Electronic data processing has become a new factor to consider in the operation of farm accounting projects. The deviation from the more traditional account project to the use of electronic processing equipment to process, classify, and report data sent in periodically is a new and popular approach in farm accounting. With the introduction of these new developments a re-appraisal of farm accounts as a tool for individual decision making and as a basis for management research and extension education is needed.

The specific objectives of this study were: (1) Evaluate the specific strengths and shortcomings of electronic farm accounting as compared to the conventional method of record keeping. (2) Review the organizational framework, approach and procedures of
several electronic mail-in programs currently operating. (3) Outline factors to consider and recommendations in developing such a program for Saskatchewan.

A properly organized electronic mail-in farm accounting program will be able to satisfy a wider diversity of interests than is possible under manually operated accounting projects. The interests and objectives with regard to farm accounts, of farmers, research people, or extension agents can be and usually are quite different. The great flexibility possible in electronic accounting programs permits them to be operated in various ways and at different levels of intensity to best meet the objectives desired.

The first mail-in electronic accounting project in the United States was established at Michigan State University in 1957. Since 1957 growth has been widespread and there is considerable interest in this approach at the present time. There are numerous variations among the electronic accounting programs as all of the states with active projects are not following the same procedures nor do they embrace the same objectives. While the early programs were concerned mainly with financial records only, many of the programs are now providing more comprehensive and complete farm accounting systems. At the present time a number of areas are in the process of development and refinement in order to facilitate a more
fully mechanized program. A great deal of progress has been made in adapting electronic data processing to farm accounting, however, more time and effort is needed to fully develop and capitalize on the possibilities associated with this approach.

In the organization and development of an electronic mail-in farm accounting program for Saskatchewan a multi-purpose project designed to serve the objectives and interest of farmers, extension, research and others interested in farm records is recommended. This would be a joint effort sponsored by the Department of Agricultural Economics at the University of Saskatchewan and the Farm Management Division of the Saskatchewan Department of Agriculture in close and cooperating roles with other interested groups.

The overall electronic accounting project would be organized with three coordinated phases, including a research phase, extension phase and a service phase, with a central data processing system. It would provide a complete and comprehensive accounting system capable of collecting and processing detailed physical and financial data. Individual cooperators will be able to select from a list of available options, the degree of detail and depth of analysis that he desires in farm accounting.
AN EVALUATIVE STUDY OF MAIL-IN ELECTRONIC
FARM ACCOUNTING SYSTEMS WITH FACTORS TO
CONSIDER IN DEVELOPING A PROGRAM IN
SASKATCHEWAN, CANADA

by

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A THESIS
submitted to
OREGON STATE UNIVERSITY

in partial fulfillment of
the requirements for the
degree of

MASTER OF SCIENCE

June 1964
APPROVED:

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Date thesis is presented December 23, 1963

Typed by Opal Grossnicklaus
ACKNOWLEDGMENTS

The writer wishes to express his appreciation to Dr. G. E. Blanch under whose guidance this study was completed. His assistance has made the thesis a valuable learning experience.

The kind cooperation displayed by the various institutions and agencies who were contacted for basic information regarding the operation of their individual mail-in electronic farm accounting projects was appreciated.

The writer is grateful to the Saskatchewan Department of Agriculture for granting educational leave that made this period of study at Oregon State University possible.

I would especially like to thank my wife, Sharon, for the patience and encouragement she has extended throughout the course of this work.
# TABLE OF CONTENTS

Introduction ......................................................................................................................... 1

Objectives of the Study ........................................................................................................ 6
Method of Study and Source of Data .................................................................................... 6

Appraisal of Farm Accounting Projects ............................................................................ 8

Farm Accounts as a Tool for the Individual Farmer .............................................................. 8
The Place of Farm Accounting Projects in an Extension Program .................................... 15
Farm Accounts as a Source of Data for Farm Management Research ............................... 25

Review of Electronic Mail-In Farm Accounting Programs ............................................... 31

Basic Operating Features of Six Mail-In Electronic Accounting Programs Operating in 1962 ...................................................................................................................... 32
  Michigan .......................................................................................................................... 32
  Northeastern Regional Program ....................................................................................... 35
  Wisconsin ......................................................................................................................... 37
  Virginia .......................................................................................................................... 40
  Nebraska ......................................................................................................................... 42
  Missouri .......................................................................................................................... 44

Other Programs Employing Electronic Processing Equipment ..................................... 45
Michigan's Proposed Program for 1964 ............................................................................ 49

Required Parts of a Comprehensive Farm Accounting System ........................................ 52

Inventory ............................................................................................................................ 52
Record of Financial Transactions ....................................................................................... 55
Enterprise Accounts .......................................................................................................... 57
Farm Production Records ................................................................................................. 58
Farm Business Analysis ...................................................................................................... 60
How do Electronic Mail-In Accounting Programs Satisfy the Requirements of a Complete Accounting System ................................................................. 62
# TABLE OF CONTENTS (Continued)

Factors to Consider and Recommendations in Developing an Electronic Farm Accounting Project in Saskatchewan.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Background</td>
<td>73</td>
</tr>
<tr>
<td>Responsibility for Providing Electronic Accounting System</td>
<td>76</td>
</tr>
<tr>
<td>Regional Approach</td>
<td>79</td>
</tr>
<tr>
<td>Recommended Structural Organization for Saskatchewan</td>
<td>82</td>
</tr>
<tr>
<td>Reporting Forms</td>
<td>87</td>
</tr>
<tr>
<td>Coding System</td>
<td>90</td>
</tr>
<tr>
<td>Business Summaries</td>
<td>92</td>
</tr>
<tr>
<td>Cost and Financing</td>
<td>94</td>
</tr>
<tr>
<td>Summary</td>
<td>99</td>
</tr>
<tr>
<td>Bibliography</td>
<td>109</td>
</tr>
</tbody>
</table>
AN EVALUATIVE STUDY OF MAIL-IN ELECTRONIC FARM ACCOUNTING SYSTEMS WITH FACTORS TO CONSIDER IN DEVELOPING A PROGRAM IN SASKATCHEWAN, CANADA

INTRODUCTION

Farmers as a group maintain rather meagre records of their business. Most farmers keep some kind of account but for the most part they are sketchy and fail to provide the necessary information whereby a full analysis of the business may be made. There are, however, farmers who keep complete physical and financial accounts which are summarized at the end of the year and used as a basis for decision making. Many of these farmers are successful in their business. The failure of farmers in this department of their work is due largely to the fact that farmers have failed to recognize farming as a business and have not yet realized the utility of record keeping.

Progress has been slow in the practical application of conventional accounting methods to the farm. This may be due to a combination of causes. First, conventional accounting is a special and somewhat laborious process and requires a degree of clerical skill not usually available on the farm. Another cause for the failure of the development of accounting on the farm has been the rather
general failure in educating farmers to the importance of farm records and record analysis for improved business management. This is evidenced by the fact that a high proportion of farmers keep only the minimum amount of financial records for income tax reporting purposes.

The management problems of farmers and the adjustments required continue to increase and become more complex. Such problems are traceable to changing production techniques, improved technology, increased pressures from costs, and shifts in the marketing system. Competition in farming has become very keen. Farmers are competing not only with farmers in their local region and the rest of the nation, but with farmers of other countries. Farming also appears to face stiffer competition with other industries for the use of resources such as labor, land, and water. Farming decisions change under varying conditions. Yesterday's right decision may be wrong today. A few years ago, with relatively favorable cost-price ratios, the right decision was to get quantity of production at almost any price. The emphasis was on production. Today income differences are closely associated with differences in efficiency-crop yields, livestock feed-conversion ratios, how much is accomplished in a day, efficiency in use of power and machinery. Having shifted to tighter cost-price ratios,
efficiency becomes the prime consideration. Agriculture today employs much larger amounts of capital than ever before. Some of the decisions today involve a large quantity of money and may commit a person to a program involving many years. Mistakes are costly. In order to be in adjustment with the economic climate in which one operates his business, current reliable input-output information must be available and secondly, one must be able to apply it. Increased efficiency in production, larger scale of operation and adoption of better business methods have become necessary in our highly commercial agriculture.

In the complex changes that have affected modern agriculture, mechanization has played a large part. The invention and perfection of automatic or partly automatic machines and their increasing use have relieved many of the production processes of their former dependence on human labor. Engineers have mechanized harvesting and tillage operations. They have taken the backbreak out of barnyard chores. Even the farm housewife has an easier time due to electric refrigeration, central heating and water on tap. With automation all over the farm, one of the last areas to be mechanized has been farm accounting but now with electronic data processing a major breakthrough is shaping up in this area.

The mechanization of farm accounting has developed around
mail-in systems making use of electronic data processing equipment. There are a number of mail-in account programs at present in operation involving the use of electronic data processing equipment. Although there are minor variations among these programs with respect to operating procedures, the following is a brief outline of the principal operating features of a mail-in electronic farm account system. The farmer records all financial transactions as they occur on a basic data sheet. Each transaction is coded either by the farmer himself or at a central coding center according to a specified coding system. The farmer mails his completed basic data sheets periodically to a collection center where they may be coded, checked and sent on to the processing center where business machines perform the sorts and calculations. Periodically during the year reports are mailed back to the farmers giving a classification and summary totals of all transactions to date.

In the past, an old shoe box has been the extent of mechanization in farm accounting. It was handy for receipts and bills recording day to day transactions. Trouble began when the farmer had to sort out the contents and figure his income tax for the year. Even with simplified account books the sorting and calculations were added effort on top of all other duties. While the farmer participating in the mail-in electronic farm accounting system still must
report the details of his transactions on some type of input form, the records are basically kept by machine in the central office with totals accumulated automatically as the year progresses.

The development of electronic farm accounting has received varying comments ranging from, "the greatest accounting device since the invention of the pencil," to that of the skeptics, "just another gimmick." Technological developments have brought dramatic changes in farm organization and operation. Farming has changed from a largely self-sufficing industry in which the farmer produced not only his own food but also much of his clothing and equipment, to the present specialized commercial type of production. Even in the present specialized production, the typical farm manager is his own technician, personnel man, financial expert, and engineer. Today many commercial farmers do not have the time and usually lack the ability to keep the records needed to satisfactorily analyze a farm business. Automatic data processing has become a new variable or factor to consider in the operation of farm accounting projects. Mail-in farm accounts employing automatic data processing equipment offer possibilities as a method of providing much of this information at a minimum of effort and at a reasonable cost to the farmer.
Objectives of the Study

It is the purpose of this study to review the objectives, problems and experience of conventional accounting methods; to evaluate the potential of the electronic farm accounting approach; to outline the major factors to consider in the organization of such a program by using the experience of electronic farm accounting projects in operation.

The specific objectives of this study may be stated as follows:

1. In as far as possible, evaluate the specific strengths and shortcomings of electronic farm accounting as compared to the conventional method of record keeping.

2. Review the organizational framework, approach and procedures of several electronic mail-in programs currently operating.

3. Outline factors to consider and recommendations in developing such a program for Saskatchewan.

Method of Study and Source of Data

This study is divided into two parts. The first involves a review of the development of mail-in electronic farm accounting programs, investigating possibilities and limitations. The second part of this study is to outline major factors to consider in organizing a
mail-in electronic farm accounting program in Saskatchewan. The direction of outlining major factors to consider is contingent upon the results of the previous analysis of existing electronic farm accounting programs.

The data procured were primarily from various secondary sources and from mail correspondence with those in charge of several operating electronic farm accounting programs. The writer had the opportunity to attend a meeting at Pullman, Washington of the Western Farm Management Extension Committee which was held to discuss the Development and Initiation of an Electronic Farm Accounting Project on a cooperative basis with other Western States. Some information and points of view presented in this study, therefore, were drawn from first hand contact with individuals attending the above meeting.
APPRAISAL OF FARM ACCOUNTING PROJECTS

This chapter is devoted to a review of objectives, problems and past experiences with farm account projects, with an appraisal of the value of electronic mail-in farm accounts as compared to the conventional method of keeping records. The approach considers this subject under the following headings:

1) Farm accounts as a tool for the individual farmer.
2) The place of farm accounting projects in an extension program.
3) Farm accounts as a source of data for farm management research.

Each of these areas is discussed separately, considering criticisms and weaknesses of farm records in serving the objectives of the areas outlined. Although electronic mail-in farm accounting programs are relatively recent, the limited experience available is used to evaluate the potential of this method as an alternative to the conventional method of farm record keeping.

