1971). This data correspond to the profit increases noted above. Debt servicing begins with the net cash income (item 10) and deducts the income and social security taxes, as well as the estimated family living costs to determine the residual which is called "Cash Available: Debt Servicing, Replacements and Alternative Uses." From the latter, current loans (item 14) and scheduled principal payments on intermediate and long term debts (item 15) are deducted to determine cash available for alternative uses. Once again, the alternative plan "looks good" in three of the five transitional years but indicates potential problems with deficit cash available for 1970 and 1972. Payback, as shown by item 17, refers to the years required to pay off intermediate and long term debt if all cash available were applied to debt payments.

A balance sheet is provided in Table 3 (Appendix IV) of the printout which reports assets, liabilities and net worth. For this plan, the expected net worth (item 10) is decreasing. Four ratios are also reported in Table 3 as

additional information for evaluating the farm plan during the transition years. Income to expenses is a key ratio and shows a decrease over the present year (1967) in three of the five transitional years. A high ratio indicates income considerably greater than expenses which is a key to greater profits. The principal and interest to income ratio (item 13) indicates the percentage of total income which must be paid out for debt servicing. Capital turnover (item 14) points out the number of years required for gross cash income to equal the farm investment.

Two additional tables are presented on the computer printout which are designed to indicate changes in profits, cash flow, and other key indicators in the event that prices of farm products should rise or drop by a predetermined percentage. As noted previously, the computer program is designed to show results of a 20 percent increase and decrease in farm product prices. However, any percentage increase or decrease can be selected to override the 20 percent currently in the computer program.

It is interesting to note that a 20 percent increase in 1967 farm prices results in \$36,205 (Table 4, item 3, Appendix IV) in net cash operating income, while a 20 percent decrease results in only \$7,847 (Table 5, item 3, Appendix IV). The original net cash operating income is \$22,026 (Table 1, item 12).

Returns to the farm investment in 1967, go up from

\$12,732 (Table 2, item 4) to \$26,793 (Table 4, item 9) and then down to \$-1,448 (Table 5, item 9) with the assumed 20 percent increases and decreases in farm prices, respectively. Return to operators net worth goes up from \$9,014 (Table 2, item 8) to \$23,193 (Table 4, item 10) and down to \$-5,165 (Table 5, item 10). Several other key indicators are presented to help evaluate the possible consequences of a major price fluctuation.

If the operator of the example farm were to adopt the basic plan, the actual years when investment were made could be expected to fluctuate. Many farm operators make major investment in years when high farm prices and farm profits as incurred and delay major purchases in low profit years. Making purchases in years of high income, reduces the amount of major loans since extra cash permits higher down payments, thus obtaining more even cash flow patterns. In observing the actual records of the example farm from 1968 through 1972, the author noted that the major new investments were incurred in years of high farm profits. Nearly half of the new investments were made in 1972 which also was one of the best years for farm prices.

Summary

The five year transition period budgets are presented in each table. Undistributed cash expenses are adjusted according to changes in investments, and annual interest

charges are adjusted as liabilities are lowered by principal payments or increased due to new liabilities incurred. The net worth statement each year is changed to reflect investment changes, depreciation, and debt payments.

The computerized Farm Investment Analysis program presents a series of transitional budgets to show what might be expected in terms of farm profits, cash flow, and net worth changes if the various coefficients incorporated into the plan be relatively near what actually takes place.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Large scale investments are required today in order to operate a farm or ranch at the size needed to stay competitive. A thorough analysis of the profitability and cash flow consequences of major changes in farm plans, particularly investments of a fixed nature, are essential if a farm is to remain viable. Many attempts have been made to develop procedures to aid a farm operator in analyzing the consequences of various farm plans or major changes in investments. These range from one-sheet partial budgets to highly sophisticated computerized programs.

The major goal of this research was to develop procedures for analyzing farm plans involving major changes in investments. Two procedures with appropriate forms were developed and presented. The first was a procedure for hand calculations, using total cash receipts less total cash and non-cash expenses, to determine the economical feasibility of alternative farm plans. The second procedure involved a computerized program to evaluate changes in a single farm plan from the present year through each of five succeeding years.

The budgeting procedure for hand calculations

involves the use of eight basic forms, or worksheets, each of which was explained and illustrated. Four supplemental forms were provided for more detailed inventory and financial data, if needed, along with map forms for farm and farmstead layout planning and a special form for labor analysis. The eight basic forms include: 1) a land value estimator; 2) a summary of resources and a financial statement; 3) a cropping system summary; 4) a livestock summary; 5) a feed balance and crop income summary; 6) a labor and expense summary; 7) a cash summary; and, 8) a form for listing new investments. Three of the supplemental forms are designed to accumulate detailed inventories of livestock, machinery, buildings, grain and supplies. Most farms have inventory records available, eliminating the need for the latter three forms. A form provides space for itemizing the non-farm business assets and liabilities. The final supplemental form may be used for more detailed analysis of labor requirements and seasonal distribution by jobs.

The major changes included in the proposed hand budgets from the hand block budgeting currently used in Missouri are: 1) gross income less cash and non-cash expenses is the major starting point, instead of using income less variable costs per unit as is used in block budgets; 2) crops and livestock do not include investment capital requirements as part of the budget; 3) the proposed

budgets require a complete listing of investment changes required for each alternative plan, where as the block budgeting system currently in use requires a listing of all new investments, except those involving livestock. The time required for budgeting does not seem to differ appreciably between the newly proposed "hand budgets" and the "block budgets" currently in use in Missouri.

The computerized farm investment analysis program developed during this research differs from the original Missouri Farm Business and Financial Management Computer Budget in two significant ways. First, the new computer program is designed to analyze a selected long run farm plan from the standpoint of profitability, cash flow and net worth changes; beginning with the present year and updating the results for each of five succeeding years. The original computer budget is designed for comparative budgeting to assist in selecting a long run farm plan for development and provides for comparing up to five alternative plans with the present farm plan. In other words, a transitional analysis is not part of the original computer plan. The original computer plan uses a five-year average of expected results to compare each alternative plan with the present. The second major difference between the two computer programs involves the capability of the new program to recalculate the major financial outcome, should farm prices increase or decrease by a predetermined

percentage. This feature allows one to analyze the economic consequences of major changes in farm prices as they may affect profits, cash flow, net worth and ability to pay financial obligations. This is a unique feature of the proposed computerized farm investment analysis program which has not been found elsewhere in the literature.

Use of the Proposed Budgets Systems

The proposed hand budgeting system was designed primarily for "field" use for rather quick comparisons of one or two alternatives with the present farm plan. If quick "turn-around from a computer is feasible under given circumstances the currently used Farm Business and Financial Management Computer Budgeting program would be the rational one to use in Missouri, when several alternative plans need to be compared with the present system.

A second use of the new hand budgeting forms might be in conjunction with a farm management class, particularly if the same plans were to be combined and computerized for comparing more than one alternative. In using the new hand budgeting forms, the class could become familiar with the steps used in converting "raw" data into a complete farm budget for analyzing the economic merits of a particular farm plan. In contrast with the block budgeting system currently used, the new hand budgets coincide more closely with the computerized budgeting system currently used, since both use the same approach of computing gross cash

income and cash and non-cash expenses.

The new computerized Farm Investment Analysis program is designed to explore the transitional consequences of a selected farm plan, beginning with the present year and continuing through each of five succeeding years. Each year's balance sheet is updated based upon each of the preceeding year's expected performance. The method of selecting the particular farm plan to study is irrelevant, since most any hand or computerized complete farm budgeting system can be used. Certain advantages are inherent, however, in using the currently used computerized farm budgeting system in conjunction with the new farm investment analysis program since each uses similar information and the input forms are quite closely related. In addition, computer printouts for both programs are quite similar.

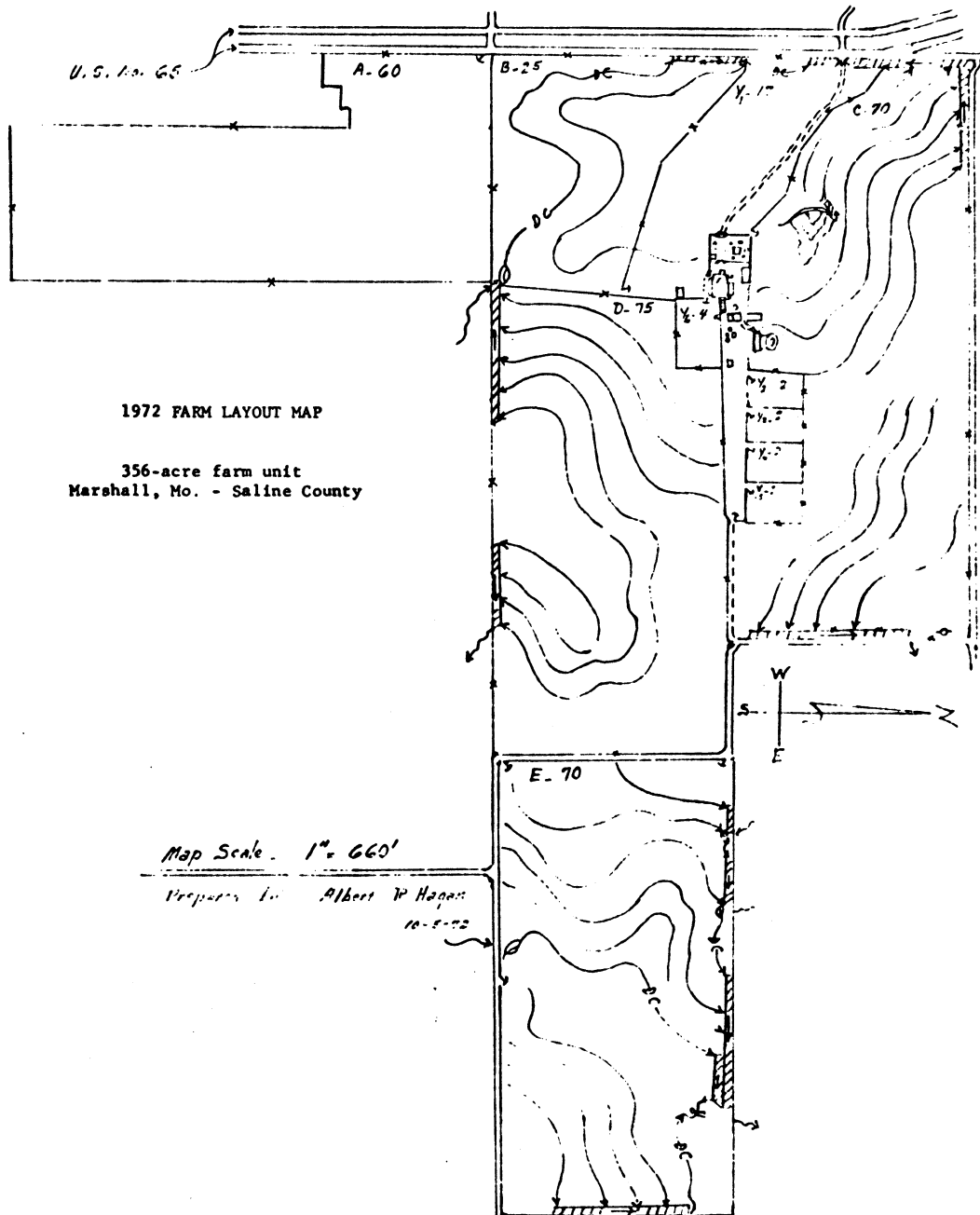
In the opinion of the author, both of the new budgeting systems presented from this research can serve a useful place in both classroom and extension programs.

