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TITLE OF THESIS .... Managerial Performance and Characteristics of Farmers in Central Alberta Samples ....

UNIVERSITY .... University of Alberta ....

DEGREE FOR WHICH THESIS WAS PRESENTED .... M.Sc. ....

YEAR THIS DEGREE GRANTED .... 1974 ....

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THE UNIVERSITY OF ALBERTA

MANAGERIAL PERFORMANCE AND CHARACTERISTICS OF FARMERS IN TWO CENTRAL ALBERTA SAMPLES

by

© HUGH WYNDHAM

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF SCIENCE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

EDMONTON, ALBERTA

SPRING, 1974

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Managerial Performance and Characteristics of Farmers in Two Central Alberta Samples," submitted by Hugh Wyndham in partial fulfilment of the requirements for the degree of Master of Science.

W. M. Schultz
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Supervisor

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Date October 12, 1973

ABSTRACT

This study is concerned with measuring and distinguishing between various levels of managerial performance among a selected farming population in Central Alberta by means of a limited number of composite factors obtained by reducing a large number of variables.

The approach used encompasses two analytic methods. These were: (1) factorial analysis, used to extract composite factors from a large number of variables, and (2) ordinary least squares regression analysis, used to test the relationship of these factors with several management performance indices which contain both subjective and objective criteria.

The study was carried out on two groups of farmers: one group consisting of members of a provincial Farm Business Association and operating a livestock type farm in the black soil zone of Central Alberta, the other being a control group. Members of the Control Group were paired with Association Group members by selecting a farm (a) as near as possible to the Association farm, (b) whose operator matched the Association operator in age ± 5 years, and (c) without regard to type or size of farm. The Control Group was selected with the assistance of the provincial agricultural advisory officers.

Information was obtained from farmers through personal interviews. Cross tabulation indicated that there were only small differences between the averages of the two samples. Factor analysis, however, revealed differences to the extent that only in very few cases were factors in each group closely related to each other in terms of containing the same variables. Thus, different interpretations were put on most of the factors in the Association Group as compared to the Control Group. While the interpretation and naming of factors is subjective and not independent

of the orientation of the researcher, the existence of differences in the factor structure is objectively verifiable, reflecting somewhat different orientations in the two groups.

Regression analysis of success ratings and management performance indices on the factors further served to enlarge upon the differences between the two groups. The indices used were the synthetic ones of farmer life satisfaction, a satisfaction index, an internal success rating, an external success rating, a self-success index, and the conventional business success criteria of net farm income and net farm income per acre.

The regression of factors on the success indices showed that within the Association Group the factors were more efficient predictors of success than within the Control Group, in that they explained a much higher percentage of the variation of these factors on the success indices. On the other hand, the regression of factors on the satisfaction indices revealed that factors in the Control Group explain a much higher percentage of variation of the factors on the satisfaction indices than in the Association Group.

Regression of factors on the monetary criteria also provided different results between groups. In terms of predictive value, the Association Group factors explained a higher percentage of variation when regressed on net farm income per acre. The Control Group factors, however, explained a higher percentage of variation when regressed on net farm income.

In the final analysis, the two groups were compared and conclusions were drawn as to the advantages and/or disadvantages of belonging to a Farm Management Association. Generally it may be concluded that the factors

isolated do act as both measures of and discriminators between levels of managerial performance among farmers. It can also be concluded that the results do indicate a definite advantage to farmers belonging to a provincial Farm Business Association in that it was deemed unlikely that the differences apparent in the analysis were not magnified by some outside influence.

Due to the positive results obtained in the study, it was also concluded that the technique employed here could be used with confidence in further research into the human factor in farming.

ACKNOWLEDGEMENTS

This dissertation is the result of two rewarding years of study spent at the University of Alberta, Edmonton. My appreciation and sincere thanks go to Dr. W.M. Schultz, my most capable supervisor and guide during this period. Without his valuable assistance and continued patience and encouragement, the task at hand would, I fear, have been much more difficult.

For his valuable assistance during the computing phase of the study, I am indebted to Mr. C. Shier, the department's computer analyst. Thanks are also due to Mr. R. Bence for his aid in providing first class maps and diagrams, and for his help in arranging for the reduction in size of several key tables.

I would also like to express sincere thanks to the clerical staff of the Department of Agricultural Economics and Rural Sociology, and, in particular, to Mrs. J. Warren, for the time and effort devoted to the typing of the drafts of this paper.

Finally, I would like to thank those in the Department of Agricultural Economics and Rural Sociology on whose recommendation I was enabled to continue my education at the University of Alberta. But for their confidence in my capabilities, none of this would have been possible.

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CHAPTER I

INTRODUCTION

In the last few decades agriculture in Canada, as well as in other "Western" countries, has experienced a great technological change. Among the results of this change have been ever increasing production, higher product quality and increasing specialization in agriculture.

From the standpoint of the consumer these advances have brought nothing but good in improving the range and quality of foods which can be purchased. The farmer on the other hand has not experienced such improvements. Due to the atomistic structure of most agricultural industries and the competition among producers the improved technology resulting in greater output has in many cases lowered the prices received by the farmer. The overall situation in the agricultural industry has been one of variable incomes with steadily rising costs of production and intense competition among farmers for farms and farm land. The situation has put a high premium on farmers ability to cope with change and to manage their affairs.

The Problem of Management

While it is not possible to stop the advances of technology, it may be possible to influence the farmer's managerial ability to enable him to cope more easily with this problem. Managerial ability is an important input in farming and recognized as such. There is, however, a marked lack of information and understanding of the qualitative aspects of the human resource. This is largely through the difficulty of measuring managerial ability. This is no small problem and it is recognized that

here is an urgent need for improvements in the understanding and measuring of this resource. If those who say that "the ignorance of the function of management, of its work, of its standards, and of its responsibilities is one of the most serious weaknesses of an industrial society" [1] are correct then research to such areas is most necessary.

Management can be said to encompass the role played by the farm operator as designer, coordinator, decision maker, and driving force behind the physical farm production--be it grain, livestock, or any other type of farm enterprise. So defined, management excludes all physical inputs including labour. Managerial ability is a complex entity and includes numerous variables, all of which are likely to differ between areas, between different types of farming enterprise, and, most important, between individual farmers.

The success of farming can be said very broadly to depend upon the quantity, quality, and combination of three classes of inputs, the first two of which are measurable in functional terms:

1. Given natural resources--that is, land (soil quality), climate,
2. Physical inputs--that is, crop or livestock varieties and breeds, machinery, capital, labour,

and one which is an intangible:

3. Management.

While output is often represented to depend solely on the first two classes, management is the guiding force. While it is important to study the proper combination of physical inputs in a given resource setting based on the principles of the economic theory of the firm, it is most necessary that managerial ability or management performance be assessed by itself for two reasons:

1. Research into farm organization has shown many times over that

resource endowment, enterprise, input selection, and work method selection alone do not explain all the variation in farm performance that is observed. It stands to reason that managerial ability as defined above may be the cause for farmers differing in performance, even if similarly endowed and organized.

2. Management is often treated like the weather; while everybody talks about it, nobody does anything about it. Admittedly, management is a complex subject and the difficulty of talking about it clearly and measuring the components and their interaction is seen as a major obstacle to doing something about it in a logical, meaningful way. Sifting the evidence and categorizing it seems a formidable task in itself.

Broadly speaking researchers have approached the study of management along two avenues. The first is concerned with the process of management--that is, the nature of decision-making, information gathering and use, expectations, and utility. [2] The second approach compares the "inputs", or "factors" with the "outputs" or products of management. It is management factor analysis. It identifies characteristics of the manager or the management unit, their capabilities, drives, and the life experiences and relates them to the outcome of management. Managerial characteristics can be described and measured in arbitrary terms. By relating measures of characteristics to measures of goal, achievement it is possible to single out characteristics that should be conducive to good achievement. Such measures of characteristics then are tentatively identified as partial measures of managerial ability. (Managerial ability is defined as a measure of relative achievement of a management goal, subject to the limitations of time, place and resource base). The second approach complements the first. Crucial to this approach is an awareness that the individual goals of farmers differ. Some farmers have as a goal recognition

by their peers as good operators, others may prefer to concentrate on income, and some aim for the "good life" however defined. To some, the survival of the farm is the basis of family survival, and this is a goal to be attained; others may prefer to devote their efforts to establishing themselves as top producers of quality crops or breeds of livestock.

Since farm goals will vary, it is necessary to distinguish two study objectives:

1. To identify characteristics and to theorize their association with success in terms of what the farmer wants. In this study individual success rating by the farmer on himself is used as the primary indication of degree of attainment, regardless of what the farmer's goals might be.

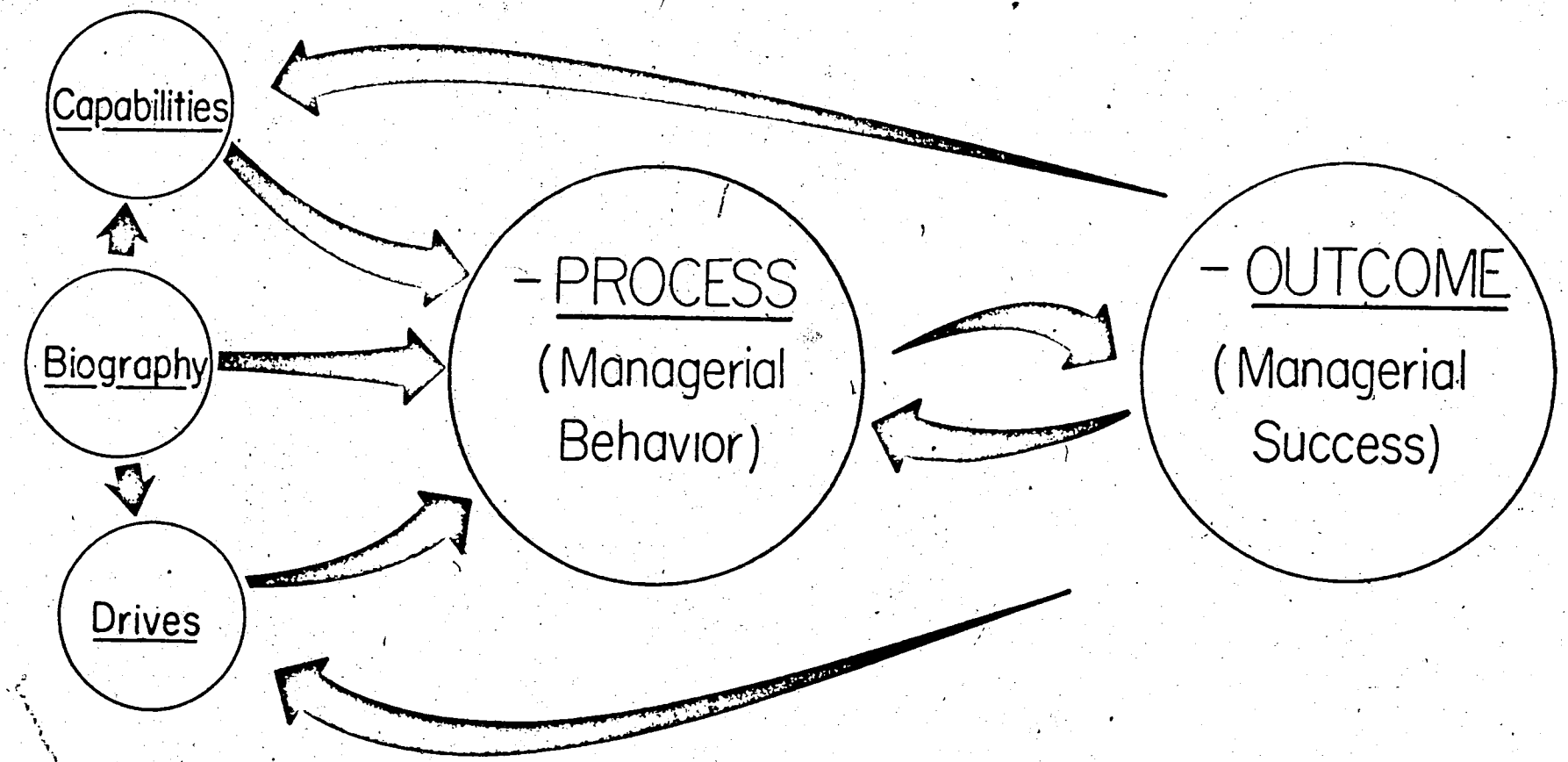
2. To identify characteristics and measure their association with the kind of managerial outcome which we can define as necessary, or at least conducive, to the survival of the farm firm in the face of competition among farmers and other producers trying to snatch the consumer's dollar away from the agricultural industry.

Measures of managerial characteristics and abilities are objective in nature, but arbitrary. They become meaningful only if related to stated goals. They must be defined. Ability to generate income should certainly be included--it is the basis of solvency, credit rating, control of land flexibility, ability to adjust to new methods requiring additional finance, and so on. Innovativeness, it must be agreed, makes a contribution to business success, as may educational standing. There are many others which can be used, and these will be defined later.

Nielsen [3] has illustrated the nature of management as shown in Figure 1.1. This diagram is in the form of a flow chart showing the effects of various components on managerial success. As can be seen in the model, outcome is a function of several categories of inputs. Process, or

FIGURE 1:1

MANAGERIAL PERFORMANCE MODEL



managerial behaviour, describes how the manager carries out the task of management. While management process is the sum of the actions by means of which the outcome is controlled, it is the sum of the underlying characteristics grouped into the three categories of drives, capabilities, and biography, all of which control managerial behaviour and, hence, managerial success.

The ultimate motive for the study of management is the improvement of farm management in order to assist farmers in remaining competitive. Managerial ability can be improved in several ways, the most common of which is learning from experience in the "school of hard knocks". Other methods involve formal education, mass media extention, and advisory and consulting services offered by governmental organizations, universities, private corporations, or farmer organizations.

Outline of Chapters

An outline of the study in terms of its aims, hypothesis, methods of analysis employed, and a review of research into managerial ability in farming is contained in Chapter Two.

The area from which respondents in the study were selected is described in Chapter Three. This description is mainly concerned with geographic and climatic characteristics, although a short comment is made on certain characteristics of the farming population. It was considered that the information gathered from the respondent farmers would adequately describe many other characteristics; thus, this description in Chapter Three is fairly limited.

The sources of information used in this study, the various questionnaires used, the method of presenting them to the respondents, and the selection of the two groups of farmers in the study is described in Chapter

Four. Copies of each questionnaire are contained in Appendices I, II, and III.

Chapter Five uses the information obtained to make preliminary comparisons between the two groups. A satisfactory number coding system had to be used and this is described in some detail.

Methods of statistical analysis are described in Chapter Six. An illustration of the factor analysis model in matrix notation is followed by a description of the steps taken in the empirical use of the technique. The method by which factor scores for use in the regression analysis are obtained is also described. The use of regression analysis in this study, being a statistical technique in common use, is mentioned only briefly. Finally, a statistical test used for determining the validity of the results of the regression analysis is described.

Chapters Seven and Eight contain the results of the statistical analysis. The factors isolated, their component variables, and their assigned names are described in Chapter Seven. Chapter Eight describes the managerial success indices used and the results of the regression of the isolated factors on them.

Finally, Chapter Nine contains conclusions and implications drawn from the study. These are stated in terms of the working hypothesis of the study. Final comments are made on the validity of the study and potential future uses.

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CHAPTER II

STUDY OUTLINE AND BACKGROUND

Aims and Methods of the Study

Given the need for research into managerial ability it now remains to outline the objectives, hypothesis, and methodology of this study.

Objectives

The primary aim of the study is to define and measure characteristics that might be related to managerial success and ability, and to examine them in order to determine if they are related to certain indices of success. Success is considered to be the result of factor endowment and managerial ability. In addition, comparisons will be drawn between members of Alberta farm business associations and a cross section of more "typical" farmers in the region.

Hypothesis

It is hypothesized that certain personal and business information regarding farm operators is statistically related to the level of managerial success of the farmers in the study. It is also hypothesized that certain differences exist between the farmers who join farm business associations and those who do not.

Methodology

Two statistical tools are used in the study. Factor analysis is utilized in the reduction of a large number of characteristics, or variables, to a smaller number of relevant factors with the same predictive powers as the variables which they contain.

"Factor analysis supplies methods for reducing a large number of observed variables to a lesser number of in some way more fundamental variables

or, as they are usually called, factors" [3]. This is done through an analysis of intercorrelations between the observed variates. Factor analysis accounts for common variability trends in a set of observations or variables, the statistical expression of which is the matrix of covariances of the observed variates. This reduces the significant information to a much smaller number of hypothetical variables or factors. Factor analysis is a branch of multivariate analysis dealing with the internal structure of matrices of covariances and correlations. In factor analysis the first question that arises is whether any correlation exists; that is, whether the correlation matrix differs from the unit matrix. If there is correlation, the next question is whether there is a random variate (f_1) such that all partial correlation coefficients between the x-variates after eliminating the effect of f_1 are zero. If not, then two random variates (f_1 and f_2) are postulated and the partial correlation coefficients after eliminating f_1 and f_2 are examined. The process continues until all residual partial correlations between the x-variates are zero or insignificant [8]. According to Bartlett: "Factor analysis must be regarded as a natural and inevitable development in the analysis of the correlated sets of test scores and other variates with which psychologists have had to deal" [1]. The principal concern, then of factor analysis may be said to involve the resolution of a set of variates linearly in terms of a small number of factors. Kelley has expressed what may be termed the essential purpose of factor analysis in the following terms.

> There is no search for timeless, spaceless, populationless truth in factor analysis; rather it represents a single straightforward problem of description in several dimensions of a definite group functioning in definite manners, and he who observes to read more remote verities into the factorial outcome is certainly doomed to disappointment [5].

