

A STUDY OF THE BUDGETARY ANALYSIS APPROACH TOWARD
TEACHING FARM MANAGEMENT TO VOCATIONAL
AGRICULTURE STUDENTS IN THE SECONDARY
SCHOOLS OF NORTHEASTERN
OKLAHOMA

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CHAPTER I

INTRODUCTION

One of the most challenging tasks for vocational agriculture instructors today is presenting the principles of farm management, to vocational agriculture students, in such a manner that the concepts of farm management are developed and understood. The method of instruction must take into consideration the individual learner and the fundamental learning process, whereby the principle of "transfer of learning" will be utilized and the maximum learning will take place. Edward Olsen notes the extent to which the learner uses today what was learned yesterday depends upon:

- a. A "native" ability to generalize. In the degree that this factor is "native" not much can be done about it, but most persons have more of this ability than they use.
- b. The similarity between yesterday's and today's situation either in respect to their objective manifestations or methods of coping with them. One of the tasks of education is to increase the degree of relationships between the situation used for learning and the later situations which the learner will meet.
- c. Practice of these dispositions, skills, and understandings which increase the range of situations to which learning can be applied. Activities such as looking for big ideas seeking relationships, and formulating hypotheses help to improve one's ability to generalize.

In the teaching of farm management the instructor of vocational agriculture will have to take complete advantage of the "learning experience"

and transfer of training to accomplish the task. The basic concept of teaching farm management as a major area in the total vocational agriculture program will determine the effect of the "learning experience."

If the teacher training departments of vocational agriculture are to adequately train men to become efficient vocational agriculture teachers, a study of this type will guide their training program. In this type of research knowledge will be learned about the high school student, their ability to comprehend more detail and abstract learning, the effect of a contest on a learning situation, and thereby render our teacher training and supervision more proficient.

General Statement of the Problem

In recent studies of Ashley¹ and Triplett,² their findings indicate the major emphasis of farm management, as taught by vocational agriculture teachers in Oklahoma, has been to place it within the enterprise. This study was designed to investigate approaches of teaching farm management whereby farm managerial principles and procedures can be taught to high school vocational agriculture students. This experimental study is an attempt to design a teaching model so the vocational agriculture instructor would be able to make the complicated process of farm

¹Glyn H. Ashley. "A Study of the Amount of Time Devoted to Teaching Farm Management, Marketing and Economics in the Four Year Course of Study in Forty Three Vocational Agriculture Department in Southeast Oklahoma." Masters Thesis, Oklahoma State University, 1960.

²Clyde Triplett. "An Analysis of Teaching Programs in Farm Management, Agriculture Economics, and Marketing in Forty Vocational Agriculture Departments in Northwest Oklahoma." Masters Thesis, Oklahoma State University, 1958, pp. 57-58.

management vivid and meaningful to their students enrolled in vocational agriculture.

Purpose of Study

The purpose of this study was to determine if the budgetary analysis approach of teaching farm management to high school students in vocational agriculture would result in more effective learning than the traditional approach now used. Thirty-two randomly selected schools in Northeast Oklahoma voluntarily contributed their services to perform the role in which they were assigned. Four groups of vocational agriculture students taught with different approaches to instruction in farm management and with and without contest participation were compared in order to find out whether or not there were significant differences among the groups. More specifically, the study sought answers to the following questions:

1. How do students taught farm management by the budgetary analysis approach compare with regard to farm managerial ability with students taught by the traditional approach?
2. How do students that have participated in an interscholastic farm management contest compare with regard to farm managerial ability with students that have not had this experience?
3. How do students with different amounts invested in supervised farm training programs compare with regard

to farm managerial ability when they are taught by the budgetary analysis approach and the traditional approach?

4. How do students with varying amounts invested in supervised farm training programs compare with regard to farm managerial ability when they have participated in an interscholastic farm management contest and when they have not had this experience?

Need for the Study

Research would tend to substantiate a conclusion that the present learnings in the area of farm management achieved by vocational agriculture students are somewhat inadequate. While variations may be observed in the approaches used by teachers, most of the instruction can be recognized as confined within the area of specific enterprises. It is recognized that this may tend to create difficulty for students in the development of ability to understand problems related to the total farm organization.

One of the purposes of the Smith-Hughes Act of 1917 was to establish vocational education in the United States during a crisis. A specific major objective of the program was to develop the effective ability of each farmer to "manage a farm business." Trends in the increased size of farms and the increased use of capital as a farm input has made it imperative that rural educators be given advantage of research supported by valid information, regarding the latest teaching procedures available. Consequently they will be able to make the

best possible selection when teaching the youth in their care.

Definition of Terms

Because of the frequent use of a number of terms throughout the presentation that follows, it is necessary to define or clarify certain of them from the outset.

The term "experimental" is given the interpretation given to it by Barr, Davis, and Johnson.³ They note that the process of adding to scientific knowledge by experiment consists of the following sequence of events: (1) statement of the problem; (2) critical examination of theories on the basis of available evidence; (3) formulation of hypotheses that are appropriate for testing; (4) the carrying out or execution of the experiment; and (5) interpretation of the results and application of the selected solution; (6) application of the experimental principles of randomization, replication and control, of variation makes it possible to investigate an experimental problem when several variables are undergoing change.

The word "school" used herein includes the teacher of agriculture and the vocational agriculture department in the school under consideration, the school itself, and the community service area in which the school is located.

Treatment Group is used with reference to the group of students that will spend a minimum of twenty-four class periods studying farm management by the budgetary analysis approach.

³Arvil S. Barr, Robert A. Davis, and Palmer O. Johnson. Educational Research and Appraisal, J. B. Lippincott & Co., 1953.

Non-treatment Group is used with reference to the group of students enrolled in vocational agriculture that will study farm management by the traditional method.

Contest Group is used with reference to the department of vocational agriculture that has participated in the Farm Management Interscholastic contest sponsored by the Agricultural Economics department of Oklahoma State University.

No Contest Group is used with reference to the department of vocational agriculture that has not participated in the Farm Management Interscholastic contest sponsored by the Agricultural Economics Department of Oklahoma State University.

Material is used with reference to the unit on farm management presented to each teacher that participated in the treatment group.

Traditional Approach is a term used with reference to an approach largely embodying emphasis upon management within a specific enterprise. For instance, basically all the farm management pertaining to beef cattle would be included when units regarding various production factors of beef cattle were taught. This assumption was substantiated through a review of monthly reports submitted by over 100 vocational agriculture teachers.

Invested in Farming is used with reference to the amount of money that the individual student had invested as recorded in his supervised farm record book.

Vocational Agriculture is used with reference to the term "vocational agriculture," as it refers to organized programs of instruction in agriculture offered in the public secondary schools in accordance with the provisions of the National Vocational Education Act commonly known

as the Smith-Hughes Act of 1917, as amended.

Final Report is used with reference to the standard form, "Final All-Day Report," used by teachers of Vocational Agriculture in Oklahoma for reporting the individual students supervised farm program.

Expansion is used with reference to the increase of farm business in size and scope. This is the problem of the small, independent family farm as compared to the large, commercialized farm. In 1950, "large farms," according to the United States Bureau of the Census, consisted of those containing at least 1,000 acres or selling more than \$70,000 worth of products. This group constituted only about 1.3 per cent of farms, but produced 17.3 per cent of the total sales made from all farms. Data from the 1954 Census shows a doubling in the number of "large farms" reported, though it should be mentioned that reclassification explains a portion of this increase. It is apparent that the importance of large farms did increase during the period cited above.

Mechanization is interpreted as referring to the continued development and introduction of machinery to replace more and more of the farm laborers and horse and mule power once needed. The modern tractor on the American farms has made it possible for one man to manage many more acres within the past ten years. In 1950 the tractor would develop sixty horsepower; whereas, in 1962 the large wheel type tractor will produce one hundred nineteen horsepower. The tractor is only an example of the increase in mechanization on the American farms. We could take any one of the many other types of farm machinery with the same results.

Establishment is interpreted as referring to the same meaning used by Deyoe, who states: Establishment begins when a person takes on full or joint responsibilities for managing an enterprise or an entire farm

business. As such, it includes such statuses as (1) a partner in a farm business with a definite share in the returns and some responsibility in operating and managing the farm, (2) a renter who operates and manages the farm, (3) an owner who operates and manages the farm, (4) a manager and an operator of a farm for another party, and (5) some combination of the preceding.⁴

Changes in Efficiency is a term used with reference to the increase in outputs as measured by inputs. An example of this is the amount of feed required to produce one hundred pounds of pork. The twentieth edition of Morrison's Feeds and Feeding⁵ contain the following statement. "When fed efficient rations, pigs marketed at the usual weights frequently require less than four hundred pounds of concentrates or other air-dry feeds to produce each one hundred pounds of gain, and rarely require much over four hundred and fifty pounds. From weaning time to market weights, well-fed pigs should make an average gain of 1.0 pounds per head daily." To produce a certified litter, in one of our major breeds of swine (in 1964) pigs must weight 200 lbs. in one hundred seventy days. Also in 1964 it is possible to negotiate a contract with several major feed companies that will guarantee one pound of gain on three and one half pounds of feed providing certain management practices are provided.

⁴George P. Deyoe. Supervised Farming in Vocational Agriculture, Danville, Illinois, Interstate, 1947.

⁵F. B. Morrison. Feeds and Feeding, 20th Edition, Morrison Publishing Company, 1947, p. 807.

CHAPTER II

REVIEW OF LITERATURE

In recent years the rural educators have become aware that our production goals were not adequate in training youth to meet the challenge of American agriculture. The youth were able to take a small segment of the farm and perform unusual accomplishments, but when it was time for them to manage a complete farm they were totally inadequate. In a study conducted by Glen Ashley, it was found that:

A majority of vocational agriculture teachers in Southeast Oklahoma are not including sufficient study of farm management, marketing and economics in their four year teaching plans to meet the demands of agriculture today.⁶

The area of farm management seems to be less thoroughly understood by a large segment of teachers of vocational agriculture as the time allotted is not enough to attempt to present the basic concepts of farm management. The terminology "farm management" is of such magnitude that it may seem impossible for the vocational agriculture instructor to become acquainted with all facets of instruction thereby it is included in the curriculum merely as a name. From the very beginning of the check of the attempt to review literature pertaining to the area

⁶Glyn H. Ashley. "A Study of the Amount of Time Devoted to Teaching Farm Management, Marketing and Economics in the Four Year Course of Study in Forty Three Vocational Agriculture Department in Southeast Oklahoma." Masters Thesis, Oklahoma State University, 1960.

of farm management it was evident that a recognition of the difficulty of proper understanding by teachers was commonly found. Beneke and Perry pointed this out as follows:

Practically all programs of vocational agriculture now make some provisions for the teaching of farm management principles. However, the experience of the authors in teaching vocational agriculture suggests that the work in this area is less well defined and organized than are the other phases of the program.⁷

Farm management has always enjoyed a basic location in the vocational agricultural curriculum. It can be found by name in all stated curricula, but how it has been taught varies from state to state and from teacher to teacher. It is this variation that caused the reaction in an article written by Harry Peirce, in which the author states:

.....in Minnesota, management is becoming the key word in teaching vocational agriculture to high school farm boys, young farmers, and especially to adult farmers. Farm people are practical people and the farm management approach to agriculture education is the practical approach.

What is the farm management approach? A simple question with a "not so simple" answer. Basically, it is using farm management data derived from farmers records either individually or by groups to determine the strong points and weakness in the individual farming program.⁸

It is evident that there are wide variations in the amount and, very possibly, the quality of instruction in the various phases of the subject under consideration. A deficient background including a lack of clear objectives, a lack of a well defined and organized curriculum,

⁷Raymond R. Beneke and Dudley L. Perry. What Emphasis--in Farm Management Teaching, The Agricultural Education Magazine, Volume 24, December 1951, p. 124.