Farm Accounts as a Tool for the Individual Farmer

Individual farmers have varying objectives and purposes for recording information pertaining to their farm business operations.
Many want records to serve only for income tax filing requirements. Others desire information for general farm analysis and still others are interested in detailed enterprise accounts. Farm accounts generally can be divided into two major types, each of which may be kept in varying degrees of detail. The general financial account provides information on the entire farm business rather than for any separate enterprise. It will include information on total receipts and expenses, which are required for tax reporting, and may include additional information so that an analysis can be made of the farm business. The enterprise account provides detailed information on each enterprise within the farm business. While only a few farmers keep this type of record, it is from the enterprise account that the farmer can determine his costs of production and profitability of each enterprise. Physical records have often been the neglected part of farm accounts. Physical records indicate whether the physical performance of the various enterprises is up to a satisfactory standard. Physical records are just as important as the financial records to the farmers who are interested in improving the efficiency of operation of their farm business.

Devising an accounting system to serve the various objectives individually or collectively has been a difficult problem with conventional accounting methods. Such a system needs to be sufficiently
flexible to provide a minimum of detail to the farmer who wants a simple accounting system, yet it must accommodate the farmer who wants a complex accounting system.

Electronic record systems offer definite possibilities of being a very flexible system able to serve various objectives and adapt itself to various degrees of detail. Enterprise accounting can be accomplished with little added effort. Classifying information is accomplished through the use of an enterprise code. The enterprise code facilitates the allocation of costs and returns and physical quantities among enterprises, crop years and in other ways within a farm business. This overcomes the problem of separate pages and multiple columns in an account book to record entries belonging to different enterprises. Farmers can record all types of transactions on the same sheet. The sorting, cumulating, and calculating can be carried out by machines.

It should be emphasized, however, that common (joint) costs still must be divided among the specific enterprises. The allocation of common costs is often a troublesome area in enterprise accounting. While enterprise accounts are often desirable in making better decisions, care needs to be exercised in interpreting the results correctly.

One of the basic problems of conventional accounting is the
procrastination in recording the items as they occur. Inasmuch as farmers must submit their information periodically in mail-in accounting projects, the more timely recording should improve the accuracy of the information, especially the recording of physical data.

Farm records do not reach their full potential unless they are analyzed, interpreted, and used by the farm manager in decision making. The end product of this job, the farm business analysis, will be used by farmers as a guide for making changes in the organization and management of their farm business. Accuracy is of primary importance in processing the data contained in the records. Therefore, the analysis should be as accurate as the data allow. Otherwise, the analysis is of little value and may cause a farmer to make wrong decisions. This could damage his business hundreds of dollars.

In mail-in farm accounts, especially if the process can be largely mechanized, the extent and quality of farm business analysis would be greatly improved over conventional methods. In addition to the periodic processing of financial transactions a completely mechanized processing program will include, the mechanized handling of inventories, depreciation schedules, credit accounts and other information essential to analyzing a farm business. Also, all
individual farm business and analysis factors would be programmed to be computed by electronic computers. This would not only eliminate the possibility of human errors but the quicker calculation of yearly farm business analysis would enable a more timely availability of this information to the farmer for consideration in making the following year's plan.

One feature of electronic accounting is that it may lead to less understanding on the part of the farmer. The farmer is less involved in mechanics as compared with conventional programs. If the farmer receives the results without further training or information, his understanding of these results will likely be limited. Care must be taken in interpreting the results of the analysis and the manager must have an understanding of economic concepts in applying this information to the more profitable operation of the farm business.

In many businesses outside of agriculture, monthly analyses are made of the financial records in order to keep a constant check on the control of the operations. Perhaps this is too frequent for many farming operations but periodic checks of his business could serve many useful purposes. Prompt detection of weak points in the business may prevent serious losses. Periodic checks and summaries are possible with conventional methods. However, most farmers simply don't have the time or patience to do this
tedious sorting, classifying and accumulation. As a result of the difficulty in doing this job manually, farmers have relied strictly on year end figures. Undoubtedly they have missed opportunities to make current management decisions. The monthly or quarterly business summary with cumulative totals provided by electronic accounting systems enables a farmer to appraise operations and make a partial business analysis without waiting until the end of the year.

The cumulative figures provided by electronic record systems should put the farmer in a much better position for effective income tax management practices. The accumulated totals provide the information required so that he can shift sales or purchases or payments in tax planning. A problem often arising in farm accounting is the conflict of grouping and breakdowns required for farm analysis and that suitable for income tax reporting. For example, in reporting cash transactions for the year, there may be some expenses or receipts this year which were really last year's business. For the business analysis to be more accurate these items should be left out of this year's business. But on reporting for income tax on a cash basis, these items should be included in the year which the expenses were paid or receipts received although they pertained to last year's operations. This problem is overcome in electronic systems by preparing two listings. The first lists all transactions
grouped by expense and income categories appropriate for income tax reporting purposes, while the second listing specifies total receipts and expenses for each enterprise category designated. The preparation of two listings is not a serious inconvenience with machine processing although it often is shied away from in manual processing.

Ability to obtain credit and tie it to the specific purposes of the farm business is greatly facilitated by a set of systematic accounts. Farmers with records showing their efficiency have much easier access to credit than those who can offer only general and verbal statements concerning their earning power. Some credit sources require their borrowers to keep systematic accounts, and most lenders recommend it. Several credit agencies have given favorable recommendations to mail-in accounting programs and farmers cooperating in these programs should increase their ability to obtain credit at the lowest cost possible as well as having accurate information on which to base the use of credit wisely. With the increased use of operating credit, the handling of open operating credit accounts has caused numerous accounting problems and has been the source of many errors. Those responsible for electronic accounting systems have developed methods of handling credit transactions which provide farmers with periodic statements showing all
credit transactions and end of period balances on all accounts receivable and payable. This information is important in making a critical evaluation of a farm business operation.

**The Place of Farm Accounting Projects in an Extension Program**

Over the years extension education has devoted its efforts primarily to the farmer's technical problems associated with the use of his land, capital, and labor factors of production. Comparatively little emphasis has been given to problems directly associated with the management factor of production. Yet, it is the management factor which plans and organizes the optimum use of the other factors of production. Increasing importance of the management factor was recognized in the Scope Report\(^1\) and there has been a trend to devoting a greater quantity of resources to the area of farm management education.

There are a number of problems in the development of an effective farm management extension program. One of the basic problems is the content of an educational program in management that will represent effective assistance to the farmer. A second important question is how should the educational resources

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\(^1\) A Statement of Scope and Responsibility - The Cooperative Extension Service Today, 1957 Extension Committee on Organization and Policy.
available be organized and mobilized to convey skills in the application of the management concept to farmers in sufficient numbers to be an effective force for the improvement of their income position.

One apparent weakness of farm management extension programs has been the "piecemeal" approach of the educational programs. Many extension farm management programs have been designed to teach farmers managerial skills, tools and techniques. Such a program undoubtedly is incomplete. On the other hand, a program devoted only to teaching economic principles and factual material is incomplete. Farm management educational efforts generally have been characterized by a narrow approach and have been handicapped by the allocation of so few educational resources that the program had little chance of reaching more than a comparative handful of farm operators.

Teaching management to farmers is not an easy task and developing effective programs has been a difficult problem especially considering the limited resources available in this field. What appears to be required is a program which is both comprehensive as well as intensive. No type of educational resource or method should be regarded as sufficient. An examination of the basic elements of the management factor provides us with an insight into the requirements for an effective farm management program. Three essential
elements of management as outlined by Pulver are:

(1) The hard core center of the individual manager is his basic decision-making ability;
(2) this hard core is surrounded by a body of economic principles, management concepts, and working tools; and
(3) a collection of facts and relationships which are related to the problems at hand through the decision-making process and economic concepts. (13, p. 1463)

Since management involves all three elements, it is not sufficient that a farm management extension program focus on any one element alone as the effective manager will need to possess all three basic attributes.

Teaching basic decision-making and management concepts is difficult because of its complex and sometimes abstract nature. Yet accepting the individuality of farm firms and the rapidly changing conditions, greatest long range benefits should be obtained with this approach. In teaching the basic decision-making process, efforts should be made to show the application of the various tools and economic concepts. Farm accounting projects, besides furnishing instruction in the use of one of the required tools, may perform several additional functions in a farm management extension program.

A conceptional structure of the steps involved in the decision making process is helpful both in understanding and in developing a teaching approach. There are differences among students of management on the exact number and order of the functions in the
management process. However, it is believed there is general agreement that they might be listed in the following steps:

1) Recognition of problems.

2) Observation of relevant facts.

3) Analysis and specification of alternatives.

4) Choice of alternatives (decision-making).

5) Taking action, accepting responsibility and re-evaluation.

Problem identification is an important function in the decision-making process. Formulation of goals and objectives, and problem recognition are closely related. Sometimes goal orientation is listed as a first step in the process as problems present themselves in terms of the goals of the individual. Defining problems will usually have to lead from the overall farm situation to the specific parts of the business. Here detailed records and systematic analysis procedures with guide lines based on farm business analysis studies provide opportunities for locating strong and weak points in the business. Farm accounting analysis concepts are particularly well adapted for pinpointing causal factors of price relationships, size of business and use of resources.

Observation or the gathering of relevant information is an important function of management. Poor decisions may be the result of incomplete or inaccurate information. Information needs to be
gathered both on and off the farm. The individual farmer needs to possess, or have ready access to a body of facts and relationships which can be used in conjunction with appropriate management concepts. The scope and types of information required in commercial farming today is broad and covers many fields. Technical information in physical and biological areas as well as knowledge of price trends, labor and machinery availability, and the provisions of government programs and services are all required. The farmers cannot and need not be expert in all these fields but he must know the sources of information and be able to select relevant information for his particular situation.

Farm accounting projects are very useful sources of information about the farm business both in providing information required by the individual and as a source of information for illustrative purposes in teaching. They provide a process of fact gathering which supplies a continuous flow of financial and physical information. Farm accounting data needs to be supplemented with additional data from other sources but where input and output relationships can be derived from farm accounts, they are germane to the situation of each manager.

Determining and evaluating alternatives provides opportunity for the application of the economist's working tools. Many concepts,
principles and relationships are relevant at this step. These include diminishing returns; marginal costs; fixed and variable costs; opportunity costs; enterprise relationships; complementary, supplementary, and competitive relationships as a partial list. In explaining and demonstrating the above, the use of available local data personalizes the approach and makes it more acceptable when used in educational meetings. Farmers are not mentally disciplined to the study of abstract theory out of context to present day problems. Generally, there is a plethora of agricultural economic information available which is unrelated to local conditions, but for economic information to be most helpful and meaningful to farmers it should be interpreted in the light of the local and regional situation. Arbitrary selection of illustrative data and "brush-off" replies to inquiries of the source often void the good intent of the teaching effort. Accounting projects can be used to provide data directly relevant to local problems and conditions, both by supplying information directly and as a means for encouraging further research.

In the final step the decision maker implements his choice of actions and accepts responsibility for his choice. Perhaps the most vital part of this stage is the evaluation of results. An important element includes the evaluation of the results in terms of whether there was a loss or profit. But it also is broader in that it includes
answering whether the goal or objective was achieved, if not why not, and could the goal have been achieved more economically. Summary and analysis of farm records serve as an instrument for checking the results of action by the measuring of financial progress and factor analysis.

Farm people are not particularly interested in learning the decision-making process or economic principles per se and usually little openly expressed demand is made for such educational service. It is also difficult to teach basic decision-making and economic principles on a one-shot meeting basis. Farm accounting projects can be used as the center of integrated farm management programs. They serve as an effective educational entre, to open the door for educational work with farmers providing personal contact and the opportunity to move into over-all management education. Farm accounting projects can be used as a focal point for repetitive contacts over a period of time and thus serve as a basis for sequential instruction.

Farming today is a highly dynamic business and demands a dynamic approach to its economic problems. The farm management worker needs to keep abreast of the thinking of the farmer and the changes that are occurring in farm technique. A continuing and close contact with key groups of farmers through a continuing farm
accounting project is one of the most effective ways of accomplishing this.

While several advantages and strong points can be credited to a farm accounting project in a farm management extension program, it also has its shortcomings. Much of the criticism of farm account projects in the past may have been justified, but with the development of business machines to process and report data we need to re-appraise the place of farm records and farm business analysis as part of an extension program. One of the main criticisms of accounting projects as part of an extension program has been that they tend to be closer to a service rather than an educational tool. Although there is considerable educational merit in an accounting project for new members, continual effort by extension workers in individual record summary, farm analysis, or income tax can be considered closer to service than to education. A second criticism has been that farm account projects may monopolize extension resources. Rather than being one of the segments of an integrated program the account project may tend to constitute the whole farm management extension program. Department funds and specialist's time become tied up in the account project and nothing is left for other aspects of a broad program or to work with other farmers who are not in the project. When a large portion of the program is
devoted to farm accounting the public image of farm management becomes tied to farm records only and the farm management specialist becomes identified as a "farm records" or "accounting" specialist. The tool of record keeping becomes identified with the real objectives of managerial economics while of course there is more to farm management than record keeping.