In this study the function of factor analysis is one of data reduction from a large set of variables to a smaller set of interrelated observations in the form of their common factors. This function is as described by Kelley above. There has been no attempt to draw general conclusions from the results of this data reduction.

The second statistical tool, regression analysis, is used to determine the relative statistical association of the factors extracted from sets of original characteristics to factors of the set success measures and other success indices. Ordinary least squares regression is used to determine whether or not a relationship exists between a dependent variable and several independent variables. The individual relationships are expressed in terms of coefficient of determination; that is, the square of the coefficient of multiple correlation, R, is a direct measure of the fraction of the variances of the dependent variables "explained" by the specified independent variables.

Review of Several Farm Management Studies

At this point it is timely to comment on several studies in farm management which have used factor analysis as a research tool. This fulfills two purposes--that of justifying the choice of factor analysis as used in this study and that of illustrating the use of the technique in farm management research.

One particular study which successfully used factor analysis as the evaluation method was that done by MacEachern, Thomas, and Eisgruber [9]. They studied human attributes and their relationship to the performance level of farm tenants in the U.S. Midwest. In surveying a large number of farmers, they obtained information allowing the use of two criteria for increasing the level of managerial ability. These were the rating of

tenants by their professional farm managers, which is a subjective criterion, and calculating the residual returns to management of specific farm types, an objective criterion.[1]

Using factor analysis to try to discover empirically what general abilities and motivations can be measured by biographical data and how these influence the level of managerial ability, six common factors were isolated.[2]

The most important common factor was determined as being education. This was followed by job mobility and farm family interpersonal relations.

Several conclusions were drawn from this study by MacEachern, Thomas and Eisgruber, the most important being:

1. The factors isolated in the study were consistent with the ideas of professional farm managers relating to what an above average or below average tenant is.

2. The results suggest that research into managerial ability and an understanding of the source will more likely be successful if the approach is broader than economics.

3. The reason for looking for causes which determine a phenomenon, such as managerial preference, is usually that there is either a desire or a felt need to manipulate these causes to obtain a desired result involving the particular phenomenon.

---

[1] The study of Alberta farmers described in this paper does, by its very nature, preclude the use of the first criterion for evaluation. As farmers in the study could not be rated in this manner, other subjective criteria will be used.

[2] The six factors were given descriptive but arbitrary names: socio-economic status seeking; prior success satisfaction; farm family interpersonal relations; family farm interpersonal relations; education; and job mobility.

The results of this study of Alberta farmers will not necessarily be the same; in fact, they will in all probability differ considerably as we are dealing with different types of farmers and a different area.

A second study which bears mention is that done by Kivlin and Fliegel [7], who studied certain attributes of Pennsylvania dairy farmers in 1964. Two distinct groups of dairy farmers were used and distinction between groups was made on size of business. As in the previous study mentioned, the main analytic tool was factor analysis. The aim of the study was to try to isolate the main factors which are responsible for the adoption of new farming practices by farmers.

The authors hypothesized that farmers' attitudes towards innovation rest on certain farm attributes,[1] and the aim of the study was to try to find those attributes which contributed most. An earlier analysis had shown that a certain fifteen attributes of modern farm practices accounted for one-half to two-thirds of the adoption behavior of the farmers [6]. By employing factor analysis these fifteen attributes were reduced to give main factors reflecting different orientation to agriculture.

The analysis of the two groups was carried out and resulted in the middle scale sample; that is, the larger farm size group having five factors which accounted for 88 percent of the variance in the matrix of intercorrelations among the fifteen attributes. The small scale farms analysis showed six factors which accounted for 91 percent of the variance.

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[1] Attributes here refers to the certain advantages of various farm practices and the farmers' perception of them.

The findings for both groups were not the same, The middle scale dairyman essentially takes a conservative position with respect to agricultural innovations. This is not to say that he adopts new methods slowly, but that his criteria for adoption are conservative. More favourable responses are generated by innovations having long-run financial implications, but not necessarily maximum profit. Also, those innovations which will save time and effort and involve no reorganization of business receive favourable attention.

The small scale farmers, on the other hand, are inclined to respond favourably to all innovations with short-run investments which yield a high profit. Also, they are relatively more willing to accept practices requiring more time and effort for higher profit.

The results of the study indicate that it is necessary to take a closer look at the occupation and the way in which an individual relates himself to that occupation if we wish to explain and predict decision-making behaviour. With the rapid technological changes being made in agriculture, farmers become not only sensitive to it, but, to some extent, caught up and carried along by it. This being the case, specific adoption decisions will be explicable only in terms of the particular stimuli and perceptions of the movement.[1]

Hobbs [4], in a paper entitled "Use of Factor Analysis in a Farm Management Study", reported on a project which was designed to measure the value of orientation of farm operators along with some other personal and social characteristics and relate these to the economic performance

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[1] With this dissertation in mind, the association group farms were limited to those with livestock operations.

of farms managed by these individuals. He used factor analysis to see whether the selected variables designed to measure the different dimensions would group together in different factors in the factor solution. Hobbs also examined some further possible applications of factor analysis in farm management. In fact, he suggests that valid studies could be made relating farm operator goals, values, attitudes, and biographical data to various criteria of farm operator performance together with an analysis of the relationship between adoption of farm practices and farm performance. There is also a suggestion that factor analysis could be useful in studies of farm records. This would result in the acquisition of a fuller understanding of some of the functions underlying the various performance indicators in farm record summaries.

Duncan is somewhat skeptical of whether Hobbs' approach would be as efficient as would be necessary and suggests that "a better approach would be through the estimation of functional relationships suggested by biological and economic theory" [2].

The Agricultural Economics Research Institute at the Hague, Netherlands claims to have developed factor analysis as a comparative research tool for analyzing farm survey data [10]. The study carried out was one involving dairy farmers in two different areas of Friesland Province. While there were some variables which were included on the basis of previous knowledge and on assumptions about certain relationships, the ultimate conclusion drawn about the relationships between the variables were obtained from the structures delineated by factor analysis.

Factor analysis, as a research tool in farm management, is not to be treated carelessly. There must be strict controls over the variables used to ensure that the boundaries of the study are properly set and not violated.

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CHAPTER III

THE STUDY AREA

Geographical Description

Location

The study area, comprised of parts of the counties of Lacombe and Red Deer and the Municipal District of Mountain View in Central Alberta, is located between 51.5° and 52.5° North Latitude and 113° and 115° West Longitude (Figure 3.1). The approximate area of the study region is 8,800 square miles. The southern east-west boundary of the region is some thirty miles north of the city of Calgary and runs very close to the town of Crossfield. The northern east-west boundary is some seventy miles south of the provincial capital, Edmonton, and runs just south of the township of Ponoka. Provincial Highway No. 2, the main north-south link between Calgary and Edmonton, runs directly through the centre of the study region such that the north-south boundaries are never more than a distance of forty-five miles from it.

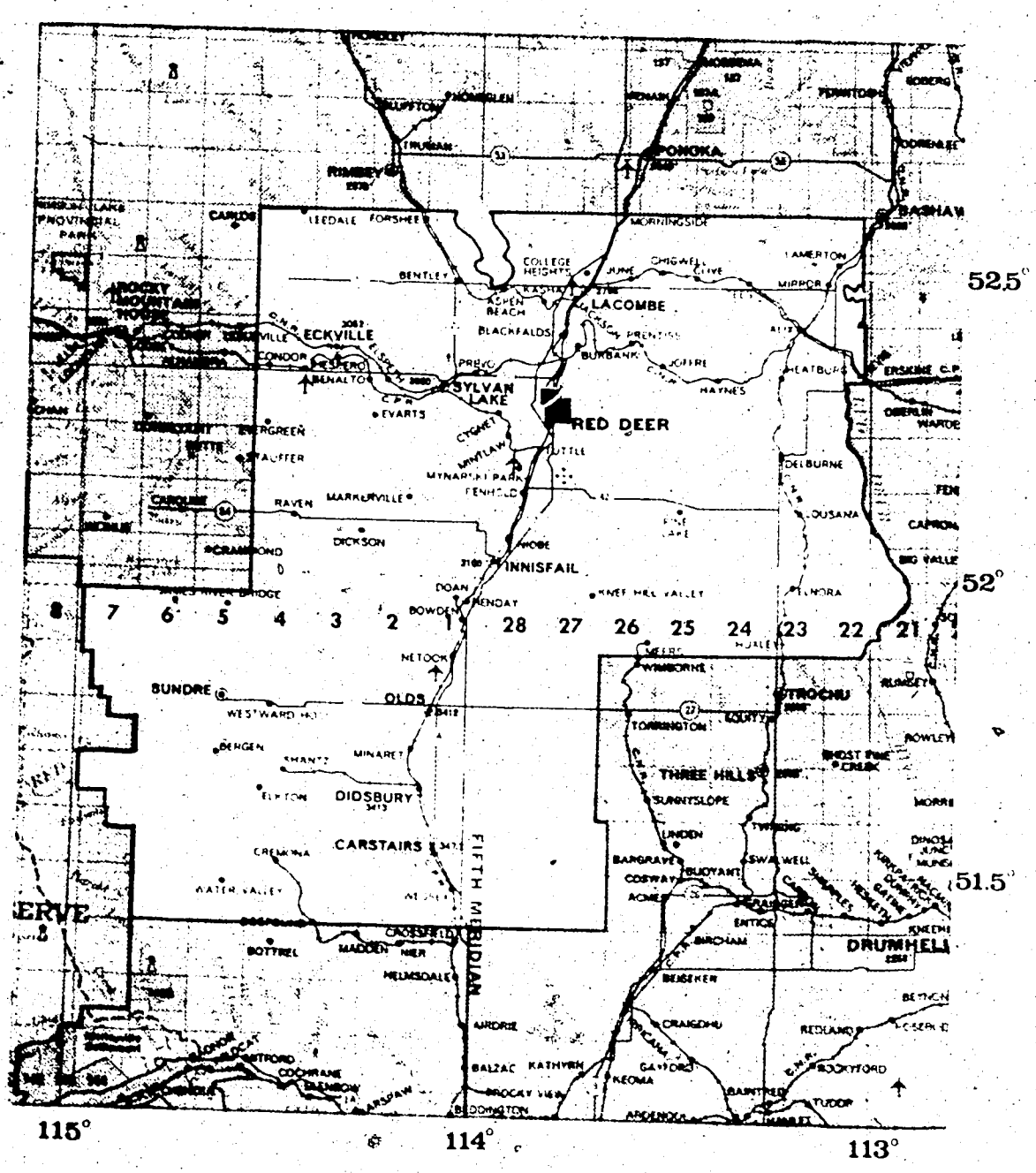
Topography of the Region

The study area can be roughly divided into three sections from east to west: (1) an eastern section of rolling country which includes a few deep cuts in the terrain, the legacy of once flowing rivers or streams, (2) a central section of flat land, the largest section, and (3) a western section of hilly country which is fairly well wooded and is in fact the beginning of the foothills of the Rocky Mountains. The transition from one type of terrain to the next is not clearly defined; thus, no distinct boundaries can be drawn.

There is an increase in altitude from east to west of approxi-

FIGURE 3.1

OUTLINE MAP OF STUDY AREA



mately 1,000 feet in the southern half of the study area, and a rise of approximately 700 feet from north to south through the central section.

Climatic Characteristics

Rainfall

The rainfall in the study area varies from sixteen inches per annum on the eastern side of the area to twenty inches per annum on the western side. There will be, of course, variations in the total annual rainfall from time to time but the regularity of rainfall is high and drought is an uncommon occurrence. Table 3.1 shows the mean monthly total precipitation at selected recording stations in the study area [2].

Water Supply of Farmers

Due to the short period of high temperatures, the evapo[illegible]spiration rate is relatively low. Thus, normal rainfall is sufficient for farming activities in the area. Additional water for livestock is obtained from wells and bores using electric pumping equipment. There is no artesian water in the area. Also, a considerable number of farmers have small dugouts on their properties which assist in the watering of stock. There is little or no irrigation practiced in the area.

Hail Incidence

Damage from hail is a common occurrence in Alberta. Each year during July and August the likelihood of hail storms is high, with the period of greatest incidence falling in the latter days of July, a time after which it is too late for severely damaged crops to recover. Storms can form in less than an hour and within five minutes of the first stone's falling a year's work can be ruined. Historically, largest losses have been in West Central Alberta, an area which includes the study region.

TABLE 3.1

MEAN MONTHLY TOTAL PRECIPITATION FOR SELECTED STATIONS

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Alix	1.00	0.93	1.19	1.08	1.57	2.98	2.52	1.84	1.27	0.95	1.03	0.75	17.11
Lacombe	0.75	0.79	0.96	1.32	2.02	3.48	2.85	2.52	1.48	0.90	0.64	0.64	18.35
Olds	0.65	0.66	0.97	1.17	2.07	3.56	2.74	2.77	1.38	1.03	0.66	0.55	18.21
Penhold	0.74	0.73	0.89	1.10	1.85	3.28	2.81	2.50	1.34	0.88	0.59	0.59	17.30
Red Deer	0.94	0.76	0.90	1.29	2.82	3.72	3.76	3.67	1.90	0.92	0.65	0.61	21.44

Commercial hail suppression was begun in 1956 in the Municipal District of Kneehill. Later, the counties of Rockyview, Wheatland, and Mountainview also formed hail suppression associations. The Alberta Weather Modification Co-operative was formed in 1964 through a federation of the four county associations [6].

Growing Season--Frost Free Days

One of the most important aspects of climate is the length of the growing season. The period between the last spring frost and the first autumn frost will more often than not be a definite restriction in the choice of a crop. The number of frost free days per year is illustrated in Table 3.2 [1].

Temperature

Temperatures in the study region remain fairly uniform and the daily mean temperature ranges from a low of approximately 6° F. in January to a high of 61° F. or 62° F. in July. The months during which the daily mean temperature is below 32° F. are those from November to March. Temperatures for three centres in the study region are shown in Table 3.3.

An additional means of determining characteristics of temperature is by measurement in heating degree-days [3]. Heating degree-days are most commonly based on a temperature of 65° F., which is applicable to the relative fuel consumption in homes and offices heated to a temperature of 70° F. One heating degree-day results for each degree that the daily mean temperature is below the base of 65° F. No degree-days are counted when the mean temperature is above 65° F. Table 3.4 shows the normal monthly and annual degree-days below 65° F. for the same centres as in Table 3.3 and for the period 1931 to 1960.

TABLE 3.2

NUMBER OF FROST FREE DAYS FOR SELECTED STATIONS

Station	Lat. N.	Long. W.	Ht. above sea level	No. of years	Av. frost free days	Last frost (spring)			First frost (fall)			Frost free season--Extremes on record					
												Longest			Shortest		
						Av.	Earliest	Latest	Av.	Earliest	Latest	Last (spring)	First (fall)	No. of days	Last (spring)	First (fall)	No. of days
Alix	52 23	113 10	2585	43	82	Jun 5	May 7	Jul 2	Aug 26	Jul 21	Sept 2	May 7	Sept 8	124	Jul 2	Jul 21	19
Bentley	52 24	114 03	n.a.*	5	85	Jun 2	May 14	Jun 21	Aug 26	Aug 16	Sept 14	Jun 3	Sept 14	103	Jun 11	Aug 21	71
Blackfalds	52 24	113 47	2876	3	80	May 27	May 21	Jun 4	Aug 15	Aug 10	Aug 22	n.a.*	n.a.*	n.a.*	n.a.*	n.a.*	n.a.*
Didsbury	51 40	114 08	3300	17	86	Jun 5	May 20	Jul 14	Aug 30	Jul 24	Sept 20	May 28	Sept 20	115	Jul 14	Aug 30	47
Drumheller	51 28	112 41	2255	17	110	May 23	May 4	Jun 18	Sept 10	Jul 28	Oct 6	May 10	Oct 4	147	Jun 9	Aug 19	71
Lacombe	52 28	113 44	2783	43	78	Jun 9	May 4	Jul 14	Aug 26	Jul 20	Sept 19	May 4	Sept 19	138	Jun 22	Jul 25	33
Olds	57 45	114 06	3413	35	97	Jun 3	May 12	Jul 2	Sept 8	Jul 23	Oct 12	May 15	Oct 12	161	Jun 4	Jul 23	49
Red Deer	52 16	113 48	2870	28	79	Jun 9	May 10	Jul 1	Aug 27	Jul 17	Sept 28	May 19	Sept 9	113	Jun 27	Aug 14	48
Penhold	52 11	113 54	2965	13	93	Jun 1	May 4	Jun 22	Sept 2	Aug 7	Sept 24	May 4	Sept 24	143	Jun 19	Aug 14	56
Three Hills	51 42	113 21	2936	39	69	Jun 13	May 12	Jul 14	Aug 21	Jul 23	Sept 19	May 27	Sept 16	112	Jun 24	Jul 23	29

* Not Available.

TABLE 3.3

DAILY MEAN TEMPERATURES FOR THREE CENTRES IN THE STUDY REGION

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lacombe	6.80	12.20	21.48	37.90	50.29	56.00	61.38	58.61	50.80	40.48	24.50	13.61
Olds	11.90	15.79	22.70	38.20	49.29	54.80	60.48	57.96	50.80	41.09	26.60	18.19
Red Deer	7.80	13.48	22.38	38.80	50.61	56.10	61.19	58.90	50.90	40.80	25.40	15.09

SOURCE: Canada Department of Transport, Temperature and Precipitation Tables for the Prairie Provinces (Toronto: C.D.T., 1967), p. 26.

TABLE 3.4

NORMAL MONTHLY AND ANNUAL DEGREE-DAYS BELOW 65° F. FOR THREE CENTRES IN THE STUDY REGION

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Lacombe	1804	1531	1349	813	456	270	112	198	426	760	1215	1593	10527
Olds	1646	1427	1311	804	487	306	140	211	426	741	1152	1451	10102
Red Deer	1773	1494	1321	786	446	267	118	189	423	750	1188	1547	10302

SOURCE: Canada Department of Transport, Meteorological Branch, Climatology Division, Heating Degree-Day Normals C.D.S. 5-64 (Toronto: C.D.T., 1964).