Recommendations

Additional research to synchronize the new transitional computer budgeting more closely with the original computer budgeting program designed for long run comparative budgeting seems desirable. Then the computer could automatically run the new investment analysis program on, perhaps, the two best alternatives and even on the poorest

alternative. A package like this would require more input data for each of the alternatives and could, of course, get too cumbersome to be of real value. This latter prospect also would need to be explored.

APPENDIX I

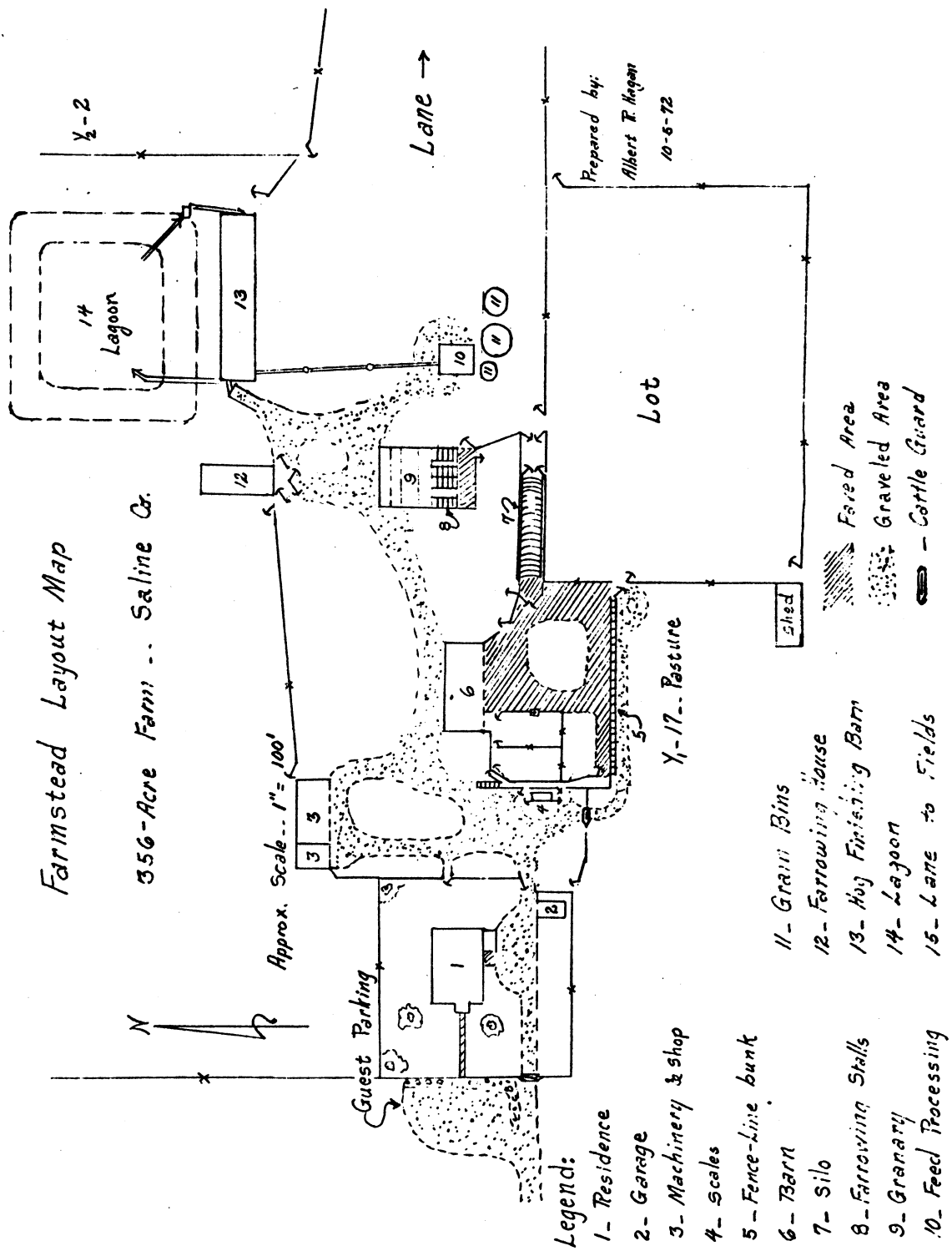


1972 FARM LAYOUT MAP
356-acre farm unit
Marshall, Mo. - Saline County

Map Scale - 1" = 660'
Prepared by Albert P. Haas
10-8-72

Farmstead Layout Map

356-Acre Farm -- Saline Co.



Legend:

- 1 - Residence
- 2 - Garage
- 3 - Machinery & shop
- 4 - Scales
- 5 - Fence-Line bunk
- 6 - Barn
- 7 - Silo
- 8 - Farrowing Stalls
- 9 - Granary
- 10 - Feed Processing
- 11 - Grain Bins
- 12 - Farrowing House
- 13 - Hog Finishing Barn
- 14 - Lagoon
- 15 - Lane to Fields

Farm Mgt. Extension
Univ. of Missouri

Form 1
FARM MAP

Present System
Alternate No.