While the continual processing of individual accounts may rightfully be considered a service, it is a service which many farmers can profitably use and should be willing to pay for. Yet farm records alone are not sufficient. The farmer must be able to use them, know how to interpret them and realize that the returns are often high for the time spent in accounting and management decisions. Education in the use and application of farm accounting and other management aspects is an extension responsibility. From the experience of farm management associations and several other accounting projects many farmers appear willing to pay a reasonable fee for this service.

Mail-in farm accounting with electronic processing equipment offers possibilities for providing this service on a commercial basis. It shows potential of being able to handle large numbers of farm records more accurately and on a more complete and thorough basis than any other known system. Electronic accounting systems, once
fully developed and operational, hold possibilities of being able to replace professional management time involved in accounting mechanics with business machine methods. If the system can be fully mechanized and the cost of operation made largely self-supporting, it should definitely leave greater resources available for other aspects of a broad program in farm management extension and make the program available to a greater number of farmers.

From the experience of programs in operation, electronic mail-in farm accounting appears to have considerable farmer appeal and should be an effective motivational device. The value and possibility of employing electronic computers as a motivational device pertaining to management education programs is recognized in the following statement.

Most extension programs in the physical sciences through the years have had some type of tangible process tied directly to it - e.g., soil testing, demonstrations, production testing and the like. The electronic computer has been a practical reality in the business world for many years now. In fact, our own scientists have been making widespread use of these machines in carrying forward their research programs. Have we as farm management specialists perhaps missed a bet by not tying the electronic computer to our program and profession as a symbol of the type of educational program in which we are involved? Granted, it would be more a "spotlight or attention getter" than an educational device per se. Historically, this has also been true of the gimmicks involved in the educational programs of the physical sciences. Perhaps it is not too late to evaluate this device carefully to see how it might be fitted into the program, cautioning ourselves, of course, that this can never be an end in itself. (3, p. 122)
Generally the resources available to do farm management extension work are scarce. There is a limited number of farm management specialists. It appears necessary to have increased resources oriented toward farm management if those in extension are to carry on satisfactory management education programs in the future. Electronic mail-in account programs may serve as an instrument in attracting additional resources to do farm management extension work.

In every state where an electronic mail-in account program has been established it has served as an instrument for attracting resources to the management area. This will continue to happen whether the emphasis is on the field education side or on research. It has been called a novel gadget. It may be this but it is far more. The rather wide publicity received based on relatively limited accomplishments to date indicates the extent of interest. Most farm management educators have failed to recognize the extent of resources conceivably within their reach to do vital management work through an approach as electronic accounting. The additional resources may come from education institutions, farmers, agri-business people, or even from grants. (4, p. 51)

Farm Accounts as a Source of Data for Farm Management Research

Farm management research based on farm accounts was initiated in Minnesota in 1902 by W. H. Hays and Andrew Boss. This was the first organized continuing research project in the entire field of agricultural economics in the United States. Farm records and accounts have continued to be an important source of farm
management research data, especially in certain sectors of the country. Information available from this source has some limitations, of course, but so do similar data from other sources such as farm surveys and controlled experiments.

One of the limitations of farm accounting studies for research purposes is the difficulty of getting a cross section or random sample of any group of farmers. The selection is based at least in part on the willingness of the individual farmer to keep records. This in turn tends to weight the study with a greater proportion of the more progressive and more successful farmers, and usually with those on larger farms and who are more highly financed. A survey, if properly done, would give a more representative sample when the nature of the research demands a random selection of observations from a defined population.

However, data obtained from farm accounts have some advantages over that obtained from surveys. The records are more complete and internally consistent; it is often possible to follow the influence of a factor from one section of the business to another than is possible if the information came from a survey and depended on the recollection of the farmer some months in the past. The memory recall bias is minimized because of reporting at the time of action. Also more data can be requested than are typically possible
Farm records serve an important function in supplementing the controlled experiments conducted by the agronomist, animal scientist, etc. Often the results obtained on farms differ from those at the experiment station or in the laboratory. The only safe way to find out just how the new practices work is to try them and get a record of the results.

The approximately 500 farm accounts that we summarize each year are extremely valuable in checking the validity of input-output coefficients. The records allow us to move from "what ought to be" to "what is" in our thinking. For example, we go to the production scientist for feed requirement data to use in budgeting. Based on feeding trials, he tells us what the requirements should be. The requirements under controlled conditions must be raised about 20 percent in order to match the feed actually being used in farm account farms. For average or below average operators the discrepancy would be even greater. We must constantly check our input-output relationships with what good farmers are able to do if we are to keep the proper perspective. (15, p. 61)

A criticism similar to that directed against accounting projects as part of extension programs also exists in the use of farm accounts for research purposes. Servicing individual accounts absorbs so much of the researchers' time that he has little time left to go beyond routine tabulations. The repetitive nature of a farm record study always carries with it the threat of becoming routine and stereotyped. It is easy to become lost in the mass of detail and to grind
out mere figures rather than useful, timely, and significant facts that will serve the farmer.

Another criticism of farm records has been that it takes so long to accumulate the needed data that they are obsolete by the time they reach the publication stage. This criticism is probably true of much of the research work in farm management and it was especially true of some of the earlier cost accounting work.

The greatly increased ease of handling farm record data and extensiveness possible in calculation with electronic processing makes it much more feasible to gather and include both financial and physical information by enterprise breakdowns. The enterprise code facilitates the allocation of financial and physical data among enterprises, crop years, individual machines, buildings and in other ways within a farm business. This system could also be adapted for time and motion studies as a specialized phase of a general farm accounting program. The quicker calculation of data should provide for a more timely availability of publications and the flexibility of the system provides an opportunity for greater variety of studies.

The problem of obtaining a random sample is difficult to overcome but if a large number of farmers were encouraged to maintain records, this would provide a pool from which different types of samples might be selected. This would still have limitations for
certain studies, such as the description of farming in an area. However, a random sample is not of a prime essential in obtaining data for many kinds of farm management research.

The rapid change with which new techniques enter the farm picture tend to make obsolete some fairly recent data and necessitates frequent repetition if input-output data are to be kept current. A continuing accounting project employing electronic processing equipment can serve an important function in maintaining input-output relationships up to date. The plea of many farm management extension people is for more input-output data i.e. building blocks, coefficients or factor-product relationships. Numerous articles point out the lack of available information and material for extension farm management programs. Some of the material turned out by research people has very limited application in solving the current day-to-day problems encountered by the extension agent. This type of information has been slow in coming out and the quantity available in relation to the total need is exceedingly small. An electronic mail-in account effort may be a means to encourage more applied research.

The gap between agricultural economics research results in the United States and the needs of extension workers and other field educators is not narrowing. In Michigan with the old account book project, there were seldom any recognized research studies conducted in conjunction with the farm record work. In 1962, there were 9 special
research efforts carried on in conjunction with the electronic mail-in account program. This type of effort appears to offer possibilities at least as great for research as for extension programs. To the extent that it may be able to bring the two closer together, the effort deserves support. (4, p. 51)
Electronic processing equipment has been widely used by industry and research institutions. The Dairy Herd Improvement Association has been one of the first agencies in agriculture to employ electronic computers in the processing of records. It was tried first in Utah and Illinois in 1951 and has since gained wide acceptance among Dairy Herd Improvement Associations.

The first continuing electronic mail-in farm account program in the United States was established at Michigan State University in 1957. Since 1957 there has been tremendous interest and substantial growth in electronic farm accounting programs. At the present time there are more than 30 states at the university level now involved to some extent in electronic farm account programs. In addition there are a number of State Farm Bureaus and commercial firms who are employing this method of farm accounting.

While there are variations among the programs, a number of features are common to nearly all electronic mail-in farm accounting projects. All the programs operate on a "mail-in system", whereby the communications between the farmer supplying the basic data and the processing agency who performs the accounting is provided by mail delivery. The farmer reports his financial
transactions and other required data periodically on basic data forms. Most programs use numerical codes as the language for transmitting the data into the electronic processing machines. However, there are variations in the programs as to the responsibility for the actual coding of entries. Periodic reports, either on a monthly or quarterly basis, are returned to the farmers showing the details of all entries sent in. Totals are shown both for the particular period involved and also on a cumulative basis to date. Annual financial summaries and a farm business analysis are provided participants in many of these programs. All information pertaining to the individual farm business is handled as strictly confidential throughout all phases of the accounting systems.

Basic Operating Features of Six Mail-In Electronic Accounting Programs Operating in 1962

Michigan

The program developed by the Department of Agricultural Economics at Michigan State University is a cooperative effort of extension and research with service to farmers not being a primary objective. Approximately 1300 records were included in the 1962 program. This is a limited enrollment program with the cooperators being selected to serve three major purposes:
1) To keep farm management extension men competent.
2) To train county agents in on-the-farm business analysis work.
3) To provide cooperators for research. (9, p. 12)

Although an annual charge of $3.00 per participant is made for record supplies used by the farmer, this fee is so low it may be considered a free program for practical purposes. Participants agree to provide special research information in return for the service which they receive. From this supplementary information several research projects are carried on in connection with the mail-in accounting project. These research projects have included: a credit study, feed utilization studies for various livestock enterprises, investment intentions, family living costs and several other similar type studies.

The estimated cost per record for the 1962 project was $42.00 based on 1300 records summarized. This cost does not include charges for administration, specialist time, assistance given by county field staff, travel or the cost of printing farm business analysis reports which are for general distribution. In conjunction with the business machine people at Michigan State University, costs have been budgeted for 3000 and 6000 records on the basis of the present accounting system. For 3000 records they estimated the cost could be reduced to $37.00 and with 6000 records, it could go down to $34.00.
Farmers report information on income, expenses, and investments on a monthly basis. All coding of entries is done at the processing center by a coding clerk under the direction of farm management extension staff members. Each transaction is punched and verified on business machine cards. Quarterly business machine reports are returned to the farmers showing the details of all entries sent in. This report shows a listing of each item with totals both for the particular quarter and cumulative totals for the year to date. A year-end summary listing of expenses, receipts and investments with totals classified for income tax reporting is sent each cooperator during January.

During January and February farm management specialists and county agents visit all cooperators to get information for completing the farm business analysis and to clarify any questions arising out of the monthly reports and summaries. Information obtained includes inventory data which the farmer keeps in a four year inventory and depreciation book, crop production records, and supplementary facts required for completing a farm business analysis. All of this information together with the year-end financial summaries for each cooperator is consolidated on an office summary sheet. The results of the year's farm operation and the financial data appearing on the individual farm summary sheet are computed and
recorded manually. The individual farm summary data are then transferred to business machine cards. These cards are then processed through sorting and tabulating machines to assemble the group reports. Cooperators receive copies of these group reports for farm business comparison purposes together with their individual farm figures.

In 1962 Michigan operations employed the following business machines; Key puncher, Verifier, Sorter, Collator, Interpreter and I. B. M. Tabulator 407.

Northeastern Regional Program

The Northeastern Regional program is known as "Elfac" (electronic farm accounting). Elfac is a regional extension program which includes the eight states of Vermont, Maine, New Hampshire, New York, Massachusetts, Connecticut, Rhode Island, Delaware and the Canadian provinces of Quebec, Ontario and Nova Scotia. Elfac is sponsored by the "Northeast Farm Management Extension Committee" and operates under the guidance of a seven man steering committee composed of Farm Management Extension and Research workers chosen from among the participating states and the Federal Extension Service.

The total enrollment of participants in 1962 was 336 with an
increased enrollment in 1963. Farmers pay for all materials and the entire processing charge. The service fees follow a complex rate schedule with a basic charge of $20.00 and a variable charge based on individual crop acreages and size of livestock enterprises. Average charge made per cooperator in 1962 was $45.59. Approximately $6.00 of this amount went for materials and miscellaneous costs and the remainder for processing. The actual machine processing of the data is being done by an independent firm, Ayrshire Breeders Association, Brandon, Vermont, on a contract basis. The Breeders Association employs much the same type of equipment as used at Michigan State.

Farmer participants in the Elfac program report receipts, expenses, credit transactions and all other financial and physical information on a single basic data sheet. Farmers do all the coding of entries themselves and mail in completed data sheets weekly to the farm management specialist in their respective state or province. The state specialist is responsible for the checking of basic data sheets and coding and forwarding these sheets to the contracting processing center.