Soil Description

Soil Zones and Capabilities

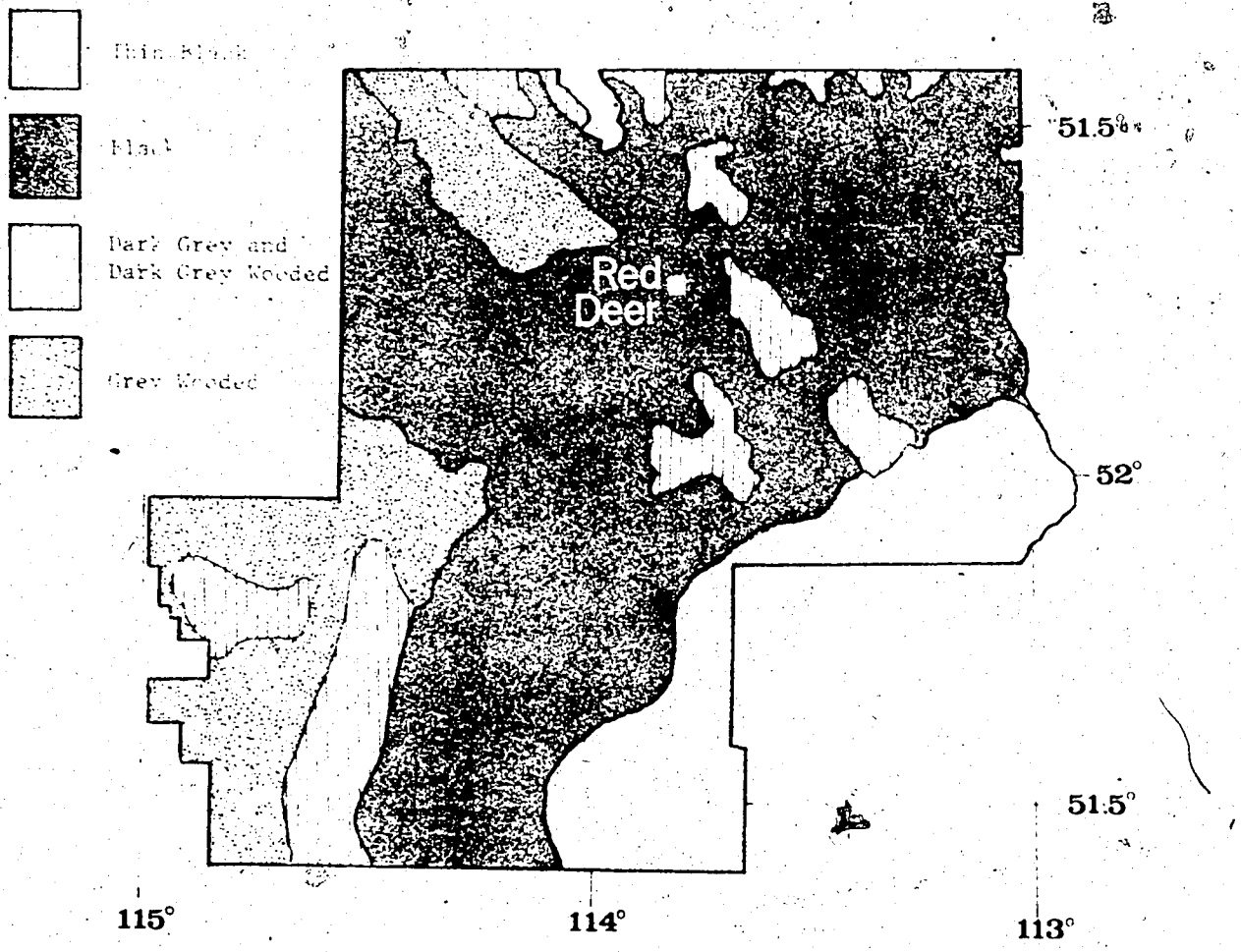
The soils of the area are most important to the land use pattern. The description of the soil involves two areas of discussion: first, the general soil zones and their characteristics, and second, the soil capabilities.

The area in question includes four soil zones (see Figure 3.2) [5]. These zones are of a very general nature and give no indication of restrictions in land use due to climate or other factors. The main zone consists of a central strip comprising two-thirds of the study area and is made up of black chernozemic soils. Generally speaking, the rainfall is from seventeen to nineteen inches per annum and is consistently regular. The vegetation of this strip is predominantly grassland. The black soils of this zone are very rich and have in the surface foot of the profile three to four times as much nitrogen and organic matter as is found in average brown or grey wooded soils.

There is a zone of thin black soils in the south eastern sector of the study area. The overall rainfall is from fourteen to seventeen inches per annum and, as in the black soil zone, is consistently regular. This is an area of predominant grassland interspersed with clumps of trees. The thin black soils show a much shallower horizon than the black soils and, correspondingly, the nitrogen and organic matter content is not as high. The main deficiency of the thin black soils, however, is in phosphorous. As the soil is less fertile, it is necessary to employ good soil management techniques, for example, crop rotations and fertilizer applications, in order that both fertility and soil structure be maintained at a satisfactory level.

FIGURE 3.2

SOIL ZONES OF STUDY AREA



The western zones are comprised of both grey wooded and dark grey wooded soils. The main climatic feature is a growing season shorter than in the eastern part of the study area. Annual rainfall is in the vicinity of twenty inches per annum and is highly regular. As indicated by the name, the vegetation of the area is predominantly woodland. Clearing of the land, although expensive, is quite feasible. Whereas the black and thin black soils have definite horizons of ten to twelve inches, respectively, the soils in the western zones have less defined A horizons, the surface generally consisting of semi-decomposed leaf litter and a mineral horizon which is either black, grey or dark brown on the top half and severely leached grey in the bottom half. Leaching has, in most cases, removed much of the nitrogen, phosphorous, organic matter, and sometimes sulphur from the soil. Thus, fertility is impaired to varying degrees depending on the severity of the leaching process.

Land Use

As the topographical nature of the country changes, so does the land use pattern. This is due partly to the nature of the country, partly to the length of the growing season, and partly to the soil types and soil capabilities. The soil types and capabilities are extremely important as determinants of land use, but, rather than affecting managerial ability, will affect economic return.

Generally speaking, the country in the east of the study area is suitable for both cash grains and grazing, although the further east one travels, the more cattle are to be found. There are large [illegible] farms in this area. Many farmers keep hogs, but the number [illegible] varies considerably. The main crops in the eastern section of the area

are wheat (which is sold as a cash crop), and barley (which can be sold, but is also fed to livestock). The imposition of grain quotas has no doubt had a considerable effect on the practice of feedlotting which enables much of the excess grain to be disposed of profitably.

To the west, the pattern of land use becomes one of more feed grain and hay production. However, feedlotting is not too prevalent.

Overall land use in the eastern and central sectors of the study area is fairly well specialized. Cash grain farming and feedlotting are two of the main farming activities. In the western section, however, the trend is more towards mixed farming. Not unexpectedly perhaps, the eastern farm operations are generally on a larger scale than those on farms in the west.

The major crops produced in the study area include barley, wheat, oats, rapeseed, and alfalfa. In some areas toward the west there are specialized hay farms. Beef and dairy cattle breeds in the area include Angus, Hereford, Charolais, Holstein, Ayreshire; while hog breeds include Lacombe, York, and Hampshire.

As with most grain crops, weeds are a problem. Spraying must be carried out for thistle, sperry, buckwheat, and wild oats. Selective sprays are used so as not to damage the crop. In many cases, time of planting will have a marked effect on the weed problem; that is, the earlier the planting the smaller the problem is likely to be. This, however, doesn't remove the necessity of spraying. Fertilization of soils is mainly done at planting, where the fertilizers are drilled into the soil with the seed.

Farmer Characteristics

Especially important in this study is a short description of the farmers in the area, their historical background, and their attitudes,

as this could have a great affect on their methods of farming and on the quality of management.

The area was settled mainly from 1890 to 1910 and the majority of the settlers were of European origin. Thus, many of the present farmers in the area are first generation Canadians. The age group or average age of farmers, if such a thing can be found, is important as a factor having an effect on acceptance of change or new technology. According to census data available for 1966, 57.4 percent of Alberta farmers were in the forty-five years and older age bracket [4]. Thus, it would not be inconsistent to conclude that there is a very good chance that the farmers in the study area fall into the same age distribution. Many farmers are taking the opportunity of buying more land and so extending their operations. This seems to indicate that there are quite a few farmers in the area who are willing to outlay capital for long run hopes of gain.

While the area of study may generally be termed an opportune area for farming enterprises, there are individual farmers at both ends of the success scale. In other words, there are farmers who have made a great success of their operations and there are farmers who have been singularly unsuccessful. It would appear that managerial ability of inability, whichever the case may be, is to some degree responsible for this divergence. In this study it is hoped that certain factors can be delineated which will give a good indication, numerically, of the actual degree to which managerial ability or inability has been responsible for success or failure of the farming enterprise.

Sources of Information

Some specific references have been used in the description of the study region. The remaining data, however, were obtained through interviews with the district agriculturists at the centers of Olds and Red Deer. Information regarding such aspects as land use patterns and farmer characteristics and background came almost exclusively from this latter source.

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CHAPTER IV

DATA SOURCES AND METHODS OF COLLECTION

Introduction

All of the material used in this study was gathered through personal interviews, standardized self-administrating psychological tests, and, subject to written approval of each respondent, extracts from individual farm business analysis reports.

The primary questionnaire (see Appendix I) was concerned with general farm information such as acreage, value, use of credit and details of the latest available returns and biographical data, attitudes, and goals. Farm financial data were either taken from 1966 tax returns or, when available, from analysis reports released by the respondents for this purpose. The general interview was supplemented with several standardized psychological test instruments[1]--namely, the Gordon Personal Inventory [1], the Gordon Personal Profile [2] and the Straus Rural Attitudes Profile [6]. The latter had been employed in Straus' Columbia Basin settler project [7].

As the names suggest, these test instruments have been devised in order to obtain standardized information concerning a number of attitudinal and personality parameters. They are used in this study with several objectives in mind:

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[1] Copyright laws prevent the inclusion of the Gordon Personal Inventory and the Gordon Personal Profile test instruments in this dissertation. Permission was sought to do this in an appendix form but was withheld by the publishers. The Straus Rural Attitudes Profile appears in Appendix III.

1. To examine the suitability of these test instruments for the purpose at hand.

2. To determine possible associations of test scores with measures of farm success.

3. To compare parameters between different farmer groups.

An evaluation form (see Appendix II) was used to report details of the survey including the impressions of the interviewer immediately following the interview. Agricultural officers familiar with the farms in the study were asked to give their opinions regarding the performance and potential of each farmer. The evaluations were done in order to obtain indications of the kind of subjective judgement in which people often engage based on not much more than first impressions. These data were collected in order to determine the degree of confidence one might place in such opinions.

Questionnaires Used to Obtain Data

Farm Questionnaire

In order to explain the purpose of the study, to answer questions, and to seek the operators' co-operation, a personal interview was considered an essential part of the data collection method. In addition, considering the range and nature of the subject matter, a personal interview was calculated to considerably reduce the effort required by the respondent in answering the questions.

The main questionnaire was used as a guide for the interview and as a permanent record of the response. Attitudinal questions were to be administered literally. The questions dealt with the farmer's age, education, farm experience, farm size, income, the operator's aims for

the future, farming goals, and his satisfaction with his farm, his living conditions, his social life in the community, and his income. The questionnaire includes questions suggested by the results of the work of Straus [7] and questions relating to the imputed factors isolated by MacEachern, Thomas, and Eisgruber in their study. Questions in the main questionnaire taken directly from Straus are contained in Appendix 1 and are the following: A21 to A25 inclusive; A26a; A37; A39; A42 to A49 inclusive. In addition, the ratings by an impartial outsider are also taken from the work of Straus. Other questions are taken from McCormick, Blanchard, and Thomas [3,4] and MacEachern, Thomas, and Eisgruber.

Gordon Personal Inventory

Devised by L.V. Gordon, the Inventory measures four personality traits which are considered important in determining the adjustment of individuals in varied situations. The traits are interpreted as cautiousness, original thinking, personal relations, and vigour. The fixed form of the Inventory is a result of exploratory factor analysis, repeated experimentation, and revision.

The Inventory consists of a series of twenty questions, each having a set of four descriptive phrases. In any of the twenty sets, one of the four alternatives correlates to the four above-mentioned traits. These types of questions are known as tetrads. The respondents must indicate one phrase as "most like themselves" and one as "least like themselves." In each set, two phrases are highly complimentary and two are highly uncomplimentary. As it is not possible to give favourable answers to all four views, distortion due to a natural desire to give the right, or socially most acceptable answer, is reduced. The test is self-

administering and easy to score. The four scales are separately scored with each item marked "most liked" getting two points; each item not marked, one point; and items "least liked", no points. The maximum possible score on any one trait is forty.

The four scale scores can be interpreted in the following manner:

Cautiousness: Individuals who are highly cautious, who take a long time to think the problem over before making a decision, and who are risk averters score highly on this scale. Low scorers, on the other hand, are those who are impulsive, do things on the spur of the moment, make quick decisions, are risk preferrers, and seek excitment.

Original Thinking: Those who score highly in this section are those who enjoy difficult problems, are intellectually curious, like thought provoking questions and discussions, and like to think about new ideas. The low scorers dislike complicated problems and are disinterested in acquiring knowledge or intellectual stimulation.

Personal Relations: High scorers have high trust in people and are tolerant, patient, and understanding. Low scorers reflect lack of trust and confidence in people and have a tendency to become critical and insulted by the action of others.

Vigour: People who prefer to be active and always on the go will have high scores in this section. Those who are lethargic and prefer a slow pace will have low scores [1].

Gordon Personal Profile

The Gordon Personal Profile enables quick measurement of four aspects of personality: ascendency, responsibility, emotional stability, and sociability. These are four relatively independent, but psychologically meaningful, traits which have been found to be important in determining the adjustment and effectiveness of an individual in many social, educational, and industrial situations.

The answer sheet of the Profile consists of eighteen sets of questions, each with four parts in the form of a descriptive phrase, as in the Personal Inventory. The scoring method also is identical to that used for the Personal Inventory.

The four traits can be interpreted as follows:

> Ascendency: When an individual scores high in this section he will tend to be verbally ascendent, incline toward an active role in a group, be self-assured in dealing with other people, and tend to make independent decisions. On the other hand, those with low scores will play a passive role in group activities and will be listeners rather than talkers. They will let others take the lead and will normally be overly dependent on others for advice.
>
> Responsibility: Those individuals who will persevere with any job assigned to them and who can be relied upon will tend to score in the higher levels. Low scorers will be those who are unable to complete tasks which do not interest them and who are probably irresponsible.
>
> Emotional Stability: Those individuals who are well-balanced, emotionally stable, and relatively free from anxieties and nervous tension will generally have high scores. Low scores are associated with excessive anxiety, hypersensitivity, nervousness, and low frustration tolerance.
>
> Sociability: High scores are made by individuals who like to be with and work with people and who are gregarious and sociable. Low scores reflect the opposite; that is, general restriction of social contacts and, in the extreme, an actual avoidance of social relationships [2].

Straus Rural Attitudes Profile

The Straus Rural Attitude Profile purports to measure the attitudes of the farm operator and his wife towards certain rural values. As the name suggests, it is confined to a farm or rural situation. The farmer's version (M2) differs slightly in wording from the wives' version (F2). In method, however, the S.R.A. Profile is very similar to the Gordon tests and is, in fact, modelled after them. The S.R.A. Profile consists, in

each case, of a set of twelve tetrads. It measures four characteristics of farmers and their wives; namely, innovativeness, rural life preference, primary group preference, and economic motivation.

Straus describes the traits to be measured by the S.R.A. as follows:

> Innovation Proneness: A high score indicates individuals who have a desire to look for changes in farming or home-making techniques and are willing to introduce such changes into their own operations when practical. Low scoring groups have either a very slight or a neutral interest in changes.
>
> Economic Motivation: High scores will indicate individuals who place emphasis on monetary gain and hold it high in their scale of preferences. Low scorers would probably prefer to remain out of debt and may be satisfied with a lower income than is, in fact, possible. These people value self-sufficiency more highly than monetary gain.
>
> Rural Life Preference: Those individuals who see farming as merely one of a number of possible occupations are expected to return low scores in this scale. High scorers prefer farming for farming's sake and would generally not consider changing occupations.
>
> Primary Group Preference: Those who score high are individuals who find their associational needs best met by primary type contacts with family and neighbors, while low scorers prefer to seek diversity and the greater freedom of the urban pattern of association [6].

Farms in the Study

Data used in the study were collected from seventy-one respondent farmers. There were more than seventy-one farms originally selected, but some had to be dropped from the final analysis because of insufficiency of data, inability to arrange for interviews, refusal to cooperate (two cases), or failure to complete the interview with the matching operator. In cases where there were farms run in partnership (nine), the data supplied by the senior partners were used in the analysis. Of the final sixty-two farms, thirty-one belonged to an Alberta Farm Business

Association, a description of which is given in the following section. These thirty-one farms were designated as the Association Group. The remaining thirty-one farms were designated as the Control Group.

Each farm in the Association Group was paired with a farm in the Control Group. This enabled comparison between groups, and, if necessary, between pairs of farms.[1]

Association Group

Farms in the Association Group consisted of all members of Alberta Farm Business Associations in the black soil belt of Central Alberta, in the counties of Lacombe and Red Deer, and in the Municipal District of Mountain View. A provision was made that their farm operation be of the "livestock" type.