⁸Harry Peirce. Management, Motivation,--Money. Agricultural Education Magazine, November 1959, pp. 110-11.

and a lack of preparation by the teachers makes the statement by Ashley more meaningful:

The fact that so many teachers stated that the reason they did not spend more time on particular phases of farm management, economics and marketing was "Taught in other enterprises," leads the author to conclude that there is widespread misunderstanding of just what constitutes instruction in this field.⁹

Within the framework of our present curriculum, with the project program or supervised farm training program developed around individual animals or individual acres, the concept of farm management seems remote. The idea of farm management being the core of all vocational agricultural programs only bears out the significance of the word "vocational." We are training boys to operate farms, but we aren't providing them the tools with which to work. It is the opinion of Boyles that:

The farm management curriculum is a very important part of the high school vocational agricultural course of study. The farm management course should be organized so as to "tie together" all of the previously taught subject matter into one unit or plan. Consequently, the student will be able to move into the farming business with an understanding of the factors involved in organizing and planning the farm as one complete unit.¹⁰

Construction of the Farm Management Curriculum

The school farm has had many uses over a period of time in the teaching of vocational agriculture. It has served as a place to trim a few shrubs, a place to groom a calf for a show, and now it is being

⁹Glyn H. Ashley. Masters Thesis, Oklahoma State University, 1950.

¹⁰Patrick G. Boyles. How Should Farm Management be Taught? University of Wisconsin, 1954.

suggested that the school farm come of age and be used as a problem farm for teaching "Farm Management." In an article written by Joseph W. Hooper he asks the following question:

Are you satisfied with your teaching of farm management? Does the textbook used as a reference deal with the problems of your community? If your answer is no to the previous questions, you find yourself with the same problems I had three years ago---, I developed the following farm management problem for my Vocational Agriculture IV students.

The first part of the problem is a review of farming principles and practices using the Doane Agriculture Student Digest as the text.

The second part of the problem is the actual setting up of a farm plan for an actual farm in the community.¹¹

The situation in which American Agriculture finds itself today determines its course of action for the future. The rapid advance in agricultural technology and the competitive position in which agriculture finds itself today leads to a rediscovery of the principle of farm management. The objectives for the methods of teaching farm management is made vivid by B. C. Bass when he states:

It is common knowledge that the efficiency with which a farming business is operated largely determines whether the operator of that business can successfully meet the intense competition he faces. Recent developments affecting agriculture add significance to this fact. Therefore, it is more important than ever that individuals enrolled in vocational agriculture classes receive the instruction they need in the area of farm management.¹²

In the construction of the farm management curriculum, the

¹¹Joseph W. Hooper. Teaching Farm Management, Agricultural Education Magazine, February 1960, pp. 188-189.

¹²B. C. Bass. In Planning Farm Management Instruction--What Units Should We Teach?, The Agricultural Education Magazine, Volume 30, September 1957, p. 53.

vocational agriculture instructor will have to be alerted to the fact that American farms are becoming more commercialized. In a study conducted by Duggan and Battles it was found that farm businesses were becoming more commercialized.

Farming has become increasingly commercialized since the turn of the century. In 1900, about 41 per cent of the population of the United States lived on farms, and each farm person produced enough food and fiber for himself and nearly five other persons. The increase in farm production with a decrease in number of producers has been made possible by the use of more and more capital in farm operations and with the help of science and machinery.¹³

In 1962 we find the trend toward commercialization in a continuous upward spiral. In 1963 approximately 12 per cent of the population of the United States live on farms and 81 per cent of the total food and fiber is produced by 6 per cent of the farm population.

The difficulty of teaching farm management to the average high school student has been recognized by the alert educator as indicated in the literature. The difficulty of instruction will be a challenge to the educator to meet the objective and without hesitation attempt a solution to the dilemma. George Luster points out several possible reasons such difficulties may provide the basis for teaching.

Teaching farm management as such is usually more difficult than teaching the production practices. This is especially true with high school boys.

There are several reasons why teaching farm management as such is difficult with high school boys. Farm management deals with concepts and decision-making which require a higher level of thinking than do most production practices. It deals with intangibles--principles. (A principle, of course, is an abstraction.) A second

¹³I. W. Duggan and Ralph Battles. Capital Requirements for Farming, New York, 1950.

reason may be that boys have difficulty in seeing an immediate return in dollars resulting from time devoted to farm management study. While it is true that profits can, and will increase with good management, this may be difficult for boys to see clearly!¹⁴

When the major concept of teaching farm management is placed in the proper perspective the resources with which to present the material in a meaningful manner will be provided. The alert teacher of vocational agriculture need not look beyond his home community for teaching material as the major types of farms in the community will provide the basis for the problems in the farm management curriculum. Hart, Bond, and Cunningham state:

The type of farming found in any region that has been settled for a long period of time is the results of years of experimenting by many farmers. The early settlers came from many different sections and brought with them many different kinds of crops and livestock and ideas about farming. By the process of trial and error, the kinds of crops and livestock and the farm practices best adapted to a section survived, and the others were eliminated when farmers found that they did not pay.¹⁵

With the aspect that farming appears at times to become a relatively insignificant part of the total economic activity, actually it is only losing its identity as it takes on the characteristics of a specialized business operation. In today's farming operations the owner-operator of a large farm is taking on the characteristics of an entrepreneur. For example, he may often assign others to perform manual functions,

¹⁴George L. Luster. Teaching Farm Management, Agricultural Education Magazine, June 1961, pp. 279-280.

¹⁵Hart, Bond and Cunningham, Farm Management and Marketing, Cornell University, New York, p. 8.

thus freeing him from time-consuming tasks to devote more time to the management functions.

With these items in mind, it is evident that to attain the original objectives in vocational agriculture as set forth in the Vocational Division Monograph Number 21, increased emphasis must be placed on farm management teaching. These major goals are:

1. Make a beginning and advance in farming.
2. Produce farm commodities efficiently.
3. Market farm products advantageously.
4. Conserve soil and other natural resources.
5. Manage a farm business.
6. Maintain a favorable environment.¹⁶

To obtain these objectives will provide a challenge to the most serious educator when he considers the students that confront him each day. The teenager has been taught to think in terms of physical activities which fit his growing condition. When abstract ideas are presented to this type of student problems can be expected in making the ideas meaningful, understandable, and desirable. Beneke and Perry note this when they say:

No greater challenge faces the teacher of vocational agriculture than that of converting the student who thinks in physical terms and is "improved practice" and "enterprise" conscious into an entrepreneur who weighs alternatives in terms of returns to the whole farm business. To do this the study of technical problems must be integrated with a consideration of the farm management principle which will enable the student to weigh alternatives decisions in terms of their effect on returns to the whole farming operation.¹⁷

¹⁶U. S. Office of Education, Educational Objectives in Vocational Agriculture, Vocational Division Monograph No. 21 (Washington, 1940).

¹⁷Raymond R. Beneke and Dudley L. Peery. What Emphasis . . . in Farm Management Teaching, The Agricultural Education Magazine, December, 1951, p. 124.

Farm management presents so many abstract ideas to a high school student that it will require an understanding teacher well equipped in skill of teaching and subject matter knowledge to present these ideas in a manner understandable to the student. Farm management covers material from a broad area but is a fully developed, applied science that can be understood by high school students provided the central theme of increasing income in relations to cost is made clear. The five major decisions basic to farm management are applicable to the student's desire to own an automobile. Herbst notes these decisions when he states:

Farm management is concerned with the organization and operation of a farm for the purpose of securing the maximum net returns consistent with family welfare, both in the long run and in short periods of time...

Farm management is primarily a decision-making process. Many alternative courses of action are usually open to the farmer or professional farm manager. He must study the various possibilities, choose the ones most likely to be profitable, decide to take action, and accept the responsibility of his decisions.¹⁸

When the young student purchases a calf for production purposes the events that follow are orderly and timely. Without a catastrophe he is assured the natural laws of growing and reproduction will provide him with the needed experience. This situation is comparable to farm management, but the operation is on a smaller scope which decreases the chances of a major loss. Risk sharing and risk bearing must be incorporated in the teaching plan to provide the student with the knowledge of the instability in a total farming operation. Without this instability

¹⁸J. H. Herbst. What is Farm Management? Agricultural Education Magazine, June 1959, p. 276.

in farming the necessity of farm management would be eliminated.

Bradford and Johnson make note of this when they state:

Stability in farming is abnormal. Change and the need to study and adjust to change are normal. In farming, as elsewhere, partial ignorance is universal: the need to learn and adjust is the main problem of farm management.¹⁹

Black and others also make the same point when they state:

If each growing season were exactly like every other season, if prices remained the same, and no other factors changed from year to year, the management problem would largely disappear. By a process of trial and error, perfect production methods would be discovered and adopted. One way of organizing a farm would always be the right way. Farm management owes its existence to the dynamic factors in civilization.²⁰

It would be well at this point to consider what the term "farm management" involves. Bradford and Johnson define management as:

...an intangible part of production which develops within the lives of men. It is first a mental process, a concentration of desires, a will power. Management functions when a farmer is (1) observing and conceiving ideas; (2) analyzing with further observations; (3) making decisions on the basis of analysis; (4) taking action; and (5) accepting responsibilities. Management can be seen through results.²¹

Hopkins' book lists three benefits that the farmer derives from making plans: (1) the most profitable farm organization is worked out; (2) efficient management results; and (3) "leaky elements of expense

¹⁹ Lawrence A. Bradford and Glenn L. Johnson. Farm Management Analysis, N.Y., John Wiley and Son, 1953.

²⁰ John D. Black, M. Clawson, C. R. Sayre, and W. W. Wilcox. Farm Management, New York, MacMillian Company, 1947.

²¹ Lawrence A. Bradford and Glenn L. Johnson. Farm Management Analysis, N.Y., John Wiley and Son, 1953.

are discovered.²² Concerning the third benefit, Hopkins comments, "It is very worthwhile to discover leaks in the farm business, but it is even better to stop the leak before losses begin."

Budgetary Analysis Approach in Relation
to Teaching Farm Management

The budgetary analysis approach to farm management seems to present a modified method that best promises to provide the knowledge and terminology necessary for students enrolled in vocational agriculture classes. It is understandable at the high school level and the transfer value can be understood when it is realized that budgetary analysis can be translated into the language of the average farmer. Budgetary analysis is thorough enough so the student or farm planner can be reasonably assured the alternative selected will provide the means for achievement of the family goals. In relation to the budgetary analysis approach to planning, Rorholm defines budgeting in the following manner:

A budget is a plan for future use of resources. In farm management terminology, budgeting analysis refers to the making of several alternative budgets from which is chosen the farm organization promising the highest returns.²³

In the beginning, it may appear that to teach farm management by the budgetary analysis approach a complete and accurate set of records must be available. While available records would be highly desirable,

²²John A. Hopkins. Elements of Farm Management, 1938.

²³Neils Rorholm. "Linear Programming as a Possible Refinement of Farm Budgeting Technique," Unpublished Doctoral Dissertation, University of Minnesota, Minneapolis, Minnesota, 1954.

Nielson takes issue with this viewpoint. He constructed a "simple" budgeting method that could be used in the teaching of farm management by the budgetary analysis approach. Neilson makes the following statement:

Farm accounts are useful in budgeting, but it cannot be said that the success of the method depends upon the availability of records. The most important function of account is in providing an inventory of the present organization of the farm, which serves as a starting point for the budgeting procedure. If records are not available, the recent organization can be outlined from income-tax returns, sales slips or from memory.²⁴

Though the success of budgetary analysis does not depend on the availability of records, it is hoped that budgeting will result in a greater awareness on the part of the student that advance thinking, or planning, pays off sufficiently. This knowledge should result in greater transfer as the student proceeds through high school and makes a beginning in farming. Dippold, former teacher-trainer in Oklahoma's Veteran's Agricultural Training program, gives credence to such a hope when he states:

Record-keeping will become a satisfying experience whenever budgets are made. Progress can be determined every year, and difficulties needing further attention can be overcome. Budgeting paves the way for rules in management ability and earning power.²⁵

In final review, the individual should be encouraged to establish his objectives and plan how to accomplish these goals. In farm

²⁴James N. Nielson. "Application of the Budget Method in Farm Planning," Unpublished Doctoral Dissertation, Harvard University, Cambridge, Massachusetts, 1953.