Monthly summary reports are mailed to the state specialist who channels them back to the participating farmers. These reports contain an orderly listing of farm receipts and expenses with monthly
and cumulative totals of volume and dollars. If desired the report will provide a listing of credit accounts showing charges, payments and balances. Classification of financial transactions according to enterprises, capital purchases and sales, household and personal expenditures can be provided.

Further analysis and the preparation of business reports is the responsibility of the farm management extension staff of the respective state or province. The local extension agent under the direction of state farm management extension specialists is responsible for enrolling cooperators and training farmers in filling out the basic data sheets. The extension agents provide assistance in making out farm inventories and obtaining basic information needed to make a complete farm business analysis.

Elfac is the only regional mail-in electronic farm accounting project in operation at the present time. It is the only program outlined here where the farmer does all the coding of entries and submits reports of his financial transactions on a weekly basis.

**Wisconsin**

The Wisconsin project is a cooperative effort between the University of Wisconsin Extension Service, two independent Wisconsin farm management associations and the Agricultural Records
Cooperative.  This is a trial program for 1962-1963 involving 40 farmers who are regular members of the two farm business associations. It is the intention to make this program available on an optional basis to all farm management association members throughout the state in 1964.

In 1962 the Agricultural Records Service received a flat fee of $25.00 per farm for the electronic data processing of the records. The two farm management associations involved paid one half of the processing cost from association funds and the participating farmers paid the other half. The participating farmers continued to pay the regular membership fee of their respective associations, which averages about $55.00 annually, in addition to their portion of the electronic data processing cost. For 1963 the Agricultural Records Service has offered two alternative fee schedule plans: 1) A flat fee of $50.00 per farm or 2) a flat enrollment fee of $15.00 per farm plus 05¢ for each financial transaction submitted for processing.

Farmers submit their financial transactions, together with selected livestock number information monthly. The coding is all done centrally. In 1962 it was done by the University Extension

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1 The Agricultural Records Cooperative of Madison, Wisconsin, is an independent firm which was organized several years ago. It does all the machine record processing for the Wisconsin Dairy Herd Improvement Associations.
Service but this function is being performed by the Agricultural Records Cooperative in 1963. Two business machine listings of cash transactions are processed and mailed to participating farmers on a monthly basis. The first report is a listing of all current transactions grouped by expense and income categories appropriate for income tax reporting purposes. Figures can be shown for both the operator and the landlord with totals on the current month and year-to-date basis. The second report lists receipts and expenses for each designated enterprise category, on both a current month and year-to-date basis.

The farm management associations fieldmen are responsible for collecting inventory and depreciation information together with miscellaneous data required for preparing the annual farm business analysis. Three business machine reports are provided participants at the close of the year. The first of these reports is a total listing of all transactions for the year with subtotals by enterprise. The other two reports are a business machine listing of the depreciation record and a business machine listing of the inventory record showing both beginning and ending quantities and values. In addition, two business machine reports of a business analysis form are computed and provided participants. One is a detailed business analysis report showing data for the individual farm. The other, involving less
detail, is a group comparative report showing business analysis data for the individual farm together with group averages.

The business machines used in the Wisconsin project are similar to those used in the Michigan program with the addition of an I. B. M. 1620 computer with card input-output and 60K memory capacity.

This is the only mail-in electronic farm accounting program operated in conjunction with farm management associations. One of the objectives of this program is to develop a system whereby all the clerical and computational work now done by the farm management association fieldmen can be processed with business machines. This would make it possible for the fieldmen to spend more time with each farmer in management consultation or increase the number of farmers served per fieldman. This is the most complete program in the use of business machines in that depreciation and inventory records as well as the farm business analysis are all set up for computer processing.

Virginia

The Virginia electronic farm record program is a cooperative effort of the Agricultural Economics Department, University of Virginia, and the Virginia Extension Service. The mail-in electronic
accounting system was established in 1959 as one part of a new approach in farm management education. The number of cooperators in this program is restricted, with the county agent being responsible for selecting the participants according to type and size of farms desired within his county quota. There were 625 participants in the 1962 program with a limit of not more than 700. The estimated average cost per record for the 625 cooperators in 1962 was $58.36. This cost does not include any charge for the coding of entries which is done by county agents or the cost of any farm business analysis work.

Cooperators send reports of their transactions on a monthly basis to their county agents office where they are checked, coded and forwarded to the Department of Agricultural Economics at the University. This information is punched on business machine cards monthly. Quarterly cumulative business machine reports of receipts and expenses are processed and mailed participants throughout the year with a year-end business machine summary of expenses and receipts for income tax reporting purposes provided following the close of the year.

A nine year continuous inventory record book is provided participants by the Department of Agricultural Economics for maintaining inventory and depreciation records. Summaries of the farm
inventory together with crop records and miscellaneous information are mailed annually to the processing center for use in preparing the individual farm business analysis. In addition to the individual farm business analysis, various group analyses by area and type of farming are prepared for comparative purposes.

The Department of Agricultural Economics has developed special forms for completing enterprise analyses of the various farm enterprises as a supplement to the general farm accounts. So far they have not pursued this part of the accounting program and have concentrated on general farm accounts.

This program involves the county agents to a great extent. The agents are responsible for selecting the farms, accuracy and coding of data and the educational aspects of the program. Those in charge have recognized the need for advanced training for the county agents to enable them to carry out their functions in the project. They have therefore developed intensive in-service training programs for county agents to assist the agents in carrying out the educational aspects of the project.

Nebraska

The Nebraska program is a coordinated effort involving the Extension Service of the University of Nebraska and the State
Department of Vocational Education. It is primarily a farm management educational project providing information to and contact with farmers as well as basic information for those who council and work with students and farmers. This program is available to all farmers in Nebraska. There were 150 cooperators enrolled in 1962 with a flat fee of $50.00 per cooperator for general farm accounts. Enterprise accounts, farm equipment cost studies and home accounts are available with an additional charge for each ranging from $5.00 to $20.00.

The cooperating farmer records his receipts, expenditures and other information on basic data forms and mails these forms monthly to the University. The local county agent or vocational agricultural instructor provides instruction in completing these forms as well as assistance in completing inventories, depreciation schedules, crop records and other information required to complete a farm business analysis. The coding of entries and processing of data is done at the computing center at the University under direction of the extension staff of the Department of Agricultural Economics.

Cooperators receive quarterly financial summaries as well as a ten-month income tax management summary during the year. Annual reports furnished at the close of the year include: farm
management analysis of the farm business, comparisons with other farms in the same area of the state, comparison with similar farms from other areas, and itemized totals for preparation of income tax returns.

Educational work in farm management receives heavy stress in this program, with county agents and vocational agriculture teachers responsible at the local level. The long range plan for this program is to establish self-supporting farm record-management associations or organizations at the local or area level which would hire full-time farm management specialists to work with cooperators.

Missouri

The Missouri mail-in accounting program is a joint effort of the Agricultural Economics Department of the University of Missouri and the Missouri Extension Service. The mail-in account program is available to all farmers in Missouri. There were 125 farmers enrolled in 1962 with a large increase in participants for 1963. Farmers pay a flat fee of $50.00 per year for this service.

Monthly reports including financial transactions, livestock inventory and capital transactions are collected by the county agents who mail them to the University as a county group for processing.
The coding of entries is done by a code clerk at the University supervised by the farm management extension staff.

Quarterly business machine reports with a classified list of expenses and receipts for the quarter and the year to date are returned to the farmers. Farm account items are classified in two different ways, one way for farm business and budgeting and another way for income tax reporting. This is handled by the coding system where the first three digits indicate the farm account member while the last two digits indicate the income tax account number. In November a report classified and totaled according to the income tax code is provided each cooperator for income tax management. A detailed report of expenses and receipts, instructions for transferring these figures to the income tax return, and a detailed business analysis of farm earnings and operations is prepared for each cooperator at the end of the year. The business machines used in the Missouri program are similar to those used at Michigan State with the farm business analysis being computed manually.

Other Programs Employing Electronic Processing Equipment

There are a number of State Farm Bureaus that are presently operating electronic mail-in farm accounting projects. The Ohio Farm Bureau is one of these. It operates an electronic mail-in
accounting program through an affiliate, the Ohio Agricultural Marketing Association. This is a pilot program in 1963 with approximately 100 cooperators, with anticipated expansion to a minimum of 350 cooperators in 16 counties in 1964. It is a service program and operates on a graduated fee schedule based on the size of farm operation with a minimum fee of $7.50 per month. Participants mail in their source documents, including specially designed duplicate checks. The farmer participant receives business machine reports of monthly transaction summaries which contain year-to-date totals and an annual summary in January for income tax reporting. Enterprise summaries of financial transactions can be provided if desired and income tax assistance is also available. The present operation appears to be largely restricted to financial accounting service for income tax purposes. It appears to be the intention to develop this program into an association type organization with a fieldman servicing a group of farmers.

A private firm, Northern Electronics (known as 'Agrivac'), was a pioneer in the field of electronic processing of farm records. Several years ago this firm had a contract with the Minnesota Farm Bureau and the North Dakota Farm Bureau to operate a farm accounting service for them. Both of these contracts have since terminated and as far as is known this firm is no longer in the farm accounting
Doane Agricultural Service, one of the better known commercial farm management service firms, organized a mail-in farm record service utilizing electronic data processing equipment several years ago. This service is still available but it has not gained a large acceptance.

Farm management extension specialists in several states are operating pilot programs wherein they are mailing records to one of the established projects for processing. This serves as a means of gaining experience in electronic mail-in farm accounting and also provides a method of testing farmer reaction in these states to this system of accounting. The farm management people in the extension service of Nevada is an example of such an arrangement. They have been mailing records to Elfac for processing from an experimental project consisting of 15 cooperators in 1963. The intention is to expand this experimental project to approximately 50 cooperators in 1964.

Although most of the development to date in electronic mail-in farm accounting has occurred in the United States other countries are also testing this system of accounting. A bookkeeping association in Germany is operating a mail-in electronic accounting system on a commercial basis. One of the objectives of this program is to
show that farm records should serve not only as a basis for income
tax filing but also as a basis for improved operational management
of the farm. This program is serving as a basis for collecting data
to use in linear programming of benchmark farm organizations and
in individual farm planning. The Farm Credit Corporation in
Canada, an agricultural credit agency somewhat similar to the
Farmers Home Administration, is operating a mail-in electronic
accounting program on an experimental basis in 1963. This pro-
gram is patterned after the Northeastern Elfac program adjusted to
Canadian conditions. The project includes the accounts of 117
clients representing all agricultural areas across Canada with a
planned expansion to include approximately 500 accounts in 1964.

This brief summary of electronic mail-in accounting programs
does not cover all programs in operation at the present time. It has
attempted to outline the major operating features and the procedural
variations of six of the larger programs operating in 1962 and an
overview of several other programs employing this method of farm
accounting. To complete the picture of current developments, a
brief outline of Michigan's proposed program for 1964 is presented.
Other new programs employing electronic processing equipment are
appearing on the scene rapidly and there appears to be a high degree
of interest in this approach with a number of agencies having given
intentions of initiating programs in 1964, but these developments cannot be detailed.

**Michigan's Proposed Program for 1964**

Michigan State's proposed program for 1964 will be known as "Telfarm" which stands for Today's ELeetronic FArm Records for Management. This program is to be sponsored jointly by the Agricultural Economics Department and Cooperative Extension Service of Michigan State University in cooperation with bankers, Production Credit Association personnel, Farmers Home Administration supervisors, and vocational agricultural teachers. This is a very ambitious program with a goal to enroll approximately three thousand Michigan farmers for 1964. This is about 15% of Michigan's commercial farmers (those with a gross income of $10,000.00 or more). The program will be open to anyone who wishes to participate on a fee basis. The charge, based on tillable acres and livestock numbers, will be graduated from $6.00 to $15.00 per month and is expected to average about $100.00 per farm.

Michigan State University received a substantial grant of $304,979.00 extending through 1965 from the Kellogg foundation to be used in developing a mass management educational program based upon a mechanized farm record system. In addition the University
has and is continuing to invest state funds and manpower into the
program. Cooperators in the program will also be sharing in the
cost of operation for the service which they receive.

The Telfarm program is much more comprehensive than the
former electronic mail-in accounting program operated in Michigan
which has been provided without charge to farmers. It includes a
number of additional features in order to make a more complete and
comprehensive accounting system.