Scale: 1 square = 10 acres

See The Missouri Farm Planning Handbook, Section III

III-2

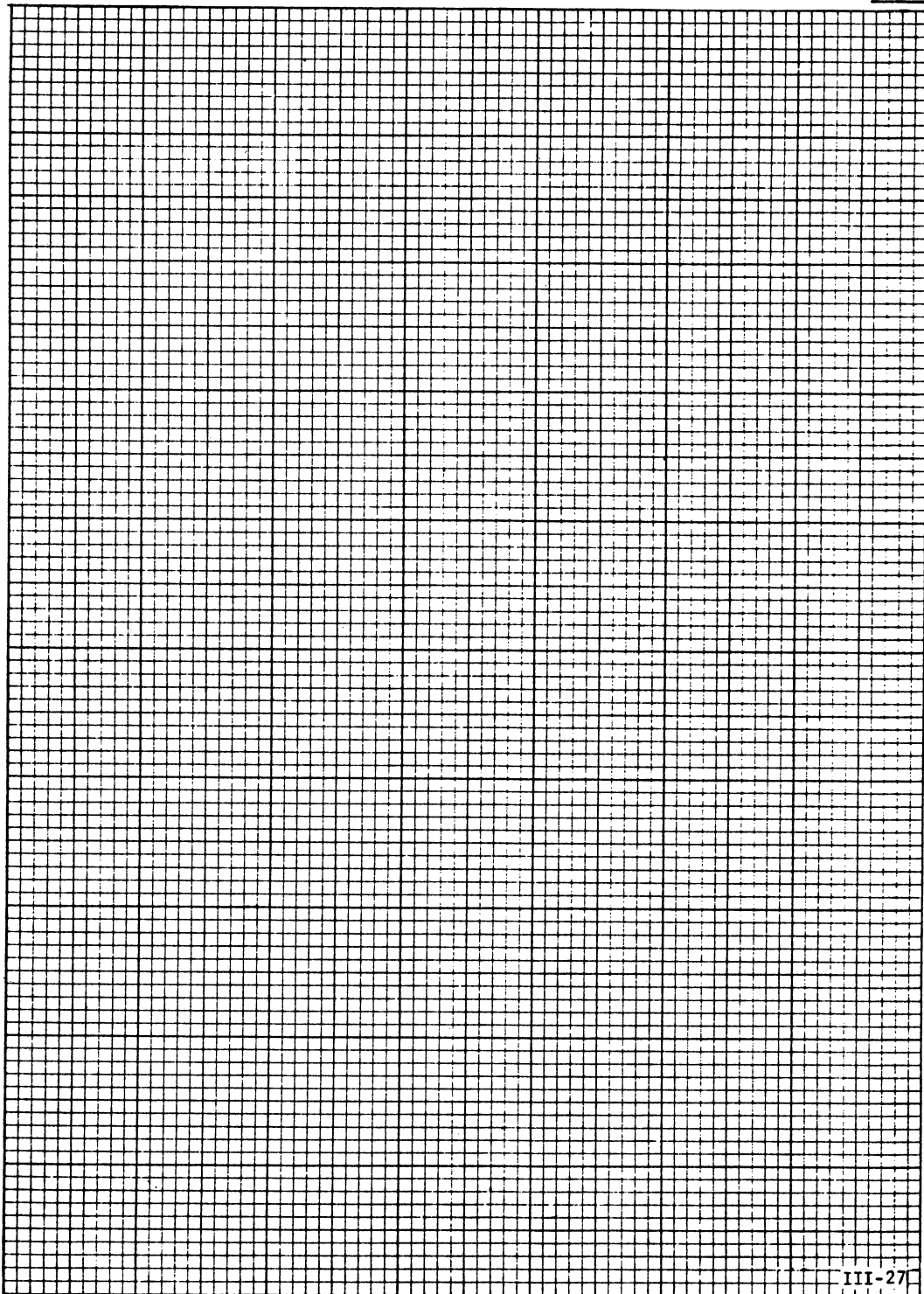
Farm Mgt. Extension
Univ. of Missouri

FORM 2
FARMSTEAD PLAN

Present _____
Alternate No. _____

Scale: 1 inch = 50 feet

Note: See Missouri Farm Planning Handbook, Section II



Example Farm

FORM 3
LAND USE CLASSIFICATIONPresent System
Alternate No. _____

	Field letter	Acres in field	PRESENT (OR PROPOSED) LAND USE					CLASS 6 Farmstead, roads, etc.
			CLASS 1 Intensive row cropping	CLASS 2 Limited row cropping	CLASS 3 Small grain continuous if terraced or rotation of sm. grain and hay	CLASS 4 Permanent pasture	CLASS 5 Timber or woods pasture	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	SB	87		87				
2	W	53			53			
3	C	139	139					
4	O	9			9			
5	SC	16	16					
6	UP	58				58		
7	IP	9			9			
8	FS	8						8
9								
10								
11								
12								
13								
14								
15								
16								
17								
18	Total acres ^{1/}	379	155	87	71	58	—	8
19	Mult. by value/ac. ^{2/}		\$ 500.	\$ 350.	\$ 225.	\$ 150.	\$ —	\$ 200.
20	Total value by class		\$ 77,500.	\$ 30,450.	\$ 15,975.	\$ 8,700.	\$ —	\$ 1,600.
21	Total value of land, excluding buildings and improvements (sum Line 18 across)							\$134,225.

Alternative Method of Land Value Determination:

22	Current farm value (land, bldgs., residence, & imp.)	157,000	
23	less value of bldgs., residence, & improvements	19,255	
24	TOTAL VALUE OF LAND (excluding bldgs. & improvements)		\$137,745.

^{1/} Sum of acres in Classes 1-6 should equal total on Line 18, Column 2.^{2/} Exclude value of buildings, fences, tile drain, wells, etc.

FORM 4
SUMMARY OF RESOURCES AND FINANCIAL STATEMENT

Present System
Alternative No.

FARM ASSETS:		Annual depr.	Total investment
(1)		(2)	(3)
1	Land (Form 3, Line 21 or 24)		137,745.
2	Machinery and equipment (Form 4A, Lines 44 and 45)	3,082.	17,728.
3	Buildings and improvements (Form 4B, Lines 23 and 24)	1,297.	9,255.
4	Grain, feed, and supplies, etc. (Form 4B, Line 39)		19,614.
5	Livestock (Form 4C, Lines 19 and 20)		23,076.
6	Cash (farm account)		—
7	New investments (Form 10, Lines 30 and 31)		
8	TOTALS	\$ 4,379.	\$ 207,418.

FARM LIABILITIES:		Value of loan	Annual interest		Annual prin. pymt
(1)		(2)	Percent (3)	Payment (4)	(5)
9	Current ^{1/}	\$ 4,080.	Interest and principal payments are not figured on current liabilities. Assume both are paid within year, see later.		
10					
11	Total current liabilities	\$ 4,080.			
12	Intermediate term loans ^{2/}	15,640.	5%	782.	6,500.
13					
14	Total I.T. loans	\$ 15,640.		\$ 782.	\$ 6,500.
15	Long-term loans ^{3/}				
16					
17	Total L.T. loans	\$		\$	\$
18	TOTAL FARM LIABILITIES (Column 2, Lines 11, 14, and 17)				\$ 19,720.
19	Total annual interest payments (I.T. & L.T.) (Col. 4, L. 14 & 17) ^{4/}				\$ 782.
20	Total annual principal payments (I.T. & L.T.) (Col. 5, L. 14 & 17) ^{4/}				\$ 6,500.

NET WORTH STATEMENT:			
21	Assets:		
22	Farm (Line 8, Column 3)	\$ 207,418.	
23	Non-farm (Form 4D, Line 13)	10,000.	
24	TOTAL ASSETS (add Lines 22 and 23)		\$ 217,418.
25	Liabilities:		
26	Farm (Line 18)	\$ 19,720.	
27	Non-farm (Form 4D, Line 20)		
28	TOTAL LIABILITIES (add Lines 26 and 27)		\$ 19,720.
29	NET WORTH (Line 24 less Line 28)		\$ 197,698.

- ^{1/} Up to one year or operating loans. ^{4/} Current liabilities not included (paid off annually and interest is part of operating interest calculations).
- ^{2/} One to nine years.
- ^{3/} Ten years and over.

FORM 4A
MACHINERY AND EQUIPMENT INVENTORY

Present System
Alternative No.

CROP MACHINERY			CROP MACHINERY cont'd		
Items	Current values	Annual depr.	Items	Current values	Annual depr.
(1)	(2)	(3)	(1)	(2)	(3)
1			24		
2			25		
3			26		
4			27		
5			28	Crop + Livestock from Records	17,728.
6			29		3,082.
7			30		
8			31		
9			32		
10			LIVESTOCK MACHINERY AND EQUIPMENT		
11					
12			Items	Current values	Annual depr.
13			(1)	(2)	(3)
14			33		
15			34		
16			35		
17			36		
18			37		
19			38		
20			39		
21			40		
22			41		
23			42		
23	Subtotals		43	Totals	
44	TOTAL VALUE of machinery and equipment (Lines 23, 32, and 43)				\$ 17,728.
45	ANNUAL DEPRECIATION on mach. and equip. (Lines 23, 32, and 43)				\$ 3,082.

FORM 4B
BUILDINGS AND IMPROVEMENTS
GRAIN, FEED, FERTILIZER, AND SUPPLIES

Present System
Alternative No.

BUILDINGS AND IMPROVEMENTS (feed storage, wells, fences, tile, etc.)*								
Items		Current value	Annual depr.	Items		Current value	Annual depr.	
(1)		(2)	(3)	(4)		(5)	(6)	
1	Mach. Shed '58	175.	175.	12				
2	Well '61	1,047.	80.	13				
3	Grain Bin '64	630.	147.	14				
4	Grain Bin '65	805.	137.	15				
5	Grain Bin '67	3,136.	402.	16				
6	Grain Bin Addition '67	736.	94.	17				
7	Feeding Barn '67	1,293.	129.	18				
8	Elevator Leg. '67	1,433.	133.	19				
9				20				
10				21				
11	Subtotals	9,255.	1,297.	22	Totals			
23	TOTAL VALUE of buildings and improvements (Lines 11 and 22)						\$ 9,255.	
24	ANNUAL DEPRECIATION on bldgs. and improvements (Lines 11 and 22)						\$ 1,297.	

GRAIN, FEED, FERTILIZER, SUPPLIES, AND FUEL										
Items		Units	\$/unit	Total	Items		Units	\$/unit	Total	
(1)		(2)	(3)	(4)	(1)		(2)	(3)	(4)	
25					32					
26					33					
27					34	From Records			19,614.	
28					35					
29					36					
30					37					
31	Subtotal				38	Total				
39	TOTAL VALUE of grain, feed, etc. (Lines 31 and 38)							\$ 19,614.		

* Exclude personal residence.

FORM 4C
LIVESTOCK

Present System
Alternative No. _____

MARKET ANIMALS				
	Itemize	No. or wt.	\$/unit	Total
	(1)	(2)	(3)	(4)
1				
2				
3				
4				
5				
6				
7				
8	From Farm Records			20,000.
9				
10	Total value of market livestock			\$20,000.

BREEDING ANIMALS					
	Itemize	Head	\$/head	Total	Annual depr.
	(1)	(2)	(3)	(4)	(5)
11					
12					
13					
14					
15	From Farm Records			3,076.	
16					
17					
18	Total value of breeding animals			\$3,076.	
19	Total depreciation on breeding animals				\$ —
20	TOTAL VALUE of livestock (Column 4, Lines 10 and 18)				\$23,076.

FORM 4D
NON-FARM ASSETS AND LIABILITIES

Present System
Alternative No.

NON-FARM ASSETS		
1	Current (stocks and bonds, savings, non-farm cash, etc.) ^{1/}	
2		\$
3		
4	Total non-farm current	\$
5	Intermediate term (personal auto, furniture, etc.) ^{2/}	
6		\$
7		
8	Total non-farm I.T. assets	\$
9	Long-term non-farm assets (personal residence, business) ^{3/}	
10		\$
11	. Personal Residence 10,000.	
12	Total non-farm L.T. assets	\$ 10,000.
13	TOTAL NON-FARM ASSETS (add Lines 4, 8, and 12)	\$ 10,000.

NON-FARM LIABILITIES		
14	Current ^{1/}	
15		
16	Intermediate ^{2/}	
17		
18	Long term ^{3/}	
19		
20	TOTAL NON-FARM LIABILITIES (add Lines 14-20)	\$ —

^{1/} Up to one year or operating loans.

^{2/} One to nine years.

^{3/} Ten years or over.