²⁵G. P. Dippold. Major Factors of Successful Farming, Farm Management Teaching Aid, Stillwater, 1950.

management, lessons may be learned that will be invaluable throughout the life of an individual, thus making the objectives of the budgetary analysis approach a part of the individual. Thus the meaning is clear as Heady states:

The major objective of budgeting is to compare alternative plans for prospective profitability. The goal is not one of setting down a single plan to be followed without deviation. The real purpose is to figure out two or more systems of farm organization, compare incomes and select the most profitable one.

A large number of alternative organizations are possible for most farms. Perhaps six different cropping systems or rotations are possible; six different livestock systems may be fitted to each cropping system, and each of these may be produced in two different ways. The number of possible plans is then 72. Yet it is seldom if ever necessary to work out so many plans.²⁶

²⁶Earl O. Heady and Harold R. Jensen. Farm Management Economic, Prentice-Hall, Inc., 1960, pp. 96-97.

CHAPTER III

DESIGN OF THE STUDY

The purpose of this chapter is to describe the procedure used in conducting this study. The description will include a statement of the hypotheses which were tested, the sampling procedure, a description of the subject groups, approaches of obtaining the data, and the approaches used in the analysis of the data.

The Hypotheses Tested

The hypotheses in this study were formulated as null hypotheses in order to facilitate testing by the application of appropriate tests of significance. Garrett made the following statement regarding the null hypotheses:

Experimenters have found the null hypothesis a useful tool in testing the reliability of differences. In its simplest form, this hypothesis asserts that there is no true difference between two populations means, and that the difference found between sample means is, therefore, accidental and unimportant. The null hypothesis is akin to the legal principle that a man is innocent until he is proved guilty. It constitutes a challenge; and the function of an experiment is to give the facts a chance to refute (or fail to refute) this challenge.²⁷

The major hypothesis stated in the form of a null hypothesis, was

²⁷Henry E. Garrett. Statistics in Psychology and Education, New York, 1953, p. 213.

as follows:

- (1) There is no significant difference in the achievement of students when taught farm management through the budgetary analysis approach as compared with students taught by the traditional approach.

The second hypothesis was also stated in the form of a null hypothesis as follows:

- (2) There is no significant difference in the achievement of students in farm management that participate in contest compared to students without such experience.

It was believed that the amount invested in the supervised farm training program was probably an indirect measure of motivation and possibly related to the criterion variable of the study, that is, the amount of achievement in knowledge of farm management. Therefore, the amount invested in the supervised farm training program as recorded by the vocational agriculture instructor on the final all-day report on file in State Vocational Agriculture Division of the State Department of Vocation Education, was used as a control variable. The use of the control variable permitted the testing of two subordinate hypotheses. While these two hypotheses were not germane to the major hypothesis they did permit an evaluation of the sampling procedure, in that if the sampling were completely adequate, the null hypothesis should hold. The two hypotheses under test with the amount invested in the supervised farm training variable were:

- (1) There is no significant difference in the amount invested in the supervised farm training program by students that

were taught farm management by the budgetary analysis approach compared to students receiving instruction by the traditional approach.

- (2) There is no significant difference in the amount invested in the supervised farm training program by students that participate in contest compared to students without such experience.

Selection of Statistical Procedure

A two-way analysis of covariance was considered the most appropriate statistical procedure for testing the major hypothesis of this study. Such a design permits the testing for possible differences between the two treatment variables, in this case, teaching approaches and effect of contest. In addition to testing for possible differences between treatment variables, this statistical procedure makes it possible to determine if there is a significant interaction between the treatment variables. The presence of a significant interaction would require a qualified interpretation of any significant differences found between the treatment variables.

The criterion variable in this study was based on the individual differences between the pretest and post test score. A measure of the amount invested served as the control variable to partial out the effects of individual differences in interest in farm management prior to treatment. The five per cent level of significance was selected for the tests that were made.

Selection of the Schools

The State of Oklahoma is divided into five districts of vocational agriculture. The Northeast district, due to the wide variation of conditions, has all the types of farming found within the state. The eighty-five schools in the Northeastern district of Oklahoma were placed in an alphabetic list. From this list the 23 schools that had participated in the Farm Management Interscholastic sponsored by the Agricultural Economics Department of Oklahoma State University were removed. Twenty-two schools from this list were selected at random with the odd numbered schools designated as group I and constituting one-half the treatment group. The even numbered schools were designated as group II and constituted one-half of the control group. Twenty-two of the twenty-three schools who had participated in the Farm Management contests met the general requirement for selection. Twenty-two schools were selected by random means from the remaining sixty-two schools in the Northeastern district. Odd numbered schools were designated as group I and constituted the remaining one-half of the treatment group. The even numbered schools were designated as group II and constituted the remaining one-half of the control group. Eleven schools, with ten boys enrolled in the junior and senior class, were included in each group at the beginning of the study with three schools designated as alternates. This was to provide the necessary eight schools for each group if for some reason one or more schools were unable to complete the program.

Requirement for Selection

The forty-four randomly selected departments included in the study were selected because they satisfied the following requirements: (1) The treatment groups were prepared to include the budgetary analysis approach unit in their 1960-61 vocational agriculture teaching plans; (2) the non-treatment group was qualified through verification that presently they were approaching the teaching of farm management largely through incorporation of farm management principles within units of instruction developed about productive enterprises. Verification of this fact was accomplished through review of monthly reports of teaching activities submitted to the State Vocational Agriculture Division; (3) they stated that at least ten students were enrolled in their junior and senior vocational agriculture classes; (4) they were able to qualify according to criteria used for selection as established by the Department of Agricultural Education in Oklahoma State University; and (5) they would carry out the various facets of the teaching program during the second semester of the 1960-61 school year.

The twenty-two randomly selected schools included in the study that compose the contest group were selected because they satisfied the following requirements: (1) They had participated in the State Interscholastic Farm Management Contest sponsored by the Agricultural Economics Department of Oklahoma State University; and (2) in addition to this requirement they would meet all requirements necessary for general qualification. The schools selected for the study represented the Northeastern area of the State of Oklahoma.

Characteristics of the Students

The students that participated in this experimental study were members of secondary schools of Northeast Oklahoma enrolled in their junior or senior year. To be eligible for participating they had to be enrolled in vocational agriculture during the school term of 1961-62. In addition each student had made suitable plans to carry out his individual supervised farming program with the advise of his vocational agriculture instructor.

Instrument of Measurement

Suitable measuring devices were needed for proper evaluation of the approaches of teaching farm management. No satisfactory standardized instrument for measurement achievement in farm management could be located. A farm management test similar to the one required in this study was used in an experiment by Edington.²⁸ Tests that had been used in the Farm Management Interscholastic Contest were used to formulate the instrument of measurement (Appendix B). In the preparation of the test, careful attention was given such factors of test construction as validity, reliability, objectivity, discrimination, and comprehensiveness.

In adapting Edington's farm management test for use in this study, it was submitted to a number of experienced vocational agriculture instructors who were asked to make recommendations concerning content. No additional topics were recommended and very few changes were suggested in the wording of questions. The test, containing 15 true-false,

²⁸Edington, Everett. "Abilities and Characteristics of Young Adult Dairy Farmers in Pennsylvania which are Associated with Farm Management," Unpublished Doctoral Thesis, Penn. State University, 1961.

16 multi-choice, and 3 problems, was administered in all of the participating schools. The instrument was administered to all the participating schools prior to treatment as a pre-test and again after the treatment as a post-test.

Development of Experimental Teaching Unit

The teaching of farm management in Vocational Agriculture in the secondary schools of Oklahoma has been taught within the enterprise. Since this situation prevailed, suitable teaching material to teach Farm Management by the budgetary analysis approach was not available to the writer. In close cooperation with the Department of Agricultural Education and the Department of Agricultural Economics of Oklahoma State University, the manual (Appendix D) for teaching farm management by the budgetary analysis approach was developed.

The time required to teach the experimental unit was discussed with members of the Agricultural Education Department of Oklahoma State University, teachers of vocational agriculture instructors and the district supervisor. They were in complete agreement that such a unit as outlined in the instructor's manual for teaching farm management by the budgetary analysis approach would require a minimum of twenty-four class periods. Since this study called for voluntary participation, on the part of the individual vocational agriculture instructor, it was deemed inadvisable to ask for more than the minimum time required. With these factors as a guide, a series of lesson plans (Appendix C) were developed to incorporate the basic principles of teaching farm management by the budgetary analysis approach within the twenty-four class periods.

Terminology used in this experimental unit had to be modified for use at the high school level. Since farm management deals in decision making and theoretical application, the terminology by its very nature, would of necessity, need to be developed at the student level.

CHAPTER IV

ANALYSIS OF DATA

Data for this chapter were secured by administering the instrument of measurement as a pre-test and as a post test to three hundred and twenty students, enrolled in thirty-two randomly selected departments of vocational agriculture in Northeastern Oklahoma. The amount of money invested in the supervised farm training program was secured from the records filed by the vocational agriculture instructor in the State Department of Vocational Agriculture for Oklahoma.

In the proposal of this experimental study to determine the effectiveness of teaching farm management by the budgetary analysis approach, the qualification of the teachers in relation to the amount of Agricultural Economics classes they had completed was considered a potential source of variance. To determine the qualification of the teachers involved in this study, an analysis of each transcript was made by the writer to establish the exact number of hours in Agricultural Economics each individual had completed. Table I gives the results of this investigation.

Since there was less than .2 of a course credit hour difference in the means for the groups it was assumed that the training was the same for each group. In checking the state requirements for certification to teach vocational agriculture in Oklahoma it was learned that nine course credit hours were required in the area of Agricultural

Economics. This explained the difference in the means for the teachers involved in this study.

TABLE I

MEANS ASSOCIATED WITH THE NUMBER OF COURSE CREDIT
HOURS COMPLETED IN AGRICULTURAL ECONOMICS
BY TEACHERS OF VOCATIONAL AGRICULTURE
THAT PARTICIPATED IN THIS STUDY

	Budgetary Analysis Approach	Traditional Approach
Contest	10.6	10.7
No Contest	10.5	10.7

TABLE II

HOURS OF AGRICULTURAL ECONOMICS COMPLETED BY
THE THIRTY-TWO TEACHERS INVOLVED IN
THIS STUDY

Hours of Agriculture Economics	Number of Teachers
6	1
7	0
8	1
9	6
10	14
11	5
12	0
13	3
Over 14	2

Table II gives the number of hours of Agricultural Economics completed by the teachers of vocational agriculture in this study. The fourteen teachers that completed ten course credit hours indicated they had done so to meet the state requirement of nine hours. The record shows this one additional hour was obtained by taking credit in a

problem course. The two instructors that had more than fourteen hours had completed seventeen and twenty-one hours respectively.

Informational achievement, as used in this study, refers to the amount of technical information acquired in the areas of farm management terminology and understanding of the basic managerial procedure in farming, as commonly measured by means of objective type examinations. The informational achievement in farm management by students that participated in an experimental design of teaching farm management by the budgetary analysis approach is compared with the informational achievement of students without such experience.

Informational Achievement Scores

Prior to the experiment an objective type examination was prepared and administered to the students in thirty-two participating schools in order to secure a measure of student informational achievement in farm management. The test was administered by the regular vocational teachers in the thirty-two schools. Each of the teachers received special instruction and training on how to administer the test. Tests were scored by one person allowing one point for each correct response.

The experimental model of teaching farm management by the budgetary analysis approach was presented by the teachers in the treatment group. The control group presented farm management by the traditional approach during the same period of time. The same objective test was administered at the end of the experimental study as a post test. The gain in scores provided the criterion measure for the analyses in this section.