The Telfarm program is a very flexible system with each co-
operator in the program having the opportunity to choose the type of
records and the degree of analysis he desires. The ten available op-
tions are:

1) Quarterly and annual reports of farm income and
   expenses.
2) A farm inventory and depreciation schedule for
depreciable items.
3) A comparative business analysis report.
4) Hired labor summaries.
5) Enterprise summaries
6) Farm business credit summary.
7) A farm business financial statement.
8) Family living summaries.
9) A complete cash flow of funds report.
10) A business and personal financial statement. (14, p. 2)

Farmer cooperators may select any number and combination of the
above options at no extra cost except $15.00 additional for home ac-
counts.

An unique feature of this program is the involvement and
cooperation of professional agri-business personnel. Active participation of these groups appears necessary if the program is to operate on the scale proposed. A staff of six district farm management agents has been established to work closely with the county agricultural professional and business people in providing contact with the farmers.
REQUIRED PARTS OF A COMPREHENSIVE FARM ACCOUNTING SYSTEM

An accounting system to adequately serve the multi-purposes of the individual farmer, extension and the research worker will need to be both comprehensive and flexible. The type of records and accounts necessary for the individual farmer will depend on the size of the operation, type of farming conducted, the purpose for which the records will be used and, to a certain extent, the services available in summarizing, analyzing and interpreting them. Some farmers will want to keep a fairly complete set of accounts for each enterprise in addition to the total farm. Other farmers will be able to function with the general-purpose account with limited detail. Records and accounts for research and extension purposes will often require a system capable of obtaining detailed physical and financial information on the inputs and outputs associated with each major production process within the farm business. After this information is collected in a detailed form it can be aggregated in a variety of ways to serve various research and extension goals.

Inventory

The farm inventory is basic to all other accounting work and usually must be kept and summarized before any other kind of record
can be made useful. A comprehensive farm inventory is a list of all that a farmer owns and all that he owes in connection with the farm business at a given time, with the value of each item. It is a necessary step in complete farm accounting. Without an inventory, net farm income cannot be accurately computed except under very simple farming operations. Unless inventories are taken and used in accounting, income in one year will often be in error in one direction while that of the following year could be in error in the opposite direction. The inventory provides a basis for computing growth in net worth and is essential for measuring financial progress. It is a necessary record in the preparation of credit statements and in the application for credit or financing.

The inventory record is essential to the farmers who file income tax returns on the accrual basis and is useful for the accumulation of facts for use in establishing farming arrangements, settling estates, and adjusting insurance claims. Finally, the calculation of certain management or efficiency measures depend on an accurate inventory.

Although the farm inventory record will supply the farmer with much valuable information, it is far from being a complete system of records for the farm business. It will not provide sufficient facts for an adequate analysis of the operations of the farm business. A
series of farm inventory records will show the producer whether or not he is getting ahead financially, but they will not tell him why or how he improved his financial position or how much profit he made from the farm business. To obtain this necessary information other types of records must be maintained and summarized.

More of the resources used in agriculture today are represented by equipment, machinery and buildings. These forms of capital not only represent an increased proportion of the investment in agriculture, but they also provide a greater proportion of the costs. The annual costs of owning this form of capital today constitute a substantial part of total farm costs that must be deducted from gross income in determining net income. Depreciation accounting involves prorating the original cost of these assets over their useful life. An important part of the accounting process is to determine just how much of the original cost of such articles should be considered a cost for one specific year.

A depreciation record is a required part of income tax reporting and it must conform to tax regulations. The objectives of calculating depreciation for farm analysis and income tax purposes will often be in conflict. There will often be tax advantages in rapid depreciation methods. However, a substantially undervalued or overvalued inventory can weaken seriously farm records for management
purposes. Because of these conflicting objectives some farmers carry two depreciation and inventory schedules in their accounts - one to facilitate the management analysis and the other to conform to tax regulations.

Record of Financial Transactions

While the farm inventory represents the worth of physical assets at a particular time, the farm financial transaction account is a record of the results of the operation of the farm over a period of time. A combination of the two will show the farmer his situation at the beginning of the year, the happenings during the year and his position at the end of the year.

Provision needs to be made in an accounting system for recording financial transactions in a systematic and consistent manner. The methods and objectives in keeping financial records will vary between farmers depending somewhat on the type of farm and on the farmer's individual interests. There are, however, several common objectives which such a system must consider. These are listed by Hopkins and Heady as follows:

1) In general, the accounts must be organized to provide the farm operator with the data he needs to reach his managerial decisions. During current operations the accounts should facilitate control of the business and aid him in putting his production plans into effect.
2) Monetary values of all transactions with persons or firms outside the farm business must be recorded.

3) At all times the correct balances owed to or receivable from outside firms must be available in the accounts.

4) Correct net cash income must be determined when desired and, in any event, at the end of each accounting period. This can be found only if all financial transactions are correctly entered as under item 2.

5) Correct net worth or proprietor's equity in the business must be shown each time the inventories are summarized and a balance sheet or net worth statement is taken off, at least at the end of each accounting period.

6) Net farm income must be determined. This means that the income summary and the net worth statement must be consistent with each other, and required adjustments are made in the valuations of assets and liabilities. Such adjustments include depreciation, losses, increases in values of growing crops or livestock, losses because of bad bills receivable, and so on.

7) As an aid to farm management decisions, receipts or increases in value should be related to the various productive enterprises or sources of income.

8) For the same reason, expenses should be matched with income and related to the enterprises in which they occur, insofar as feasible. If this is not convenient, expenses may be summarized according to functions or processes of operation.

9) The business should be considered a going concern. Income summaries should be related to successive and continuous time periods. As a series, these summaries should give a clear history of the development of the business.

10) The accounting period should correspond as nearly as possible with the production cycle on the farm. Ordinarily, this means the crop production year. For convenience it should also correspond with the income tax year.
11) Methods of accounting and methods of valuation used in preparing the balance sheet must be consistent from year to year, otherwise the data for successive years are not comparable. (5, p. 98)

Enterprise Accounts

General farm accounts will help determine whether or not adjustments in the farm business are needed, but will not necessarily disclose the cause of the difficulty or where the adjustment is needed. For this type of information enterprise accounts may be desirable.

Accounts for single enterprises may be kept where each crop and each kind of livestock, as an enterprise, is covered by one record or group of records. Further division can be made within livestock enterprises or different fields of the same crop can be treated as separate enterprises. The main purpose of enterprise accounting is to provide accurate information as to what each enterprise is absorbing in resources and is contributing in the way of profit or loss and to provide detailed statements and analysis of each. This information makes possible a better combination and balance of enterprises to utilize the resources of the farm business. Analysis of each enterprise shows changes that can be made to make it more profitable.

Enterprise accounts involve the same principles as those employed in the general farm accounts. Physical records are
especially important as they provide the basis for a complete analysis of the enterprise. The advantages of enterprise records lie in their aid to management and to administration of the farm business. Management must not only know the profit and loss in each enterprise, it must know the reason for the profit or loss.

Care must be taken in interpreting the results of enterprise analysis. Enterprises are either competitive, complementary, or supplementary. An understanding of these relationships as well as other economic concepts is required in making correct decisions based on enterprise data. The fact that a certain enterprise in the farm organization does not show a profit at the end of the year is not sufficient reason for dropping it from the farming system. The enterprise may contribute to some other activity or may utilize materials, labor, or equipment which otherwise would be completely idle. Also, the fact that an enterprise does show a profit year after year is not in itself a sufficient reason for maintaining it in the farming system. The enterprise may conflict with other projects on the farm in demands for labor, land and capital which make even greater net returns.

Farm Production Records

In farm management accounting, non-financial records have a very important part to play. While the financial records reflect
the monetary aspects of activities and decisions made during the period, the non-financial records assess the technical aspects of such activities and decisions. Physical records indicate the materials and resources used by the various enterprises or the different methods of organizing an enterprise. They also show the yield, production, or physical performance of the enterprise. They provide definite standards of performance in the use of feeds, in percentage calf crop, in poultry mortality and others. Physical records while of prime importance as a management aid to the individual farm are often the records of greatest value for research and extension purposes and are usually the records which are the most difficult to obtain in sufficient detail.

The principal types of physical records normally include crop records, livestock feed records, production records for individual classes of livestock, labor records for specialized farms, and others of special importance to the individual farm. Physical quantities of purchased inputs and physical weights and quantities of sales of grain and livestock are generally easily obtained and recorded. Other physical records such as labor and feed records may be more troublesome to maintain yet on certain types of farms these records are of extreme importance in studying efficiency and for farm planning purposes.
The most important purpose of any complete system of farm accounts should be to point out the strong and weak points of a farm business, so that the business operations in the future can be adjusted to result in the more profitable operation of the farm business.

In order to locate the strong and weak points of a farm business from the farm records, it is necessary first to summarize the records and compute certain farm business analysis factors.

The farm analysis will need to consider the technological performance of the farm as well as the financial returns. The various records must be integrated and the efficiency measures considered simultaneously in locating weak spots because the inter relationships involved are often important. All of the major types of records previously outlined are necessary to carry out the analysis. Financial records taken in conjunction with inventories are required to compute the various measures of income. The physical records provide data on yields, labor, land and other inputs used by the various enterprises. This information can then be combined in developing operating ratios or efficiency factors so that the performance of the farm can be compared with that of other years or with other farms of similar type. The comparative analysis, although it has some
weaknesses, is a time honored method of locating strong and weak points of a farm business. Nevertheless, great care needs to be exercised in applying inference from one farm or group to another. The organization or method that is good on one farm is not necessarily best for another.

The various efficiency factors should be employed keeping in mind their capabilities and limitations. While they will not always point out the specific trouble of the farm business, they often will point out those parts of the farm business where further analysis and study is needed to find the basic difficulty. They do, however, give an indication of the present position on the individual farm and serve as a benchmark from which reorganization of the farm can be developed. They will also provide much of the information required in farm budgeting. New directions can be determined effectively only if the farmer has the technical coefficients, feed requirement, yield outcome, and similar data to fit into alternative plans.

One fundamental purpose of keeping farm records is to obtain facts which will aid the farmer to plan adjustments, test alternatives and install improvements in the farm business and thereby earn higher net returns. It should be recognized that diminishing returns occur in keeping records as well as in other business activities. The more complete and accurate the records, the greater will be
the effort involved in keeping and summarizing them. After a certain point the value of the additional information may be less than the benefits obtained.

How do Electronic Mail-In Accounting Programs Satisfy the Requirements of a Complete Accounting System

Whether farm accounts are kept in the conventional manner or on a mail-in basis employing electronic equipment in the processing, all of the major types of records previously outlined are essential for a comprehensive farm accounting system. Most of the electronic mail-in farm accounting programs outlined in the preceding chapter are far from being complete. However, development work in electronic processing of farm records is still in its infancy and the areas which at the present time are lacking are being developed. Areas that are now in the process of development in order to make a more fully mechanized program involve the handling of: inventories, depreciation schedules, credit accounts, labor accounts, machinery accounts and production accounts.

The majority of the programs in operation in 1962 have been directed primarily towards a consideration of the processing of receipt and expense information. The major emphasis has been on financial records for income tax purposes. Most of the early programs operated mainly with electronic accounting machines. It is
only since 1962 that many of the projects have been experimenting with high speed computers to process record information. A number of the projects have been using electronic accounting machines in the processing of the receipt and expense transactions while employing manual methods in handling the other parts of the accounting system, following the traditional procedures in preparing the farm business analysis.

A complete accounting system requires an inventory system and method of handling depreciation schedules. Handling of inventories and depreciation schedules is required in electronic accounting systems if they are to provide a fully mechanized system and make the farmer's record more complete and timely.

Until this problem is solved, and the system becomes completely operational, the task of large scale processing of inventories information will remain the major obstacle to the development and operation of a truly comprehensive E.D.P. farm record system. (11, p. 8)

So far most of the programs have been using a four year or longer continuous inventory and depreciation record book and handling this part of the system manually. Wisconsin has been doing considerable work in developing a process to handle inventory records and depreciation schedules. Michigan has also been working on this problem and list as one of the ten options available to cooperators in 1964, a farm inventory and depreciation schedule for
depreciable items.

All of the major programs outlined are organized so that expense and receipt transactions can be allocated among enterprises. In certain of the programs, enterprise accounting is on an optional basis. Electronic processing makes it much easier to gather and include both financial and physical information by enterprise breakdowns. Cooperators have recognized this ease of classifying information and are asking for enterprise and cost accounting. Similar experiences are related from other programs.

In the Elfac program we haven't tried to sell "cost accounting". In fact most farmers would have only a vague idea of what was meant by cost accounting. Yet, several asked us if there was any way to keep a separate cost record on different trucks or tractors. When shown how easily it could be done several farmers decided to follow this procedure on other pieces of equipment. Without realizing it, many of the Elfac farmers were actually doing cost accounting. (7, p. 20)

In keeping and using enterprise accounts, the most difficult problem is the allocation of indirect expenses to specific enterprises. Indirect expenses, or joint costs for more than one enterprise, make up a large part of the total farm expenses on most farms. Before any reliable record can be kept of the cost and returns for any single enterprise or group of enterprises, some method or series of methods must be established for allocating these indirect costs to the specific enterprises. There is no best method of allocating indirect expenses.