FORM 5
CROPPING SYSTEM SUMMARY

Crop	Acres ^{1/}	Yield per acre	Production (cotton, soybeans & grain)	Corn equivalent ^{3/}	Silage tons	Hay tons	Pasture AUM	Variable costs per acre	Total variable costs	Hours	
										direct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Source of data			(2x3)		(2x3)	(2x3)	(2x3)		(2x10)		(2x11)
1 Cotton								\$			
2 Soybeans, single crop	86.5	30.6	2647					27	2,336	4	346
3 Soybeans, double crop											
4 Wheat (C.E. 1.10)	53	33.9	1,797					20	1,060	1.5	80
5 Corn (C.E. 1.00)	139	97.7	13,580	13,580				49	6,811	4.5	626
6 Grain sorghum (C.E. .95)											
7 Barley (C.E. .77)											
8 Oats (C.E. .50)	9	44.4	400						124	1.4	13
9 Silage, corn	16.2	10.8			175			43	697	10	162
10 Silage, grass, legume											
11 Hay, alfalfa											
12 Hay, mixed											
13 Hay, grass											
14 Rotation pasture		AUM ^{2/}									
15		AUM									
16 Gov't retired acres											
17 Idle crop acres											
18 TOTAL CROP ACRES											
19 Unimpr. perm. past.	58	1.3 AUM					75	4.65	270	.25	15
20 Impr. perm. past.	9	3. AUM					27	4.65	42	.25	2
21 Farmstead and other											
22 TOTALS				13,580	175		102		11,340		1,244

^{1/} When land is double cropped, list first and second crops separately. Circle acreage of second crop. Do not add circled figures in Col. 2.
^{2/} AUM = Animal Unit Month.
^{3/} Corn equivalent (C.E.) = Col. 4 x factor in Col. 1.

FORM 6

LIVESTOCK SYSTEM SUMMARY

(Get all data for Cols. 2 through 8 from animal blocks)

Present System
Alternative No.

Enterprise unit	Level of production	No. of units	REQUIREMENTS PER UNIT						TOTAL REQUIREMENTS							
			Corn equivalent	Sil- age	Hay	AUM past.	Hours direct labor	Non-feed variable costs	Gross receipts per unit	Corn equivalent	Sil- age	Hay	AUM past.	Hours direct labor	Non-feed variable costs	Gross receipts per unit
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Dairy cow								\$							\$	
2 Litter, finished hogs	Table 10.1 8 pigs	73	116			.75	16	103.	389.50	8,468			55	1,168	7,519.	28,433
3 Litter, feeder pigs																
4 Feeder pigs bought																
5 Beef cow																
6 Steer calf	Table 12.5 300 days	100	43	3.25	.26		4	222.	325.50	4,300	325	26		400	22,200.	32,550
7 Steer calf																
8 Heifer calf																
9 Heifer calf																
10 Yearling steer																
11 Yearling steer																
12 Plain steer																
13 Poultry																
14 Other																
15																
16 TOTAL FEED REQUIRED (add Columns 11, 12, 13, and 14)										12,768	325	26	55			
17 TOTAL DIRECT HOURS REQUIRED (add Column 15)											1,568					
18 TOTAL NON-FEED VARIABLE COSTS (add Column 16)															29,719.	
19 TOTAL GROSS RECEIPTS (add Column 17)																60,983

FORM 7
FEED BALANCE AND CROP INCOME

Present System
Alternative No.

CROPS		Total production	Animal feed needs	Available for cash sales ^{2/}	Price per unit	Total cash income from crops
		Form 5 ^{1/}	Form 6	(2 less 3)	(bu., ton)	(4 x 5)
(1)	(2)	(3)	(4)	(5)	(6)	
1	Cotton					
2	Soybeans	2647	—	2647	2.40	6,352.80
3						
4	Wheat	1797	—	1797	1.30	2,336.10
5	Corn	13,580	12,768	812	1.15	933.80
6	Grain sorghum					
7	Barley					
8	Oats	400	—	400	.73	292.
9	Silage, corn	175	325	-150	9.	-1,350.
10	Silage, grass, legume					
11	Hay	—	26	-26	20.	-520.
12						
13						
14						
15						
16	Gov't retired acres ^{3/}					
17						
18	Pasture	102	55	47		
19						
20						
21	VALUE OF CROP PRODUCTION FOR SALE					\$8044.70

^{1/} For cotton and soybeans, use Column 4; for hay, silage, and pasture, use Line 22; for feed grains, use Column 5 (corn equivalents) if you plan to feed all grain which is raised, otherwise, use Column 4 for that grain scheduled to be sold.

^{2/} If Column 4 shows a negative, indicating livestock needs in excess of crop production, show a negative value in Column 6.

^{3/} Include government payments here.

FORM 8
LABOR AND EXPENSE SUMMARY

Present System
Alternative No.

LABOR SUMMARY ^{1/}		
1	Direct crop labor needed (Form 5, Line 22) ^{1/}	1,244 hrs.
2	Direct livestock labor needed (Form 6, Line 17) ^{1/}	1,568 hrs.
3	TOTAL direct labor needed (add Lines 1 and 2)	2,812 hrs.
4	Allowance for indirect labor needs (10 to 20% of Line 3)	281 hrs.
5	TOTAL of all labor needs	3,093 hrs.
6	Minus operator and family labor	2,890 hrs.
7	Hired labor needed (Line 5 less Line 6)	203 hrs.
8	Months of hired labor needed (Line 7 ÷ 200)	1 mos.

CASH EXPENSES		
9	Variable crop expenses (Form 5, Line 22)	\$ 11,340.
10	Non-feed variable livestock expense (Form 6, Line 18)	29,719.
11	TOTAL DISTRIBUTED VARIABLE EXPENSES (add Lines 9 & 10)	\$ 41,059.

UNDISTRIBUTED COSTS		
12	Real estate taxes, insurance, and building repairs (Form 4, Line 7, Column 3: \$207,418. x 1.5%)	\$ 3,111.
13	Cash rent	75.
14	Hired labor (Line 8: 1 months x \$ 400. /month)	400.
15	Miscellaneous expense (Line 11: 41,059 x 3%)	1,232.
16	Subtotal of undistributed costs	4,818.
17	Interest on cash and undistributed costs (4% of Lines 11 and 16)	1,835.
18	Interest on I.T. and L.T. debts (Form 4, Line 18)	782.
19	Interest on new investments (Form 10, Line 30 x _____%) ^{2/}	—
20	TOTAL UNDISTRIBUTED COSTS (add Lines 16 through 19)	\$ 7,435.
21	TOTAL CASH EXPENSES (Lines 11 and 20)	\$ 48,494.

^{1/} See Form 8A for computing labor distribution.

^{2/} Disregard if new investments were transferred to Forms 4A, 4B, or 4C.

FORM 8A
LABOR ESTIMATE

Present System
Alternate No.

			Total hours for year	Distribution of hours			
				Dec. thru March	April May June	July Aug.	Sept. Oct. Nov.
(1)			(2)	(3)	(4)	(5)	(6)
1	Suggested for full-time worker		2400	600	675	450	675
2	My estimate for full-time worker						
3	LABOR AVAILABLE						
4	Operator (or Partner No. 1)						
5	Partner No. 2						
6	Family labor						
7	Hired labor						
8	Custom machine operators						
9	TOTAL LABOR AVAILABLE						
10	DIRECT LABOR NEEDED BY CROP AND ANIMAL ENTERPRISES						
11	Crop enterprises	Acres	Hr./Ac.				
12	Data from →	Form 5					
13							
14							
15							
16							
17							
18							
19							
20	TOTAL CROP HOURS NEEDED						
21	Animal enterprises	No. Units	Hr./Un.				
22	Data from →	Your estimate	Form 6				
23							
24							
25							
26	TOTAL ANIMAL HOURS NEEDED						
27	TOTAL CROP AND ANIMAL HOURS						
28	Estimated indirect hours						
29	TOTAL HOURS LABOR NEEDED						
30	TOTAL HOURS AVAILABLE						
31	Overload (L. 29 minus L. 30)						
32	Underload (L. 30 minus L. 29)						

FORM 9
CASH SUMMARY

Present System
Alternative No.

1	Crop cash income (Form 7, Line 21)	\$ 8,045.	
2	Livestock cash income (Form 6, Line 19)	60,983	
3	TOTAL CASH FARM INCOME (add Lines 1 and 2)		69,028.
4	Total cash expenses (Form 8, Line 21)		48,494.
5	NET CASH OPERATING INCOME (Line 3 less Line 4)		20,534.
6	Minus depreciation (Form 4, Line 8, Column 2)		4,379.
7	NET FARM PROFIT BEFORE TAXES (Line 5 less Line 6)		16,155.
8	Minus interest on equity (Form 4, Line 8 less Line 18) (x <u>5</u> %)		9,385.
9	RETURN TO OPERATOR AND FAMILY LABOR AND MANAGEMENT		6,770
10	Net farm profit before taxes (Line 7)	16,155.	
11	Plus interest paid (Form 8, Lines 17, 18, and 19)	2617.	
12	Minus operator and family labor and management charge	3,600.	
13	RETURNS TO TOTAL FARM INVESTMENT		15,172.
14	Farm investment (Form 4, Line 8, Col. 3 less Form 9, L. 6)	203,039.	
15	RATE EARNED ON FARM INVESTMENT (Line 13 ÷ 14) (x 100)	7.5 %	
16	RETURN TO OPERATOR'S NET WORTH (Line 7 less Line 12)		12,555.
17	Net cash operating income (Line 5)	20,534.	
18	Plus net non-farm income	—	
19	NET CASH INCOME (Lines 17 and 18)		20,534.
20	Less income tax (Line 19 x <u>10</u> %)	2,053.	
21	Less Social Security (Line 19 x <u>7</u> %) (max. \$ <u>575.</u>)	575.	
22	Less estimated family living costs	5,000.	
23	Less current operating loan payments (Form 4, Line 11)	4,080.	
24	Less total principal payments (Form 4, Line 20)	6,500.	
25	Total of Lines 20 through 24		18,208
26	CASH AVAILABLE FOR REPLACEMENTS AND ALTERNATIVE USES (Line 19 less Line 25)		\$ 2,326.

