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REQUIREMENTS FOR CONTRIBUTIONS

Articles in the field of agricultural economics, suitable for publication in the journal, will be welcomed.

Articles should have a maximum length of 10 folio pages (including tables, graphs, etc.), typed in double spacing. Contributions, in the language preferred by the writer, should be submitted in triplicate to the Editor, c/o Department of Agricultural Economics and Marketing, Pretoria, and should reach him at least one month prior to date of publication.

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Contents

Page

I. PERSPECTIVE ON MANAGEMENT AND AGRICULTURE IN A DYNAMIC ENVIRONMENT : PAPERS READ AT THE TENTH ANNUAL CONFERENCE OF THE AGRICULTURAL ECONOMIC SOCIETY OF SOUTH AFRICA IN PRETORIA, 27 TO 29 OCTOBER 1971

1. Speakers ..... v, vi

2. Opening address 1
   - J.A. Lombard

3. Management - perspectives, aims and approaches 5
   - Allan G. Mueller

4. Farm business management - the dynamic approach 12
   - S.D. Parsons

5. The management of research and development 17
   - S. Meiring Naudé

6. Management in marketing 21
   - A.J. van der Merwe

7. Managing agricultural extension 23
   - C. Murray

8. The prerequisites of agricultural policy management 26
   - W.E. Kassier

9. List of papers of introducers of group discussions during the conference 32

II. STATISTICS 33

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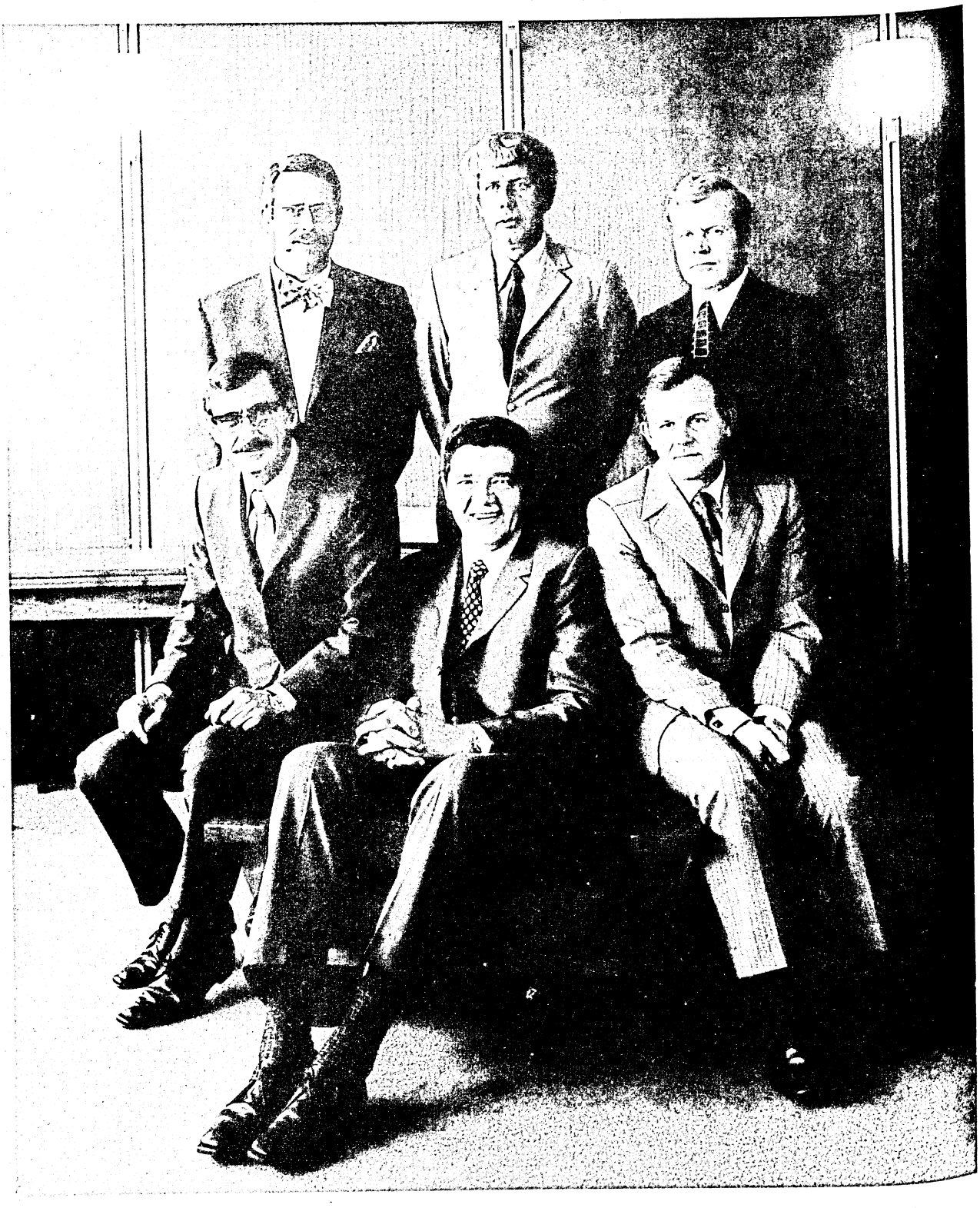
THE AGRICULTURAL ECONOMIC SOCIETY OF S.A.