Membership in an Alberta Farm Business Association is voluntary. Membership might be an indication of a special interest in improving their present positions through positive action, an indication of preference for farm improvement by systematic analysis of farm organization, or a combination of both.

The Alberta Farm Business Associations were begun in 1958. The programme reached a peak in the late sixties and then declined in membership. Now the trend has again reversed and farmers are making use of its availability. Member farmers fill in a farm business analysis form from farm accounts they maintain themselves. Their respective District Agriculturalists act as field agents and often assist in estimating the

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[1] In order to avoid accidental identification of individual farm results, all names were omitted from survey records and farm questionnaires. Farms received a code number only to identify them by district, group membership, and pair association.

necessary input. Farm business analysis attempts to provide farmers with insight into the economics of their operation by giving them a better understanding of their farm income positions, liquidity and cash flow, capital position, relative profitability of enterprises, and ways and means of increasing profit opportunities with the available resources. Since its inception, the format of the farm business analysis report has been changed repeatedly and, since 1967, analyses of the provided data have been handled by a computer. Farmers, therefore, now receive a computerized analysis of their farm operations. In 1967, the year in which the data used in this study was collected, the cost per farmer for participating in the business analysis programme was ten dollars. There were five hundred commercial farms in the programme at this time. While the records of each individual farm are held in strict confidence, group averages on income, expenses, productivity, and efficiency measures are calculated and published annually in Farm Business Association reports. The individual farmer can then compare his business to the averages for the group, thereby locating strong and weak points in the organization and operation of his business.

Since not all F.B.A. farms located in the black soil zone could be interviewed, it was decided to limit the study to the "intensive livestock" types--cattle feeder and hog farms. This would reduce the internal variability (heterogeneity) of the Association Group. Furthermore, livestock farms are the predominant type in census divisions 6 and 8, of which the study region forms a part.

Control Group

In selecting the members of the Control Group an attempt was made to match each Association Group farm with a farm located close by

and whose operator was not a member of a Farm Business Association, but whose age matched within the range of plus or minus five years. The intent was to obtain a sample of farmers representative of the "average farm" in the region, but comparable to the Association Group farms with respect to physical farming conditions and age of operator. The aid of the local District Agriculturalists was sought to assist in selection of the control sample.[1]

[1] In retrospect, it appears that the selection method employed introduced a systematic bias. The Control Group averages 21 percent larger in size than the all-farm average of the 1966 census (705 acres versus 854 acres). At least three conditions may have contributed to this: (1) District Agriculturalists tend to be more familiar with the more active and outgoing farmers, (2) low income farmers seem to be more reluctant to discuss their farm affairs and often have a higher than normal refusal rate, and (3) farms operated as one management unit, such as a partnership or family corporation, would have been recorded as two or more farms according to census definitions.

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CHAPTER V

RESPONSE AND GROUP COMPARISONS

Introduction

As an initial step in the analysis, the two farmer groups were compared with respect to group means and distribution of responses to the interviews. Not only was this done to discover any obvious differences between the groups, but this first review of the statistical data base also serves as the basis for selecting variates in subsequent analysis.

Due to the fact that, in many cases, the results of the personality tests were seemingly very similar, an analysis of variance was carried out to test for any statistically significant differences between the group means [2]. The test used was a one-tailed t-test against the hypothesis that the two group means were not statistically different from each other at the 5 percent and 1 percent level of significance.

Prior to this, however, the data were rearranged into four affinity sections; namely: farm characteristics; biographical variables; preferences, attitudes, and personal characteristics; and success measures. These sections can be factored independently of each other and then tested as to the statistical relationship existing between them and certain measures of managerial success.

Before presenting the results, it is necessary to describe both the numbering and coding system used in handling each variate. The form and sequence of the questions were chosen to streamline the interview, reduce misunderstanding, follow a sequence from simple description of fact to more probing questions concerned with more intricate and

controversial details, retain conversational ease throughout, as well as to simplify keypunching.

Variates are referred to by a code consisting of a letter and a number. Those originating in the main farm questionnaire are assigned the prefix A and the number of the question (See Appendix I). Those originating in the personality trait questionnaires; that is, the Gordon and Straus profiles, are assigned the prefix B and numbered in order through the Gordon Personal Inventory, the Gordon Personal Profile, the Struas Rural Attitudes Profile form M2 (male), and the Straus Rural Attitudes Profile form F2 (female). Those variates contained in the Interview Report Sheet are assigned the prefix C; those in the Interviewer Rating Sheet are assigned the prefix D; analytics computed from raw data are assigned the prefix E; and those variates extracted from the financial returns provided by both groups are assigned the prefix F. The numeral following the letter bears no significance save as an identification device.

Derived variates which have been entered into the data block are all calculated from data supplied in the main questionnaire and in the additional financial statement supplied by the respondents. These variates mainly comprise farm ratics or describe certain farm characteristics. For example, E10, equity ratio, and E12, debt for farm purposes as a percentage of total assets, are derived variates.

Certain response data had to be recoded. Certain codes of a nominal type could be simplified. Thus, answers to question nine in the main farm questionnaire concerning the respondent's favourite sporting activity as a teenager (variate A9) can be coded as follows:

(i)	Hockey, baseball, football, or soccer	(1)
(ii)	Tennis, golf, swimming	(3)
(iii)	Fishing or hunting	(4)
(iv)	Boxing or wrestling	(5)
(v)	Curling, bowling	
(vi)	Something else	(0)

These were reduced to "prefer team sports as a teenager" (1)--answer (i) and "prefer other sports as a teenager" (0)--all other answers. The coding does not change the character of the classes used here. The numerals are used in an "indicative" mode only. They stand for different classes of answers. There is no implication of any order among classes in the sense that category (i) would in some way be higher or lower than category (ii).

Oridinal numbers imply systematic ranking. Variate A50, for example, requires an answer to how successful a farmer sees his operation in comparison with other farms in the area. The categories are:

(i)	Among the least successful one-quarter	(1)
(ii)	Among the lower middle one-quarter	(2)
(iii)	Among the upper middle one-quarter	(3)
(iv)	Among the top one-quarter	(4)

These responses have been translated into the numerals 1 to 4 in the order indicated. The numbers used are ordinal in character by virtue of the assumption that most people would acknowledge a ranking in the four classes of answers provided. It does not, however, imply that the distance say, from (1) to (2) is equal to the distance from (2) to (3). Neither does it imply that everyone attaches the same degree of success to "among the upper middle one-quarter"--interpersonal compatibility is not assured.

Cardinal numbers are used to represent a quantity that is part of a number system with systematic intervals. This attribute implies that numbers not only can be ordered, but that arithmetic operations can be performed with cardinal numbers. The operation 1 + 1 = 2 has "meaning" only if it implies that the distances from 0 to 1 and from 1 to 2 are the same consequently the addition implies that the distance from 0 to 2 in the number scale is exactly twice the unit distance. For example, the number of brothers and sisters (Variate A8) contains cardinal numbers and ordinary arithmetic can be performed on them.

Where possible, variates were recoded into cardinal number form. Where this was not possible, ordinal numbering was used. Omission of variates from the analysis was done for three reasons:

1. In some cases, derived variates were considered to be superior to the original variates and thus they were used to replace those original variates in the data.

2. There were a few variates in which the answers for all individuals were identical or nearly so. As these variates cannot assist in differentiating between farmers it was considered that no good purpose could be served by keeping them in the analysis and so they were omitted.

3. In some cases, the number of missing values in the responses made it impossible to obtain satisfactory results with their continued use.

Statistical computations were carried out with the facilities of the University of Alberta Computing Services and using the S.P.S.S. program package [3]. The following statistics were obtained for each variate: the absolute frequency, the relative frequency (percent), the cumulative

frequency (percent), the mean, the variance, the range, and the minimum and maximum values in each variate. Absolute and relative frequencies, and, where appropriate, means, are shown in Table 5.1 and are discussed below.

Farm Characteristics

The most common type of management structure (A27-1) was the single proprietorship. Other farms, namely informal partnership (without written agreement), partnership with written agreement, and farm corporation were combined in this report to make the variate "partnership or corporation" (A27-2). Of the Association farms, 74 percent were single proprietors, 3 percent were members of an informal partnership, 10 percent were members of a written partnership and 13 percent ran their operations as a corporation. In the Control Group, 65 percent of the farmers were single operators, 22 percent were members of an informal partnership, and the remaining 13 percent were members of a written partnership. A significant observation is that a considerable proportion of farms are run under some system of joint management. Official statistics would have us believe that there is no joint arrangement at all. (Because the question is never raised.)

The total number of farmers with non-farm income (A37) shows little variation between the two groups. However, the average non-farm income received shows a significant difference. The average non-farm income for the Association Group was $740 per year and for the Control Group, $1,045 per year. The fact of such a large number having non-farm income is interesting in itself. The amounts reported are considerably higher than the $321 average reported in a 1958 Farm Survey for Prairie Province Farms [1]

TABLE 5.1

COMPARISON OF GROUP RESPONSES BY ANALYTICAL SECTIONS

Variate Code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
	Farm Characteristics							
A 27-1	Management structure	Single operator	23	74.1		20	64.5	
A 27-2		Corporation or partnership	8	25.9		11	35.5	
A 37	Non-farm sources of income (per year)	Less than $200	19	61.3		18	58.1	
		$200 to $999	7	22.6		5	16.1	
		$1000 to $4999	5	16.1		7	22.6	
		More than $5000	0	0		1	3.2	
A 30	Acreage	Less than 640	13	41.9		10	32.2	
		640 to 1,279	13	41.9	758	12	38.7	854
		1,280 and up	2	6.4		4	12.9	
A 35 e	Present net worth[d]	Less than $100,000	12	38.7		9	29.0	
		$100,000 to $149,000	5	16.1		6	19.4	
		$150,000 to $199,000	3	9.7	$110,021	5	16.1	$140,083
		More than $200,000	3	9.7		4	12.9	
F 199	Total farm depreciation[c]		28		$5,156	26		$6,327
F 100	Total operating expenses[c]		28		$27,565	26		$43,354
F 200	Gross operating revenue[c]		28		$40,460	26		$51,203

TABLE 5.1 (Continued)

Variate Code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
E 2	Net farm income per acre[c]		31		$19.52	26		$9.75
E 3	Net worth per acre		26		$131	25		$170
E 4	Rate of return on capital[c]		26		12.7%	24		6.7%
E 5	Rate of return on sales[c]		31		23.8%	26		19.8%
A 39	Total farm product sales	Less than $10,000	0	0		2	6.4	
		$10,000 to $15,000	0	0		5	16.1	
		$15,000 to $20,000	1	3.2		1	3.2	
		$20,000 to $30,000	7	22.5	$58,940	7	22.5	$46,095
		$30,000 to $50,000	8	25.8		8	25.8	
		More than $50,000	15	48.3		8	25.8	
E 6	Percent grain in total sales[c]		31		49.8%	26		30.6%
E 7	Percent livestock in total sales[c]		31		49.2%	26		65.7%
E 8	Percent other in total sales[c]		27		0.9%	26		3.6%
E 9	Increase in net worth per annum		26		$7,615	27		$9,174
E 10	Lowest equity ratio		26		54.6%	29		6.3%

Table 5.1 (Continued)

Variate Code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
E 11	Mortgage debt ratio (Debt for land to total assets)		28		14.0%	29		15.0%
E 12	Farm debt ratio (Debt for farm purposes to total assets)		26		15.7%	28		12.5%
	Biographic Information							
E 1	Number of brothers and sisters	None	1	3.2		1	3.2	
		1 to 4	22	70.9	3.3	21	67.7	3.7
		More than 4	8	25.9		9	29.1	
A 8-2	Birth order	Oldest	14	45.1		10	32.2	
		2nd to 5th	14	45.1	1.3	19	61.3	1.5
		less than 5th	3	9.8		2	6.5	
A 1	Last grade of school completed	1 to 6	1	3.2		1	3.2	
		7 to 10	14	45.5	10.6	18	58.1	10.2
		11 and over	16	51.4		12	38.7	
A 2	Number of times changed schools	None	18	58.1		20	64.5	
		1 and over	13	41.9		11	35.5	
A 3-1	Arithmetic favourite subject		11	35.5		7	22.6	
A 3-2	Some other favourite subject		13	42.2		13	42.2	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
A 11	Lived on farm before 19 years old	0 to 9 years	1	3.2		0	0	
		10 to 14 years	0	0		1	3.2	
		15 to 19 years	28	90.3		28	90.3	
A 13	Allowance as a teenager	Never for any reason	2	6.5		1	3.2	
		Only for necessities	11	35.5		14	45.1	
		Fixed allowance or cash wages	8	25.8		3	9.7	
		Whenever needed	7	22.6		10	32.3	
		Livestock or land for own farm project	3	9.7		3	9.7	
A 16	Service in armed forces	Yes	8	25.8		12	38.7	
		No	23	74.2		19	61.3	
A 17	Lived away from farm since 20 years old	Yes	16	51.7		24	77.4	
		No	15	48.3		7	22.6	
A 18	Experience as a paid farm hand	None	20	64.5		18	58.1	
		1 to 9 years	7	22.5		12	38.7	
		10 years and over	4	13.0		1	3.2	
A 28	Years operated present farm	Less than 10	3	9.7		8	25.8	
		10 to 19	15	48.3		8	25.8	
		20 to 29	8	25.8	18.4	13	42.0	17.0
		More than 29	5	16.2		2	6.4	
A 29-1	Buy farm		15	48.4		15	48.4	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
A 29-2	Contract for or rent farm		11	35.4		12	38.7	
A 36	Non-farm employment	Frequently	1	3.2		1	3.2	
		Occasionally	6	19.4		4	12.9	
		Seldom	5	16.1		4	12.9	
		Never	19	61.3		22	71.0	
A 2 a	Age	Less than 40 years	9	29.0		7	22.6	
		40 to 59	20	64.5	44.9	22	70.9	44.8
		60 and over	2	6.5		2	6.5	
	Preferences, Attitudes, Personal Characteristics							
A 9	Prefer team sports as a teenager		21	67.7		26	83.9	
	Prefer other sports as a teenager		10	32.3		5	16.1	
A 43	Debt preference	Little at a time	5	16.1		10	32.3	
		Quick improvements	26	83.9		21	67.7	
A 44-1	Dislike nature's uncertainty		17	54.8		14	45.2	
A 44-2	Dislike long hours of work		4	14.4		2	6.4	
A 44-3	Dislike societal constraints		6	20.6		10	32.2	
A 44-4	No particular dislike		3	10.2		5	16.2	
A 45-1	Farm information from district agriculturalist		14	45.2		9	29.0	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
A 45-2	Farm information from farm sources		5	16.1		12	38.7	
A 45-3	Farm information from other off farm sources		8	25.7		8	25.7	
A 46	Speak to D.A. during the year	Yes	29	93.5		24	77.4	
		No	2	6.5		7	22.6	
A 48	Subscribe to other than farm/church magazines	Yes	27	87.1		23	74.2	
		No	4	12.9		8	25.8	
	Gordon Personal Inventory (raw score)							
B 1	Cautiousness		31		30.1	31		27.0
B 2	Original Thinking		31		24.3	31		24.0
B 3	Personal Relations		31		25.2	31		24.2
B 4	Vigour		31		25.9	31		24.5
	Gordon Personal Profile (raw score)							
B 5	Ascendency		31		19.8	31		20.7
B 6	Responsibility		31		28.0	31		27.6
B 7	Emotional Stability		31		26.3	31		25.3
B 8	Sociability		31		19.3	31		20.5

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
	Straus Rural Attitudes Profile (Male) (raw score)							
B 9	Innovation Proneness		31		6.3	31		5.2
B 10	Rural Life Preference		31		4.8	31		4.6
B 11	Primary Group Preference		31		3.1	31		1.9
B 12	Economic Motivation		31		2.7	31		2.3
	Straus Rural Attitudes Profile (Female) (raw score)							
B 13	Innovation Proneness		29		5.5	31		4.4
B 14	Rural Life Preference		30		6.2	31		5.7
B 15	Primary Group Preference		28		4.1	28		4.0
B 16	Economic Motivation		29		0.8	26		1.1
A 42	Farm size aimed at	1 section	5	16.1		10	32	
		2 section	9	29.0		8	25.8	
		Greater than 3 sections	2	6.4		3	9.7	
		Feeder operation	4	12.9		5	16.1	
		Content with present	11	35.5		2	6.4	
		Something else	0	0		3	9.7	
O 102	Willingness to adopt new methods	Unwilling	0	0		2	9.1	
		Somewhat willing	0	0		3	13.6	
		Willing half the time	5	20.0		6	27.3	
		Often willing	16	64.0		10	45.5	
		Always willing	4	14.0		1	4.5	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
C 108	Appearance of machinery	In open air - poor	1	4.8		4	16.7	
		In open air - O.K.	7	33.3		11	45.8	
		Well kept	13	61.9		9	37.5	
C 112	Reception by farmer	Suspicious	2	8.3		0	0	
		Cool	4	16.7		4	16.0	
		Courteous	18	75.0		21	84.0	
	Success Measures							
A 50	Success of operation (farmer rating)	Least successful 1/4	0	0		0	0	
		Lower middle 1/4	1	3.2		4	12.9	
		Upper middle 1/4	21	67.8		18	58.1	
		Top 1/4	9	29.0		9	29.0	
A 51	Satisfaction with farm	Not at all satisfied	1	3.2		1	3.2	
		Slightly satisfied	3	9.7		1	3.2	
		Moderately satisfied	10	32.3		11	35.5	
		Almost completely satisfied	11	35.5		14	45.2	
		Completely satisfied	6	19.4		4	12.9	
A 52	Satisfaction with living conditions	Not at all satisfied	1	3.2		1	3.2	
		Slightly satisfied	0	0		3	9.7	
		Moderately satisfied	4	12.9		4	12.9	
		Almost completely satisfied	9	29.0		8	25.8	
		Completely satisfied	17	54.8		15	48.4	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP Number	Percent	Mean[b]	CONTROL GROUP Number	Percent	Mean[b]
A 53	Satisfaction with social life	Slightly satisfied	3	9.7		2	6.5	
		Moderately satisfied	4	12.9		7	22.6	
		Almost completely satisfied	8	25.8		6	19.4	
		Completely satisfied	16	51.6		16	51.6	
A 54	Satisfaction with present income	Not at all satisfied	2	6.5		6	19.4	
		Slightly satisfied	1	3.2		5	16.1	
		Moderately satisfied	11	35.5		9	29.0	
		Almost completely satisfied	11	35.5		7	22.6	
		Completely satisfied	6	19.4		4	12.9	
A 40	Net farm income	Less than $1,250	1	3.2		1	3.2	
		$1,250 to $2,500	2	6.4		4	12.9	
		$2,500 to $5,000	4	12.9	$12,500	6	19.3	$7,600
		$5,000 to $10,000	4	12.9		13	41.9	
		$10,000 to $15,000	8	25.8		4	12.9	
		$15,000 and above	12	38.7		3	9.6	
D 101	Farmer rating by local agricultural officer	Below average	1	4.0		2	9.1	
		Average	8	32.0		9	40.9	
		Good	11	44.0	2.8	8	36.4	2.3
		One of the best	5	20.0		3	13.6	
D 103	Likelihood of still being in farming in 10 years time	Not likely	1	4.0		1	4.5	
		Need much luck	4	16.0		3	13.6	
		Average chance	2	8.0	3.8	6	27.3	3.4
		Better than average	9	36.0		10	45.5	
		Almost certain	9	36.0		2	9.1	

Table 5.1 (Continued)

Variate code[a]	Name of Variate	Category	ASSOCIATION GROUP			CONTROL GROUP		
			Number	Percent	Mean[b]	Number	Percent	Mean[b]
E 13	Capital turnover		23		0.308	24		0.276

[a] A = personal interview response (main questionnaire); B = from Gordon and Straus test forms; C = interviewer's report; D = outside evaluation; E = computed or recoded from raw data; F = directly from financial statements.