Mean achievement test gain scores for the four classification groups of students with different combinations of experiences in farm

management and contest participation are shown in Table III. It will be noted that mean scores for the group that was taught farm management by the budgetary analysis approach and that had participated in the interscholastic farm management contest are virtually the same as the group that was taught farm management by the budgetary analysis approach and had not participated in the contest. Neither is there any apparent trend toward higher scores for students participating in the interscholastic contest when compared with the group that did not participate in the contest. When we consider the group that was taught by the budgetary analysis approach as compared with the group that was taught by the traditional approach, the difference appears to be large.

TABLE III

DIFFERENCE IN PRE-TEST AND POST TEST MEAN SCORE ON FARM
MANAGEMENT ACHIEVEMENT TEST BETWEEN THE GROUP OF
STUDENTS TAUGHT BY BUDGETARY ANALYSIS AND
A GROUP TAUGHT BY TRADITIONAL APPROACH
WHEN CLASSIFIED BY PARTICIPATION
IN FARM MANAGEMENT CONTESTS

	Budgetary Analysis Approach	Traditional Approach	Mean Average
Contest	16.73	12.17	14.45
No Contest	17.83	11.35	14.59
Mean Average	17.28	11.76	14.52

Data presented in Table III indicate that students taught by the budgetary analysis approach tend to gain more than students taught by the traditional approach, and further indicate that differences between contest participation and lack of such experiences was minor. Statistical analysis was undertaken to find out how significant the

differences were. For this purpose, analysis of covariance was the statistical technique used to test the following hypotheses:

1. There is no significant difference in the achievement of students when taught farm management by the budgetary analysis approach as compared with students taught by the traditional approach.
2. There is no significant difference in the achievement of students in farm management that participated in contest compared to students without such experience.

The results of the analysis of covariance are shown in Table IV.

TABLE IV

ANALYSIS OF CO-VARIANCE FOR DIFFERENCES IN PRE-TEST AND POST-TEST OF FARM MANAGEMENT ACHIEVEMENT BETWEEN THE GROUP OF STUDENTS TAUGHT BUDGETARY ANALYSIS AND A GROUP TAUGHT BY THE TRADITIONAL APPROACH WHEN CLASSIFIED BY PARTICIPATION IN FARM MANAGEMENT CONTESTS

Source of Variation	Df	Residuals		
		Adjusted Sum of Squares	Mean Square	Value of F
Total	318	10342.75		
Treatment	1	2468.23	2468.23	99.69 ^{***}
Contest	1	.20	.20	.00
Interaction	1	60.66	60.66	2.45
Within	315	7799.20	24.759	

^{***} Significant beyond .01 level

The F value of 99.69 obtained for the between teaching approach adjusted mean square is significant beyond the one per cent level. Therefore the null hypothesis pertaining to difference in achievement resulting from teaching approach is rejected. The mean gain for students

taught by budgetary analysis approach is significantly greater than mean gain for students taught by the traditional approach.

The F value of .00, as shown in Table IV, obtained for the between contest no contest adjusted mean square is not significant at the five per cent level, therefore the null hypothesis pertaining to difference in achievement resulting from contest participation is not rejected. Table IV also shows that there was no significant interaction between contest and teaching approach.

On the basis of the analysis of covariance it appears that students taught farm management by budgetary analysis acquired more technical knowledge than students taught by the traditional approach. An analysis of variance was applied to the data to determine the difference without controlling the effect of participation in the farm management contest. The results of the analysis of variance are shown in Table V.

The F values, as shown in Table V, are very similar to the values received by the analysis of covariance which indicates that participation in the farm management contest has little or no effect on the students achievement in farm management.

Analysis of Variance for Amount Invested in the Supervised Farm Training Program

The amount of money invested in the supervised farming program, as used in this study, refers to the actual amount of money invested by each student as recorded by the vocational agriculture instructor on the annual final all day report as recorded in the State Department of Vocational Agriculture in Stillwater, Oklahoma.

Means associated with the amount invested in the supervised farm

training program were computed for each group and appear in Table VI.

TABLE V

ANALYSIS OF VARIANCE FOR DIFFERENCES IN PRE-TEST AND POST-TEST OF FARM MANAGEMENT ACHIEVEMENT BETWEEN THE GROUP OF STUDENTS TAUGHT BY BUDGETARY ANALYSIS AND A GROUP TAUGHT BY THE TRADITIONAL APPROACH WHEN CLASSIFIED BY PARTICIPATION IN FARM MANAGEMENT CONTESTS

Source of Variation	Df	Residuals		
		Sum of Squares	Mean Square	Value of F
Total	319	10343.80		
Treatment	1	2442.05	2442.05	98.589**
Contest	1	1.51	1.51	.00
Interaction	1	74.11	74.11	2.99
Within	316	7826.12	24.77	

** Significant beyond .01 level

TABLE VI

MEAN DOLLARS INVESTED IN THE SUPERVISED FARM TRAINING PROGRAM BETWEEN STUDENTS TAUGHT BY BUDGETARY ANALYSIS AND A GROUP TAUGHT BY THE TRADITIONAL APPROACH WHEN CLASSIFIED BY PARTICIPATION IN FARM MANAGEMENT CONTESTS

	Budgetary Analysis Approach	Traditional Approach	Mean Average
Contest	1348.70	463.70	906.20
No Contest	230.00	442.00	336.00
Mean Average	789.35	452.85	621.10

Examination of the data presented in Table VI will reveal that departments whose students had participated in the farm management contest sponsored by the Agricultural Economics Department of Oklahoma State University had more invested in their supervised farming programs

than students without such experience.

The means associated with amount invested in the supervised farming program were generally lower for those students that did not participate in the contest. As revealed by the data presented in Table VI, it is observed that the greater difference is within the treatment group. The means for amount invested in the supervised farm training program were generally higher for those taught farm management by the budgetary analysis approach. As disclosed by the data in Table V, those students that participated in the contest and received the treatment had the largest amount invested in their supervised farm training programs. In addition, the students that did not participate in the contest and received the treatment had the lowest amount invested in their supervised farm training programs.

Though the data presented in Table V seems to indicate that students who participated in the Interscholastic Farm Management contest, and were taught by the budgetary analysis approach, tend to have more invested in their supervised farm training programs, statistical analysis was undertaken to find how significant the differences were. For this purpose, an analysis of variance was the statistical technique used to test the following null hypotheses:

1. There is no statistically significant difference in the amount invested in the supervised farm training program of students who were taught farm management by the budgetary analysis approach when compared with students receiving instruction by the traditional approach.
2. There is no statistically significant difference in the amount invested in the supervised farm training program

by students who participate in contest when compared with students without such experience.

The results of the analysis of variance are shown in Table VII.

TABLE VII

ANALYSIS OF VARIANCE FOR AMOUNT INVESTED IN THE SUPERVISED FARM TRAINING PROGRAM BETWEEN THE GROUP OF STUDENTS TAUGHT BY BUDGETARY ANALYSIS AND A GROUP TAUGHT BY THE TRADITIONAL APPROACH WHEN CLASSIFIED BY PARTICIPATION IN FARM MANAGEMENT CONTESTS

Source of Variation	Df	Residuals		
		Squares	Mean Square	Value of F
Total	319	123951.55		
Treatment	1	904.512	904.512	2.421**
Contest	1	2599.20	2599.20	6.958**
Interaction	1	2409.01	2409.01	6.449*
Within	316	118038.83	373.54	

** Significant beyond .01 level
* Significant beyond .05 level

The F value of 2.421 obtained for the between teaching approaches mean square is not significant at the five per cent level. Therefore the null hypothesis cannot be rejected. It must be assumed there is no statistically significant difference in the amount invested by the two treatment groups.

The F value of 6.958 obtained for the contest vs. no contest groups is significant at the one per cent level, therefore the null hypothesis pertaining to differences in achievement resulting from contest is rejected. The means for the amount invested in the supervised farm training program for those participating in contest is significant greater than for those students not participating in contest. The results of

this analysis reflects the financial condition of the students that participated in the type of contest. The interaction between contest and treatment was significant at the five per cent level.

An examination to Table VI (page 35) reveals that the treatment contest cell is the major contributor to the significant interaction mean square. The treatment contest mean of \$1348.70 is substantially larger than means of the other groups, in fact it is larger than the total for the remaining three groups. This interaction indicates a positive relationship between contest and treatment in regard to the amount invested in the student's supervised farm training program. Findings presented in Table VI may imply that the teacher's ability, desire, and ambition for students to have a strong supervised farm training program may likewise be seen in ambition to have students also participate in contests.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine if a budgetary analysis approach of teaching farm management to high school students in vocational agriculture would result in more effective learning than is true with the traditional approach now used. Thirty-two randomly selected schools in Northeast Oklahoma voluntarily contributed their services to perform the role in which they were assigned. Four groups of vocational agriculture students taught with different approaches to instruction in farm management and with and without contest participation were compared in order to determine whether or not there were significant differences among the groups. More specifically, the study sought answers to the following questions:

1. How do students that are taught farm management by the budgetary analysis approach compare with regard to farm managerial ability to students taught by the traditional approach?
2. How do students that have participated in an interscholastic farm management contest compare with regard to farm managerial ability to students that have not had this experience?

3. How do students with different amounts invested in their supervised farm training program compare with regard to farm managerial ability when they are taught by the budgetary analysis approach and the traditional approaches?
4. How do students with different amounts invested in their supervised farm training program compare with regard to farm managerial ability when they have participated in an interscholastic farm management contest and when they have not had this experience?

The junior and senior students of the thirty-two randomly selected schools of the Northeast district of vocational agriculture were used for the research reported in this paper. A sample was chosen from a population consisting of eighty-five secondary schools offering junior and senior credit in vocational agriculture. The sample was divided into a control category and an experimental category. These two groups were taught farm management by two different teaching approaches during the school year of 1961-62. One group was taught by the "Within-Enterprise" technique in which the student studied farm management solely as it applied to each specific enterprise. The second group was oriented around the "Budgetary Analysis Approach." The students taught by this approach received instruction in managerial principles and procedures of farm management by the budgetary analysis approach. In this approach the instructors stressed the value of farm management by determining the enterprise best suited for a given set of farm resources.

Conclusions

The nature and scope training of both pre-service and in-service received by teachers of vocational agriculture is determined by the number of hours required for state certification. This observation is based on Table I which shows less than .2 of a course credit hour difference in the mean for the thirty-two teachers involved in this study.

It appears from the results of this study that junior and senior high school students are able to comprehend the abstract ideas of farm management when taught by the budgetary analysis approach. The mean gain score for students taught by budgetary analysis is significantly greater than mean gain for students taught by the traditional approach. The achievement of students taught farm management by the experimental treatment, the budgetary analysis approach, exceeded those taught through the traditional approach, substantiating the conclusion that little doubt exists but that teachers supplied lesson plans and teaching outlines for the budgetary analysis approach will accomplish an effective teaching objective in farm management with high school students.

The theory of increased motivation through contest was not substantiated in this study when achievement of students was measured in relationship to contest participation as against lack of such experience.

The amount of money invested in the supervised farm training program of students of vocational agriculture apparently does not affect achievement in farm management learning. The relationship of amount invested in the supervised farm training program was not significant when compared with teaching approach.

Students who participated in the farm management contest have more

money invested in their supervised farm training program. Also indicated in this study is the statistically significant relation of the interaction of contest and treatment upon the amount invested in the supervised farm training program. The results lead one to conclude that students taught by the budgetary analysis approach and also participating in the farm management contest will likely have more invested in their total supervised farm training program.

Recommendations

In view of the findings and conclusions of this study, the following recommendations seem to be in order:

1. Further study is needed to investigate the possibility that other variables may contribute to the advantage or disadvantage of teaching farm management by the budgetary analysis approach. Such information should prove particularly valuable in counseling and guidance provided prospective vocational agriculture teachers.
2. This study has been concerned with the area of farm management as taught in vocational agriculture. Other studies should be undertaken to find out how well other objectives are being satisfied.
3. A study based on the records of student achievement over a period of years should enhance the value of this investigation. This extension would provide further information as to the value of teaching farm management by the budgetary analysis approach. This extension of time should

include the time prior to the students participation in the farm management contest.