FORM 10
ESTIMATE OF INVESTMENT AND DEPRECIATION
FOR NEEDED NEW & PRESENT
IMPROVEMENTS, MACHINERY, & EQUIPMENT

Alternate System No. _____

Item and description (Size, width, row, power, etc.)	Year of inv.	Annual deprec.	Cost per unit	No. of units	Total cost of item	Investment totals
(1)	(2)	(3)	(4)	(5)	(6)	(7)
NEW INVESTMENTS NEEDED:						
1 <u>Buildings and Fences Needed</u>						
2						
3						
4						
5						
6 TOTAL BUILDINGS & FENCES (Add L. 2 thru 5)						\$
7 <u>Other Land Improvements Needed</u> ^{1/}						
8						
9						
10						
11						
12 TOTAL OTHER LAND IMPR. (Add L. 8 thru 11)						\$
13 <u>Crop Machinery & Equipment Needed</u> ^{2/}						
14						
15						
16						
17						
18 <u>Animal Machinery & Equipment Needed</u> ^{2/}						
19						
20						
21						
22						
23 TOTAL ALL MACH. & EQUIP. (Add L.14 thru 22)						\$
24 <u>Livestock Needed (include feed)</u>						
25						
26						
27						
28						
29 TOTAL NEW LIVESTOCK INVESTMENTS						\$
30 TOTAL ALL NEW INVESTMENTS (add Column 7)						\$
31 TOTAL ANNUAL DEPRECIATION (add Col. 2, Lines 6, 12, 23, 29)						\$

^{1/} Terraces, outlets, structures; land leveling, irrigation ditches and wells; brush clearing; ponds and wells for livestock water.

^{2/} Some machinery and equipment may be used for both crops and animals. List in the area of major use.

APPENDIX II

CORN BUDGETS FOR SHOW-ME AREA

Description of Production: 81 HP diesel tractor; 5-16" plow; 16.5' disk; 27' sprayer; custom spread fertilizer; 6-30" row planter and cultivator; 3-30" picker sheller; corn dried and 2¢ per bu. hauling charge; all corn stored on farm; yield per acre computed at 13% moisture.

			MY FARM
1. Yield, bu. per ac. (13% moist.)	80	100	
2. Price per bu. ¹	\$ 1.15	\$ 1.15	
3. Gross income per acre	\$92.00	\$115.00	
4. VARIABLE COST PER ACRE:			
5. Lime and fertilizer	\$15.00	\$20.00	
6. Machinery	8.50	9.00	
7. Custom machine hire	1.00	1.00	
8. Seed	5.00	6.00	
9. Weed chemical	6.50	7.00	
10. Bug chemical	--	--	
11. Drying, 2.5¢ per bu.	2.00	2.50	
12. Other (misc. overhead)	3.50	3.50	
13. _____	--	--	
14. SUBTOTAL	\$41.50	\$49.00	
15. Interest (Line 14 x 6%) ²	\$ 2.49	\$ 2.94	
16. Total variable cost	\$43.99	\$51.94	
17. Income above variable cost	\$48.00	\$63.00	

Labor hours/acre	Total	Dec.-Mar.	Apr.-June	July-Aug.	Sept.-Nov.
80 bu. corn	4.2	.4	1.8	.4	1.6
100 bu. corn	4.5	.4	1.8	.4	1.9

¹Price used is long-run expected average annual price at the farm.

²Interest is computed at 8% per annum. If the money is used less than 12 months, the interest is reduced accordingly, e.g., 8% for 9 months equals 6%.

GUIDE FOR LIVESTOCK BUDGETS (CP-FORM 2)

Kind	Table Code No.	Returns Per Animal Unit			An. Products (cwt)	An. Price (cwt)	Breeding An. (cwt)	Prodn. Price (cwt)	Var. Cost/Unit	Farm Feed Requirements Per Animal Unit			Direct Hours Labor/Unit	
		Market An. (cwt)	Prodn. Price (cwt)	Prodn. Price (cwt)						Corn Eq. (bu.)	Sil. (tons)	Hay (tons)		Past. (AUMs)
		Prodn. Price (cwt)	Prodn. Price (cwt)	Prodn. Price (cwt)										
A. HOGS-LITTER (8 PIGS)	10.1	16.88	\$21.00	2.00	\$17.50			\$103.00	116.			.75	16.	
	10.2	7.5	21.00	2.00	17.50			56.00	36.			.75	11.	
	10.3	2.25	21.00					27.00	10.5				.4	
B. BEEF COWS	11.1	4.22	33.00	1.40	19.50			29.00	7.5	1.3		12.	7.5	
	11.2	3.75	33.50	1.40	19.			26.00		1.3		11.4	7.0	
	11.3	3.00	35.00	1.40	19.			25.00		.9		11.	5.5	
C. STEER, BACKGROUND	12.1	5.50	36.50					180.00		1.1			3.0	
	12.2	7.00	32.00					186.00	10.	2.5			3.5	
	12.3	7.75	30.50					183.00		1.1		3.4	3.5	
D. STEER CALF, FINISH	12.4	9.50	31.00					209.00	56.		.36		3.5	
	12.5	10.50	31.00					222.00	43.	3.25	.26		4.0	
	12.6	11.25	31.00					202.00	50.	1.35		2.8	5.0	
E. HEIFER CALF, FINISH	13.1	9.00	30.00					178.00	36.	3.	.23		4.0	
	13.2	9.25	29.50					214.00	37.	.24			3.0	
F. YEARLING STEER	14.1	10.75	31.00					256.00	46.		.26		3.0	
	14.2	11.00	31.00					246.00	37.	2.75	.22		3.5	
	14.3	7.66	30.50					216.00				4.	.5	
	14.4	11.00	28.00					228.00	50.		.29		3.0	
	14.5	11.00	28.00					230.00	7.	5.7			3.0	
G. DAIRY COWS, FLUID	16.1	.9ea	50.00	2.85	19.50	100.	5.70	233.00	70.		3.0	9.	50.	
	16.1	.9ea	50.00	2.85	19.50	125.	5.70	247.00	80.		3.0	9.	50.	
	16.1	.9ea	50.00	2.85	19.50	150.	5.70	271.00	90.		3.0	9.	50.	
H. BRED DAIRY HEIFER	16.3	1 ea	400.00					130.00	20.	3.		9.	25.	
	16.3	1 ea	400.00					70.00	20.	3.		9.	25.	

TABLE 10.0 HOG BUDGETS

TABLE 10.1 SOW, MARKET HOGS, PER LITTER

Level of production	7 PIGS RAISED	8 PIGS RAISED	9 PIGS RAISED	MY FARM
1. Sales	6.5 market hogs 225# @ \$21.00 \$307.13 0.5 cull sow, 200# @ \$17.50 35.00	7.5 market hogs 225# @ \$21.00 \$354.38 0.5 cull sow, 200# @ \$17.50 35.00	8.5 market hogs 225# @ \$21.00 \$401.63 0.5 cull sow, 200# @ \$17.50 35.00	
2. GROSS RECEIPTS/SOW UNIT	342.13	389.38	436.63	
3. Grain: corn equiv. @ \$1.15 per bu.	105 bu. 120.75	116 bu. 133.40	127 bu. 146.05	
4. Pasture: hay equiv. @ \$12.00 per ton	0.25 ton 3.00	0.25 ton 3.00	0.25 ton 3.00	
5. Protein, salt, minerals, additives	150# creep feed 9.00 900# 40% protein 45.00	170# creep feed 10.20 1000# 40% protein 50.00	190# creep feed 11.40 1100# 40% protein 55.00	
6. TOTAL FEED COSTS	177.75	196.60	215.45	
7. Breeding charge	1.00	1.00	1.00	
8. Veterinary and drugs	8.00	9.00	10.00	
9. Feed processing & delivery	10.17	11.24	12.32	
10. Electricity	1.75	1.75	1.75	
11. Marketing	Barrows & gilts \$1.70 11.05 Sows, \$2.70 1.35	Barrows & gilts, \$1.70 12.75 Sows, \$2.70 1.35	Barrows & gilts, \$1.70 14.45 Sows, \$2.70 1.35	
12. Misc. (1.5% of gross)	4.88	5.56	6.23	
13. TOTAL OTHER VARIABLE COSTS	38.20	42.65	47.10	
14. TOTAL ALL VARIABLE COSTS	215.95	239.25	262.55	
15. INCOME OVER VARIABLE COSTS	126.18	150.13	174.08	
16. RETURN TO LABOR, CAPITAL & FIXED COSTS (even \$)	126.00	150.00	174.00	
17. ADJUSTMENTS TO LINE 16:				
Feed costs: 10% higher	Subtract 18.00	Subtract 20.00	Subtract 22.00	
10% lower	Add 18.00	Add 20.00	Add 22.00	
Sale price: 10% higher	Add 34.00	Add 39.00	Add 44.00	
10% lower	Subtract 34.00	Subtract 39.00	Subtract 44.00	
18. Hours direct labor	16	16	16	
19. Animal investment	\$162.00	\$175.00	\$187.00	

TABLE 12.5 STEER CALF, WINTERED AND FINISHED TO LOW CHOICE

Description of Production: 300 days for 600# gain (gain = difference between purchase and market weights). Daily gain 2.0#.
Purchased October, choice grade, medium condition.
Marketed August, 75% choice grade.

			MY FARM
1. GROSS RECEIPTS PER STEER	1050# @ \$31.00	\$325.50	
2. PURCHASE COST	450# @ \$38.00	171.00	
3. Grain: Corn equiv. @ \$1.15 per bu.	43 bu.	49.45	
4. Hay equiv.: Corn silage @ \$9/T.	3.25 T.	29.25	
Mixed hay @ \$22/T.	--	--	
Grass hay @ \$20/T.	520#	5.20	
Pasture @ \$4/AUM	--	--	
5. Protein, salt, mineral, additives	550# @ \$5.00/cwt.	27.50	
6. TOTAL FEED COSTS		111.40	
7. Veterinary and drugs		2.00	
8. Death loss (2% of purchase cost + 1% total feed cost)		4.53	
9. Purchasing, selling, and transportation costs per head		9.00	
10. Feed processing and delivery, 1.5% of gross receipts	\$325 x 1.5%	4.88	
11. Misc., 1% of gross receipts	\$325 x 1%	3.25	
12. TOTAL OTHER VARIABLE COSTS		23.66	
13. TOTAL ALL VARIABLE COSTS		306.06	
14. INCOME OVER VARIABLE COSTS		19.44	
15. RETURN TO LABOR, CAPITAL, AND FIXED COSTS (even \$)		19.00	
16. ADJUSTMENTS TO LINE 15:			
Feed costs: 10% higher	Subtract	11.00	
10% lower	Add	11.00	
Selling price: 10% higher	Add	33.00	
10% lower	Subtract	33.00	
Purchase cost: 10% higher	Subtract	17.00	
10% lower	Add	17.00	
17. Hours direct labor		4.0	
18. Animal investment		\$252.00	

APPENDIX III

FARM INVESTMENT ANALYSIS:
BUDGETING, PROFITABILITY, AND CASH FLOW

Name T. Roy Bogle
Address _____
County _____ State _____ ZIP _____

First Card:

Farm or Ranch Name Example Farm (1-30)
Proposed Changes Expand Swine Enterprise (31-60)
Present Plan Plus Five Year Transition 6 (61)
Date: month 6 (65-66) day 20 (67-68) year 67 (69-70)
Supplemental output for 20 % (71-73) increase or 20 % (74-76)
decrease in farm product prices.