[b] Mean of respondents.

[c] Group means not comparable (see text).

In both groups there is a wide range of farm size, (variate A 30). The Association Group includes farms ranging from the largest of 1,460 acres to the smallest of 280 acres. The Control Group is similar with sizes ranging from 1,440 acres to 290 acres. The mean size in both groups, however, differs by 100 acres in favour of the Control Group. The mean acreage for the Association Group is 758, while for the Control Group it is 854 acres. In terms of sections, these are about 1.07 and 1.32, respectively.

In conjunction with the differences in size between the two groups (variate A 30), it is not unreasonable to expect that the net worth figures will be considerably higher for the Control Group farmers than for the Association Group farmers. This is in fact the case. The average net worth per farm for the Control Group farms is some $30,000 greater than for the Association Group farms. The figures are $140,000 and $110,000, respectively.

Total operating expense figures indicate considerable divergence between the two groups. The Association Group has a smaller mean than the Control Group. In conjunction with variate F 200, gross operating revenue, the difference between groups is further emphasized. While the mean operating revenue for the Association Group is $11,000 less than the mean operating revenue for the Control Group, the mean operating expenses for the Association Group are some $16,000 less than the mean operating expenses for the Control Group. The immediate implication is that the Association Group does incur relatively fewer expenses in production than the Control Group.

Net farm income per acre, (E 2) is not only a measure of the return to land, but also a measure of the intensity of the farming system. This

variate is derived from the division of the totals obtained in variate A 40, net farm income, by the totals obtained in variate A 30. The mean net farm income per acre for the Association Group is $19.52 while for the Control Group it is $9.75. Farm income per acre is a measure of the intensity of farming involved. It would be a measure of efficiency only if land remained a fixed factor, and this is not necessarily the case for the reported operators. Net worth per acre is a farm financial characteristic. The Control Group mean is considerably in excess of the Association Group mean. The figures for the respective groups are: Control, $170.62 and Association, $131.30. Net worth per acre reflects the total market value of the land less any outstanding debts carried by the owner. While it is mostly a reflection of market value (it will often fluctuate considerably with the economic climate of a country), it is also a reflection of the amount invested by an owner in his holdings.

Rate of return on capital (a measure of the profitability of an enterprise) indicates that the Association Group has a higher mean percentage, 12.78 percent, than the Control Group, 6.7 percent. This is related to the differences in net farm income.

Rate of return on sales is another measure of the relative efficiency with which farm income is generated. It is a relative measure because it cannot be assumed that either capital is a fixed factor or returns to scale are negligible. The higher this percentage, the less the expenses incurred in generating the farm products for sale. There is, however, a limit to the extent to which a high return on sales can be profitably increased. Once this level is reached, further reductions in expenses, or increases in output, would decrease total net returns. The mean percentage for the Association Group is 23.84 percent, while

for the Control Group it is 19.87 percent. Thus, while there is considerable difference in actual net incomes, there is not nearly so much divergence between groups where farm expenses incurred in generating farm sales are concerned.

Value of sales as the measure of size of business also indicates differences between the two groups. The gross farm sales can be divided into three sections: those emanating from livestock (E7), those from grain (E6), and those from other farm products (E8). These three sections do not give a clear indication of trends as both groups show a fairly similar picture with the majority of farm sales being derived from livestock, followed by grain, and other farm products playing a very minor role. The gross farm sales totals,(F200), on the other hand, do provide significant data. The average gross farm sales for the Association Group is $58,940, while the average for the Control Group is $46,095.

While the averages obtained by using the mid points of each range in F200 are useful, examination of the distribution is also worthwhile. Of the Association Group, 48 percent were in a gross sales bracket of over $50,000. The percentage of farmers in the same bracket in the Control Group was 25 percent. In the gross sales bracket, $30,000 to $80,000, the percentage of farmers from both the Association and Control Groups was 26 percent. The gross sales bracket of $20,000 to $30,000 for the Association and Control Groups gave a percentage of 22 percent. Three percent of the Association Group and 3 percent of the Control Group fell in the range of $15,000 to $20,000. No farmer in the Association Group had gross sales of farm products less than $15,000, but 16 percent of the Control Group were in the $10,000 to $15,000 range and 6 percent were in the $5,000 to $10,000 range. From a total picture viewpoint the Control Group varies more than the Association Group.

The percentage of grain sales in total sales (E 6) and the percentage of livestock sales in total sales (E7) gives some idea of the reliance of the farmer on various types of farming enterprise. That is, these figures designate the "type-of-farm." While the Association Group farmers rely as much on grain sales as on livestock sales, with mean percentages of 49.8 percent and 49.2 percent, respectively, and less than 1 percent from other sources, the mean percentage of grain sales in total sales for the Control Group is 30.6 percent, while for livestock sales the mean percentage is 65.7 percent. There is a slightly larger mean percentage of sales of other farm products in the Control Group, 3.6 percent compared to that of the Association Group.

Increase in net worth per annum figures (E 9) represent "real gains." The figures have been adjusted to the 1968 dollar value in order to eliminate the effect of changes in the value of the dollar. To have the figures as they were at the time the farms were purchased would make them meaningless in any type of analysis because of the various changes in the value of the dollar over the years due to inflation. In terms of 1968 dollar values, the mean increase per annum for the Association Group was $7,615 and for the Control Group it was $9,174.

The farmers' equity ratio (E 10) is the measurement of total farm wealth to owned assets. The mean equity ratios for the Association and Control Groups, respectively, are 2.2:1 and 3.7:1. Stated another way, for every dollar of unowned investment in their farms, the Association Group farmers own 2.2 dollars and the Control Group farmers own 3.7 dollars. These figures provide a good reflection of internal capital rationing. Farmers in the Association Group tend to be more inclined to borrow capital than farmers in the Control Group.

Capital borrowed for the purchase of land as a percentage of total assets (E 11) and operating loans as a percentage of total assets (E 12) were calculated separately. The mean percentage for both groups in debt for land shows the Control Group with a slightly higher debt than the Association Group.

The figures are: the Association Group, 14.0 percent, and the Control Group, 15.0 percent. On the other hand, as far as debt for other farming purposes is concerned, the Association Group mean is 15.7 percent and the Control Group mean is 12.5 percent. Thus, it appears that the Control Group may be prepared to borrow slightly more for other farming purposes.

Biographical Information

One of the standards on which the Control Group was selected was that each farmer's age should be within five years of that of his Association Group counterpart. This being the case, the distributions between groups are very similar. What may have important overtones is the spread of ages in the two groups. There were 29 percent of the Association Group and 23 percent of the Control Group who were under forty years of age. These farmers are those who began farming in the post-war years. There were 65 percent of the Association Group and 71 percent of the Control Group who were between the ages of forty and fifty-nine years. They began farming in the pre-war years. The remainder of the Association Group, (6 percent) and the Control Group, (6 percent) are in the sixty and over age group and are those whose farming began in the depression years. While it is difficult to evaluate the effects of age on performance, it is possible to make the assumption that socio-economic conditions, as were evident during the depression, the immediate pre-war years, and the post-

war years, will exert a certain influence on marginal attitudes of farm operators.

Most operators interviewed came from large families. Of the combined groups, only two respondents were from one-child families, and eight were from two-children families. Both groups showed a marked tendency to be high in birth order, thereby having more younger brothers and sisters than older brothers and sisters. In the Association Group, only six respondents indicated that they were the youngest in the family, while fourteen indicated that they were the eldest in the family. While the range of brothers and sisters in the Association Group is from zero to nine, that in the Control Group is from zero to thirteen. Percentage-wise, in the Association Group; 3 percent of the farmers had no brothers or sisters, 71 percent had between one and four brothers and sisters, and 20 percent with between one and four brothers and sisters, and 29 percent with more than four brothers and sisters. The variates "younger brothers and sisters" and "older brothers and sisters" were combined to obtain a measure of family size (E 1). This was felt to perhaps be important in determining different preferences and attitudes of farmers to their occupation.

Both groups have roughly the same mean of years of formal education (A 1). For the Association Group, the mean is 10.6 and for the Control Group it is 10.2. Although the means are similar, the distribution differs. There are distinctly more farmers belonging to the Association Group who have completed grade eleven and up than there are in the Control Group. The actual group percentages for the Association and Control Groups are as follows. Of the Association Group, 51 percent of respondents had completed grade eleven or above, as compared to 38 percent of the Control Group.

A number of individuals changed schools at one time or another. Percentage wise, 42 percent of the Association Group and 35 percent of the Control Group fell into this category. The difference hardly seems significant, but may indicate that the Control Group parents were more settled than the Association Group parents. Of those in the Association Group who did change schools, more than half changed only once. The percentages of those who changed schools two or more times are for the Association and Control Groups, respectively, 19 percent and 22 percent of the total number in each group.

Variate A 3, the favourite school subject of the respondent, has been reduced from six to two categories namely, A 3.1 (like arithmetic best) and A 3.2 (other preference and no preference). Of the Association Group, 35 percent preferred arithmetic and 41 percent preferred some other subject, while for the Control Group 22 percent preferred arithmetic and 42 percent preferred some other subject. The indications are that perhaps the Association Group has a greater penchant for figures, an attribute which would draw them to farm budgeting and other calculations.

Variate A 13 involving boyhood experiences in money management, is one of those adopted from the Thomas and Blanchard Study [2], where it was found helpful in discerning managerial potential. This variate created some problems in recoding as three of the suggested alternatives elicited very few responses. The responses are recoded as given in Table 5.1. Eventually responses were ranked to obtain a continuous, though ordinal, variate. The ranking reflects the availability of purchasing power for own disposition regardless of the form in which it was made available. The rankings assigned to each alternative are somewhat arbitrary and may not coincide with the rankings other would assign.

The next group of responses deals with away-from-home and non-farm experience (A 17). In the Association Group, 51 percent had lived away from their home farm for some time since they were twenty years old. The Control Group response, however, indicates that 77 percent had lived away from their home farm.

There was little difference between the groups in response to the question of service in the armed forces. In both cases the majority of answers indicated no armed forces service. Of the Association Group, 26 percent indicated that they had served while the remaining 74 percent gave a negative answer. Of the Control Group, 39 percent indicated that they had served while 61 percent said they had not.

The question related to experience as a paid farm hand resulted in 65 percent of the Association Group indicating that they had not had any such experience while 35 percent said they had. Of the Control Group, 58 percent indicated that they had no experience as a paid farm hand while 42 percent said they had.

Control of the farm (A 29) came about through various avenues. While it may be suspected that the form of the question played down inheritance, information on later land acquisition and borrowing (see E 10 and A 30), do not indicate this. The question was designed to discover how the initial holding was obtained, not how the total present holdings were obtained. It appears that many respondents gained control of and began operation of a farm of their own prior to acquiring more land through inheritance. The response relfects what most of the respondents considered the most important means by which they obtained control of their farm, namely through a monetary transaction. Variate A 29 originally contained eight alternatives. These were reduced to two alternatives. "Purchase the farm"

became one variate combining the alternatives "buy at arm's length" and "buy from relatives." Inheritance accounted for only a very small proportion of all the responses, as did the alternative "something else." As a result, these were omitted. (Even combined, they still accounted for fewer farmers than the next lowest alternative.) The remaining alternatives dealing with contracting to buy the farm or renting the farm were combined and made up the variate "contract or rent." "Purchase the farm" accounted for a little over 50 percent of all the respondents. For the Association and Control Groups, respectively, the percentages are 49 percent and 52 percent. "Contract for deed" accounted for 12 percent of the Association Group and 19 percent of the Control Group, while renting accounted for 19 percent of the Association Group and 12 percent of the Control Group.

On the whole, not many of the respondents engaged in regular non-farm employment in slack periods (A 36). Sixty-one percent of the Association Group have never taken off-farm work. Only 3 percent have taken such work on a regular basis. The remaining 36 percent are in the alternatives "occasionally" and "seldom." The Control Group, on the other hand, reported even less off-farm work; only 3 percent of the respondents in this group took other jobs frequently. There were 25 percent who took off-farm work either seldom or occasionally, and 71 percent never took any off-farm work.

Preferences, Attitudes, and Personal Characteristics

The variates brought together in this section include reported teenager preferences (A 9), responses to direct questions (A 43, A 44), habits of information gathering, and social communication. Also included are the raw scores of the Gordon and Straus test instruments.

The response to question A 9 (enjoyment of physical activities as a teenager), confirms that by far the most popular activity in both groups was team sport involving body contact. Of the Association Group, 67 percent of the farmers enjoyed this type of sport, while in the Control Group 84 percent preferred this alternative. In the Control Group only one other type of physical activity was selected--single participant non-contest activities (fishing or hunting). The response to this alternative included the remaining 16 percent of the respondents. The Association Group, however, was a little more diversified. Three percent preferred single competitor non-body contact sports, for example, swimming and tennis; 15 percent preferred single participant non-contact sports such as fishing or hunting; 3 percent preferred curling or bowling, which are team but non-contact sports; and the remaining 9 percent preferred some other type of physical activity which had not been suggested in the list of prepared responses. All but the group sports activity were combined as the single alternative (Table 5.1).

In response to a direct question (A 43), attitudes to borrowing differ considerably between groups. Of the farmers in the Association Group, 84 percent preferred to borrow and imporve their farms quickly, while the remaining 16 percent were content to borrow either small amounts or none at all and develop the farm from realized income. The corresponding figures for the Control Group are 68 percent and 32 percent respectively.

Variate A 44, dealing with farmer dislikes of his occupation, contained four alternatives. Of these, "uncertainty due to weather and poor crops" was separated as a single variate in its own right. This alternative had by far the most responses of any of the alternatives.

"Nothing in particular" reflects either a positive attitude towards farming or an inability to choose. Dislike of government programs or taxes is reflected in "societal constraints." Physical dislikes are reflected in the variate "long hours of work." The most prominant dislike, accounting for 54 percent 45.2 percent of the answers in the Association and Control Groups, respectively, is the uncertainty due to natural risks such as the weather. Twenty percent of the Association Group and 32 percent of the Control Group disliked government programs and regulations. Fourteen percent of the Association Group and 6 percent of the Control Group disliked the long hours of work. Ten percent of the Association Group and 16 percent of the Control Group indicated that they did not dislike anything.

Information about new practices and techniques (A 45), comes from a variety of sources. The Association Group tends, more than the Control Group, to consult the local district agriculturalist. Farm Business Association membership is by itself a factor encouraging contacts with the district agriculturalist. But F.B.A. membership usually has its beginning in some kind of contact with the local D.A. The Control Group reported that they had contact with the D.A. less frequently than the Association Group. It will also be observed from alternative responses to this variate that the Control Group has a tendency to rely more on traditional means of obtaining information (such as from parents, own experience, neighbors, and so on).

In fact, percentage-wise, the Association Group shows 84 percent obtaining information from the district agriculturalist, feed company, Canada Department of Agriculture, etc. (75 percent from the district

agriculturalist), while the remaining 16 percent seek information from the traditional sources of family and friends. The Control Group, on the other hand, shows only 65 percent of information coming from the institutional sources and the remaining 34 percent from traditional sources. The eleven alternatives in variate A 45 were combined to form three variates: "information from district agriculturalist," "information from farm sources," and "information from off-farm sources." Considerably more farmers in the Association Group spoke to district agriculturalists during the year (A 46) than did those in the Control Group--93 percent as compared to 77 percent. These figures are high in both groups compared to other cross-sectional studies.

The results of the analysis of variance carried out on the personality tests indicate that in the Gordon Personal Inventory there is a statistically significant difference between the two group means at the 5 percent level of significance. However, for the Gordon Personal Profile, the group means are not significantly different from each other at the 5 percent level of significance.