1971



Sitting: J.C. Strydom (Sec.), S.P. van Wyk (Chairman), Prof. W.E. Kassier

Standing: Prof. J.A. Groenewald, H.S. Hattingh, Dr. S. Parsons

Management - perspectives, aims and approaches

by

ALLAN G. MUELLER

The theme of this conference deals with the general topic "Perspective on management and agriculture in a dynamic environment." There is little doubt that agriculture operates in a dynamic environment. The agricultural industry in the United States, and particularly Corn Belt agriculture, is characterized by a rapid rate of change. New technologies are constantly being developed for potential application in agricultural production. Constantly changing price relationships among products and resource inputs also provide the manager with management challenges, including the opportunity to adopt new technology and make changes in production processes. These management challenges are not easily solved, nor are the answers to many of the management questions easily predictable. I compliment your planning committee on the choice of this particular theme. Certainly, management decisions plus employment of resources that management has available determine the future course of agricultural development in a dynamic economy.

Let us now turn to a background and definition of management and its related concepts that will serve as a foundation for this paper. A general definition of management is given by Suter.

> "Management is the skillful or judicious use of certain means in order to bring about or accomplish a certain end or ends."[15]

A somewhat more detailed and specific definition of management is as follows:

> "Farm management may be thought of as the art of or applied science or organizing and operating the farm firm in a manner that satisfies the goals and objectives of the principals involved. To accomplish this objective, management uses the tools provided by production economics tempered by social, psychological, and political forces. In addition, management adapts accounting the business management concepts in the decision-making process. The variables involved are production processes (choice of product, level of production, and technology) and prices for the production inputs and the products produced. When you tie this entire set of conditions and variables into a dynamic state with its concurrent risks and uncertainty, you have the basic elements of farm management."[9]

Management perceives problems; gathers information related to the problem; analyzes the alternative courses of action; makes decisions; implements and carries out the decision, and is prepared to accept the consequences and as a learning procedure, reviews the results previously attained. The preceding steps in management decision-making were first articulated by Glenn Johnson[6] and include the conventional role of supervisor and coordinator.

Closely related to management is the concept of entrepreneurship, which contains elements of uncertainty-bearing and risk-taking. In any production process, and specifically in agriculture with its measure of biological risk and climatic uncertainty, the risk and uncertainty-bearing function becomes quite important. The combined management-entrepreneurship concept in agriculture includes the responsibility of gaining control of resources including land, capital, and labour and using these resources in a way to achieve certain goals and objectives, one of which certainly involves the profit motive.