Where this system facilitates the keeping of cost accounts for
service units such as tractors, trucks, combines, irrigation equipment and other items that are used in the production of more than one enterprise, it may promote greater accuracy in allocating indirect expenses. During the year the hours of use or percentage of use of individual items can be kept or estimated and the cost allocated accordingly to individual enterprises.

Most disappointment in the keeping of enterprise and cost accounts occur not because of the complexity of the records but because of the failure to record promptly all transactions, both physical and financial, as they occur. The regular reporting of transactions required and the periodic summaries showing transactions to date may encourage greater regularity in recording and result in more complete and accurate records.

Enterprise analysis has great appeal to many people interested in farm management and while the use of electronic computers will make it more feasible to collect detailed data required for enterprise analysis, judgment is required in interpreting the results. Often there is the assumption that if accurate information is kept on individual farm enterprises, sufficient information is available to decide on the expansion or elimination of enterprises. As was discussed in the previous section on enterprise accounts, this is not always the case. While enterprise accounts supply much of
the necessary information, correct interpretation of the results requires understanding of such economic concepts, as fixed and variable costs, opportunity costs and may involve the use of other management tools in making a correct decision. The farm must be treated as a whole, as it is the maximum net farm income that must be the objective, and not the profit or loss in an individual enterprise.

Most of the early mail-in farm accounting programs were directed primarily in the area of processing financial transactions. The classifying, sorting and tabulating of financial transactions did not require the use of computers as does the mechanization of the depreciation schedule or the farm business analysis. A great deal of the early emphasis has been on the income tax filing objective. These early programs are being expanded to include greater detail and more classifications of transactions for management purposes. It is possible to identify and retain details of the description, physical, financial and marketing information which is unique to each transaction. These transactions can then be aggregated at any level of interest desired. For example, feed may be aggregated as a specific type of dairy feed such as concentrate, as dairy feed, or as feed in general. The classification of financial transactions to serve multi-purposes such as income tax reporting, business
analysis, and enterprise analysis can be easily accomplished with this system.

In a conventional accounting system it has been difficult or impossible to develop a farm account book suitable for different types of farming operations or to fill the needs of varying degrees of detail desired by individual farmers or research workers. The flexible reporting system of electronic accounting systems will serve the reporting needs of any type of farm and once the material has been properly coded for machine processing, a number of accounting objectives are possible.

Development of the mechanization of the analysis procedure depends to a large extent on the availability of electronic computers and programming the machines to develop the type of analysis desired. At the present time there is a great deal of work going on in this area.

Several State Extension Services have used electronic data processing equipment in analyzing records and preparing the individual analysis reports of record projects kept in the conventional manner. Using the factors-affecting-profit type of analysis they have successfully applied machine processing to this type of analysis. At the Ontario Agricultural College they have been able to perform the analysis procedure in three and one-half minutes using
electronic data processing equipment as compared to the customary three and one-half hours using the previous manual system. The employment of such a system should facilitate getting the record analysis back to the farmers early enough to be used in planning for the coming year.

Plaut suggests another method of farm business analysis which would follow a different approach than the familiar factors-affecting-profits type of analysis.

It is hoped that a farm business analysis system will be developed which will take the basic information provided by the receipts and expenses system on the one hand, and the inventories system on the other, and prepare a partial budget for each of the major enterprises on a given farm and a complete budget for the farm as a whole. In so doing it is hoped that it will be possible to measure those physical and financial inputs and outputs that determine the profits that accrue to a given enterprise, and in this way to provide part of the information required to estimate the profitability of any proposed change in the farm business. (11, p. 8)

The quarterly or monthly summaries of transactions may be very useful as a basis for a partial analysis of the business during the year. If the farmer is attempting to keep a budget these periodic summaries permit a comparison of actual results with the expected results of the original plan. Even without a definite budget, comparison with figures for the corresponding period in the preceding year may yield useful information. By using the periodic summaries, especially the physical data, a preliminary analysis can be
made of enterprises. Using the input-output relationships in conjunction with expected price levels and costs, partial budgets can be calculated to help in making decisions concerning the expansion or curtailment of enterprises during the year. In particular types of farming profitable changes may be made during the year when important price changes are expected or where the records uncover some serious defect in the previous operation.

With the application of electronic computers to the analysis process there is the possibility of a breakthrough into the greater use of linear programming in farm planning. In the application of linear programming methods one of the limiting factors is the lack of adequate data. Here is where electronic mail-in accounting programs would be integrated with the linear programming technique. By having the information stored on magnetic tapes or business machine cards, the individual items of original data can be sorted and resorted to provide the desired information. The application of linear programming methods to individual farms may not be feasible at the present time. However, the programming of benchmark or type-of-farm situations could serve a very useful purpose in extension farm management work. Starting with the benchmark farms, adjustment can be made to fit the individual farm situation using simplified programming or partial budgeting methods. The availability
of realistic restriction and "tailor-made" input-output coefficients will help farmers make better decisions about their organization and operation.
FACTORS TO CONSIDER AND RECOMMENDATIONS
IN DEVELOPING AN ELECTRONIC FARM
ACCOUNTING PROJECT IN SASKATCHEWAN

Mail-in electronic farm accounting systems can overcome many of the shortcomings of the traditional farm accounting projects. It is the opinion of this writer that such a system could be adapted to serve the objectives of farmers, extension workers, research people, and others interested in farm accounts in Saskatchewan. Some of the apparent advantages of developing an electronic farm accounting project for Saskatchewan are summarized as follows.

1) An electronic mail-in accounting project can be a very flexible system which can be adjusted to meet the objectives of various agencies interested in farm accounts. The flexible reporting system will serve the needs of any type of farm, and once the material has been properly coded it can be classified to serve for income tax reporting, for business analysis purposes, and other farm accounting objectives.

2) The use of electronic processing machines will make it possible to handle large numbers of records more completely, accurately and quickly than conventional methods. It permits collecting and preserving descriptive, physical, financial and marketing
information which is unique to each transaction. This detailed information can then be assembled in numerous ways to serve various research and extension goals. The regular reporting and checking of data provides more accurate information than the annual collection and summary of farm account books.

3) Most of the mechanics of an electronic mail-in account program can be handled by machine methods and once the programs and procedures are perfected, the processing of the records should become almost routine. An electronic accounting project will require less professional time than is required in servicing the conventional accounting project and professional workers will be able to concentrate their efforts on other aspects of their respective programs.

4) An electronic accounting system should create greater interest in accounting as a tool for management by both farmers and extension personnel. It should attract additional resources with which to do management education work. This could come about in several ways. In addition to the possibility of obtaining support from financial institutions and agri-business, it could shift the emphasis within the extension service to a greater management orientation. It should also serve as a link in obtaining closer coordination between research and extension workers with mutual benefit to both.
General Background

The province of Saskatchewan, with an area of approximately 250,000 square miles, lies in the north central portion of the Great Continental Plain of North America. The total farm area consists of about 64.5 million acres with approximately 94,000 farms. Although it is still predominantly a grain growing area, livestock has attained greater importance in recent years. With the completion and development of the South Saskatchewan River Dam project, irrigation farming will also gain in importance.

The total farm management educational needs of farmers in Saskatchewan are increasing each year with increases in commercialization. The trend, as in many other areas, is to larger and fewer farms and as each operator combines his labor with more capital, the importance of the management function increases. Past and prospective changes in the size and complexity of farm businesses has placed a premium on improved decision making for successful farm operations. Increased efficiency of production, larger scale of operation, greater specialization and adoption of better business methods are becoming essential.

The farm management extension program in Saskatchewan is relatively recent, having been established in 1957 with the
appointment of one farm management specialist to the farm management extension division. The farm management extension division is organized as part of the provincial agricultural extension department. The present staff consists of five full-time specialists organized on an area basis with four district areas and a central office. Close cooperation is maintained with the Department of Agricultural Economics at the University of Saskatchewan, Federal and Provincial Agricultural Economic Research Departments and Vocational Agricultural Instructors. With limited resources and a large number of farmers to work with, farm management extension work in Saskatchewan is confronted with the same basic problems as elsewhere. Not only do farmers need to adjust to the changing situation, but those in extension also need to search for improved approaches and methods.

A farm accounting project has been operated as part of the farm management extension program since its inception in 1957. This project has served as a basis for getting interested farmers together for sequential instruction in farm management and as a basis for providing information for both individual and general farm management education work. The accounting summaries and farm business analysis have been processed employing the traditional hand methods.
Although the current farm accounting project has contributed a great deal to the farm management extension program, it has several shortcomings. The hand methods involved in processing the records have been time consuming and expensive. It is highly seasonal in its resource requirements. At the end of the accounting year there is pressure to do the hand computational work in a hurry to facilitate getting the individual and group summaries and analysis processed. It also establishes an upper limit to the number of accounts that can be analyzed without devoting an unduly great portion of the resources to the accounting project and hence infringing on other parts of the overall program.

Consideration has been given by the Saskatchewan farm management extension staff to the employment of electronic data processing procedures as an instrument in improving the effectiveness of the farm management education program. There has also been widespread interest on the part of research people and business agencies in electronic mail-in farm accounting.

The review of electronic mail-in accounting projects has demonstrated numerous procedural variations in the operation of these projects. Variations among programs are natural for objectives are not identical and techniques which work in one program may not work in another. However, taking advantage of
the developments and experience with the described programs should save much time and money for those considering launching an electronic mail-in account project. The remainder of this chapter will consider several factors and recommendations for developing an electronic mail-in farm accounting program in Saskatchewan.

Responsibility for Providing Electronic Accounting System

Whether an educational institution like the University of Saskatchewan or the provincial extension service should sponsor the operation of an electronic accounting system has raised differences of opinions. There are those who question the propriety of direct educational institution engagement in record service programs, claiming it should be left to private enterprise since this is a service and educational institutions should be in education and not in service businesses. It has been suggested that the best arrangement might be to have a commercial or business group provide the service features and the educational aspects be left to educational institutions. The question is should it be structured on a strictly commercial basis or is it necessary that the university and extension be involved for an effective program. There appears to be several reasons why it is necessary and desirable to have such a system developed and coordinated through educational institutions.
All of the major programs discussed previously, involve educational institutions directly. The developments and progress made to date have almost entirely come through educational institution efforts. Two of the programs, "Elfac" and the Wisconsin project, employ private facilities to process the records, but in each case the appropriate University is responsible for the coordination of the accounting project.

The organizational and development cost of an electronic accounting system is high. It requires a great deal of promotion and there appears to be limited profitability in a comprehensive program of this type. Considering the large amount of resources, both manpower and financial which the Universities have invested in this system together with the various grants received, it is doubtful if private enterprise would or could develop such a program in the immediate future. The system is still not fully developed by any means and a great deal of further development and refining is required.

Several private enterprise systems have failed in the past. There may be several reasons for this, one being that a certain amount of personal contact is essential for the effective operation of such a program.
The lack of effective personal contact with the farmer has been a critical factor leading to the demise or stagnation of some commercial mail-in record programs. (7, p. 17)

Another reason for the failure of commercial farm accounting systems is that farm records by themselves are not enough. A farm record should not be an end in itself but a tool for attempting to make better farm management decisions. Like any other tool, the success of the record is dependent directly on the use made of it after it is obtained. For farmers to receive the full benefit from an electronic mail-in farm accounting system, accompanying educational aspects of management are a prime necessity. Facts without proper interpretation and without accompanying assistance to the farm operator in developing the skills in integrating these facts, concepts and principles may well lead to actions with more serious accompanying consequences than might accompany no action at all. In the past, farmers in general and the accounting projects of commercial firms have emphasized records for income tax reporting. The primary objective of an electronic accounting program sponsored by a public educational agency should be to provide information for making better management decisions and guidance in implementing these decisions into the farm business. Only in this way can the use of public funds and resources be justified. Tax information and assistance can be a part of such a program. However, we
have had too many farmers keeping records for income tax purposes only. It needs to be recognized that there are very few farmers whose income is more affected by the taxes paid than by the income losses due to poor management.

The facilities of electronic farm accounting should be made available to all who wish to participate, as is pointed out by Robbins. (13, p. 7) If a private enterprise, such as a commercial bank, sets up a program, does it process records and provide assistance to clients of Production Credit Associations or who provides service for those who don't belong to either of these groups? Low cost operation of such a system appears to require a high volume of records so that several different groups attempting to provide such a service would likely result in unprofitable operations for all. Hence, such competition is not likely to result in lower service cost to farmers but would likely also restrict the quality of services rendered.