4. Teaching materials used in this study should be revised to conform to current procedures and practices and made available for general use in the teaching of vocational agriculture.

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APPENDIX A
LETTER TO SELECTED SCHOOLS

Dear

The Department of Agricultural Education of Oklahoma State University has become increasingly concerned with the problem faced by teachers in their effort to provide effective instruction in the area of farm management. After a number of conferences with the Department of Agriculture Economics, we have decided to attempt to develop a research study. We hope such a study will provide data concerning the effectiveness of practices now used by teachers as well as point out possibilities for new approaches in teaching farm management.

We are asking your cooperation in this endeavor. Your school was randomly selected to serve as a center to participate in this research study. Your school has been designated as a member of group _____, teachers in schools in group I will be asked to: (1) allow their junior and senior students to take a test over farm management to be administered within the next few weeks; (2) teach units on farm management using the budgetary analysis approach; (lesson unit plans will be furnished by the Ag. Ed. Dept. to all teachers in group I) (3) administer final test to all participating junior and senior students at the close of the study (probably April or early May).

Teachers designated in schools comprising group II will be requested to only conform to steps 1 and 3 as outlined above. If the study is to be successful teachers in this group must continue to teach farm management in precisely the same manner as they have in the past.

Mr. Milford Quimby will be coordinating this study. Staff members involved will include Dr. Cook, Dr. Edington, and Dr. Price of the Agricultural Education department, as well as Mr. J. B. Morton, N.E. Dist. Supervisor.

Please mark the enclosed card and return today.

Sincerely,

Robert R. Price, Head
Agricultural Education

RRP: dw

APPENDIX B
INFORMATIONAL ACHIEVEMENT TEST

P 1

Name _____ School _____ Date _____

Farm Management Test

True-False

Write T or F in blank spaces

- _____ 1. The law of diminishing returns as applied to the use of fertilizer states. As more units of fertilizer are applied to the land, additional production continues to increase with each unit of fertilizer added.
- _____ 2. A 50 ton application of manure on 10 acres would result in more increased production than if 50 tons were applied on 5 acres.
- _____ 3. If corn production becomes more profitable as a result of utilizing the by-products of an enterprise such as barnyard manure from the livestock enterprise, then the relationship between corn and livestock is said to be complementary.
- _____ 4. A justifiable criticism of partial budgeting is that it enables the operator to compare two or more alternative plans of operation but does not provide any measure of costs and returns.
- _____ 5. The principle of diminishing returns tells us that quantity of resources to use on a single acre, animal, or the whole farm.
- _____ 6. It is profitable to make a change on a farm if income is increased more than cost or income remains the same but costs decrease.
- _____ 7. An increase in price of one product being produced on a farm relative to the price of another being produced calls for a shift of productive resources from the lower priced product to the higher priced product.
- _____ 8. Farm buildings should always be well scattered so as to reduce the chances of loss by fire.
- _____ 9. The size of farm cannot be increased without increasing the area of the farm.
- _____ 10. A farmer can at times afford to continue production even though the prices of the product does not pay average total costs.
- _____ 11. A useful farm management rule is to maximize returns to the scarce resource.
- _____ 12. The location of different kinds of farming in different geographical regions is explained by the preferences of farmers in different areas.
- _____ 13. Farmers with small acreages may do custom work with machines owned in order to decrease fixed costs.
- _____ 14. Labor saving devices (mechanized equipment replacing labor) are profitable if they save labor.
- _____ 15. A partnership means that each member of the partnership shares equally in the income.

P 2

Circle the answer which is most nearly correct

1. The profits of a farmer will be greater if each unit of labor, capital and land is:
 - A. used on one enterprise where production can be concentrated
 - B. used evenly in a number of enterprises to spread out risks
 - C. used where it will add the most to net returns as determined by each situation
 - D. concentrated in one major enterprise with minor supporting enterprises

2. Fertilizer should be used as long as:
 - A. it increases the crop yields
 - B. the added returns are more than the expenses over a reasonable length of time
 - C. the quality of the crop is increased
 - D. the original fertility of the soil is maintained

3. Which of the following fertilizer mixtures would be the most economical to buy if the soil was low only in phosphorus?
 - A. 3-12-6
 - B. 10-10-10
 - C. 8-16-16
 - D. 0-20-0

4. The cost of owning machinery, for a farmer who is limited in the amount of capital which he has for production purposes, can be determined by:
 - A. the rate he could earn on an outside loan or investment
 - B. the rate of return his money would yield when used for other investments on the farm.
 - C. the rate of interest he would get if he put the money in a savings account
 - D. the rate of return he would get if the amount were invested in low risk investments such as government bonds

5. Soil conservation practices should:
 - A. be practiced so that the soil is always at a better condition at the end of the growing season than at the beginning
 - B. be practiced so that the soil maintains its original fertility
 - C. be at a point where the farmer may obtain maximum production in any one year
 - D. maintain or increase profits and production over a longer period of time

6. Machinery should be substituted for labor when:
 - A. the value of labor saved is more than the increase in machine costs
 - B. there is a plentiful supply of labor
 - C. the machinery is first placed on the market
 - D. farm prices are beginning to go downward

P 3

7. Which of the following would be considered a liability for a farmer?
 - A. cash on hand
 - B. crops on hand to be sold
 - C. bank note for operating expense
 - D. cash reserve in the bank

8. A likely source of production loan in addition to Production Credit Association would be the:
 - A. local commercial bank
 - B. Federal Land Bank
 - C. Insurance company
 - D. Federal Intermediate Credit Bank

9. The price of any agricultural product is usually:
 - A. not related to the distance from market
 - B. lowest in the surplus area farthest from the market
 - C. highest in the surplus area farthest from the market
 - D. uniform throughout the market area

10. For a farmer just getting started in farming, to raise pure-bred stock for show purposes:
 - A. is a business with very little risk involved
 - B. is easy to get into and takes very little capital
 - C. requires large capital funds and involves large risks
 - D. will give him quick returns for the capital which he has invested

11. The most suitable measuring stick for an efficient dairy enterprise would be:
 - A. greatest production per animal in pounds of milk
 - B. greatest production per animal in pounds of milk
 - C. maximum profit from the enterprise
 - D. to have the highest quality livestock possible

12. The maintenance ration requirement for dairy cows of the same size:
 - A. is approximately the same for high and low producing cows
 - B. is much higher for high producing cows
 - C. is higher for low producing cows
 - D. differs greatly with the amount of production

13. If one pound of soybean meal will substitute for 1.12 pounds of linseed meal of equivalent nutritional quality and soybean meal is 4.8 cents per pound and linseed meal is four cents, which practice should the farmer follow?
 - A. feed all soybean meal
 - B. feed 50% soybean meal and 50% linseed meal
 - C. feed all linseed meal
 - D. feed 75% soybean meal and 25% linseed meal

P 4

14. If the price of dairy products is highest in fall and early winter and lowest in spring and summer, the best time to have most of the cows freshen would be:
- A. June and July
 - B. August and September
 - C. January and February
 - D. March and April
15. The time for a farmer to expand production is when:
- A. industrial wages and employment rise and before his farming costs catch up
 - B. industrial wages and employment have risen and farming costs have caught up and leveled off
 - C. general employment seems to be going into a slump
 - D. his costs are going up faster than prices received for his products
16. Which of the following is not an advantage of specialization:
- A. more labor-saving equipment is practical
 - B. production knowledge can be concentrated
 - C. marketing and purchasing may be carried on more effectively
 - D. labor can usually be distributed more evenly over the year

P 5

FARM MANAGEMENT PROBLEM SECTION

Each part of this section contains a specific farmer problem and numerical data needed in providing answers to that problem. Some of the problems have more than one part. Place your answer in the space provided. Do necessary computations at the bottom or on the back of the problem page.

1. (a) Use the following data to determine, on the basis of lower costs, how many bales of hay a farmer needs to harvest each year in order to justify owning a baler instead of hiring a custom baler.

<u>Fixed costs</u>	<u>Costs</u> <u>\$ Per Year</u>
(\$2200) (\$400)	
Depreciation: Original Costs -- Trade-in Value (10 years)*	
(\$2200) (\$400) (6%)	
Interest: Original Cost + Trade-in Value ÷ 2 - x interest rate	
Taxes, shelter, insurance	<u>\$64.00</u>
Total fixed cost per year	
Operating Costs	<u>\$ Per Bale</u>
Fuel	.006
Lubricants	.001
Repair and maintenance	.018
Wire	.04
Labor	<u>.018</u>
Total Operating Costs	.083
Custom rate is \$.18 per bale	
Formula: Breakeven Bales = $\frac{\text{Fixed cost per year}}{.18 - \text{operating cost per bale}}$	

_____ Answer: _____ bales.
score

- (b) About how many bales of hay would be produced on 100 acres of alfalfa if the average yield is 3 tons per acre?

_____ Answer: _____ bales.
score

* Expected life of machine

P 6

2. A feed salesman has told Mr. Collins that he can increase returns from feeder steers by using a special additive in their ration, buying a water "de-icer," increasing the pen size, and feeding alfalfa hay "free-choice." The salesman has estimated the returns from changes and Mr. Collins believes the estimates are accurate. The returns estimates are presented in Table 1 under cattle. Mr. Collins has just read a bulletin which indicates returns he can expect from fertilizing crops which he does not now fertilize. These returns estimates are given in Table 1 under crops. He must decide how much additional money to invest in these two enterprises.

Table 1

Units of Additional Capital (\$100)	Additional Returns from \$100 Invested in: Cattle	Crops
1st	180.00	155.00
2nd	180.00	165.00
3rd	150.00	180.00
4th	145.00	160.00
5th	145.00	145.00
6th	125.00	130.00
7th	105.00	120.00
8th	105.00	110.00

- A. If Mr. Collins can get \$109 for each \$100 invested in enterprises other than crops or cattle, how many dollars will be invested in
 (1) Cattle _____ (2) Crops _____?

- B. How could Mr. Collins most profitably allocate:

- (1) \$300 (a) Cattle _____ (b) Crops _____?
 (2) \$800 (a) Cattle _____ (b) Crops _____?
 (3) \$200 (a) Cattle _____ (b) Crops _____?
 (4) \$600 (a) Cattle _____ (b) Crops _____?

P 7

3. In selecting a least cost ration, a farmer must first learn which feed combinations will give the desired gain and then compare their costs. The following table indicates four rations (combinations of supplement and grain) which will produce 100 pounds of pork. You are to specify the least cost ration under two different price situations.

Ration	Pounds of Supplement	Pounds of Corn	One Lb. of Supplement Substitute for _____ Lbs. of Grain in Changing from One Ration to Another
A	40	290	1:4
B	50	260	1:3
C	60	240	1:2
D	70	225	1:1

Which ration gives 100 pounds of pork at lowest cost if:

_____ (a) Corn is \$1.50 per cwt and supplement is \$4.00 per cwt?
score

_____ (b) Corn is \$1.50 per cwt and supplement is \$5.00 per cwt?

APPENDIX C

OUTLINE FOR TEACHING FARM MANAGEMENT
BY THE BUDGETARY ANALYSIS APPROACH

Outline for Teaching Farm Management
by the Budgetary Analysis Approach

Objective: To acquaint vocational agriculture students with the budgetary analysis approach in farm management and to give them practice in using this method in real situations in their local communities.