Entrepreneurship may be conceived of as that part of management which gains control of resources, accepts the risks and uncertainty associated with the commitment of these resources to a production process, and receives a certain measure of the rewards. Madden suggests that the usual notion of management profits or management returns may be divided into two components-management wages and entrepreneurial income.[8] The residual claimant approach to income determination used by accountants contains the usual deductions of market prices for resources, and opportunity costs for the labour input of the manager, leaving a surplus that is often called operator's management income. This amount is a return to the operator for his services of coordinating and supervising and for bearing the risks and uncertainty of the business. Entrepreneurial income may be defined as the operator's management including supervision and coordination. This idea implies that there is a market price for management and that the surplus, if any, is analogous to pure profit as defined by Knight. Where there is a degree of uncertainty in the business enterprise, the entrepreneurship income or profits must be positive, at least over the long run, for the firm to continue to operate.

For decades, agricultural economists have deplored the lack of a cardinal measure of management. They have struggled with the definition and interpretation of the management function. Behavioural concepts, satisfying, and non-economics rewards or value judgments have been brought into the literature as a way of further identifying and specifying the concept of management and entrepreneurship. All of these concepts and ideas are

useful and germane to a discussion of management perspectives, aims and approaches. We propose to look at some of these in detail later in the paper. I think we can all agree that we are dealing with a concept that is at best undefined and unmeasurable, perhaps unpredictable, and in some instances we may even question whether it is reproducible.

On the other hand, our experiences in teaching farm management principles to college students and to farmers through the University of Illinois Co-operative Extension Service programs in farm business management and farm record analysis have clearly demonstrated that management skills can be developed and improved within individuals.

We also have at our command many tools that can be used in enhancing management, such as: budgets, linear programming, farm record analysis, game theoretic models, and conventional economic models that may be used to help predict the probable outcome of alternative actions. These models do not necessarily suggest the precise action to be taken, but they can show the range of possible outcomes from which management can make a choice. It is from this positive approach that we propose to look at some of the developments in farm management in the United States with the hope that these concepts can be applied to agriculture in the Republic of South Africa.

One year ago, the annual meeting of your Society had as its theme, "Planning and adjustment of agriculture in the seventies." In an editorial written as a preface to the published proceedings of that conference,[1] the unidentified editorial writer stated the problem of management as follows:

> "There is, however, one outstanding cause for the majority of problems confronting the agricultural industry. It must be admitted that most farming units in South Africa are not properly managed on a business basis..... The biggest challenge confronting agriculture in the seventies will undoubtedly be the efficient integration of business principles into farming..... It is a challenge to the agricultural economist to give positive guidance in this respect in the years that lie ahead. No one is better equipped for this task."

The sentiments expressed above have a familiar ring. In fact, this statement could have been made in my home country, the United States. Our problems are very similar to yours, and differ only by the state of economic development and are affected by the institutional and economic conditions surrounding the decision-makers who operate and manage agricultural farms.

The assertion is also made in the editorial that business principles have been applied more successfully in the non-agricultural sector than in agriculture. Here again, I am in complete agreement with this assertion. It is also applies to our work in farm management in the United States. We also have our problems of farm businesses too small to support the living requirements of the farm family and a problem of disseminating technology so that it can be applied to bring about more efficient production of food and fiber.

In the recently published "Annual Report of the Secretary for Agricultural Economics and Marketing, 1 July 1969 to 30 June 1970," the following quotation was made:

> "It is clear that the time has come for a positive approach to the basic problems in the industry, such as raising the standard of management, settlement of farmers on units of economic size, and the removal of redundant entrepreneurs, for unless these steps are taken, the adjustments that must necessarily follow will bring considerable disruption."