T. Roy Bogle
Dept. of Agricultural Economics
University of Missouri

Credits to: Herman Workman
University of Missouri
E. E. Carson
Purdue University

FIA FORM 1. CROP BUDGET AND NON-FARM BUSINESS INFORMATION

1/ Crop	Crop code ²	Acres each year ^{3/}					Yield each year per acre ^{3/ 4/}					Price per unit ^{3/ 5/}					Var. costs per acre (51)	Hours labor per acre (61)		
		Pres-ent (6)	1st yr. (11)	2nd yr. (16)	3rd yr. (21)	4th yr. (26)	5th yr. (31)	Pres-ent (36)	1st yr. (41)	2nd yr. (46)	3rd yr. (51)	4th yr. (56)	5th yr. (61)	Pres-ent (66)	1st yr. (71)	2nd yr. (76)			3rd yr. (81)	4th yr. (86)
Corn	42	139	153.5	191	144	154	150	91.7	95	69.1	56	107.1	93.3	1.15					49	4.5
Soybeans	53	86.5	113	90	.1	60	46	30.6	32.9	30.6	.1	33.3	18.7	2.4					27	4
Hay	61					4	10					1.8	2	20					21.5	6
Rot. Rst.	70	9	20	81.5	91	34	61	3	1.8	1.2	.7	2.1	1.5						4.65	25
Perm. Rst.	70	58	58	20	20	18	18	1.3	1.2	1	1	1.4	1.4						4.65	.25
Silage Corn	48	16.2	15	15	14	14	14	10.8	11.7	10.3	10.7	10.7	10.7	9					43	10
Wheat	51	53	40	41.5	.1	19	.1	33.9	41.4	22.3	.1	42.1	.1	1.3					20	1.5
Oats	56	9	.1	.1	15	.1	.1	44.4	.1	.1	26.7	.1	.1	.73					13.8	1.4

Crop Codes: Corn--42; milo--49; wheat--51; soybeans--53; oats, rye, barley--56; cotton--66; set-aside--68; silage, haylage--48; pasture--70; hay--61; other cash crops--66.

NON-FARM BUSINESS INFORMATION:

To the extent to which you wish to include in this analysis, enter such items as: rental income, interest on savings, dividends, etc. These will also be included in assets on FIA FORM 5.

Type of asset or property	Code	Number of units each year					Price per unit					Var. costs per unit (51)	Hours labor per unit (61)										
		Pres-ent (6)	1st yr. (11)	2nd yr. (16)	3rd yr. (21)	4th yr. (26)	5th yr. (31)	Pres-ent (66)	1st yr. (71)	2nd yr. (76)	3rd yr. (81)			4th yr. (86)	5th yr. (91)								
	(1)	5	11	16	21	26																	
	90																						
	90																						
	90																						
	90																						
	-1	Plus one blank card																					

- 1/ For share rented acres, enter only the operator's share of yields, variable costs, and labor.
- 2/ Double crops or crops with more than one product yield are entered with different code numbers and same acres.
- 3/ If no change in acres, yield, or price from previous entry, leave blank.
- 4/ Yield per acre is expressed as bu., tons, bales, dollars, AUM's, etc., according to crop code used.
- 5/ Prices for a particular produce (same code no.) should be the same on each line that the crop appears. Leave price of pasture AUM's blank.

FIA FORM 2. LIVESTOCK BUDGETS
Present System Plus Next Five Years^{1/}

PRESENT SYSTEM^{1/}

Kind	Code ^{2/}	No. units	Market animals		Breeding animals		Animal products		Var. cost per unit	Feed requirements per unit				Hours direct labor/unit
			Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.		Corn bu.	Silage tons	Hay tons	Past. ADM's	
Fed Cattle	20	100	10.5	31.					222.	43.	3.25	.26		4.
Sows F to F (8 pigs)	4	73	16.88	21.	2.	17.5			103.	116.				.75
Last Card														

FIRST YEAR^{1/}

Kind	Code ^{2/}	No. units	Market animals		Breeding animals		Animal products		Var. cost per unit	Feed requirements per unit				Hours direct labor/unit
			Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.		Corn bu.	Silage tons	Hay tons	Past. ADM's	
	(1)	(6)	(11)	(16)	(21)	(26)	(31)	(36)	(41)	(31)	(57)	(63)	(69)	(75-79)
	20	106.5												
	4	102.												
Last Card														

^{1/} Use one section for each year.

- ^{2/} Livestock Codes: Sows (litters) - 4. Fed cattle ----- 20.
Purchased pigs - 5. Sheep ----- 21.
Dairy cows ----- 10. Poultry ----- 25.
Beef cows ----- 15. Other livestock - 26.

NOTE: List livestock codes for each year. If no change in units, returns, costs, or requirements, LEAVE BLANK.

FIA FORM 4. LIVESTOCK BUDGETS cont'd.
Present System Plus Next Five Years^{1/}

FOURTH YEAR^{1/}

Kind	Code ^{2/}	No. units	Returns per unit				Var. cost per unit	Feed requirements per unit				Hours direct labor/unit (75-79)		
			Market animals		Breeding animals			Corn bu.	Silage tons	Hay tons	Past. ADM's			
			Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.							Prod. cwt.	Price/cwt.
	(1)	(6)	(11)	(16)	(21)	(26)	(31)	(36)	(41)	(51)	(57)	(63)	(69)	(75-79)
	20.	88.												
	4.	152.												
Last Card	-1.													

FIFTH YEAR^{1/}

Kind	Code ^{2/}	No. units	Returns per unit				Var. cost per unit	Feed requirements per unit				Hours direct labor/unit (75-79)		
			Market animals		Breeding animals			Corn bu.	Silage tons	Hay tons	Past. ADM's			
			Prod. cwt.	Price/cwt.	Prod. cwt.	Price/cwt.							Prod. cwt.	Price/cwt.
	(1)	(6)	(11)	(16)	(21)	(26)	(31)	(36)	(41)	(51)	(57)	(63)	(69)	(75-79)
	20.	95.5												
	4.	132.												
Last Card	-1.													

^{1/} Use one section for each year.

^{2/} Livestock Codes: Sows (litters) - 4. Fed cattle ----- 20.
Purchased pigs - 5. Sheep ----- 21.
Dairy cows ----- 10. Poultry ----- 25.
Beef cows ----- 15. Other livestock - 26.

NOTE: List livestock codes for each year. If no change in units, returns, costs, or requirements, LEAVE BLANK.

FIA FORM 5. BALANCE SHEET INFORMATION

BALANCE SHEET INFORMATION:

A. Assets:

Farm Assets

1. Cash	\$	<u>19,614</u>	(1)
2. Grain, feed, etc.		<u>23,076</u>	(11)
3. Livestock		<u>17,739</u>	(21)
4. Machinery and equipment ^{1/}		<u>7,725</u>	(31)
5. Buildings and improvements ^{1/}		<u>144,750</u>	(41)
6. Land ^{2/}			(51)
<u>Non-Farm Assets</u> ^{3/}			
7. Current			(61)
8. Intermediate			(71)
9. Long Term		<u>10,000</u>	(1)

The Present Plan Balance Sheet represents the beginning of the present year. Changes in the Balance Sheet will automatically occur as changes in investments for the present and alternative plans are made on FIA FORM 6.

B. Liabilities: (Farm and Non-Farm)

	Amount	Interest rate ^{4/}	Annual principal payment
10. Current	<u>4,080</u>	<u>6.</u>	(21)
11. Intermediate (1 to 10 yrs.)	<u>15,640</u>	<u>5.</u>	(51) \$ <u>6,500</u>
12. Long Term (10 yrs. or more)		<u>.</u>	(1) <u>.</u>

^{1/}It is suggested that you use the remaining unrecovered cost from your depreciation schedule for values of machinery, buildings, etc.

^{2/}Land value = total farm value less Item 5 and the operator's dwelling.

^{3/}To the extent you wish to use in this analysis, include: stocks, bonds, savings, cash value of insurance, household goods, operator's dwelling, and any other assets for which the earnings and expenses are shown in FIA FORM 1, Non-Farm Business Information.

^{4/}Combine and average interest rates when you have more than one loan of a particular type.

FIA FORM 6. CHANGES IN INVESTMENTS

CHANGES IN INVESTMENTS: Additions or deletions of capital assets--cash, feed, etc., livestock machinery, buildings, land and non-farm business.

Investment changes	Year investment is to be made ^{1/}	Code ^{2/}	Value (for sales and trade-ins use a "minus" value) (11)	Years of life depr. (21)	Property tax rate per \$100 assessed value ^{3/} (26)	Insurance rate per \$100 original value (31)	Bldg. repair percent per \$100 original value (36)	New loan information			
								Type: ^{4/}	Interest rate (%) (46)	Years to repay (51)	
	1.	5.	2347	10.	4.	.5	.	2.		6.	6.
	1.	6.	7065	20.	4.	.5	2.	3.		6.	10.
	2.	5.	4039	10.	4.	.5	.	2.		6.	6.
	2.	6.	1030	20.	4.	.5	2.	3.		6.	10.
	3.	5.	12,175	10.	4.	.5	.	2.		6.	6.
	3.	6.	2666	20.	4.	.5	2.	3.		6.	10.
	4.	5.	1342	10.	4.	.5	.	2.		6.5	6.
	4.	6.	10,881	20.	4.	.5	2.	3.		6.5	10.
	4.	4.	250	3.	4.	.5	.	2.		6.5	3.
Last Card	6.	-1.									