- | | | |
|------|-------------------------------------------------------|---------|
| I. | Managerial Principles and Procedures | 1 hour |
| | a. Management defined | |
| | b. Steps in management | |
| II. | The Budget Method of Farm Management | 2 hours |
| | a. Steps in the budget method | |
| | b. Alternatives in Budgeting | |
| | c. Narrowing the range of alternative | |
| | d. Normalizing the present plan | |
| | e. Judgement required in using the method | |
| | f. Complete budgets | |
| | g. Partial budgets | |
| | h. Long term budgets | |
| | i. Short term budgets | |
| III. | Inventory of Available Resources and Goals | 2 hours |
| | a. The farm map - land size | |
| | b. The labor supply | |
| | c. Available capital | |
| | d. Family goals | |
| | e. Present organizations and plan | |
| IV. | Planning the Cropping System | 3 hours |
| | a. Limitations | |
| | b. Economics factors | |
| | c. Competitive crops | |
| | d. Complementary crops | |
| | e. Supplementary crops | |
| | f. Crop management - Fertilization, Irrigation, etc. | |
| | g. Alternative crop budgets | |
| V. | The Livestock Plan | 3 hours |
| | a. Characteristics of different livestock enterprises | |
| | b. Livestock in the Labor Program | |
| | c. Alternative livestock budgets | |

- VI. Complete Farm Plan 3 hours
- a. Feed balan
 - b. Labor distribution
 - c. Alternative adjustments
 - d. Situations and use of machinery
- VII. Practical Application of Budgeting Method 10 hours
- a. Go to a farm in the community, complete the present plan and budget one alternative plan. (Students may be assigned in groups on this problem).

APPENDIX D
MANAGERIAL PRINCIPLES AND PROCEDURES

Managerial Principles and Procedures

The farmer of today is a businessman concerned with the complex business of farming. His goal is to receive maximum profits from the farm over a reasonable length of time.

Farm management is a continuous process. The farmer is confronted with day to day decisions concerning his business, as well as long time planning which involves changes in his farming operations. Findings in all fields of agricultural science must be considered if the farmer is to reach his goal of maximization of profits for his given situation. In addition to these he must consider numerous outside factors in many of the decisions which he must make. The principal changes with which the farm manager must deal are as follows: (1) fluctuations in price (2) weather variations and disease (3) new farming methods (4) changes in the people and (5) institutions with which the farmers deal.¹

The process which the farm manager must follow to completely fulfill his function in decision making is as follows: First thing he must do is to decide upon his goals or objectives. The goals of the entire farm family must be considered here. In our present type of culture maximization of profit in his farm business will enable the farmer to meet these most successfully.

He then must define and isolate the problem concerning his business which will help him meet his objective. The next step is gathering of available information which is related to the problem and to identify possible alternatives. He may have the alternative to raise all of

¹ Beneke, Raymond R., "Managing the Farm Business," 1955, p. 3.

replacement heifers or to buy them from someone else. After analyzing the information as it concerns his situation he makes his decision and takes the steps to carry out the decision once it has been made. The final step of the farm management function would be that of bearing the responsibility for the outcome of the decision which he made.

The same process is followed in all types of decisions which the farmer must make. It is included in those which range from minor ones such as which rates of fertilizer to apply to major decisions such as types of enterprises to include in the farm business. Management is a continuous process and the steps may not be easily identifiable in every situation. In order to carry out these responsibilities an analysis is needed. A very useful technique for this analysis is the budgetary method.

An example of this process would be as follows: A farmer with extra feed supplies is trying to determine whether to sell the feed or purchase additional livestock to feed it to. He would gather as much information as he could concerning costs, market prices, etc. He would study his labor and facilities to determine which types of enterprise they were most suited. After analyzing this information he then would decide which plan to follow and carry it out. He must then bear the responsibility for the profit or loss which may result.

The Budget Method^{*}

The budget shows the intended use of all resources and the expected

^{*}The majority of the material in the first section of the booklet was taken from "Application of the Budget Method in Farm Planning" by James Melvin Nielson, Ph.D. thesis, Harvard University, 1953.

results of their use. A farm budget shows how available land, labor and capital can be combined and the resulting net income.

The basic budget process is to determine two figures, total revenue, and total expense. From these, the expected net profits can be determined. The entire budget procedure is to obtain these two items.

Two sets of data are required in the use of the budget method: data on physical input-output relationships and price-cost data. With these data at hand, the farmer outlines immediate and long-time family goals. Next the farmer lists the productive resources at his disposal--land, capital, labor, livestock, machinery, and other resources. An outline of the present organization of the farm is made, using normal yields and production rates, and prices that are expected in the period for which the plan is being made. This present normal organization shows acres and normal yields of crops; kind, number, and normal production and feed requirements of livestock; and gross income, expenses, and net earnings under price-cost relationships expected in the future. After the present normal plan has been prepared, the more promising alternative plans or organizations are outlined. For each of these alternative organizations, gross income, expenses, and net earnings are estimated. Using normal production rates and expected prices. The farm family then appraises these alternatives in light of family goals and preferences, and chooses one of the alternatives to form the basis of the farm plan. The final step consists of putting the plan into action, and making adjustments in the plan to keep pace with changing economic, technological, and social conditions.

Use of the Method in Teaching

Early workers in the field of farm management used the budget method as a teaching device, and the method is still widely used for that purpose today. When the method is used in teaching, students are required to work out budgets for their home farm, or for actual or hypothetical farms assigned by the instructor. This is an excellent method of teaching farm management. It serves as a particularly good device for teaching economic principles, and doing it in such a manner that students can see how the principles can be used to solve practical farm problems.

Special Considerations in the Application of the

Budget Method

The principal objective of budgeting is the comparison of alternatives. This distinguishes the method from commonly used farm planning procedures in which the farmer outlines his present farm organization, and then sets down a revised plan which is expected to be superior to the present one.

Selecting Alternatives to Budget

The question then arises as to the source of suggestion of alternatives to be budgeted. Important and realistic alternatives for budgeting may be suggested in the following ways.

Studies of direct comparison--Systems of farming reported in studies of direct comparison can serve as an important source of alternatives to be budgeted. This is particularly true when farms are subclassified by

size, type, tenure, and other criteria. The average enterprise organization on a sample of heterogeneous farms in a geographic area, however, would be of no value in suggesting alternatives to other farmers.

Computation of efficiency factors--Although efficiency factors computed for the farm to be reorganized are most useful in inventorying the present status of the farm, they may also suggest profitable changes in the management of the farm. Standards of performance may be useful in making comparisons, but it should again be stressed that standards will not necessarily indicate the most profitable rates of inputs or outputs for any given farm.

Experiences of other farmers--One of the most fruitful sources of suggestions for budgeting is the experience of farmers. The most help for an individual farmer is apt to come from observing the more successful farmers in his own neighborhood. Knowledge of organization and management practices of other farmers may be obtained by studying extension publications, by attending farm tours, and by reading farm newspapers and magazines.

Recommendations of farm advisors--Extension specialists, county agents, vocational agriculture teachers, should be able to suggest practical alternatives to farmers. Farm advisors may be especially helpful because of their understanding of the economic principles which determine what lines of production and what types of resource use have the advantage in a given situation. Recommendations based on informal judgement, which are insufficient in themselves to serve as a basis of action, may suggest excellent alternatives to be tested by budgeting.

Results of experiments--Certainly the results of research conducted by the experiment station should serve as an important source

of suggested alternatives. The budget method is particularly well adapted to testing the feasibility of changes suggested by both technical and economic research under actual farm conditions.

Economic theory--For the research workers, the construction of theoretical models should suggest adjustments in farm organization and resource use which may be tested through budgeting.

Narrowing the Range of Alternatives

Since the important role of budgeting is one of comparison, one might erroneously conclude that the number of alternatives which must be budgeted through is so large as to make the job of planning prohibitively time-consuming. Actually, for any given farm the number of feasible alternatives is usually very definitely limited. Black, Clawson, Sayre, and Wilcox state the point as follows:

The operator of each farm has to decide what enterprises or what combination of enterprises, promises to maximize his income. But whether acting consciously or unconsciously, few of them are free agents in choosing what to produce. A complex of physical, biological, and economic forces usually compels them to choose within a rather narrow range.

Physical factors, such as soil type, precipitation, and length of growing season, play an important part in determining the most profitable combination of enterprises. For example, a large acreage of rough land on a farm indicates the advisability or necessity of producing forage, and the keeping of forage-consuming livestock to utilize it. Economic factors combined with the physical and biological factors determine what lines of production have the advantage in an area, or on a particular farm. In most areas there is usually one basic crop around which the cropping system is built. This narrows the range of alternatives and greatly simplifies the planning procedure.

Economic principles and profit-maximizing criteria can be applied to rule out possible alternatives. For example, rates of substitution and factor price analysis can be applied to determine the most efficient combination of input factors. Budgeting can be carried out, using the most efficient combination determined in this manner. Comparisons of competing enterprises, such as oats and barley, can be made. Such simple comparisons usually reveal that one of the enterprises will add the most to net earnings under prospective production and price relationships. The other enterprise can then be eliminated from consideration until there is a significant change in technology or prices which affects the competing enterprises.

Other factors, such as the preferences of the farm family, managerial ability, and the availability of land, credit, and labor, will make it necessary to eliminate some alternatives and thus simplify the task of budgeting.

Normalizing the Present Plan

An essential step in budgeting is the normalizing of the present plan before proceeding to the consideration of alternatives. The results obtained in any one year may be at considerable variance with normal expectations, either because the particular year was an abnormal one for crop yields, livestock production, disease losses, or other factors for the area as a whole, or because circumstances on the individual farm were unusual. It is generally agreed that average or normal expectations for crop and livestock yields in estimating returns from the present organization. Average yields are sometimes used for this purpose.

In addition to normalizing the budgets for yields and production, it is necessary to normalize them for price. This would not be necessary if it were assumed that the prices would be exactly the same in the future as they have been in the past. The essential consideration is that the same set of prices be used to estimate returns under the present and under alternative systems so that the effect of changing prices is removed.

The Role of Farm Accounts in Budgeting

Farm accounts are useful in budgeting, but it cannot be said that the success of the method depends upon the availability of records. If records are not available, the present organization can be outlined from income-tax returns, sales slips, or from memory.

Farm records, providing they are accurately kept and properly interpreted, can help the farmer determine the change in inputs and outputs that can be expected from the adoption of a particular practice or enterprise. Farm accounts cannot be expected to furnish all of the data needed in deciding on changes in enterprises or use of resources; some of the information will have to be provided through research. For example, farm records can tell a farmer little about the adoption of an entirely new technology. But accounts can help the farmer localize and interpret experimental results in terms of conditions on his own farm. This is important because the budget will be most valid and useful if it accurately reflects the productive potentialities of the farm for which it is drawn up. For instance, records which show past results on different fields as affected by cropping system and soil management

practices furnish a basis for predicting yields. Similarly, livestock feed and production records can be used to estimate feed requirements and livestock production. Records will provide the best basis for estimating such items as building expense, machinery and equipment expense, livestock expense, interest, taxes, government payments received, receipts from custom work, and miscellaneous receipts and expenses.

After the budgeted plan has been put into operation, accounts can be used to measure progress and check results. Records may indicate that adjustments in the farm plan are in order, as, for example, when crop production exceeds or falls short of expectations. If production, expenses, and receipts are recorded during the year, then at the end of the year results actually obtained can be compared with those contemplated in the budget. In this way the accuracy of the advance budgets can be tested. Records may show that there were inaccuracies in the budget, that certain factors had been overlooked, or that improper forecasts were made. On the basis of the information contained in the farm account book, revisions in the farm plan can be made.

Judgement is Required in the Use of the Method

As in other methods of farm planning, judgement is required in the application of the budget method. In applying the method, judgement is required at the following stages: (1) in determining whether or not the budgeting procedure is applicable to the problem at hand; (2) in determining whether or not the decision is of sufficient importance to warrant the application of the method; (3) in selecting alternatives to be budgeted; (4) in selecting the data to be used in budgeting; and

(5) in deciding when the process has been carried to the point where further budgeting will not be worth the additional time and effort.

Caution must be exercised in the application of the budget method to be sure that the conclusions remain close to the realities of practical farming. Good judgement is particularly important on the part of the research worker, or on the part of anyone who is assisting farmers in the development of plans.

Appraisal of the Budget Method

One of the strong points of the budget method is that it lends itself particularly well to the application of economic principles to farm organization and management problems. Use of the method takes into account the principles of diminishing returns, rates of substitution among factors and among products, and other theoretical concepts which are relevant in planning a farm. Through budgeting, economic principles, production data, and outlook information are all brought to bear on practical farm problems. It is a process which stimulates thought and clarifies the thinking of both farmers and specialists. Working through a farm budget is one of the very best kinds of educational processes.