The preceding observations should clearly indicate the broad nature of management and to establish a close similarity between the problems of management in the Republic of South Africa and the United States of America. Management and its concepts are similar in both economics; perhaps the only differences are those related to the economic and political environment in which farm managers are asked to make economic decisions.

PRODUCTION ECONOMICS AND MANAGEMENT

Production economics, as a specialization within the field of agricultural economics, had its beginning at the turn of the twentieth century. The early work by Spillman, Hayes, Boss, and Warren marked the first use of economic principles to analyze the problems of managing individual farms. These early workers were trained in the fields of natural sciences but applied the concepts of economics in their work with farm management. The Marshallian theory of the firm followed later in the early part of the twentieth century, and was influential in the development of budgeting work and farm record analysis in farm management during the 1920's and 1930's.

A landmark publication, Hicks "Value and Capital"[5] appeared in England before World War II, but its impact was not really felt until after the war. The explicit technical relationships that are a part of the theory of the firm were brought out quite clearly by Hicks. Following Hicks, another landmark effort was the work by Earl Heady, at Iowa, in the extension and refinement of production economic theory and the many examples of its application to farm management work as well as macro economics and policy. Heady's text published in 1952, "Economics of Agricultural Production and Resource Use," is still widely used as a reference text in teaching farm management courses at the college level throughout the United States.

Williams in a recent article relates the problems associated with integrating production economics, farm management, and the application of production economics and farm management to extension educational programs in farm management. In William's words:

> "Production economics, if it has a standing as a discipline, is comprised of principles and concepts that provide for interpretations of the economic relationships existing among resources used in individual firms. Once defined, these principles and concepts should find universal application; if they fail to do so, production economics loses claim to status as a separate discipline. Thus it would appear that production economics so far has not formalized a set of principles that takes account of differences in motives, behavior, and institutions between different countries or different regions within countries."[16]

Williams then relates farm management to production economics as follows:

> "Farm management, by contrast, is an applied discipline that finds its identity in relation to the whole set of established social institutions and to the structure of farming in a given country. It is designed to develop principles that provide understanding of agricultural practice and managerial performance, as an aid to individual farm enterprises and as a basis for agricultural policy. It links the discipline of production economics and agricultural extension, though it does other things as well."16)

This article by Williams is recommended reading for those agricultural economists who would like to build a management model on the decision-making framework of production economics. He gives due credit to Earl Heady and Glenn Johnson for their work in developing production economics as an internally consistent logic that defines the systems and conditions for optimum economic use of resources. He particularly gives credit to Heady for his work at Iowa State University that received widespread recognition in the 1950's.

However, Williams argues that Heady's contribution to production economics contains the seeds of its own destruction because it abstracts from problems of human behaviour and institutions and concentrates on resource inputs and the resultant production function. There is a need for management work to rise above and beyond the constraints exercised by this discipline if management problems in the real world are to be tackled. He does not deny that the information provided by production economics is helpful to farmers. Neither does he deny the importance of the analytical framework which embraces marginal returns, opportunity costs, rates of substitution between inputs and between outputs, etc. But he does expect those persons working in management to be required to interpret these principles to meet the circumstances of farmers as individuals or as groups.

I find the preceding views articulated by Williams quite in accord with our experiences and the perspectives that we have developed in our farm management work during the past twenty years. Production economics provides a valuable tool in helping make management decisions. In teaching farm management principles to senior level students at the University of Illinois, we extensively use economic principles, particularly production economics, as a tool to help identify meaningful problems and to identify the important relationships contained in the problem. By use of the economist's favourite ruse, the choice of assumptions, we can break the problem down into manageable proportions so that the decision-maker can look at a complex problem in bits and pieces. Production economics does not provide a prescriptive answer; it simply is the analytical tool that we bring to bear on the problems at hand in order to gain further insight into the possible consequences of alternative lines of action open to the manager. It is this framework that makes production economics a necessary subset of the disciplines that are involved in the practice of management as an art and a science.