Regional Approach

In developing and organizing an electronic mail-in accounting project in Saskatchewan it is recommended that careful consideration be given to the possibility of organizing a regional program. A regional project including the prairie provinces of Saskatchewan, Alberta, and Manitoba would have a number of advantages both in
the short and long run. There would also be advantages of expanding a regional program into a national effort in the future. However, a regional project including the three prairie provinces should be promoted. The main types of farming enterprises in the three provinces are similar. Also a cooperative effort has already been established in an attempt to promote a joint farm account book and a standard method of analysis. The northeastern states' "Elfac" program is an example of an operating regionally organized effort.

It has been difficult to develop a standard account book for the three provinces because of the numerous types of farming encountered and the different objectives of farm accounting. Even if a compromise is reached it will only fulfill the minimum needs of each objective. A book which is complete enough to accommodate the minimum financial accounting objectives will be lacking in detail required to fill many research objectives. It is also extremely difficult to design an account book which can accommodate all types of farming. A book designed specifically for a grain farm will be of little interest or value for a vegetable producer. The flexibility of the electronic accounting system in meeting various objectives would be able to overcome many of these shortcomings.

One advantage of a regional program would be the development
and use of one standard method of farm business analysis. Once this is completed and agreed upon, results from one province can be compared with results from other provinces employing this method of analysis. In the past such comparisons have been virtually impossible because of differences in methods.

Since types of farming do not follow provincial lines, workers in a province with a limited number of records in a specific type of farming can make a meaningful study by combining forces with adjacent provinces. Such cooperative efforts would encourage and strengthen regional studies. If such a system could be developed on a national basis, industry wide collection of data and analysis would enable the determination of areas of comparative advantage for crop and livestock production operations.

A coordinated approach enables cooperating parties to concentrate on problems peculiar to its region, while at the same time all findings are available to other regions. It allows delegating problems of common concern among several specialists and avoids duplication of effort.

A regional program would permit capitalizing on economies of scale. It is estimated from Michigan's experience that at least 3000 records are required for a reasonable level of efficiency. This number of records is unlikely to be obtained in an individual
province for a number of years, yet the three provinces together might approach this figure in a short period. There does not appear to be an upper limit if the demand for service should increase above this figure as more modern and faster electronic processing equipment is rapidly becoming available.

**Recommended Structural Organization for Saskatchewan**

The electronic mail-in farm accounting project would be sponsored jointly by the Agricultural Economics Department of the University of Saskatchewan and the Farm Management Division of the Cooperative Extension Service of the Saskatchewan Department of Agriculture in cooperation with Federal and Provincial Agricultural Economic Research Departments and the Department of Vocational Agriculture. It is felt these are the most logically cooperating groups in the province for such a project.

The objectives of the various groups interested in a farm accounting project in Saskatchewan will overlap and differ. In order to assist the different groups in reaching their objectives with respect to farm records, the following organizational structure is recommended. The electronic accounting project would be organized as one overall project with joint planning and coordination and a central processing system. The overall project as envisioned
would be organized with three coordinated phases as follows:

1) An extension mail-in accounting phase which would be operated in connection with the present three year farm management extension program sponsored by the Saskatchewan Extension Service. This would be a rotating group as each year there will be the addition of new cooperators and the graduation of members from this program. It may be desirable to maintain selected farms of this group for trend analysis and other research purposes. These would be carried as part of the research phase which follows. The extension records phase would provide information on the major types of farming, by size, and all geographic areas of the province. These records would provide extension workers with contacts with farmers and information on current developments in farm business operations.

2) The research mail-in accounting phase would be organized to serve the objectives of farm management research. This phase would include survey research projects involving farm records. Needs of particular research studies which require a stratified random sample group of cooperators would not be satisfied by the extension phase as cooperators in the extension phase would not be on a selective basis. However, this phase could include some of the extension group of cooperators if they satisfied the needs of the
sample and were willing to provide the required information. Included in this phase would be specialized enterprise accounts of selected groups of highly specialized cooperators. Also special economic studies on the application of new equipment and new methods may be desired in order to evaluate new technology. Some of these detailed studies would be done on a limited number of farms as they would require close supervision to obtain the detail desired.

3) The service phase would provide records and business analysis to farmers for a fee. This would be available to all farmers in Saskatchewan. It would provide the opportunity for former cooperators in the above two groups to continue this system of farm accounting if they wished. These cooperators could select from among a set of available options and would be able to choose the degree of detail and type of records which they desire.

The processing center would be located at the University of Saskatchewan where modern electronic data processing equipment is available. The processing center would be under the direction of a record laboratory supervisor. This individual should be both research and extension orientated and would need to be well acquainted with farming. He should be well enough acquainted with machine programming and electronic processing machines so that he would know what can be done and what can't be done regarding procedures.
His job will be to see that records flow through with reports going out to farmers and other pre agreed parties. He would work with the extension specialists to aid them in their efforts and reports, and with the research workers in their research studies and publications.

The overall project would be coordinated by a steering committee consisting of one representative from each of the five cooperating groups, plus the record laboratory supervisor. The steering committee would provide liaison between the phases and guide the overall project.

All information from the accounts will be treated as confidential and will be used in no way which would associate the information with the individual cooperator without his specific permission. The reports on file at the processing center from all phases will be available to any member of the cooperating groups in making group averages for use in research, teaching, and extension.

The electronic accounting program will provide a flexible system of classifying and reporting. It will provide the individual cooperator with minimum financial information for tax reporting or provide detailed information required to make an enterprise analysis. The comprehensive accounting system will be capable of collecting and processing detailed physical and financial information on the
inputs and outputs associated with each major production process within the farm business. This information can then be aggregated at different levels in attaining a number of research and extension goals. In addition, provision will be made for obtaining and handling additional information required in specific project studies. Supplementary information which would be required for specific studies could include feeding practices, use of credit, investment intentions, and so forth. The following features will be provided for Saskatchewan farmers on an optional basis so that cooperators will be able to choose the type of records and degree of detail which they desire in farm accounting.

1) Periodic, and annual income, expense, and investment summaries.

2) Farm inventory and depreciation summaries classified for farm analysis purposes.

3) Enterprise summary, at least involving an allocation of cash income and expenses by enterprises.

4) An analysis report comparing the cooperator's business with similar types of farms.

5) Family living summaries.

In the development and initiation of the electronic farm accounting project a limited pilot project would be operated for at
least one year. Becoming involved in an operating program is the best way to learn about electronic mail-in farm accounting. This pilot effort would be on a relatively small scale of probably less than fifty farms in the first year. It would include three or four basic types of farming and would not attempt to incorporate all possible features initially. There would be advantages in selecting these farmers from among cooperators in the present accounting project, as these farmers will have inventory records and experience in accounting methods. A pilot project provides an opportunity to gain experience in the mechanical and processing operations, in addition to working out the details of organization. It will also allow the testing of reporting forms and coding system, and permit adjustments and modifications to meet local requirements. Careful advance planning and programming is necessary in the use of electronic machines. Close coordination and communication with processing personnel will need to be maintained in overcoming inexperience and working out complications.

**Reporting Forms**

The reporting forms are a very important part of an electronic mail-in accounting system. The accurate and timely recording of
information depends to a large extent on the proper filling out of these forms. In a comprehensive system of accounting, detailed reporting forms are required to get sufficient detail to describe each transaction adequately so that it can be properly identified and coded. These forms do become quite complex especially to someone who may not be accustomed to keeping records. While they usually do not require any information which is not easily provided, they may be quite difficult and laborious to some farmers. It is the writer's opinion that certain of the forms studied are better organized than others, yet farmers will probably require considerable help initially to get these forms filled out properly and completely.

Separate reporting forms for the periodic reporting of expense and receipt transactions are recommended. While a single reporting form is complete and allows all transactions - farm, home, and capital items - to be entered on the same sheet, separate forms seem to have a number of advantages. When separate reporting forms are used, each individual form requires fewer columns and less information and hence are less complicated. Ease of reporting from the standpoint of the farmer needs to be emphasized and simplicity of outline where possible is very important in obtaining accurate and complete information. Using separate expense and receipt forms, there is little danger of confusing receipt and expense items
if these items are not adequately identified. The two forms can be differentiated by using different colored paper. A separate section on the bottom of the reporting forms for capital purchases and sales should also be incorporated into the forms. Capital sales and purchases require different information and classifications, both for income tax reporting and business analysis purposes, than is required by other financial transactions. This would make the main part of the forms more straightforward, yet provide for listing the detailed information required on capital transactions. From correspondence with states operating active projects, information involving capital transactions and inventory changes is listed as one of the main problems encountered in achieving accurate reporting of information.

The periodic reporting of basic information of receipts, expenses and all other financial and physical information puts pressure on the farmer to keep up to date with his entries. While the weekly reporting of data may be too often or unnecessary for most farming operations in Saskatchewan, monthly reporting of information should not be too often and is necessary for obtaining accurate information. Monthly reporting of transactions permits checking on accuracy and omissions while the individual transactions are still relatively recent and easily recalled and corrected. The
monthly reporting of record data will allow spreading the work load out evenly over the year at the control and processing center.

**Coding System**

The possibility of accomplishing several purposes from a single set of detailed data depends to a large extent upon the capacity and flexibility of the coding system employed. A comprehensive coding system is required if it is to be capable of identifying and retaining a great degree of detail. If the detail of the individual items is maintained it can be aggregated at various levels for use in income tax reporting, management, or research purposes.

A Federal Extension Service grant has been made available in the United States to develop a national flexible coding system for general distribution. This system of coding is being developed at Michigan State University and will be published in 1964. The basic system has been developed and is being tested at several locations but is still undergoing changes to make it consistent and complete for general use. Those who have had experience with this system appear to like the general structure of the system and find it to be very comprehensive.

Michigan State has, in my opinion, developed a coding system which can handle input data in almost any degree of detail. (13, p. 5)
The only coding system the author was able to obtain that provides sufficient capacity and flexibility is the system developed by Warren Vincent of Michigan State University. (17, p. 5)

This system is more comprehensive than would normally be used by an individual or institution. Provision has been made for expansion and inclusion of items initially omitted or unknown.

Since the proposed electronic accounting program for Saskatchewan has broad objectives, a comprehensive and flexible coding system will be required. If the information from an electronic accounting system is to be used to provide comparative data between regions or as a basis for a regional reporting service, a comprehensive national coding system will be a first requirement. The coding system being developed at Michigan State should fill both of these requirements. The portion of this coding system which is applicable to Saskatchewan farming operations would be extracted and expanded to meet the requirements of all types of farming enterprises in Saskatchewan.

Although there are advantages to having the coding of entries done locally, it is felt for a multi-purpose project as outlined here centralized coding will be the most efficient. Since a comprehensive and detailed coding system will be employed, farmers should not be tied up with the detailed coding of entries as much of the detail will be required for specific research or extension projects.
Rather than spend time in teaching farmers how to code entries this time would be more valuable to farmers if spent on instruction in the mechanics of accounting methods, or in utilizing the information from the accounts.

Coding clerks working fulltime on records quickly become expert at coding and are able to code transactions rapidly. Central coding will provide greater uniformity in the coding of entries than is likely possible with local coding. The data included under each category must be uniform from farm to farm particularly if a comparative analysis is to be made. Uniformity of coding entries is particularly important for the attainment of consistent research information.

**Business Summaries**

One of the unique features of the electronic mail-in system of accounting is the frequency and number of reports and summaries provided cooperators. The periodic summary reports during the year will likely be an important factor in maintaining farmer interest and in obtaining timely and accurate reporting of the basic data.

Quarterly summary reports during the accounting year should be frequent enough for making current management decisions for most farm operations in Saskatchewan. Some types of farm
operations in Saskatchewan such as feeder livestock operations and poultry enterprises could benefit from more frequent summaries. The frequency of periodic summaries would be left somewhat flexible with quarterly summaries being the standard procedure unless more frequent summaries are requested. This should not create too much difficulty once the information is placed on the electronic data processing cards or on magnetic tapes. Each set of farm records when on cards or tape may be summarized at any interval desired, monthly, quarterly, annually, or an accumulated summary can be obtained from the beginning of the accounting period to any time within the accounting year. It will also be possible to provide summaries based on a financial year basis rather than on a calendar year if requested. Such a summary may be desired for income tax reporting. For those cooperators receiving quarterly business summaries, an additional ten or eleven month accumulated totals summary report would be provided for income tax management purposes.