While it cannot be claimed that the budget method as used in farm planning is dynamic, its dependence on forecasts regarding important variables renders it nonstatic or forward-looking. With respect to prices and costs, for example, the data which are relevant in budgeting are those which reflect relationships which are expected in the future period for which the budget is being made. It is true that budgeting has frequently been based on historical price-cost relationships,

criticism of the method for its dependence on forecasts. The difficulty of foreseeing future economic trends and predicting prices in particular is stressed. It must be acknowledged that the problem of forecasting is a difficult one, and that actual results may vary widely from those predicted. The large amount of time and cost involved in making price forecasts must also be recognized. However, since all planning is for the future, it is logical that the planning should be based on the best forecasts that can be made of future events.

Because of the forward-looking nature of the budget method, it is of greatest usefulness during a period of rapid economic or technological change, and in areas where farmers face a large number of alternatives. For example, in highly diversified farming areas, changes in price relationships make it profitable to adjust enterprises more frequently than in highly specialized areas. Under these circumstances, budgeting will be more involved, but there will be more to be gained from budgeting.

Some Concepts in Farm Planning

A farm-ranch budget or plan is a plan for the future use of farm-ranch resources such as land, labor, and capital. A farm-ranch plan or budget is not a record of past performance; rather it is a plan for the future development and future use of resources. It is to be used in choosing from among alternative courses of action and is an aid in decision making.

Long-term farm-ranch budgets are goals in resource use which may be reached by employing available resources in different ways. A long-term budget is not a plan which can be put into operation immediately.

Rather it is a plan which may be realized after a period of change and development. A long-term farm-ranch plan may be changed or revised due to changes in family goals, changes in technology, changes in the economic setting, or other foreseen events. However, it is essential that long-term goals be firmly in mind so that short-run plans can lead toward long-term goals.

Short-term or annual plans are plans for the use of farm-ranch resources for the year ahead. The short-term or annual plans or budgets should lead toward the long-term goals or objectives. The annual plan should include the acreages of each crop to be grown, numbers and kind of livestock, and anticipated production and income from each.

Present plan as used in farm-ranch budgeting, refers to the present normal organization and operation. This is not necessarily a record of any one year, rather acres and yields, and livestock numbers and production assume normal weather and normal operations under the present plan.

Proposed plan, as used in farm budgeting, is a plan which is developed as an alternate to the present plan. A minimum of two proposed alternatives should be developed.

A complete farm-ranch budget is a plan for the future in which all items of costs and returns are estimated. A complete budget makes it possible to estimate net farm income expected from the various alternative plans. Such fixed items as taxes, insurance, and depreciation, would be included in addition to the operating expenses such as fertilizer, purchased feed, and labor. A complete budget may be either long-term or short-term in nature.

A partial budget is a plan for the future in which only the items of receipts and expenses which are expected to change with a change in organization are listed. For example, if taxes and insurance are the same for all alternatives budgeted, it would not be necessary to list all these expenses. Thus, any item of expense or receipts which remains constant for each of the alternative budgets may be ignored. It is not possible to estimate expected net income from alternative plans when a partial budget is used. However, expected gain or loss over the present plan and differences in expected earnings from alternative plans can be derived. A partial budget is sufficient, for most farmers. A partial budget may be either a long-term or an annual plan. The usual problem is to choose the best alternative from those budgeted rather than to determine the net income from each plan. Thus for most problems in farm decision making, a partial budget is entirely adequate. However, one must be careful to include all of the expenses and receipts which change in computing partial budgets.

A written budget is a plan for the future use of farm resources in which the receipts, expenses, and estimated incomes, production practices, etc., are written in a systematic fashion. Most farming decisions are sufficiently complex that it is necessary to write farm budgets in order to systematically evaluate alternatives.

INVENTORY OF AVAILABLE RESOURCES AND GOALS

In organizing or re-organizing the farm business one of the first things to consider is what are the available resources. How much land is available? The classes of land and soil type are very important considerations. Is the available labor supply to be family or hired is an

important question which must be answered. The amount of capital available and the sources and amounts of capital which may be borrowed are important factors in inventorying resources. The uses of these resources should help meet the objectives and goals which the farm family has set.

Land Use--The Farm Map

The basic resource of any farm is its land and soil. This determines the types of crops which can be produced advantageously. The final proposed crop and livestock plans for the farm will be determined by the available land resources.

The first step in inventorying the land resources of a farm is that of classification. Each farm may have a number of different classes of land included with each more suited to certain crops or cultural practices. Soil conservation land capability maps are very useful in determining land classifications on a given farm.

After the land has been inventoried, it should be appraised as to the restrictions which its nature imposes upon the operation of the farm business. These restrictions determine the types of practices which may be carried out on each of the fields in the farm. A land use map should be made if one is not available from the S.C.S. if proper farm planning is to be completed satisfactorily.

The Labor Supply

Labor is the largest contributor to farm income. It contributes more than the factors of land and capital combined. It is very important, therefore, that the farmer make efficient use of his labor.

The two sources of labor on a farm are, family labor and hired labor. Many farmers do not put a price tag on family labor, but should do so. The cost of such labor on the farm is equal to what it is worth elsewhere. Good hired farm labor is becoming more difficult to obtain and the cost of such labor is continually increasing.

Available Capital

Capital is the third major factor in farm production. In addition to money on hand, other resources such as livestock; crops; machinery; etc. are considered capital resources. It would take a large outlay of cash to purchase the livestock and equipment which is found on most farms.

Financing from other sources should, also, be considered when inventorying available capital. It is good business when a farmer can make use of borrowed funds to make a profit for himself.

Family Goals

The family goals and objectives must receive top priority when considering re-organization of a farm. These need to be projected into the future for long term planning. The high school boy who plans to go on to college may call for entirely different plans in the farm business organization than the one who plans to stay home and eventually become a partner in the farm business. We must remember that the real ends of farming are not farming for its own sake, but that the success of the farm business itself is only a means to the goals set by the humans who receive their livelihood from that farm. The needs of the family must be carefully considered along investments to be turned back into the

farm business.

Present Organization and Plan

All of the above resources mentioned are part of the present farm organization and plan. They may not be used as efficiently as possible and because of this other alternatives will be planned and budgeted. The present organization should give all the inputs and outputs in the farm business. All livestock, crops, and machinery should be inventoried and listed. The present uses of all land, labor, and capital should be accounted for.

Expenses, receipts, and the resulting net income should be calculated. This should be normalized over a five year period to obtain average yields and production.

PLANNING THE CROPPING SYSTEM

We will begin in planning the over-all farm organization or re-organization by planning the cropping system. Not only land use but the other factors of management, labor and capital should be considered as well. Each of these resources are necessary for producing crops.

The first step will be to estimate the net income per acre for the crops which are being considered. The different classes of land which make up the farm should be carefully considered at this time. Yield averages over a number of years should be used rather than data from a single year. Some of the questions to be answered are as follows: What crops should be produced? How many acres of each should be planted? What rotations should be followed?

Physical Limitations

Certain limitations such as soil & climate are very basic in determining what crops to grow. The information on the land use maps and soil surveys should be used in determining which crops would grow best on the particular farm. Items to consider in the soils are soil types, erosion hazards, organic matter, soil structure and fertility. The rotations planned should give the most economical returns over a long period of time.

Economic Factors

Some crops may yield far more per acre than others, but, if the prices are not favorable, it still may not be as profitable to produce them. The expected price is very important in budgeting to determine possible alternatives in crop production. Yield and prices may be high but with a very small or no profit if the production costs are also high. All three must be considered at the same time to estimate profit.

Competitive Crops

Each farmer has only a limited amount of resources and the different crops compete with each other for these resources. The use of resources to produce more of one would take it away from another. There are so many acres of crop land for example, and if more of one crop is grown, then, the land must be taken from another crop. Yield, prices, and costs must be closely studied to determine the most profitable combination of crops to grow when they compete with each other for available resources.

Complementary Crops

Complementary enterprises are those which one adds to the production of the other when resources are limited in amount. The resources taken away from one and added to another may increase the return from the first. An example of this would be when some of the grain land was taken for production and alfalfa hay planted in its place. More grain could be produced on a smaller number of acres as a result of the nitrogen which the alfalfa added to the soil. Nurse crops used to increase the stand of grasses or legumes is another example of complementary crop enterprises. Two crops are never complementary in all combinations of the two. After a certain point they may be competitive rather than complementary. When they become competitive the best combination should be found depending on price and cost relationships.

Supplementary Crops

Enterprises which neither compete with each other nor add to the production of each other are known as supplementary enterprises. A limited, winter grazing program is an example of a supplementary use of wheat. As long as the gross returns are greater than the costs it pays to produce the supplementary crop. Small vegetable gardens are used many times as supplementary crops by farmers.

Crop Management

The next step after deciding on the general cropping plan is to consider the management practices for each of the different crops. These include such things as varieties to select tillage practices,

fertilization and harvesting. The yields and thus the return from the crop depend upon these different management practices for each of the different management practices selected. These practices cannot be considered alone but in their relationships with each other. It may make little difference which variety of a crop is planted if the proper fertilizer practices are not followed. If the proper fertilizer practices are undertaken then the better variety will have a better chance to produce higher yields. All crop management practices must be considered together in planning.

Higher yields do not necessarily mean higher profits to the farmer. A point may be reached where the costs for higher production will be higher than the added returns. A farmer may continue to add fertilizer to his wheat but when the cost of the added fertilizer and application are higher than the added returns, then it is no longer an economical practice. Another important consideration in determining rate of inputs for a particular crop is the price and market situation. Certain practices may be economical at one time and not at another when the prices are not quite so favorable.

Alternative Crop Budgets

In determining alternative crops to grow on a particular farm each of the above factors and principles should be considered. They should be crops which are suited to the area and the farm. They should be supplementary or complementary to one another and not in competition. The management practices should be planned to obtain the maximum profits for that particular farm. The alternative will then be selected which will give the greatest returns.

THE LIVESTOCK PLAN

Plan of livestock in farming students. There are two major problems existing with livestock. The first is the selection and combination of enterprises and the second the management problem for the individual livestock. There is no reason for the farmer to have livestock on his farm unless it means higher profits. Many farmers do not have livestock and are strictly crop farms. In many situations a higher profit can be realized if livestock enterprises are included in the farm business. The farmer in these cases can feed home grown feeds to livestock at a better advantage than selling the crops or use the resources more efficiently.

Characteristics of Different Livestock Enterprises¹

Different enterprises have characteristics which make them more profitable under certain conditions than other enterprises. Some of these enterprises will be discussed here along with their characteristics:

Poultry: Poultry may fit well as a supplementary enterprise to make use of available labor. It has less risk than other animal enterprises and can fit into almost any size of operation. For a main commercial enterprise it is best suited to a small intensive type farm. Poultry does not fit into a cropping plan where large amounts of forage are produced. Broilers and layers fit about the same type situations as far as supplementary and commercial enterprises are concerned.

¹The material for this section was taken from Heady & Jensen, "Farm Management Economics," Pages 252-255.

Dairy Cows: Milk cows are adapted to farms with plenty of labor and forage. They give high returns on feed. In most situations, forage is necessary to make dairy an economical enterprise. In a few special cases this may not always be true. Dairy farmers do better where there is a whole milk market. The dairy enterprise gives a higher return over feed costs than other livestock but the labor requirements are usually higher.

Beef Cows: This enterprise gives the comparative returns on land that is unfit for commercial crop production. They give the competitive returns on soil producing native grasses and which will give low or no profits when crops are grown. They may also be useful on farms producing a lot of forage with some pasture land. The labor requirements for beef cows is low and fit in well in situations where the labor supply is low or is needed for producing crops. A disadvantage is the slow turnover of capital.

Sheep: Ewes are adapted to some places for about the same reasons as beef cows. They do involve a higher risk and higher labor requirements but have a faster rate of capital turnover. Neither sheep nor beef cows have a place on the farm with a large amount of labor where the land can be used more advantageously for crop production. A small flock of sheep may, sometimes, be useful for gleaning fence rows, roadways and small corners on the farm.