The results of the analysis of variance carried out on the Straus Rural Attitudes Profile for the farmers themselves indicate a statistically significant difference between the group means at the 5 percent level of significance. But, for the wives the group means are not significantly different.

There is considerable variation between the groups where future desired farm size is concerned (A 42). Whereas 35 percent of the Association Group are satisfied with their present farm size, only 6 percent of the Control Group feel the same way. There are twice as many farmers in the Control Group as in the Association Group who are aiming for a one-

section (640 acres) farm. This is 32 percent and 16 percent of the two groups, respectively. In number, those aspiring to a two-section farm were fairly similar in both groups and accounted for 29 percent of the Association Group and 26 percent of the Control Group. It may be interesting to note that, of the farmers who are concerned with one or two-section farms, in the Association Group almost twice as many expressed a desire for two-section farms as for one-section farms. In the Control Group, however, the numbers wanting one or two-section farms are fairly similar. Of the remaining few in the Control Group, 10 percent wanted a three-section farm and 10 percent wanted some other type of farming system. All of the Association farmers remaining (7 percent) indicated a desire for a three-section farm. In a number of cases, the respondents made it clear that their farm size objective cannot be defined in acreages. These were 13 percent and 16 percent, respectively, stating size goals in terms of head of cattle owned, and about 10 percent in both groups used annual turnover of birds (poultry operation) as a size measure. In terms of present size, the indication was that, on average, the farmers of both groups were aiming for holdings of a larger size than they presently had. Of those farmers who indicated that they were aiming for a certain size, the Association Group average is 1,090 acres as compared to the present group average of 758 acres, and the Control Group average is 1,000 acres.

An outside opinion on willingness to adopt new methods, (Variate D 102), was sought from the farmers of both groups. The response, however, was incomplete and could not be used for factor analysis. The Association Group had 80 percent grouped in the top two categories, "often willing" and "always willing," while, on the other hand, only 44 percent of the Control Group were in these two categories. The remaining 20 percent

of the Association Group's valid responses wer in the category "willing about half the time," while 24 percent of the trol Group were in this category. The remaining 32 percent of the Con ol Group were in the lower two categories, "sometimes willing" and "willing." Thus, it appears that the Association Group is seen as more likely to adopt new methods than the Control Group.

The last two variates represent the interviewer's opinion. Being of the "first impression" category, not too much reliance can be placed on them. Regarding machinery appearance, only two-thirds of the responses were valid. Sixty percent of the Association Group, but only 40 percent of the Control Group, rated machinery as being "well kept." Only 5 percent of the Association Group is in the class "appear in poor shape," along with 16 percent of the Control Group. The remaining respondents, 35 percent and 44 percent respectively, fall into the intermediate class "O.K., some machines in the open."

The reception accorded the interviewer by the respondents gave results which were fairly similar between groups. In 84 percent of the 80 percent of valid responses in the Control Group, the reception was judged "courteous," as were 75 percent of valid responses in the Association Group. In 16 percent of both groups, the reception was described as "cool," and in only two instances (9 percent of the Association Group) did the respondents display an attitude considered "suspicious." In virtually all instances, the interviewer was personally unknown to the respondents prior to the first farm visit. The reception thus might be taken as an indication of the respondents' approach toward strangers. Observation of this approach may provide experience that could prove useful in briefing future interviewers.

Success Measures

Success rating by the individual farmers (A 50) brings fairly similar responses from both groups. Sixty-eight percent of the Association Group considered themselves among the upper middle quarter of success when compared to other farmers with whom they were acquainted. Fifty-eight percent of the Control Group also considered themselves in the upper middle quarter. Twenty-nine percent of the Association Group and 39 percent of the Control Group considered themselves in the top quarter of success and only 3 percent of the Association Group and 13 percent of the Control Group thought that they were under the upper middle quarter. These percentages should become more meaningful when related to actual performance criteria.

Satisfaction with the present farm (A 51) obtained almost identical ratings from both groups. Only 13 percent of the Association Group and 6 percent of the Control Group were anything less than moderately satisfied and only 19 percent of the Association Group and 13 percent of the Control Group were completely satisfied. The remaining 68 percent and 81 percent of the Association and Control Groups, respectively, were spread evenly over the remaining alternatives; namely, "moderately satisfied," 32 percent and 35 percent, respectively, and "almost completely satisfied," 36 percent and 46 percent, respectively.

Satisfaction with living conditions (A 52) was almost the same for both groups. While 55 percent of the Association Group were completely satisfied, 48 percent of the Control Group were satisfied. Only 3 percent of the Control Group and 3 percent of the Association Group were completely unsatisfied. The remaining 46 percent and 49 percent of the respondents were spread over the rest of the categories. None of the Association

Group and 10 percent of the Control Group were slightly satisfied. Thirteen percent of the Association Group and 13 percent of the Control Group were moderately satisfied, while 29 percent of the Association Group and 26 percent of the Control Group were almost completely satisfied.

With regard to "satisfaction with social life in the community," both groups had an identical percentage: 51 percent who are completely satisfied with social life. Twenty-five percent and 19 percent of the Association and Control Groups, respectively, are slightly satisfied or almost completely satisfied. Thirteen percent and 23 percent, respectively, were moderately satisfied. No one in either group was not at all satisfied.

Satisfaction with income (A 54) may be expected to differ markedly, given that both groups entertain roughly the same income goals. The figures seem to bear this out. A much greater percentage of Control Group farmers were unsatisfied with their present income range than were the Association Group farmers. While the Association Group mean net income was twice as large as the Control Group mean, there are some Association farmers with relatively low income levels. Thus, it is not surprising that there were a few Association farmers who were not very satisfied with their incomes. The percentage figures for each group follow. While 6 percent of the Association Group was not at all satisfied with present income, 19 percent of the Control Group was in the same category. Only 4 percent of the Association Group was slightly satisfied, as compared to 16 percent of the Control Group. Thirty-five percent of the Association Group was moderately satisfied and 29 percent of the Control Group felt the same way. Thirty-five percent of the Association Group was almost completely satisfied, as were 22 percent of the Control Group. Finally,

20 percent of the Association Group was completely satisfied, but only 13 percent of the Control Group felt the same way. In aggregate, 88 percent of the Association Group was moderately satisfied or better, while 64 percent of the Control Group was moderately satisfied or better.

Net farm income comparisons (A 40) bring to light considerable differences between groups. Average net farm income, as calculated from figures supplied by the respondents, shows that for the Association Group the average was $15,840 while for the Control Group the average was $7,865. One conclusion which may be drawn from these figures is that the Association farmers were more efficient farmers. Another possible conclusion is that the Control Group respondents as a whole were more modest in rating their income level or were less aware of the actual magnitude of their net farm income. Any one or any combination of these and other possibilities may be true.

Net farm income per acre figures show that the Association farmers derive considerably more from each acre than do the Control farmers. This being the case, it did not appear an error to assume that, as a group, the Association farmers were more accomplished farmers. What remained to be done was to see if some of the differences could be isolated through the factor analysis technique.

Of the 75 percent of valid responses for the outside farmer rating (D 101), at least 75 percent in both groups fell in the range average or good. The distribution between average and good in both groups was almost identical. Of the remaining 25 percent of valid responses in the Association Group, 20 percent were rated very good, while 12 percent of the Control Group was rated very good. Conversely, 5 percent of the Association Group and 13 percent of the Control Group were rated below average. No farmer in either group was rated very poor.

Association Group was given a much greater chance of remaining on their farms in the next decade than the Control Group (D 103). Of the 75 percent of valid responses, 72 percent of the Association Group and 54 percent of the Control Group were rated in the top two categories "almost without a doubt" and "may quit for reasons other than lack of farm success." The remaining 28 percent of the Association Group and the remaining 46 percent of the Control Group was spread fairly evenly over the remaining three categories: "better than average chances," "about average chances", and "with a lot of luck." No respondent in either group was rated "not likely to farm in ten years."

Capital turnover (E 13) was calculated by dividing gross operating revenue by total farm capital. This gives a figure representing the time taken for a farm to have an operating revenue turnover equal to the amount of farm capital. A rapid rate of capital turnover normally indicates a fairly healthy and successful business. On the whole, the rate of turnover is very slow, but probably typical of farms. For the Association Group, the mean capital turnover is 0.308 and for the Control Group it is ten percent less, 0.276.

Summary

The test variates do indicate some differences between the Association and Control Groups. In summary, the main differences apparent from the comparisons made in this chapter are as follows.

Among the farm characteristics, the divergence between groups in terms of non-farm income is considerable and in favour of the Association Group. In the field of operating expenses there is considerable divergence between groups, more so than the differences in operating revenue would at firs

indicate. This implies that the Association Group incurs fewer expenses per operating dollar than the Control Group. Net income comparisons show that in terms of intensity (income per acre) the Association Group returns more than the Control Group. Rate of return on capital, a profitability measure, indicates that the Association Group is superior to the Control Group.

Biographic comparisons resulted in only a few divergences between groups. The only major one showed that the Control Group had a far greater tendency than the Association Group to enter into employment and to obtain experience away from home before returning to farming.

Preferences, attitudes and personal characteristics comparisons revealed a number of differences between groups but not many which may be significant. While only two types of physical activity seem to have appealed to the members of the Control Group, the Association Group answered in the affirmative in five categories. Attitudes on borrowing differ to the extent that the Association Group appears, on the whole, more inclined than the Control Group to borrow for farm imporvements. Comparison of the groups' answers on the three attitudinal questionnaires indicate that there are significant differences between the groups in two of the three cases. Future aspirations with respect to farm size show the Association Group much more satisfied with their present situation than the Control Group. However, both groups were universal in terms of having members desiring an increase in their holding size to one, two or three sections. Willingness to adopt new methods has the Association Group much more willing than the Control Group. This perhaps indicates a more receptive or innovative frame of mind among the Association Group members.

In terms of success and satisfaction measures, the Control Group shows much less satisfaction with present income than does the Association

Group. This coupled with the fact that mean net income for the Association Group is twice as much as the Control Group provides for some interesting and varied speculation.

These comparisons then, while providing food for thought, give no clear indication of superior management one way or the other.

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CHAPTER VI

METHODS OF ANALYSIS

Factor Analysis

Today factor analysis is a fully recognized statistical technique which can be applied to many areas of scientific inquiry. Its beginnings, however, are very much tied up in the realms of psychology. It has become one of the most widely used multivariate techniques, although as Hotelling has pointed out, the application of the same has not always been entirely appropriate [4].

While there are a number of people who have become highly involved with theories of factor analysis, those to whom most recognition is given are: Spearman, Burt, Kelley, Thurstone, Holzinger, and Thompson [12]. Of these, it is Charles Spearman who is generally acknowledged as the man who initiated factor analysis. In 1904, he published a paper in the American Journal of Psychology entitled "General Intelligence, Objectively Determined and Measured." This paper involved the development of a psychological theory of a single factor and a number of specific factors and was the basis of his two-factor theory.

After 1925, there was a considerable broadening of interest in factor analysis and there was considerable comment both for and against the then-used theories. During the 1930's it became apparent to many that the two-factor analysis of Spearman was in some cases not adequate for describing certain sets of tests. Due to this broadening of interest and the shortcomings of Spearman's model, group factors came into being. In fact, what really happened was that Spearman's original specific factor form was replaced by theories of many factors. The original method of determination was still employed. It was Garnett who evolved the concept of multiple

factor analysis through the extraction of several factors directly from a matrix of correlations among tests [2].

Because factor analysis was born in a psychological setting, it was for many years applied chiefly to psychological testing. In 1940, Kelley was one of the first to propose a broadening of the range over which factor analysis may be applied [6]. Today the majority of factor analysis studies are involved in clarifying and verifying certain scientific hypotheses in fields of investigation often far removed from the realms of purely psychological interest.

Factor Analysis Method

As a method by which inroads are made into problems of the unknown, factor analysis attempts to account for the covariances of certain observed variates in terms of a much smaller number of hypothetical variates or factors.

In factor analysis the basic assumption is that:

$$x_i = \sum_{r=1}^{k} \lambda_{ir} f_r + e_i \quad (i = 1, \ldots, p),$$

where f_r is the rth common factor, the number k of such factors being specified, and where e_i is a residual representing sources of variation affecting only the variate x_i [7].

In the above equation it is assumed that the random variates (e_i) are independent of each other and of the different factors (f_r). The factors may be defined as either oblique or orthogonal, that is, correlated or uncorrelated. Usually variates are standardized with a variance of one and a mean of zero.

A warning must be included in terms of the variates in a particular study. If a certain process is common to a whole set of characteristics in a sample or observed population which is being tested; that is, there are

no individual differences with respect to that process, then that process cannot be investigated by factor analysis. In other words, if a population contains some identical characteristics, or has the same reaction to certain processes, then it is not possible to differentiate between processes in that population by using factor analysis.

While factor analysis is not restricted by assumptions regarding the nature of the factors, there are certain assumptions made with regard to the nature of the data from which these factors will be discovered. These are briefly as follows:

1. Individual differences in a great number of tests are possible to describe as functions of individual differences in a limited number of fundamental variables.

2. The multi-variate populations have different factor structures.

3. The interaction of the factors in the different tests are possible to describe approximately through addition.

4. The relations between factors reciprocally and between tests and factors are approximately linear.

5. The same pattern of loadings applies to all individuals in the population and the differences between individuals depend on different numerical values in factor scores [3].

All that is assumed by factor analysis as a statistical method is that there are a variety of phenomena in a certain set of data and that these are in some way correlated and can be at least partially expressed by a smaller number of factors.

In factor analysis there are no independent and dependent variates. If the nature of the study of a set of data requires an analysis of the underlying order among the variates, then it is a factor problem. If,

on the other hand, the important consideration is a prediction involving a selected (dependent) variate and a set of other (independent) variates, the problem is one of regression.

Factor Analysis Model

To go deeply into the algebraic systems underlying factor analysis is beyond the scope of this paper. Considerable simplification can be had, however, in describing the factor process in matrix form, following [7].

Of primary importance in factor analysis is the square table of the intercorrelations of n observed variables--called the correlation matrix, which in the case of standardized observations is also the covariance matrix. This matrix of correlations is square and symetric because $r_{jk} = r_{kj}$, and of order n.[1] When this matrix is written with unity in the diagonals, it is called a complete correlation matrix and is denoted R_1. The correlation between the standardized observations or scores Z_{ji} and Z_{ki} (where subscripts j and k both refer to observed variables) is

$$r_{jk} = \frac{1}{N} \sum_{i=1}^{N} Z_{ji} Z_{ki}$$

because the standard scores have unit standard deviation and unit mean.[2] The standardized score matrix with elements Z_{ji} is an n x N matrix and is denoted Z. The score matrix with elements Z_{ik} is the transpose of Z and is of the order N x n. Therefore, the matrix algebraic expression for the product moment correlation can be written as $R_1 = \frac{ZZ'}{N}$. This is the matrix of observed correlations. If $Z = AF$ is substituted into this equation and into the observed correlation matrix; that is, replaced by the matrix

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[1] n = number of variates 1, 2 .... j, k .... n.

[2] N = number of observations.

of reproduced correlations R*, then the result is:

$$R^* = \frac{AFF'A'}{N} = \frac{(FF')A'}{(N)} = A \phi A',$$

A being the matrix of factor loadings of the n variates Z on the m factors F.

When the diagonal matrices of the reproduced correlation matrix R* are unity,

$r_{jj} = \frac{1}{N} \sum_{i=1}^{N} Z^2_{ji} = 1$, the resulting matrix can be represented as $(R^* + D^2)$.

Another way of describing what has been done is by saying that we have separated the uniqueness, d_j^2 from the communality, h^2_j, in the (unit) variance of each variate. Uniqueness can be described as a complement of communality and this, $H^2_j + U^2_j = 1$. Communality of a variate denotes that part of the total variance of a variate which is attributable to common factors.

With the matrix $(R^* = D^2)$, the equation $R^* = A \phi A'$ becomes:

$$(R^* + D^2) = M \overset{\Phi}{} \overset{Q}{} M'$$

in which the composite square matrix of order (m = n) includes an identity matrix(of order n) of correlations among unique factors as well as the correlation matrix (of order m) among the common factors.

With a complete factor matrix of common factors in n observed variables and N observations (F) and a complete factor matrix of unique factors in n observed variables and N observations (U), a factor pattern matrix, M, can be formed composed of the matrix A of common factor coefficients and the diagonal matrix D of unique factor coefficients. That is:

$$M = AD$$

Common factors represent characteristics that are involved in two or more variates in the battery of variates. Unique factors, on the other hand, are those which are involved in only one variate in the battery. Hence, the diagonal form of the Matrix D.

The factor pattern for the total pattern matrix can be written as:

$$Z = M\ (f/u) = A/D\ (f/u) = A_f + D_u.$$

For the common factor portion of the total pattern matrix this becomes simply $Z = A_f$.

The table of correlations of the varibles with the factors, called the structure, is defined by:

$$S_{jp} = R_{Zj}\ F_p,$$

where $j = 1, 2, \ldots n$ and $p = 1, 2, \ldots m$.

It is now possible to develop the relationship between the pattern and the structure.

The common factor pattern $Z = A_f$ can be written specifically in terms of N observations, namely $Z = AF$. The next step is to post-multiply both sides of this expression by the transpose of the matrix of common factor values F and divide by N observations to obtain:

$$\frac{ZF'}{N} = \frac{A\ (FF')}{N}.$$

The left hand side of the equation will now simplify to $\frac{ZF'}{N} = S$. The expression in brackets on the right hand side is the matrix of correlation coefficients among factors. Substituting into the equation $\frac{ZF'}{N} = \frac{A\ (FF')}{N}$, the expression can be reduced to the form $S = A$. This is the fundamental relationship between the factor pattern matrix A and the factor structure matrix S. This expression, in effect, says that the structure matrix is equal to the pattern matrix post-multiplied by the matrix of correlations among the factors.