BEHAVIOURAL THEORIES OF THE FIRM

The behavioural theory of the firm, as it is related to management concepts, assumes that the basis of human behaviour is the satisfying concept developed by Herbert A. Simon.3) Cyert and March attempt to develop a behavioural theory in their text, "A Behavioral Theory of the Firm."3) They construct their theory around the notion that the firm is the basic unit, and that the prediction of firm behaviour with respect to such decisions as price, output, and resource allocation is the objective. They place explicit emphasis on the actual process of organizational decision-making as a basic focus of their endeavours. The behavioural theory uses the same basic firm unit that is used in production economics, and it looks at the choice of resources, choice of product, and the quantity of output as also does production economic theory. However, they differ in the basic assumption of rational profit maximization that is inherent in production economics. Rather they substitute the notion of satisficing as the goal or objective of the decision-maker. That is, the decision-maker will seek satisfactory rather than optimal solutions to his decision-making problems.

The concept of satisficing has inherent in it the notion of utility and indifference curves derived from consumption theory. The behavioural theory of the household (consumption economics) can be related to the behavioural theory of the firm. Ferber cites three factors or behavioural considerations that would likely affect the objectives of consumers.4) They are, the frequent desire of the consumer to conform in his consumption pattern with those with whom he comes in contact; the forces of habits, customs, and tradition; and the ever-growing desire for security, including both financial and psychological security.

It is not difficult to relaty each of these three consumer behavioural concepts to the actions of farmers. For example, the desire to conform may be an important factor that influences decision-makers to adopt a new technology. All of you have heard of the innovator, early adopter, and late adopter classifications that are used to describe the dissemination of technology among farmers.

Also, habits, customs, and traditions are strongly rooted in the actions taken by farm managers when making decisions on the choice of crop, the choice of technology, and many other decisions. The third major behavioural consideration, that of a drive for security, is related to the manager's attitude towards accepting risk and uncertainty.

In our introduction we defined farm management as the art or applied science of organizing and operating the farm firm in a manner that satisfies the goals and objectives of the principles involved. One might argue that if there were a discipline of management by itself, it would involve a blending of production economics, the behavioural concepts of consumer economics, and satisfying concepts from psychology.

FINANCING AND ACCOUNTING RELATIONSHIPS TO MANAGEMENT

The traditional controlling mechanism in business firms is the accounting system which measures economic activity. In agriculture, the farm record system may be thought of as the controlling system. In the absence of uniform systems of farm records, the taxing regulations and reporting requirements specified by governmental institutions may serve as a proxy for well-defined accounting principles used in business firms. Thus it can be seen that management decision-making, although influenced by production economics and behavioural considerations, also must operate in a business and financial environment that has constraints and regulations that detract from or make difficult the application of economic and behavioural concepts.

For example, the accounting methods used to price inputs or outputs may not coincide with the real world situation. Transfer prices for products produced on the farm, and subsequently used in the production process of another enterprise, are a typical example. This might be illustrated by forage or grain produced and subsequently fed on the same farm in the production of livestock. How, for example, might a management decision-maker evaulate contributions of the grain or forage-producing activity when all of the crop is marketed through livestock? The "transfer price" at which these forages and grains are charged to the livestock enterprise may affect his decision processes in the choice of livestock and crop production techniques.

Another example may be the depreciation charges that are specified by tax accounting systems as opposed to the economic service life of the business investment. Others might be the tax shelters (for capital assets) supported by the accounting system and governmental taxing regulations. In assessing income taxes in the United States, profits from the sale of capital assets held for one year or more are taxed at a maximum rate of twenty-five per cent.