^{1/} Year codes: Present = 1, First year = 2, Second year = 3, etc.

^{2/} Codes for investment changes:

- Cash--1
- Buildings--6
- Land--7
- Feed grains--2
- Market livestock--3
- Cur. non-farm assets--8
- Breeding livestock--4
- Int. non-farm assets--9
- Machinery & equip.--5
- L.T. non-farm assets--10

^{3/} Assumes assessed at 1/3 value shown.

^{4/} Current loans (1) are assumed to be "rolled" each year and should not have any "years to repay." Intermediate loans (2) are from 1 to 9 years; long-term loans (3) are for 10 years or more.

Keypunch instructions: Place a card with:
 1 (1) 0 (6), 2 (1) 0 (6), 3 (1) 0 (6),
 4 (1) 0 (6), 5 (1) 0 (6), or 6 (1) -1 (6)
 at end of each year's investment cards.

FIA FORM 7. UNDISTRIBUTED COSTS (fixed and variable) AND MISCELLANEOUS INFORMATION

Undistributed costs:	Present	Year 1 ^{1/}	Year 2	Year 3	Year 4	Year 5
Cash rent	\$ 75.(1)	\$ 1.(1)	\$ 1.(1)	\$ 1.(1)	\$ 40.(1)	\$ 1.(1)
Hired labor	464.(11)	1228.(11)	1335.(11)	1766.(11)	2153.(11)	6133.(11)
Building repairs	155.(21)					
Property tax	651.(31)					
Insurance	320.(41)					
Miscellaneous ^{2/}	.(51)					
Depr.--lvstk. & mach.	4140.(61)					
Depr.--buildings	5272.(71)					
Miscellaneous information:	Present	Year 1	Year 2	Year 3	Year 4	Year 5
No. of families for income tax filing ^{3/}	1.(1)	1.(1)	1.(1)	1.(1)	1.(1)	1.(1)
Total no. exemptions for income tax filing ^{3/}	4.(11)	4.(11)	4.(11)	4.(11)	4.(11)	4.(11)
Value of operator's labor per year	3600.(21)	4000.(21)	5000.(21)	5200.(21)	6000.(21)	7500.(21)
Est. annual family living expense	5000.(31)	5500.(31)	6000.(31)	6500.(31)	7000.(31)	7500.(31)

Automatically calculated (see footnote 2/)

Keypunch instructions: Insert two blank cards if no entries are given. If entry in Col. 1 and/or 11, insert one blank card in this section (undistributed costs).

1/ Complete for present system. If no change from previous entry, leave blank.

2/ You may leave miscellaneous expense blank if you prefer. The larger of your figure here or 2% of the income exceeding variable costs is used in the results.

3/ For corporations, enter "0." For multiple operators, total number of exemptions should be the total of all families.

APPENDIX IV

 * FARM INVESTMENT ANALYSIS *
 * COMPUTER BUDGETING *
 * * * * *
 * FARM: EXAMPLE FARM *
 * DESCRIPTION - *
 * * * * *
 * UNIVERSITY OF MISSOURI *
 * DEPARTMENT OF AGRICULTURAL ECONOMICS *
 * * * * *

SUMMARY OF 5 YEAR PLAN BEGINNING 1967

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
CROPLAND ACRES:						
CORN	139.	154.	191.	141.	154.	150.
SOYBEANS	87.	113.	90.	0.	60.	46.
HAY CROPS	0.	0.	0.	0.	4.	10.
PASTURE	9.	20.	82.	91.	34.	61.
SILAGE	58.	58.	20.	20.	18.	18.
WHEAT	16.	15.	15.	14.	14.	14.
OTHER CROPS	53.	40.	42.	0.	19.	0.
	9.	0.	0.	15.	0.	0.
LIVESTOCK NUMBERS:						
FED CATTLE	100.	107.	93.	82.	88.	96.
SWINE	73.	102.	103.	85.	152.	132.
PRODUCTION SURPLUS OR DEFICIT:						
CORN EQUIV. BU.	2789.	-7.	-1709.	-5668.	-4043.	-5423.
HAY TONS	-26.	-28.	-24.	-21.	-16.	-5.
PASTURE AUMS	48.	29.	41.	20.	-17.	18.
SILAGE TONS	-150.	-171.	-146.	-115.	-136.	-161.
LABOR HRS. REQUIRED (1)	2810.	3430.	3475.	2510.	3923.	3573.
FARM PROFIT SUMMARY:						
1. NET FARM PROFIT	12614.	18325.	9576.	-3306.	18787.	435.
2. FARM INVEST.	203492.	198694.	202316.	202893.	195759.	214707.
3. RATE EARNED ON INVEST.	6.3%	8.9%	4.1%	-2.2%	8.8%	-0.1%
4. LABOR & MGMT. RETURN (2)	664.	5799.	-3088.	-15381.	5818.	-12336.
5. TOTAL ASSETS (3)	216621.	222939.	229382.	229558.	230870.	249818.
6. TOTAL LIABILITIES (3)	17455.	14150.	18321.	28704.	14721.	36969.
7. NET WORTH	199166.	208789.	211061.	201255.	216149.	212849.

(1) DIRECT LABOR (EXCLUDES INDIRECT LABOR - FENCE BLDG., ETC.)
 (2) LABOR & MGMT. RETURN = NET FARM PROFIT LESS (.06 X NETWORTH)
 (3) FARM & NON-FARM

TABLE 1. PROJECTED PROFIT OR LOSS STATEMENT

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
CASH INCOME:						
CORN	534.	0.	0.	0.	0.	0.
WHEAT	2336.	0.	0.	0.	0.	0.
SOYBEANS	6353.	8922.	6610.	0.	4795.	2064.
OTH. GRAIN	292.	0.	0.	292.	0.	0.
HOGS	28432.	39727.	40116.	33106.	59201.	51411.
FED CATTLE	32550.	34666.	30109.	26528.	28644.	31085.
1. TOTAL CASH INCOME	70896.	83315.	76835.	59926.	92640.	84561.
CASH EXPENSES:						
VARIABLE CASH EXPENSES:						
CORN	6811.	7522.	9359.	6909.	7546.	7350.
WHEAT	1060.	800.	830.	2.	380.	2.
SOYBEANS	2336.	3051.	2430.	3.	1620.	1242.
OTH. GRAIN	124.	1.	1.	207.	1.	1.
FORAGES	1008.	1008.	1117.	1118.	930.	1184.
HOGS	7519.	10506.	10609.	8755.	15656.	13596.
FED CATTLE	22200.	23643.	20535.	18093.	19536.	21201.
BUY FEED	1870.	2098.	3762.	7748.	6258.	7779.
2. SUBTOTAL VAR CASH EXP	42928.	48629.	48643.	42835.	51927.	52356.
OTHER UNDISTRIBUTED CASH EXPENSES:						
3. BUILDING REPAIRS	155.	176.	229.	447.	447.	724.
4. TAXES	651.	719.	916.	1079.	1143.	1590.
5. INSURANCE	320.	345.	420.	481.	505.	672.
6. CASH RENT	75.	1.	1.	1.	40.	1.
7. HIRED LABOR	464.	1228.	1335.	1766.	2153.	6133.
8. INT-ON DEBT (1)	3718.	3332.	3803.	4034.	4449.	6801.
9. MISCELLANEOUS (2)	559.	694.	654.	654.	814.	814.
10. SUBTOTAL OTH CASH EXP	5942.	6494.	7397.	8501.	9550.	16736.
11. TOTAL CASH EXPENSES	48870.	55122.	56041.	51336.	61478.	69091.
12. NET CASH OPR INCOME	22026.	28193.	20794.	8590.	31162.	15470.
13. -DEPRECIATION	9412.	9867.	11218.	11896.	12375.	15035.
14. NET FARM PROFIT B. TAX	12614.	18325.	9576.	-3306.	18787.	435.
15. +NET NON-FARM PROFIT	0.	0.	0.	0.	0.	0.
16. NET PROFIT BEFORE TAX	12614.	18325.	9576.	-3306.	18787.	435.
17. -INCOME TAX + SOC.SEC.	2219.	3202.	1305.	0.	3103.	0.
18. NET PROFIT AFTER TAX	10395.	15123.	8271.	-3306.	15684.	435.

(1) INCLUDES 1/2 YEAR INTEREST ON OPERATING EXPENSES @ 8% ANNUALLY
(2) MISCELLANEOUS=2% OF CASH INCOME LESS VARIABLE CASH EXPENSES

TABLE 2. PROFITABILITY, DEBT SERVICING, AND PAYBACK

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
PROFITABILITY ANALYSIS:						
1. NET FARM PROFIT BEFORE TAX	12614.	18325.	9576.	-3306.	18787.	435.
2. + INTEREST PAID	3718.	3332.	3803.	4034.	4449.	6801.
3. - OPR LABOR+MGMT CHR	3600.	4000.	5000.	5200.	6000.	7500.
4. =RETURN TO FARM INVEST	12732.	17657.	8379.	-4472.	17236.	-264.
5. FARM INVESTMENT	203492.	198694.	202316.	202893.	195759.	214707.
6. RATE EARNED ON FARM INVEST	6.3%	8.9%	4.1%	-2.2%	8.8%	-0.1%
7. CHANGE IN FARM INV	0.	-4798.	3623.	577.	-7134.	18948.
NET FARM PROFIT BEFORE TAX LESS OPR LABOR+MGMT CHARGE EQUALS :						
8. RETURN TO OPR NET WORTH	9014.	14325.	4576.	-8506.	12787.	-7065.
9. RATE EARN ON OPR NET WORTH	4.5%	6.9%	2.2%	-4.2%	5.9%	-3.3%
DEBT SERVICING:						
10. NET CASH INCOME	22026.	28193.	20794.	8590.	31162.	15470.
11. - INC TAX + SOC SEC	2219.	3202.	1305.	0.	3103.	0.
12. - EST FAMILY LIVING	5000.	5500.	6000.	6500.	7000.	7500.
13. -CASH AVAIL: DEBT SERV, REPLACMTS & ALT. USES	14807.	19491.	13489.	2090.	21059.	7970.
14. -CURRENT LOAN PAYMENT (1)	4080.	0.	0.	0.	0.	0.
15. -TOTAL SCHED PRIN PAYMT (2)	7598.	8374.	10670.	12065.	13014.	17828.
16. =CASH AVAIL FOR ALT. USE (3)	3129.	11117.	2820.	0.	8046.	0.
17. YEARS TO REPAY DEBT (4)	1.6	0.7	1.4	9.0	0.5	3.4
18. CHANGE IN DEBT (2)	0.	-3305.	4171.	408.	-7773.	16155.