With the relationship between the pattern and structure, alternative formulas can be derived which preclude the explicit use of the matrix Φ.

Substituting $S = A \Phi$ into:

$$R^* = \frac{AFF' A'}{N} = A \frac{(FF') A'}{(N)} = A \Phi A'$$

results in $R^* = SA'$. When the factors are uncorrelated, the matrix Φ reduces to an identity matrix and $R^* = A \Phi A'$ simplifies to the following e: ession for the reproduced correlations. That is, $R^* = AA'$. What this means is that the product of the complete factorial matrix, by its transpose, is the complete correlation matrix.

In factor analysis, the objective is to fit a set of observed data which has already been reduced to a matrix of correlations with a model, the factor pattern. In matrix notation, this is $Z = A_f + D_u$. Assuming that such a pattern exists, the required correlations are derived from the common factor coefficients. This can be seen from $R^* = AA'$. In order that the reproduced correlation matrix (R^*) appropriately fits the observed correlation matrix (R), the diagonal elements must also be obtained from the common factor portion of the pattern. Therefore, if coefficients which approximate the communalities are inserted into the observed correlation matrix instead of the unity diagonal, the factor solution involves both common and unique factors. This approach is also called the Principal-Factor Solution. However, if the principal diagonal of the observed correlation matrix is unity, only the common factors will be involved in the factor solution. This is because, in order to produce the unity values from the equation $R^* = AA'$, only common factors can be used (Principal-Component Solution). Therefore, it should be noted that the values placed in the principal diagonal of the observed correlation matrix will determine what part of the unit variances are factored into common factors.

The final factor analytic solution concludes with the matrix of factor loadings A_f, or the factor pattern matrix. An element of this matrix indicates the strength and direction of association between one of the variates and one of the factors.

The factors in this matrix are purely mathematical devices which are designed so as to maximize the communality part of the covariance of all the variates. The factors in the factor pattern matrix simply serve the purpose of identifying the various factors needed to adequately reproduce the observed correlations. There is no need to expect, from the way that they were obtained, that they can be interpreted.

However, it is possible to take the factors defined by A_f and redistribute, by what is termed factor rotation, their associative functions among the same number of new factors that can be identified and interpreted. It is then possible, through inspection of rotated factors, to select those variates with large factor loadings as the main determinants of the factor and, in addition, to find some underlying connection between the variates not shared by those which do not have large loadings.

Factor rotation is directed toward two ends: first, to obtain some theoretically meaningful factors and, second, to obtain the simplest factor structure [9]. What this means in practice is that, given the fixed number of factors extracted from the matrix of correlations and the fixed amount of variance accounted for by these factors, one tries to simplify the rows (or columns) of the factor matrix to make as many values as possible in each row (or column) close to zero. Either of these simplifications will lead to the same simple structures. As well as this, an unrotated solution may be unstable in that the removal of a variate from the matrix of correlations may change the matrix loadings on the unrotated factors. In this respect, the rotated factors are more stable than the unrotated ones.

In a rotated factor matrix the numbers called loadings in each row represent regression coefficients of factors on a given variate. Thus, the factor with the highest loading in any given row will be most closely related to the particular variate in question. By reading every row in the matrix in a like fashion, it is possible to describe the linear composition of the communality of each variate in terms of the factors. By scanning each column, it is possible, in turn, to ascertain the character [illegible] of each factor in terms of its association with the variates. The process, then, is one of reduction of a large number of variates to a reduced number of composite factors which best represent the collectivity of component variates.

The communalities for the final rotated factor matrix are taken into account in determining the validity of the factors. The communality of a variate shows the total variance of a variate accounted for by the combination of all common factors. Therefore, the larger the communality value for any variate, the more use that variate is in the factor complex. The variates with high communalities can be thought of as prime variates.

The selective and interpretive stage in factor analysis is largely subjective as the interpretation of the factors and their particular variates is not independent of the opinions and feelings of the researcher.

Estimation in factor analysis may therefore be regarded as a two-stage process. First, the factor pattern (the number of factors required to account for significant correlation between the variates and the loadings of the factors in these variates) is estimated. Second, there remains the problem of estimating the scores of the individual members of the sample for the factors themselves, using the factor structure matrix, S, and scores, Z. In factor analysis, where the total variance of the variates

is not accounted for by the common factors, F_r, the calculation of the factor scores is problematic.

Computations

The initial step in the factor analysis of raw data is the compilation of a matrix of correlations. Working by hand, this calculation would constitute an enormous task; however, the job is much simplified through the use of a computer program in the Statistical Package for the Social Sciences [10]. One particular program in this package handles the calculation of a matrix of correlations. A sub-program "factor" in the same package handles the extraction of factors from the matrix of correlations [11].

The Correlation Matrix

Correlation coefficients were calculated for some seventy-three variates belonging to the four affinity groups. Initially, a 73 x 73 correlation matrix for all the variates was obtained. Following this, the correlation coefficients for each section were separated and the end result was four correlation matrices for each of the two farmer groups, each matrix having unity, (1.0000) in the principal diagonal. In this form, then, the matrices of correlations for each group and section can be factored.

Factor Analysis by Groups

The type of analysis used in this study, classical factor analysis, is based on the proposition that the observed correlations between the variables are mainly the result of an underlying regularity in the data; that is, the analysis deals with inferred, rather than defined, factors. In S.P.S.S. five methods of factoring are available, but only principal factoring wtih iteration (P A 2) was used here. There are two reasons for this selection.

First, it automatically produces inferred factors by replacing the main diagonal coefficients in the matrix of correlations wtih estimates of communality. Second, it employs an iteration procedure for improving the estimates of communality, which it continues to do until the differences in two successive estimates of communality are negligible. At present, P A 2 is the most universally accepted factoring method.

"Equimax" factor rotation is used in this analysis. It compromises to a certain extent by trying to accomplish simplification on both the rows and columns of the factor matrix rather than concentration on one or the other. Equimax is an orthogonal method of rotation which means that the factors are assumed to be initially uncorrelated; that is, independent from each other.

While the initial factor solution extracted by the iterative principal-factor method (P A 2) produces orthogonal factors in the order of their importance, the rotational method simplifies the factors by assigning each variate to the single most significant common factor.

Factor Scoring

Once the factors and their associated "leading" variates have been determined, it is necessary to calculate the factor weights of each individual. The factor scores (F_j) are derived from the X_i's variates (X_j) for each individual farmer. As the relationship between the F_j's and the X_i's is not known, the use of ordinary regression techniques of the form $F_j = \beta_i X_i + E_j$ is not possible. Thus correlation coefficients cannot be constructed.

There are, however, several methods of computing individual factor scores:

1. The one selected for this study is a factor score computer program which utilizes the original data matrix used to calculate the matrix of correlations and the factor structure matrix constructed in the factor analysis of the data [1]. The output of this program lists the factor scores for each individual on each factor.

2. A method which is a simpler calculation, but which involves more time and effort in obtaining the results, utilizes the factor loadings from the factor analysis as the correlation coefficients of the variates with the factor. This being the case, the following factor scoring model can be used:

$$F_j = \sum_{i=1}^{n} P_i X_i + E_j$$

where: F_j = the score on the factor j; P_i = partial regression coefficient on F_j on X_i (that is, the factor loading); X_i = original response to the variable X_i, influencing the factor j; E_j = random error (which is assumed to equal zero); and j = (1....m) and i = (1....n) [8]. This equation will provide a set of values for each quantity of a factor so, when considered in terms of a specified geometrical system, they reflect linear relations among the various quantities.

Regression Analysis

Ordinary Least Squares Regression

Once the factors have been isolated, it then becomes necessary to determine the statistical relationship of these factors to certain indices of farming success. Regression analysis seems to be fairly well suited to the second part of the analysis of managerial ability.

The regression technique used to test the type and degree of relationship between managerial ability and the factors is in common use; therefore,

no mathematical explanation is necessary. For discussion of this method see Johnston, Anderson and Bancroft, Yule and Kendall, Graybill, and others [5].

The functional form of the model used is as follows:

$$Y = \beta_0 + \beta_i X_i \pm v$$

which is derived from a functional relationship such as $Y = f(X_1, X_2 \ldots X_n)$. Application of this model allows the measurement of certain properties of the data from which various conclusions can be drawn.

In the analysis of managerial ability, the dependent variate, Y, is one of several indices of farm success, while the X variates are factor scores as previously determined.

A statistical test which may be made on the result of the regression analysis is the F-test. This is a test to find out whether or not the R^2 coefficient of determination is significantly different from zero, allowing various probability threshold levels. The F-test is the ratio of the mean square of the regression and the residual mean square.

The following two chapters present the results of both the factor analysis and the regression analysis of the isolated factor on certain success indices. Comments on these results and conclusions will be found in Chapter Nine.

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CHAPTER VII

RESULTS OF FACTOR ANALYSIS

In all, seventeen factors were isolated for each group. Each section was factored independently and the results of the factor analysis will be presented in this fashion.

A comment can be made at this time on the substantial variation between groups regarding the factor pattern in each section. That is, very few of the factors in any section are the same in both groups. Differences which were already apparent in the group comparisons of Chapter V are continued by the factor analysis of the data.

Because many of the variates which are contained in each factor have no apparent relationship with each other, the designation of factors by name is at times fairly difficult. In the last analysis the interpretation of factors is a subjective process influenced by the thoughts of the interpreter. Factor loadings and communality values are the objective basis for factor interpretation; however, for brevity, factors are often referred to by number and a letter prefix. The Association Group factors are assigned the letter X and the Control Group factors, the letter Y.

Results of the Factor Analysis by Section

A. Factors Containing Variables Reflecting Biographical Data

Table 7.1 contains a profile of factors describing biographic characteristics for both groups and shows the prime variates in each factor and their respective factor loadings.

The Association Group--Factor X1 contains only one variate with a high factor loading--that describing the number of years on the present farm. This is itself correlated with age. In addition, educational background is reflected directly in four of the variates in this factor--last

TABLE 7.1

PROFILE OF BIOGRAPHICAL FACTORS SHOWING PRIME VARIATES IN EACH FACTOR AND THEIR RESPECTIVE FACTOR LOADINGS

Factor Code	Factor Loading	Variate Description
	ASSOCIATION GROUP (X FACTORS)	
Factor X1	(Age-Education)	
E1*	0.48174	Total brothers and sisters
A1	-0.48029	Last grade of school completed
A2	-0.47739	Number of times change schools
A3.1*	0.49269	Arithmetic favourite subject
A13	-0.52314	Allowance
A28*	0.80505	Time on present farm
A2a	0.47214	Age
A3.2	-0.50921	Some other favourite subject
Factor X2	(Job Mobility-Ability)	
E1*	.75180	Total brothers and sisters
A8	.54666	Older brothers and sisters
A3.1*	-.51602	Arithmetic favourite subject
A17	-.55648	Lived away from farm since 20 years old
A18	.45674	Experience as a paid farm hand
A36	.43059	Part time employment
Factor X3	(Farm Acquisition)	
A29.1*	.90529	Buy farm
A29.2	.77084	Contract for or rent farm
Factor X4	(Farm Background)	
A11*	.68718	Lived on a farm before 19 years old
A16*	.71989	Serve in armed forces
A18	.41780	Experience as a paid farm hand
	CONTROL GROUP (Y FACTORS)	
Factor Y1	(Age)	
A1*	-0.51191	Last grade of school completed
A16	-0.16600	Serve in armed forces
A28*	0.81774	Time on present farm
A2a*	0.95216	Age

TABLE 7.1 (Continued)

Factor Code	Factor Loading	Variate Description
Factor Y2	(Job Mobility-Ability)	
E1*	0.50116	Total brothers and sisters
A8	0.43530	Older brothers and sisters
A17	0.43318	Lived away from farm since 20 years old
A18	-0.26598	Experience as a paid farm hand
A36	-0.48484	Part time employment
A29.2	0.52592	Contract or rent farm
Factor Y3	(Desire for Permanency)	
A2	0.53630	Number of times change schools
A29.1*	0.66978	Buy farm
A3.2*	0.60684	Some other favourite subject
Factor Y4	(Education)	
E1*	0.50116	Total brothers and sisters
A1*	0.66306	Last grade of school completed
A3.1*	-0.39791	Arithmetic favourite subject
A11*	-0.72884	Lived on a farm before 19 years old
A13	0.60566	Allowance

* Indicates variable with communality greater than 0.5.

nineteen years old" and "serve in armed forces." The remaining variate in this factor indicates experience as a paid farm hand. These variates are difficult to relate although it may be postulated that an individual who was a paid farm hand during the years 1940-1945 is more likely to have had armed services experience than an individual who owned his farm. Factor X4 reflects farm background as a young man and is so named.

Control Group--Factor Y1 loads very high on two variates, namely "age" and "time on present farm." "Last grade of school completed is inverse correlated to age and time on present farm. This relation reflects both the opportunity and social pressure on the younger generation to spend more time in school. Factor Y1 reflects the age of the farmer and is given this name.

Factor Y2 is almost the same as factor X2 in the Association Group. In fact, only one variate of the six in the factor is different. Factor Y2 reflects job mobility from the point of view of the experience and ability necessary to change jobs and is named job mobility-ability.

Factor Y3 contains variates which appear to be totally unrelated except that the tendency to buy the farm after having changed schools may reflect a desire for permanency of living. Subject choice other than arithmetic does not seem to indicate much except perhaps that the individual does not like dealing in absolute values. Factor Y3 can probably be best explained as representing desire for permanent settlement and is named desire for permanency.

Factor Y4 loads fairly high on three variates, two of which describe some type of educational experience. These are the "last grade of school completed" and "allowance as a teenager." The other variate loading high on factor Y4 is "lived on farm before nineteen years old." Family

grade of school completed, number of changes of schools, arithmetic favourit subject, some other favourite subjects, and, possibly indirectly, allowance as a teenager. This factor, therefore, is an age-education factor and can be so named. It should be noted that age and educational measures are inversely correlated, reflecting changes in educational opportunity over time.

Factor X2 for the most part, also reflects education, but it is of a type different than that reflected in factor X1. Family size is the predominant variate (E2) and the others can be interpreted around it. Birth order, while probably not directly related to family size, could have as much effect as family size on the willingness or need to find work away from the family farm, both of a farm or non-farm nature. That is, in a large family the farm may not be able to support the whole family without some of the siblings finding employment away from home.

Birth order (A8) may have the same kind of effect in that those with a number of older brothers may find the farm is being adequately run by their elders and so are not required to remain at home. (A high value indicates a low birth order). Those who do have the opportunity to leave the farm will obtain outside experience and probably increase their potential job mobility for farming work. They may even have the opportunity of learning a trade. Factor X2 reflects family size and away from home experience opportunity. This factor reflects job mobility through experience and ability and is named job mobility-ability.

Factor X3 contains only two prime variates, both with high factor loadings and both indicating alternative methods of acquiring the farm. Neither variate loads significantly into any other factor. Factor X3 has been named farm acquisition.

Factor X4 loads high on two variates, namely "lived on a farm before

size and "arithmetic favourite subject" make up the number of variates in factor Y4. More than anything else, this factor reflects teenage education or formative education. Factor Y4 has been named education.

B. Factors Containing Variables Reflecting Preferences, Attitudes and Personal Characteristics

Table 7.2 contains a profile of factors describing preferences, attitudes, and personal characteristics for both groups and shows the prime variates in each factor and their respective factor loadings.

The Association Group--There are nine variates in factor X5, all of which have factor loadings of about the same magnitude. Of these there are two which load slightly heavier than the rest, namely "original thinking" (B2) and "wives' innovation proneness" (B13). These describe personality traits which may be associated with a progressive attitude. High scores on the third variate "reception by the farmer" (C112) can, depending on the individual scores obtained, represent a positive attitude towards the interview. It is to be expected that farmers having a progressive attitude would generally be prepared to cooperate. The remaining variates appear to back up this reasoning, particularly those describing "willingness to adopt new methods," wives' "economic motivation," wives' "rural life preference," "vigour," and "talk to a district agriculturalist or other extension officer during the year." Moreover, the attitude is not confined to the farmer as an individual, but to both the farmer and his spouse. "Debt preference," (A43) when aligned with the remaining variates, is also representative of a positive attitude toward the farming operation indicating willingness to incur farm debt which probably represents a desire to get ahead in the farm business. In that it represents family progressive thinking, factor X5 has been named farm-family progressiveness.