The information on the periodic summary forms should be organized and summarized in such a way that it is easy to understand and in a form which facilitates its use for decision making purposes. Rather than having the sub-totals and totals of the different classifications listed only in rows and designated by asterisks, it is recommended that the various levels of aggregation be listed in separate
columns. This makes the report more readable and easier to understand. A separate memoranda column makes the record more complete and can provide useful reference information for farmers.

An annual farm business analysis summary including relevant area and type of farm data of a comparative nature will be provided farmers as an aid in maintaining interest and stimulating action. While discrimination needs to be applied in using this information it is a useful basis for locating strong points and weaknesses in the organization and operation of a given farm business. A mail-in electronic system should make available a larger number of records which can be sorted into more groups than is possible in the present program using manual methods of processing. It will be possible to make sorts that will give a better basis for comparison and more accurate information about profitable organization and operation of various groups. When a farmer is able to compare figures with the average of a similar group, there is a strong motivation for changes which he should make, since he made his own record and the standards are established by other farmers.

Cost and Financing

It is very difficult to estimate and project the exact cost of electronic accounting systems for Saskatchewan on the basis of
accumulated experience in the United States. Most of the programs are still in the development stage and hence have not been able to establish efficient operating processes. Also most of the programs have so far operated on a relatively small scale. Many of the cost estimates have been calculated for systems employing essentially obsolete machines and there is little information available for complete accounting systems employing modern high speed equipment.

The direct comparison of the costs of mechanized versus manual systems is also difficult. To arrive at a realistic comparison many factors need to be considered which are difficult to evaluate. Consideration should be given to such factors as the opportunity cost of the farmers' time and the time and cost required to get the data ready for processing. From the standpoint of obtaining data for research and extension purposes, those in charge of the Michigan program estimated the operating cost per record for their mail-in accounts has been no greater than those formally processed manually. In addition there has been an increase in the quantity and accuracy of the data obtained.

The University of Saskatchewan Department of Agricultural Economics and the Farm Management Division of the Saskatchewan Extension Service would take the leading role in the development of reporting forms, coding systems, and programming computers on
processing the various farm business summaries and analysis for
the individual cooperator. The objective would be to place the over-
all electronic accounting project on a self-paying basis and there
should not be any large amount of public resources used beyond the
initial organization and the development stage. Each agency or de-
partment will be responsible for supplying the resources necessary
for collecting, processing and analyzing the records associated with
that department's specific interest. This project would provide the
means for obtaining a pool of data for research and education needs.
Also much of the data presently obtained should be had at a lower
public cost.

In the present accounting project sponsored by the Extension
Service the cooperator's account books are being summarized and
analyzed on a free basis. The personal services being rendered are
considered to serve merely as inducement for participation in the
program presumed to have general educational value. This same
policy should be continued in the mail-in accounting project during
the developmental stage. However, once the system is refined and
perfected and an efficient operating procedure is established, coop-
erators should be expected to pay the entire cost of processing.
Where special purpose studies are requested and additional data
are required for specified research or extension projects, the
additional cost would be absorbed by the appropriate agency.

The research phase would be financed by the agency involved in the particular research project. These records should be on a free basis to the cooperators in order for the research worker to obtain the type of records desired on the farms desired for the particular research project. On such a basis it may be possible to overcome partially at least the difficulty of obtaining a random sample of farms for research purposes.

For records under the service phase of the accounting projects a sliding rate schedule will need to be established. Although it requires greater administration and is more complex, a variable fee schedule rather than a flat charge is recommended. A nominal basic charge plus a transaction charge is more equitable and more palatable to farmers, from the experience of projects charging fees. The basic charge should take into consideration the number of available options such as, enterprise summaries, household accounts, and others which the participant chooses. Unless a charge is made for the various options available, participants may sign up for more than they complete and records only half completed are of little or no value to anyone. Also farmers may desire to have certain options at a reduced rate rather than the complete program at a flat rate. The determination of the actual fee formula would be
developed after a cost analysis is made following the completion of the pilot project.
SUMMARY

There are very few businesses outside of agriculture who neglect the accounting part of their operations. Most businesses have a bookkeeping staff or hire accounting firms to analyze their operations. Accounting is just as important in agriculture where the business is so complex and becoming increasingly more so. Farm records do not create profits directly but they are one of the required tools that will promote more accurate management decisions. With the trend to specialization in many areas, farmers too may be able to profit by employing modern machine methods to assist them with their accounting and decision making.

An accounting project cannot be a complete farm management extension program. We have to recognize and guard against using farm records exclusively and overlook other tools and methods. Educational programs need to include other aspects such as the teaching of economic principles and concepts, budgeting, programming, and information on taxation, inheritance, machinery economics and other related topics. An accounting project can, however, serve several useful functions in an extension program.

Farm accounts as a source of research data have certain limitations just as do other means of getting similar information.
Farm accounts alone do not form an adequate basis for a farm management research program. However, continuous accounting projects in the principle farming areas are highly desirable from the standpoint of keeping up with technological changes and longer time trends. They provide a practical way of checking on the validity of input-output information and budgeted or programmed results. When this information can be obtained in conjunction with a multipurpose accounting project it can be an economical source of research information.

With conventional methods of farm accounting it has been difficult to attain objectives of different groups through a general farm account project. The availability of electronic business machines and developments in data processing have led to the possibility that objectives previously considered unobtainable through a manual farm account program, are now attainable through a mail-in electronic accounting system. A mail-in accounting project can be organized to serve at least partially the objectives and interest of the farmer, farm management research, farm management extension, and others interested in farm accounts. The electronic accounting program can be organized and operated in various ways and at different degrees of intensity to best meet a specific set of objectives or certain combinations of objectives. The great flexibility possible
to adjust the program and operation to meet the various objectives desired is probably one of the strongest single features of this system of accounting.

The use of electronic processing machines makes it feasible to collect and process large quantities of data more efficiently than was possible before with conventional methods. The electronic system of data handling allows for the classification of data into many more subdivisions than are practical with manual record systems. This should greatly increase the value of the data for both research and educational purposes. Once this system has proceeded through the developmental stage and the programs and procedures are perfected, the handling of large numbers of records should become almost routine. Farm accounting projects should then require less professional time in servicing them and more time will be available to concentrate on helping farmers to decide on improvements to be made rather than in obtaining facts and analyzing the situation as it exists. The heavy involvement of professional time required in servicing most successful manual systems is one of the most common criticisms leveled at farm account projects. However, considerable time and effort are required initially to develop and organize mail-in electronic farm accounting programs.

The regular reporting of record data allows for the evening out
of the work load at the control and processing center. This helps eliminate the seasonality of the processing of the records of conventional accounting projects. It facilitates hiring a staff on a full time basis rather than having to hire a larger number of workers on a part time basis. This should permit the maintenance of a more qualified staff and provide for a more efficient operation. A major advantage of handling the records electronically is that the reports can be returned to participating farmers soon enough for making tax reports and the comparative analysis reports are received early enough so that they can be used in planning the current year's operation.

The use of business machines in processing data does not alter the need for a comprehensive program for effective farm management education. The computer doesn't eliminate management in any way. In fact it emphasizes the need for stronger management by providing pertinent information upon which a more intelligent management decision can be made. The computer serves as a highly intelligent unemotional assistant. It will help do the paperwork required and free more time to be spent on the job of management.

Electronic processing of records will not improve the accuracy of the information furnished. The timely and accurate reporting
of the original data on expenses, income, inventory and production is still one of the most important factors in farm accounting. If the details of a transaction are not known accurately or tabulated correctly, then a summary of such information will be inaccurate whether processed by hand or with electronic equipment. However, the periodic reporting and checking of data does result in more accurate information over annual collection and summarization of accounting books. Methods have been developed for reporting errors and questionable entries to the participant for clarification and re-entry while the transaction is still relatively recent. Farm management extension agents using this system also report there is a certain "gimmick" attraction to an electronic system which encourages farmers to keep their reports up to date.

Mail-in farm accounting projects employing electronic processing equipment are a new and popular approach and have a certain appeal or attraction to many farmers. This motivational factor if capitalized on offers possibilities for increasing the effectiveness of farm management extension programs and in obtaining research information. Farmers appear willing to pay a reasonable fee for this service. However, enrolling a farmer in an electronic accounting program and maintaining enrollment will be two different problems, especially if farmers are going to be paying for this service.
The farmer's continual involvement is going to depend to a large extent on the benefits he receives. If the participants are to gain maximum individual benefit from any accounting program, they will require education on both the mechanics of accounting methods and in utilizing the farm accounts for improved management decisions.

At the present time almost every state at the university level in the United States is involved in a mail-in electronic farm accounting program to some extent or are seriously considering some type of pilot effort in 1964. Other agencies and countries are also employing this system of accounting. The early programs were mainly concerned with financial records and emphasized information for income tax reporting. Many of these programs are being expanded to include other phases necessary to comprise a complete and comprehensive accounting system. The availability of high speed computers and programming the handling of data on same have facilitated the complete mechanization of the accounting process from the handling of financial transactions to the assembling of the group business analysis reports. There has been considerable progress but most of the programs at the present time are still not complete. More time and effort is needed to fully develop and capitalize on the possibilities associated with this type of program. It will probably take several more years of field testing and
development work on procedures and techniques to determine the most desirable longer-run organization and arrangements.

New methods of production are being adopted in farming at an accelerated rate. Evaluating the effect of new technology on the individual farm operation is an important area of farm decision making in modern commercial farming. Individual producers find it profitable to introduce new production methods when such methods reduce per unit costs or lessen the degree of uncertainty. The reduction in per unit costs may come about in a number of ways. Total output may remain stable while total costs decline. Total costs may remain unchanged while output increases. Both output and total costs may increase with output increasing more than total costs. An accounting system capable of determining the effects of new technology must consider all costs. Records of financial transactions alone is not enough as overhead costs must also be considered. The technical aspects and physical records must also be determined. Evaluating alternatives and making farm organization adjustments in many of today's farm operations requires a complete and comprehensive system of accounts.

Information gained from studying the organization and operating procedures of active electronic mail-in farm accounting programs, and with consideration of local factors the following
framework is recommended for organizing such a program in Saskatchewan. It is felt that the most efficient organization for attaining the objectives of different groups interested in mail-in electronic farm accounting in Saskatchewan, is a multi-purpose project designed to accomplish several different sub objectives and gain the advantages of centralized processing facilities. This project would be sponsored by the Agricultural Economics Department of the University of Saskatchewan and the Farm Management Division of the Saskatchewan Extension Service in cooperation with other interested groups. The overall project would be divided into three coordinated phases, with a common data processing center. The three separate sections would include an extension phase, research phase, and service phase. This type of organization would make the facilities of electronic farm accounting available to all farmers in Saskatchewan, as well as assisting the various groups interested in farm accounts in reaching their individual objectives.

In developing an electronic accounting program in Saskatchewan the possibilities of establishing a regional project including the three prairie provinces of Saskatchewan, Alberta and Manitoba should be thoroughly investigated. There are many advantages to offer an organizational framework on a regional basis for this type of program.

A limited pilot program would be operated for at least one
year to test reporting forms, coding system and work out details of
operation. This will provide an opportunity to gain experience in
mechanical and processing operations and develop the skills and ex-
perienced personnel required to service an electronic accounting
program.

A multi-purpose project will require a comprehensive ac-
counting system which is capable of collecting and processing both
detailed physical and financial information. Once this detailed in-
formation is obtained it is possible to assemble it in numerous ways
to serve a wide variety of research and extension goals. Reporting
forms will be developed capable of handling all relevant detail. Sim-
plcity of outline appears to be very important in reporting forms
and it is recommended that separate forms for expense and receipt
transactions be considered as a means of obtaining complete and ac-
curate reporting of the basic data by cooperating farmers. The per-
iodic reporting of information by farmers would be on a monthly
basis in order to obtain accurate data and spread the workload at
the processing center out evenly over the year.

The coding system being developed at Michigan State University
for national use will be modified and expanded to meet Saskatchewan
requirements. All coding of entries will be done centrally, relieving
the farmers of this task and obtaining uniformity of coding among
In designing periodic reports and summaries the needs and interests of the individual farmer will be given high priority. Emphasis will be given to providing the information in these reports in a form which is usable and which farmers can readily comprehend. The frequency of periodic summaries for participating farmers during the accounting year will be on a flexible basis, with quarterly summaries being the common practice.

An individual farmer may choose the type of records and degree of detail that he desires from a list of available options. A variable fee schedule with a basic charge based on the number of options selected plus a transaction charge, rather than a flat rate would be used. For farmers who are in the extension or research phase of the project this service would be provided on a free basis in exchange for maintaining the type of records, and providing supplementary information required for research and extension purposes.
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