From a purely accounting point of view, increases in net worth of an individual can be achieved only by reinvesting the portion of profits, in excess of withdrawals for consumption purposes, back into the business. Another form of change in net worth results from the unrealized gains from the appreciation in value of fixed assets in the balance sheet of the firm. In agriculture, land is a major fixed asset owned by agricultural firms. If the taxing system permits all or a part of the increases in net worth generated by appreciation in land prices to escape taxation, this may affect the management decision-making of the firm in such a way that it is difficult to use the marginal and substitution relationships of production economics in management.

The flow of funds or cash flow concepts derived from the accounting system are also involved in review of management perspectives. The flow of funds statement looks at the sources and application of funds for use internally within the business and funds withdrawn for consumption purposes and for investments outside the firm. It seems possible that the profit maximization theory, inherent in production economics, and some of the behavioural considerations, inherent in the behavioural theory of the firm, can be investigated by the use of the flow of funds concept in a historical or longitudinal study. For example, an empirical analysis of the direction of and reasons for shifts in the income and expenditure flows of the farm household complex might provide additional insights into the behaviour of farm firms and households.[11]

The flow of funds concept also has potentially useful applications as a planning device that would assist with production planning by the firm and the implementation of these plans in the real world business environment. Conventional budgets and projected flow of funds are not substitutes; rather they serve a complementary function. The projected profit and loss statement and projected balance sheet present the operating plans and goals of the business. The flow of funds statement embodies no production plans of its own, other than matching sources and uses of funds in the planning period.

In summary, we can see that production economics, behavioural theories of the firm, and financing and accounting relationships are inherently involved in a discussion of management perspectives, aims and approaches. With a discipline as broad and involved as management, it is not surprising that it is researched by a wide range of investigators; yet no one has come up with a body of management science adequate in scope yet internally consistent that will satisfy many unanswered questions concerning management and particularly its application to agriculture.

RESEARCH IN THE MANAGEMENT FACTOR

A brief review of some of the more significant studies in the management factor in the United States is appropriate at this point. A colleague of mine at the University of Illinois, F.J. Reiss, undertook one of the early studies of management performance of farmers. He had at his disposal a large number of farm records on Illinois farms and attempted to relate measures of financial success from these records to characteristics of successful farmers. The implicit assumption was that performance would serve as a proxy measurement of managerial ability. As Reiss pointed out,[13] the financial measures from farm records were not a good proxy measurement of ability for three reasons:

(a) they are measures after the fact and therefore require historical experience before any prediction can be done;

(b) they reflect fortuitous circumstances as well as losses outside the control of the manager; and

(c) they measure residual outputs which are a function of the factor mix and, in the calculation of the residual income measures, these factors were usually rewarded at market price or opportunity cost rather than at their marginal produc-

tivity. Similarly, quantity and proportion of factors used may be beyond the control of the individual farm managers.

In the dacade of the 1950's, a regional project called the "interstate Managerial Survey" (IMS) under the leadership of Glenn L. Johnson, investigated, through an impirical study using farm surveys, the managerial processes of midwestern farmers.[6] Nearly ten years later, a second major regional project was activated and officially designated "The Identification and Measurement of Managerial Ability and Its Affect on Resource Use in Farming." Several universities in the Corn Belt region of the United States contributed to this research work. A summary of the work of this research committee is published in "The Management Factor in Farming: An Evaluation and Summary of Research." [7] The justification for the study was stated as follows:

> "Efforts to measure the productivity of land, labor and capital of farming regularly disclosed divergences between farms in income and efficiency that cannot be explained in terms of the quality and quantity of these resources. Therefore, interest has turned to studying the ability, performance, and goals of the person or persons responsible for decisions that serve to allocate the resources on the farm."[7]

The researchers responsible for this work agreed that a well-developed theory was not available for use in identification and measurement; and that such a theory could not be developed without aid from other disciplines dealing with behaviour; namely sociology and psychology. In attempting to define the management factor in agriculture, the investigators were quickly confronted with the frustrating questions of what are we measuring-management ability, management potential, or management performance, (or all three?), and what should we be measuring? The co-operative research undertaken by this committee looked at many facets of management. Noteworthy in their accomplishments was the formulation of a model of management credited to James Nielson.