(1) CURRENT LOANS = MONEY BORROWED FOR CURRENT OPERATING EXPENSES
 (2) APPLIES TO INTERMEDIATE AND LONG TERM ONLY.
 (3) IF SURPLUS CASH IS INSUFFICIENT TO PAY LCANS, NEW CURRENT DEBTS WILL BE CREATED
 (4) IF ALL CASH AVAILABLE (AFTER CURRENT LOAN PAYMENT) IS APPLIED TO INTERMEDIATE AND LONG TERM DEBT.

TABLE 3. BALANCE SHEET AND ANALYSIS - AT END OF YEAR - SOLVENCY

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
ASSETS:						
1. CASH (1)	3129.	14246.	17065.	17065.	25111.	25111.
2. CURRENT	42690.	42690.	42690.	42940.	43394.	43844.
3. INTERMEDIATE	13599.	13094.	15508.	14954.	13367.	24686.
4. LONG TERM	157203.	152910.	150119.	154999.	148998.	156177.
5. TOTAL ASSETS	216621.	222939.	229382.	229958.	230870.	249818.
LIABILITIES AND NET WORTH: (2)						
6. CURRENT (3)	0.	0.	0.	9974.	0.	9858.
7. INTERMEDIATE	11996.	7571.	10152.	1844.	0.	2068.
8. LONG TERM	6359.	6579.	8169.	16886.	14721.	25044.
9. TOTAL LIABILITIES	17455.	14151.	18321.	28704.	14721.	36969.
10. NET WORTH	199166.	208789.	211061.	201255.	216149.	212849.
RATIO ANALYSIS						
ADEQUACY OF CAPITAL:						
11. DEBT:NET WORTH (4)	0.09/1	0.07/1	0.09/1	0.14/1	0.07/1	0.17/1
OPERATING EFFICIENCY:						
12. INCOME:EXPENSES (5)	1.45/1	1.51/1	1.37/1	1.17/1	1.51/1	1.22/1
DEBT SERVICING:						
13. P.+I. PAYMT:INCOME (6)	0.16/1	0.14/1	0.19/1	0.27/1	0.19/1	0.29/1
PROFITABILITY:						
14. CAPITAL TURNOVER (7)	2.87/1	2.38/1	2.63/1	3.39/1	2.11/1	2.54/1

(1)CASH IS ACCUMULATED EACH YEAR.

(2)INCLUDES FARM & NON-FARM

(3) CURRENT DEBTS ARE PAID OFF EACH YEAR EXCEPT WHEN SURPLUS CASH IS NOT AVAILABLE

(4)INDICATES THE BORROWED CAPITAL PER DOLLAR OF OWNER CAPITAL.

(5)INDICATES THE CASH INCOME GENERATED BY ONE DOLLAR OF CASH EXPENSE.

(6)INDICATES THE DEBT SERVICING DRAIN AS A PERCENT OF TOTAL CASH INCOME.

(7)INDICATES THE NUMBER OF YEARS NEEDED TO PRODUCE INCOME EQUAL TO THE FARM INVESTMENT.

TABLE 4. SUMMARY WHEN LIVESTOCK & CROP PRICES INCREASE 20.00%

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
1. TOTAL CASH FARM INCOME	85075.	99978.	92202.	71912.	111168.	101473.
2. -TOTAL CASH EXPENSES	48870.	55122.	56041.	51336.	61478.	69091.
3. NET CASH OPR. INCOME	36205.	44856.	36161.	20576.	49690.	32382.
4. NET PROFIT B. TAXES	26793.	34988.	24943.	8679.	37315.	17348.
5. NET PROFIT AFTER TAXES	21025.	26433.	19908.	7514.	28164.	14506.
6. TOTAL ASSETS	227252.	232934.	230081.	217596.	229972.	231969.
7. TOTAL LIABILITIES	0.	C.	0.	18729.	0.	27112.
8. NET WORTH	227252.	232934.	230081.	198866.	229972.	204858.
9. RETURN TO FARM INVESTMENT	26911.	34320.	23745.	7513.	35764.	16648.
10. RETURN TO OPR. NET WORTH	23193.	30988.	19943.	3479.	31315.	9848.
11. RATE EARNED ON OPR. NET WORTH	10.2%	13.3%	8.7%	1.7%	13.6%	4.8%
12. CASH AVAIL. FOR ALT. USE	15574.	25734.	18313.	4534.	23575.	4469.
13. YEARS TO REPAY DEBT	0.7	0.5	0.7	1.5	0.3	1.2
14. CAPITAL TURNOVER	2.39/1	1.99/1	2.19/1	2.82/1	1.76/1	2.12/1

TABLE 5. SUMMARY WHEN LIVESTOCK & CROP PRICES DECREASE 20.00%

	PRESENT 1967	YEAR 1 1968	YEAR 2 1969	YEAR 3 1970	YEAR 4 1971	YEAR 5 1972
1. TOTAL CASH FARM INCOME	56717.	66652.	61468.	47941.	74112.	67649.
2. -TOTAL CASH EXPENSES	48870.	55122.	56041.	51336.	61478.	69091.
3. NET CASH OPR. INCOME	7847.	11530.	5427.	-3395.	12634.	-1442.
4. NET PROFIT B. TAXES	-1565.	1662.	-5791.	-15291.	259.	-16477.
5. NET PROFIT AFTER TAXES	-1565.	1662.	-5791.	-15291.	259.	-16477.
6. TOTAL ASSETS	204661.	208164.	204382.	194790.	202067.	200987.
7. TOTAL LIABILITIES	7017.	0.	7386.	3701.	4330.	53625.
8. NET WORTH	204661.	208164.	204382.	176060.	202067.	173875.
9. RETURN TO FARM INVESTMENT	-1448.	994.	-6988.	-16458.	-1292.	-17176.
10. RETURN TO OPR. NET WORTH	-5165.	-2338.	-10791.	-20491.	-5741.	-23977.
11. RATE EARNED ON OPR. NET WORTH	-2.5%	-1.1%	-5.3%	-11.6%	-2.8%	-13.8%
12. CASH AVAIL. FOR ALT. USE	0.	964.	0.	0.	0.	0.
13. YEARS TO REPAY DEBT	6.1	2.3	-32.0	-1.9	1.9	-3.0
14. CAPITAL TURNOVER	3.59/1	2.98/1	3.29/1	4.23/1	2.64/1	3.17/1

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VITA

T. Roy Bogle was born [REDACTED] [REDACTED] [REDACTED], in DuBois, Pennsylvania. He was graduated from DuBois, Pennsylvania High School in 1956 and the Pennsylvania State University with a B.S. degree in Animal Husbandry in June 1960. Upon graduation from "Penn State," he began work as a 4-H Agent in Jefferson County, Ohio, for the Ohio Cooperative Extension Service.

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FARM INVESTMENT ANALYSIS--HAND-CALCULATED
COMPARATIVE BUDGETING AND COMPUTERIZED
FIVE-YEAR TRANSITIONAL BUDGETING

T. Roy Bogle

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ABSTRACT

Tremendous capital investments required in today's modern farming necessitate prudent planning of future investments. The object of this research was to provide a systematic means of analyzing profitability and cash flow consequences, resulting from anticipated changes in farm investments. Two budgeting systems were developed. The first uses hand calculation to compare one or more alternative farm plans to a present system. The second is a computerized system to analyze the five-year transition of a selected farm plan.

The two budgeting systems are quite different in purpose and design. The hand budgeting procedure was developed as a tool for long run planning in which the economic consequences of alternative plans for farm organization can be evaluated and compared, before committing resources to making adjustments. It was designed

specifically to coincide rather closely with computer budgeting procedures currently available for long run planning. It provides a way of projecting the consequences of the "present system" of farm organization by applying selected crop and livestock enterprise standards which also are used in computing each alternative plan chosen for comparisons. In each case, computations are based upon some typical future year in which the plan is presumed to be implemented fully, with all changes and investments completed and with the projected performance levels of all enterprises fully achieved.

The computerized farm investment analysis program was designed for an entirely different purpose. It provides a way of evaluating the expected performance of the selected long run farming system during each year of the developmental period. It is a transitional process which permits an analysis of the economic consequences of year-by-year adjustments or changes in assets, liabilities, net worth, cash flow, and other key measurements. Experience indicates that the most troublesome years in making major changes in a farming system are in the transition period--the years when substantial major investments are made (and usually with borrowed capital) but also years in which the expected higher production and cash income have not yet been generated. This procedure is designed to help identify in advance some of the pitfalls and financial problems which

may be encountered when changes are in progress.

Since neither a farm operator nor any other professional can be expected to predict with complete accuracy the prices of crops and livestock, as well as prices of farm inputs, an additional feature was included in the computerized program. This unique feature provides for both crop and livestock prices to be increased and decreased by a predetermined percentage. The entire five-year transition budget is recalculated with the changed prices and key figures are printed out. This final step allows the operator to observe the possible consequences of a substantial up-swing or down-swing as it may effect farm profits, net worth and cash flow.

In summary, the proposed hand budgeting system can be used in place of one of the many other farm planning budgets to select a particular long run farm plan. The computerized five-year transitional budget then is available to take the previously selected farm plan and analyze the farm profits, net worth, and cash flow for each of the five succeeding years, beginning with the present system.

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