Feeder Cattle or Lambs: These enterprises can be used to an advantage as a winter program on a farm where large amounts of labor are used in the summer for crop production. There are, also, many year-around feeding programs. The farms with these enterprises, should be able to raise a large amount of the feed needed. Good management is especially

important in feeding operations. Farmers with low amounts of funds may want to have some other type of enterprise. For a small farm with ample labor supply, feeding enterprises are less desirable than hogs, milk cows and poultry.

Hogs: Swine is a general purpose enterprise and will fit in well with other types of enterprises. Hogs give both a high return on labor and land and fast turnover on capital. They are very efficient in connecting grain into meat but make poor use of forages. They are at a disadvantage in grain deficit areas and therefore are more suited to areas where there is a grain surplus. The enterprise fits in well for a beginning farmer with little capital or an older operation in need of large volume.

Livestock in the Labor Program

The peak labor requirement on most farms is during the summer months when crops are grown and forages harvested. Livestock enterprises can, many times, be used as supplementary enterprises on these farms, as far as the labor is concerned. The labor requirements for most animal enterprises are usually lower during these summer months. Exceptions to this are dairy and poultry which is somewhat constant throughout the year. In situations such as this labor is usually fixed cost and only such items as feed, livestock and equipment costs need be considered. Prices and market outlook should be considered as well as labor; however, if they are not favorable the farmer would be better off to make no use of his extra labor rather than have them and lose money. Livestock should not always be considered as a supplementary enterprise. If the farmer can make a profit by hiring labor to increase

his livestock enterprises, he should do so.

Alternative Livestock Budgets

In determining alternative livestock enterprises, the first step is to consider the types of crops which can be produced more efficiently. The likes and dislikes of the operator should, also, be considered. If a farmer likes one type of livestock better than another, he will probably do a better job of management on the one he likes the best. However, it is not always the one which he likes the best which will bring in the most money. A good example of this is a specialized pure-breed livestock operation which show animals are emphasized. Many young farmers will enjoy this type of operation which will not be feasible because of the amount of capital involved and available market. They would be much better off in a regular commercial operation.

The different livestock enterprises should be studied carefully to determine which will bring a larger profit to the individual farm situation.

THE COMPLETE FARM PLAN

After the crop and livestock systems have been planned, then, they must be co-ordinated and adjusted. One of the alternative livestock plans may show a larger profit and thus necessitate a change in the original or planned cropping system. The farmer should not hesitate to make such a change if it is feasible.

Feed Balance

If the proposed plan calls for livestock on the farm it is important

that the proper feed supply be available. It is usually more economical to grow a large amount of the feed consumed on the home farm. The feed crops grown should therefore, be of the type to supply the livestock enterprise. The livestock enterprise chosen should, also, be one which would be able to use the types of feed grown on the farm.

Labor Distribution

The crops and livestock chosen should either be complementary or supplementary for the available labor on the farm. Usually the crops grown take a large amount of labor in the late spring and summer months and the livestock programs should be built around this. Dairy and poultry are usually year around programs with the labor fairly evenly distributed. Swine is becoming more of this type of a program than it used to be now that multiple farrowing is being practiced. Many times the farmer can make more profit by hiring labor at the peak work loads if it is available. Machinery should, also, be used as a substitute for labor when it means a profit for the operation.

Alternative Adjustments

Each of the resources of production involved, land, labor and capital, should be carefully studied before the final decision is made concerning a proposed plan whether it be a partial or complete, or a short or long term budget. Adjustments will have to be made within each area to give the largest expected returns of profit from the entire farm business.

Machinery Selection and Use

One of the major costs in agriculture today is that of machinery. Mechanization has completely changed the work of the farmer in a relatively short period of time. The farmer needs to use machinery on his farm at maximum efficiency, if he expects to realize the top profits from his business.

There is a problem of over-mechanization as well as under-mechanization on many farms. Many times it would be more profitable for a farmer to hire work done on a custom basis rather than own the equipment himself. Many farmers have large amounts of capital "tied up" in equipment which could be used advantageously elsewhere in the farm business. The opposite is, also, true. Numerous farmers need to make more efficient use of new types of equipment in their farming operations.

These problems call for better management of the machinery programs. The farmer needs to be always trying to find better means of reducing his per-unit machinery costs and thus increasing the profits from his farm business. He should become acquainted with custom operators in the community and compare their costs with that of owning machinery. Another method which the smaller operator may use to reduce costs is that of owning certain pieces of machinery cooperatively with other farmers. This makes it possible to use the machinery on more acres and thus reducing the fixed costs per acre.

Farm Problem

The Jack Green farm is 320 acres, located about five miles from town. Mr. Green is thirty-nine years old and his oldest son Bill is

sixteen, a junior in high school. He has three smaller children who are all girls. The Green farm is a cow calf, cash grain and feeder pig operation. Mr. Green felt that he could be more efficient and asked Mr. Jones, the vocational agriculture teacher, to help him plan his farm operation. As a number of farmers in the community had similar problems, Mr. Jones had a series of lessons on farm re-organization and planning and Mr. Green took the class. The following is a description of Mr. Green's farm.

Total acres--320

Acres in Crops:

Wheat--55

Alfalfa--35

Acres in Pasture--180

Waste, etc.--50

His wheat yields were 28 bu. per acre of which he sold the entire crop. His alfalfa hay melled 6 ton per acre of which he used 55 ton and sold the remainder. The native pasture yields 1.5 AUM (Animal Units Per Month). With the Bermuda pasture yields 10 AUM. On the wheat pasture he gets .65 AUM.

He seeded Triumph wheat at the rate of one bu. per acre which cost \$1.75 per bu. He applied 100 pounds of 0-45-0 per acre which cost \$4.46 per unit for a total of \$245.30. The custom work for combining the wheat was \$297.00.

One hundred and eight acres of Native pasture were over seeded with Bermuda at a cost of \$201.66. Bermuda seed for 72 acres was 80 cents per acre. He used Ammonian Nitrate on the Bermuda which cost \$288.00.

He planted 15 lbs. of Oklahoma Common alfalfa per acre on the 35 acres. The price was \$.22 per pound and was seeded at the rate of 15

pounds per acre. 0-45-0 fertilizer was used at 100 pound per acre at the cost of \$4.46 per unit for a total cost of \$156.10.

Insect and disease control costs were \$70 with \$550 for other expenses.

The livestock include fifty Beef cows and one Bull with an average of 45 calves each year. He bought 320 feeder pigs each year which he fed out.

The Expenses are as follows:	<u>Am.</u>	<u>Price</u>	<u>Value</u>
Feed purchased and (corn)	184900	\$ 2.00	\$3689
Supplement	26500	5.40	1431
Pigs	320	8.00	2560
Cows (replacement)	10	180.00	1800.00
Veterinary			301.50
Minerals			10.00
Marketing commissions			381.20
Harvesting			105.00
Hired Labor			200.00
Seed			471.01
Fertilizer			689.40
Other Prod--Costs			620.00
Harvesting			297.00

The feed requirements for the present plan are as follows:

Cows (50)	37.5 tons hay and 600 AUM pasture
Calves (45)	16.75 tons hay and 183 AUM pasture
Bull (1)	.75 tons hay and 12 AUM pasture
Hogs (320)	184,900 lbs. grain and 26,500 lbs. supplement

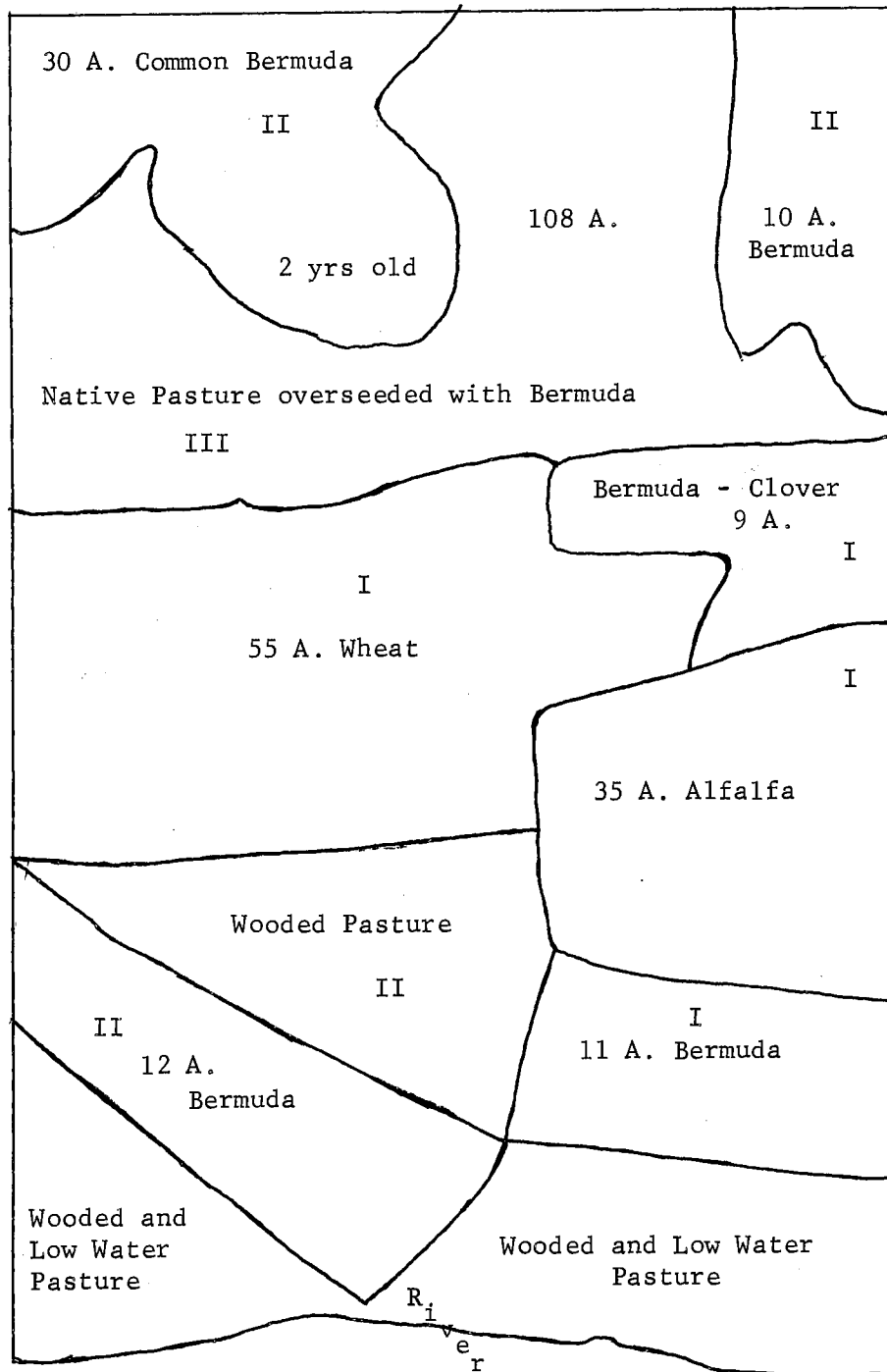
The available AUM of pasture are distributed as follows:

Permanent pasture (Summer)	720
Permanent pasture (Winter)	162
Temporary pasture (Winter)	35.8

The receipts from the present plan are:

	<u>Amount</u>	<u>Price</u>	<u>Value</u>
Wheat	1540	\$ 1.60	2464
Alfalfa	155 T	28.00	4340
10 Cull Cows	900 Lbs.	.16	1440
45 Calves	615	.24	6542
320 hogs	200 lbs. (ea)	.16	10,240

Farm Map



Note: Roman numerals are land classes

VITA

Milford Edward Quimby

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF THE BUDGETARY ANALYSIS APPROACH TOWARD
TEACHING FARM MANAGEMENT TO VOCATIONAL AGRICULTURE
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