This model (see Figure 1) describes a manager as possessing a biography of past experiences, drives and motivations, and capabilities which produce managerial behaviour or processes which in turn produce an outcome or managerial success. The model is completed by appropriate feedback from the outcomes of managerial success to reformulation and modification of drives, motivations, capabilities, and biography. Managerial success is the function of managerial behaviour which in turn is the function of a whole complex of activities including biography, motivation, and capability constraints of the individual.

This model is helpful in understanding the complex nature of the management process. However, it leaves us with a dichotomy. Should we, as agricultural economists, be studying and investigating the antecedents (biography, motivation, capabilities) or should we be looking at the managerial processes that are used in making the decisions. It is my view that both should be done. However, in an action program designed to improve the managerial capability of farmers in a short period of time, our extension and educational activities must, I believe, concentrate on the latter and provide farmers with tools to aid in making managerial decisions and with improved procedures and processes for evaluating alternatives and arriving at choices. It is this area that we shall now turn to in our discussion.

MANAGEMENT AIDS FOR FARMERS

Farm record programs, as an extension teaching method and management aid, had their beginning in the United States at the turn of the twentieth century. Farm record systems as we know them today serve multiple objectives. We have cutlined these multiple objectives in a recently published report.[10] Farm record systems provide data and procedures for:

1. Controlling of financial affairs
2. Meeting legal and institutional requirements
3. Farm business analysis and evaluation of decisions
4. Forward planning and budgeting of alternatives.

In this condensed listing of the functions served by records, the need for controlling financial

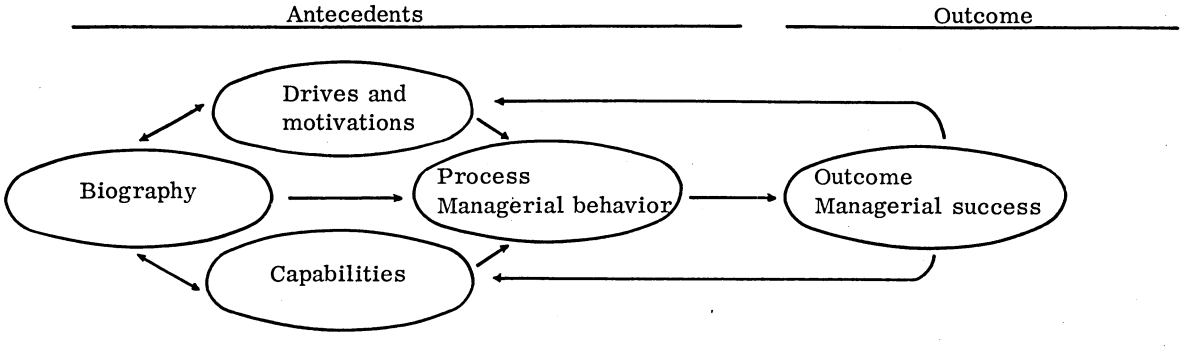


FIG.1 - A model of the farm manager was designed and presented by James Nielson in "Aspects of Management of Concern to Basic Researches", DESCRIBING AND MEASURING MANAGERIAL ABILITIES AND SERVICES, report No.4, Farm Management Research Committee of the Western Agricultural Economics Research Council, Denver, Colorado, 1962.

affairs and meeting legal and institutional requirements requires no defense. Farmers clearly require accounting data for day-to-day control of their business affairs and for their relationships with other parties related to the farm business. They are also fully aware of the needs for supporting evidence in preparing tax returns and related government reports.

Business analysis is also firmly embedded in farmers' acceptance of the function of records. The accounting profession suggests that financial statements may be analyzed by comparative analysis as well as internal analysis. Comparative analysis refers to the analysis of historical financial statements by comparing them with performance in a previous year (trend analysis), with projected plans, with performance standards from other business units, or with rule-of-thumb standards derived from the business world. Comparative analysis has been a keystone in the development of farm record systems over the past fifty years.

Although there is nothing unique or academically sophisticated about comparative analysis, it has stood the test of time and has been accepted in the business world by farmers. This alone is compelling evidence of its value to farmers.

The fourth group of functions, those concerned with forward planning and budgeting, are also widely accepted. However, the concept of forward planning is not a single-value term. It can mean many things. Financial planning is one example. The business activities of the farm business can be reflected in a projected cash flow. Farmers and credit agencies find that this useful financial planning device can be readily predicted with historical records as the starting base.

The planning applications for which record data can be used are many and varied in their scope and development. Budgets that evaluate alternative production plans or specify a profit-maximizing plan of action are best described as projected modifications of the profit and loss statement derived from accounting records.

Budgeting methods, independent of a record system, are also widely used as a management aid. The conventional partial budget, whole farm budget, break-even analysis, and many other budgets with varying titles are familiar to agricultural economists and have been used for over fifty years. These budgeting methods will not be explored here.

However, the application of computer technology to aid in budget applications is a recent development and deserves recognition. Cost-minimizing and profit-maximizing linear programming models are, in principle, easily adapted to farming problems. Yet computer-assisted management planning is not widely used by farmers. Many reasons may be offered to explain the slow expansion of computer-assisted management planning. In my view, the biggest problem is related to problem specification. The individual farmer has unique problems that are not easily meshed with general programming models and the generalized data used in these models. The professional time and costs required to develop a model specific to individual problems have restricted the linear programming method to teaching demonstrations and "bench mark" solutions. Preliminary work at the University of Illinois with generic linear programming models that are adapted by computer codes to be specific for individual use shows promise of overcoming the cost problem.

Lack of access to computer terminals is another handicap. Agricultural economists are experimenting with the use of telephone terminals and time-sharing computers in a wide range of computer budgeting problems and information retrieval applications. With a telephone in the farmer's office, he has access to a computer, which provides answers by voice response. His questions are limited to a small number of computer models that are on file in the computer. The main focus of this work is on communication with computers as a management aid, supplemented by specific computer budgets using generalized data coefficients.

Another computer-assisted technique is non-optimization budgeting, often called simulation, where the "what if" question may be answered. Several universities in the United States have experimental programs using this technique. The method shows considerable potential, but the computer algorithms are costly to write and limited to generalized data coefficients.

One salient feature is present in the use of all of management aids, namely the role of a management consultant or farm management extension personnel to assist the farmer in the management steps of problem identification, selection of information (data) to use in the analysis, and interpretation of the budgeting results to the specific problem that is being analyzed. If the services of the management consultant are not made available, the alternatives are

(a) train the farmer decision-maker in the use of records, budgets, and computer methods, a formidable and lengthy task, or
(b) at least in the immediate future, forego the significant progress that can be made by the application of management aids to improving management performance of our farm operators.

CONCLUDING COMMENTS

Management has many perspectives; the goals and objectives of management are strongly influenced by intra-personal characteristics. Management is expected to have a social conscience. Decisions made by managers are expected to satisfy a set of personal goals and objectives; and, at the same time, achieve goals and objectives which are consistent with the goals of the economic system in which the individual farm firm operates.

As agricultural economists, we have a responsibility to interact with the decision-making processes on our farms. It is my belief that our efforts will be most effective if we concentrate on two areas. One area is concerned with management education programs and the development of management aids for use by individual decision-makers.

Our extension education programs in farm management should provide effective programs in this area. The second area of activity involves the development of national policies and programs that will provide the needed incentives so that actions of individual decision-makers will bring about the desired changes in the agricultural economy.

An understanding of the management decision processes and behavioural characteristics of farmers is a prerequisite for effective work in these two areas. The focus of this paper has been an outline and review of these important characteristics of management.

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