TABLE 7.2

PROFILE OF PREFERENCES, ATTITUDES, PERSONAL CHARACTERISTICS, FACTORS SHOWING PRIME VARIATES IN EACH FACTOR AND THEIR RESPECTIVE FACTOR LOADINGS

Factor Code	Factor Loading	Variate Description
	ASSOCIATION GROUP	
Factor X5	(Family-Farm Progressiveness)	
A43	0.51904	Debt preference
A46*	-0.51949	Speak to District Agriculturalist during the year
B2	0.64629	Original thinking
B4*	0.53418	Vigour
B13*	0.62675	Female innovation proneness
B14	-0.41556	Female rural life preference
B16*	0.51554	Female economic motivation
D102	-0.49968	Willingness to adopt new methods
C112	0.60519	Reception by farmer
Factor X6	(Farm Family-Community Relations)	
B4	0.48131	Vigour
B5*	0.76060	Ascendency
B8*	0.87551	Sociability
B15*	0.47152	Female primary group preference
A45.2*	0.62016	Information from farm sources
Factor X7	(Stability Preference)	
A44.1*	0.76717	Dislike uncertainty
B6*	0.67179	Responsibility
B7	0.40476	Emotional stability
A44.2*	-0.91774	Dislike other things about farming
Factor X8	(Operator Motivations)	
B9*	0.69010	Male innovation proneness
B10*	-0.66127	Male rural life preference
B11	-0.52528	Male primary group preference
B12*	0.86507	Male economic motivation
Factor X9	(Off-Farm Information Seeking)	
A45.1*	0.54140	Information from District Agriculturalist
A46*	-0.55574	Speak to District Agriculturalist during the year
A48	0.34387	Subscription to other magazines
B7	0.41233	Emotional stability
A45.3*	-0.82210	Information from off-farm sources

Table 7.2 (Continued)

Factor Code	Factor Loading	Variate Description
Factor X10	(Aggressive Traditionalist)	
A9	0.50099	Team sports
A44.1	-0.43352	Dislike natural uncertainty
B3	-0.44886	Personal relations
B14	0.41221	Female rural life preference
A42	0.34504	Farm size aimed at
C108	0.40793	Appearance of machinery
A45.2*	0.41396	Information from farm sources
	CONTROL GROUP	
Factor Y5	(Farm Dislikes Motivation)	
A43	0.51007	Debt preference
A44.1*	-0.76417	Dislike uncertainty
B4	0.48788	Vigour
B9*	0.47022	Male innovation proneness
B12*	0.40129	Male economic motivation
A44.2*	0.80665	Dislike other things about farming
Factor Y6	(Farm Family-Community Relations)	
A9	0.52696	Group sports
B5*	0.85960	Ascendency
B8*	0.78437	Sociability
B11	0.50647	Male primary group preference
B14	-0.57642	Female rural life preference
Factor Y7	(Family Farm-Personal Motivations)	
B2*	0.70799	Original thinking
B3	0.57331	Personal relations
B6*	0.47131	Responsibility
B7*	0.49095	Emotional stability
B12*	-0.40100	Male economic motivation
B13*	-0.47171	Female innovation proneness
Factor Y8	(Information Seeking)	
A45.1	-0.49224	Information from District Agriculturalist
A46*	0.71057	Speak to District Agriculturalist during the year
B9*	-0.52902	Male innovation proneness
B10	0.36037	Male rural life preference
A45.2	0.51853	Information from farm sources

TABLE 7.2 (Continued)

Factor Code	Factor Loading	Variate Description
Factor Y9	(Family Farm-Future Aspirations)	
A48*	0.51285	Subscription to non-farm magazines
B12*	-0.46306	Male economic motivation
B14*	0.49270	Female rural life preference
B15	0.40991	Female primary group preference
A42	-0.42505	Farm size aimed at
D102	-0.48717	Willingness to adopt new methods
C112	0.37239	Reception by farmer
Factor Y10	(Female Influence-Information Seeking)	
B13*	0.52919	Female innovation proneness
B16*	0.72477	Female economic motivation
C108	0.34900	Appearance of machinery
A45.3	-0.63764	Information from off-farm sources

* Indicates a communality greater than 0.5.

Factor X6 loads high on two variates, namely "ascendency" and "sociability." "Information from farm sources" also loads fairly high. Factor X6 represents position and social relation in the farm community. "Information from farm sources" gives added substance to interpreting the factor in this way. As well as reflecting the general positioning in the farm community, it may also be added that the tendency is to show an active role in the same. Factor X6 has been named farm family-community relations.

Factor X7 loads very high on two variates, indicating that a strong "dislike of uncertainty" is inversely correlated with"dislike other things about farming." "Responsibility" and "emotional stability" also appear in this construct. Factor X7 has been named stability preference.

Factor X8 is concerned solely with farmers' attitudes toward the rural life style. "Economic motivation" loads fairly high and has a positive relation to "innovation proneness." Primary group (family) preference, however, is negatively related as is rural life preference. Thus, farmers who are, on the one hand, innovative and economically motivated are, on the other hand, not heavily rural life or primary group orientated. Factor X8 has been named operator motivations.

Factor X9 contains five variates four of which reflect the orientation of the farmer towards off-farm sources of information. Of these five, three have a positive association between each other and two have negative factor loadings. The relationships can be interpreted as follows: those people who get most of their farm "information from the district agriculturalist" (A45.1) will not be likely to get "information from off-farm sources" (A45.3) as well. In addition, those relying on the D.A. also tend to subscribe to more general interest "other magazines" (A48) and score higher on emotional stability. The one puzzling feature in this factor is the

negative loading of (A46). "speak to D.A. during the year" as opposed to the positive loading of (A45.1). It appears that those who do have verbal contact with the D.A. during the year do not necessarily obtain their farming information from him. Factor X9 has been named off-farm information seeking.

Factor X10 contains variates which do not appear to have much in common. No one variate loads much higher than the rest and as such the interpretation of this factor is somewhat difficult. The majority of variates in this factor are concerned with the future in that they reflect present and possible future desires. The four variates in this category in factor X10 are wives' "rural life preference," "farm size aimed at," "information from farm sources," and "appearance of machinery." The remaining three variates differ considerably from each other although the negative loading of variate A44.1 suggests an indifference towards natural uncertainty. Factor X10 has been named aggressive traditionalist.

The Control Group--Factor Y5 loads high on two variates concerned with some kind of dislike in farming, namely, negatively, ie. indifference towards, natural uncertainty and a dislike of other things about farming. The remaining variates in factor Y5 all reflect to some degree both willingness to take risks, as illustrated by the variate "debt preference," or motivation to improve the farming system, as illustrated by the variates "vigour," male "innovation proneness," and male "economic motivation." Factor Y5 has been named farm dislikes-motivations and appears to combine aspects of X5, X8 and X10.

Factor Y6 in the Control Group is very similar to factor X6 in the Association Group, even to the extent that the same variates in each group load high in the factors. While there are differences between some of the variates in this group and the Association Group, the variates in factor Y6

are "group sports," reflecting the enjoyment obtained in participating with others, male "primary group preference," reflecting the desire to have contact with the peer group and negative wives' "rural life preference," reflecting dissatisfaction with the farming way of life. Factor Y6 has been named farm family-community relations.

Factor Y7 loads high on only one variate, "original thinking." This, however, when combined with several others in this factor (namely, "personal relations," "responsibility" and "emotional stability") reflects the manner in which the farmer conducts himself with others and the way in which he is likely to order his thoughts. These are basic characteristics which can be orientated towards certain goals when taken into consideration with the remaining variates in this factor. These are negative male "economic motivation" and female "innovation proneness." Factor Y7 then reflects family farm-personal motivations.

Factor Y8 in the Control Group appears like the mirror image of factor X9 in the Association Group. Both are concerned with farm information. However, while factor X9 expresses a predilection to rely on the D.A. for information, factor Y8 indicates primary reliance on information obtained from on or off-farm sources (A45.2), as opposed to D.A. source (A45.1). Paradoxically, again, the variate with the highest loading in this factor is that indicating that the farmer spoke to the district agriculturalist during the year. "Innovative proneness" is negatively related to this factor, and "male rural life preference" positively. Factor Y8 is named information seeking.

Factor Y9 contains seven variates, none of which have high factor loadings, but most of which have an apparent relation to each other. Five of the variates in this factor reflect quite strongly the family aspirations

for the future. There is a negative factor loading indicated for "farm size aimed at", "willingness to adopt new methods" and "male economic motivation," and positive ones for female "rural life preference," and female "primary group preference." A further positively loading variate, "subscription to non-farm magazines", too. may reflect an interest in topics other than farming which may or may not have some influence on the family hopes for the future. Factor Y9 has been named family farm-future aspirations. Factor Y9 and X10 differ, however, in such aspects as "farm size aimed at."

Factor Y10 contains four variates, two with fairly high factor loadings but negatively related. Wives "economic motivation" has a positive loading and "information from off-farm sources" is negatively loaded. These two variates would seem to reflect the influence or the assistance of the wife in obtaining information relevant to farm improvements. Factor Y10 has been named female influence -- information seeking.

C. Factors Containing Variables Reflecting Farm Characteristics

Table 7.3 contains a profile of factors describing farm characteristics for both groups and shows the prime variates in each factor and their respective factor loadings.

Association Group--Factor X11 loads very high on four variates, namely "total farm product sales," "gross operating revenue," "total operating expense," and "total farm depreciation." These suggest that this factor reflects absolute farm size measured in economic terms. The remaining two variates in this factor, "return on capital" and "debt for farm purposes as a percentage of total assets," are both comparative ratios but, as they do not load particularly high on this factor, they need not be incorporated in the description of the same. Factor X11 has been named business size.

TABLE 7.3

PROFILE OF FARM CHARACTERISTICS FACTORS SHOWING PRIME VARIATES IN EACH FACTOR AND THEIR RESPECTIVE FACTOR LOADINGS

Factor Code	Factor Loading	Variate Description
	ASSOCIATION GROUP	
Factor X11	(Business Size)	
F199*	0.83401	Depreciation
F100*	0.89876	Total operating expenses
F200*	0.90755	Gross operating revenue
E4*	0.51344	Return on capital
A39*	0.92196	Total farm product sales
E12*	0.54607	Debt for farm purposes to total assets
Factor X12	(Income Size Intensity)	
E2*	0.92839	Net farm income per acre
E3*	0.70332	Net worth per acre
E4*	0.47503	Return on capital
E5*	0.77965	Return on sales
Factor X13	(Operation Size-Debt Relation)	
A27.1*	-0.84303	Operate as a single proprietor
A35e*	0.75516	Present net worth
A30*	0.72376	Acreage
E10*	0.62362	Lowest equity ratio
E11	-0.45196	Debt for land to total assets
E12*	-0.45056	Debt for farm purposes to total assets
A27.2*	0.84304	Corporation or partnership
Factor X14	(Type of Farm and Growth)	
A37	0.28772	Non farm sources of income
E5	0.41180	Return on sales
E6*	0.80971	Percentage of grain in total sales
E7*	-0.87461	Percentage of livestock in total sales
E8	0.44844	Percentage of other products in total sales
E9	0.43774	Increase in net worth per year
	CONTROL GROUP	
Factor Y11	(Size-Income Relation)	
A30*	0.69336	Acreage
E2*	0.85141	Net farm income per acre
E3*	0.75837	Net worth per acre
E4*	0.96194	Return on capital
E5*	0.97143	Return on sales

TABLE 7.3 (Continued)

Factor Code	Factor Loading	Variate Description
A39*	0.95863	Total farm product sales
E6*	0.94410	Percentage of grain in total sales
E7*	0.94207	Percentage of livestock in total sales
Factor Y12	(Business Size)	
A37	0.48950	Non farm sources of income
F199*	0.88758	Depreciation
F100*	0.89608	Total operating expenses
F200*	0.86057	Gross operating revenue
E9	0.57773	Increase in net worth per year
E12	0.41115	Debt for farm purposes to total assets
Factor Y13	(Operation Size-Debt Relation)	
A35e*	0.88800	Present net worth
F200*	0.43880	Gross operating revenue
A30*	0.41644	Acreage
E10*	0.86629	Lowest equity ratio
E11	-0.31293	Debt for land to total assets
Factor Y14	(Farm Operation Type)	
A27.1*	0.95708	Operate as a single proprietor
E8	0.31572	Percentage of other products in total sales
A27.2*	-0.95643	Corporation or partnership

* Indicates a communality of greater than 0.5.

Factor X12 loads high on three variates, namely, "net farm income per acre," "return on sales," and "net worth per acre." The remaining variate in this factor is "return on capital." These variates are all comparative farm ratios and three out of the four reflect the net income position with regard to farm size. Factor X12 has been named income size intensity.

Factor X13 loads high on four variates which reflect the type of ownership of the farm ("single proprietorship" has a negative loading), the present size, and the total farm worth. Other variates reflect the debt position of the farm both for land and for other farming purposes which may give an indication of borrowing strategy. As size, type of ownership and borrowing strategy are combined to reflect farm operation, if has been decided that factor X13 should be named operation size-debt relation.

Factor X14 is loaded high by two variates; namely, positively in "percentage of grain in total sales," and negatively on "percentage of livestock in total sales." In other words, these variates determine the farm type or enterprise mix. In addition, factor X14 contains variates describing "sources of income" (low loading not in table), "return on sales," "percentage of other farm products in total sales," and the "increase in net worth per year."[1] Factor X14 more than anything else appears to reflect enterprise mix, net income, and related to this, non-farm sources of income. Factor X14 has been named type of farm and growth.

The Control Group--Factor Y11 loads high on eight variates and reflects two different farm characteristics; namely, farm size-income

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[1]Financial returns are for 1967, when grain prices and grain sales were high, and livestock prices low.

relations through acreage and comparative ratios (such as "net farm income per acre" and "net worth per acre") and enterprise mix as determined through "percentage of grain in total sales" and "percentage of livestock in total sales." Due to the high loadings on each variate, they must all be taken into account when attempting to interpret this factor. Factor Y11 has been named size-income relation.

Factor Y12 loads high on three variates, all of which reflect financial size. In addition, however, there are three other variates, only one of which ("increase in net worth per year") can in any way be related to them. The three variates reflecting monetary values are "total farm depreciation," "total operating expenses," and "gross operating revenue." In interpreting this factor it has become necessary to keep in the background those variates describing "non-farm income sources" and "debt for farm purposes as a percentage of total assets." Factor Y12 has been named business size.

Factor Y13 also reflects farm size but, in addition, contains variates which describe the farm debt position. Two variates load high in this factor, "present net worth" and "lowest equity ratio," the one a reflection on size of operation and the other on borrowing strategy. While "present net worth" does reflect only the value size of the operation, "acreage," which is also included in factor Y13, gives an indication of physical size. As well as this, the negative relation of debt incurred for land gives further indication of the borrowing strategy of the farmer. Factor Y13 has been named operation size-debt relation.

Factor Y14 contains only three variates, two of which load very high on the factor. These describe the type of farm organization, namely "operate as a single proprietor" and with a negative loading, "operate as

a corporation or partnership." The remaining variate is of no consequence and can be discarded from the interpretation of this factor. Factor Y14 has been named farm operation type.

D. Factors Containing Variables Reflecting Farm Success

Table 7.4 contains a profile of factors describing success characteristics for both groups and shows the prime variates in each factor and their respective factor loadings.

The Association Group--Factor X15 contains two variates which load high on the factor, namely, "interviewer rating" and "potential for remaining in farming" as rated by another external source. The variate "net farm income" is also in this factor but does not load as high as might be expected. In addition, there is a negative loading on "capital turnover" but this is very small. Factor X15 has been named external success rating.

Factor X16 contains three variates, all of which are concerned with aspects of the farmers' satisfaction rating. The one which loads the highest describes "satisfaction with present income." Both the variates "satisfaction with farm" and "satisfaction with social life" load fairly low on this factor. Factor X16 reflects satisfaction of the farmer with his mode of living and has been named farmer life satisfaction.

Factor X17 contains two variates, one of which loads fairly high. This variate describes the farmer's rating on his own performance. The other variate, "satisfaction with living conditions," is negatively related to the farmer's success rating; however, this variate loads low on the factor and thus appears to be of less importance. Factor X17 has been named internal success rating.

The Control Group--Factor Y15 contains six variates, four of which are concerned with farmer's satisfaction and which load, on the whole,

TABLE 7.4

PROFILE OF SUCCESS FACTORS SHOWING PRIME VARIATES IN EACH FACTOR AND THEIR RESPECTIVE FACTOR LOADINGS

Factor Code	Factor Loading	Variate Description
	ASSOCIATION GROUP	
Factor X15	(External Success Rating)	
F001	0.58363	Net farm income
D101*	0.91627	Interviewer farmer rating
D103*	0.76404	Potential for remaining in farming
E13	-.27510	Capital turnover
Factor X16	(Farmer Life Satisfaction)	
A51	0.31184	Satisfaction with farm
A53	0.46250	Satisfaction with social life
A54*	1.00638	Satisfaction with present income
Factor X17	(Internal Success Rating)	
A50*	0.71383	Farmer rating on success of operation
A52	-0.33483	Satisfaction with living conditions
	CONTROL GROUP	
Factor Y15	(Farmer Life Satisfaction)	
A51*	0.52187	Satisfaction with farm
A52*	0.70892	Satisfaction with living condition
A53	0.59200	Satisfaction with social life
A54*	0.65644	Satisfaction with present income
F001	0.22138	Net farm income
E13	-0.33624	Capital turnover
Factor Y16	(External Success Rating)	
A54	0.43442	Satisfaction with present income
D101	0.55537	Outsider farmer rating
D103*	1.03283	Potential for remaining in farming
Factor Y17	(Internal Success Rating)	
A50	0.45592	Farmer rating on success of operation
A51*	0.76527	Satisfaction with farm

* Indicates a communality of greater than 0.5.

fairly high. The remaining two variates, "net farm income" and "captial turnover" (with a negative loading), load low on the factor and appear to be of little importance to the farmer's overall satisfaction. Factor Y15 has been named farmer life satisfaction.

Factor Y16 contains three variates with that describing "potential for remaining in farming" loading very high indeed. Also in this factor are the variates "outsider farming rating," which loads fairly high, and "satisfaction with present income," which also has a factor loading high enough to make the variate reasonably significant. However, due to the two variates in the factor reflecting ratings by outsiders, factor Y16 was named external success rating.

Factor Y17 contains two variates describing "satisfaction with farm," loading fairly high, and "farmer rating of success of operation," which, while not loading particularly high on the factor, is probably significant. Combined, the two variates appear to reflect the farmer's opinion of his success and, as such, factor Y17 has been named internal success rating.

The Factors Compared

While there is considerable divergence between groups in some aspects of the factor interpretation, some of the factors, particularly those involving success characteristics, have been given the same name. An attempt has been made in the naming of the factors to stay as close as possible to those characteristics which the variables in each factor describe. A list of factors and the names assigned to each appears in Table 7.5.

TABLE 7.5

FACTOR NAMES OF SEVENTEEN EXTRACTED FACTORS

Factor	Description
ASSOCIATION GROUP	
BIOGRAPHICS	
X1	Age-Education
X2	Job Mobility-Ability
X3	Labor Acquisition
X4	Farm Background
PREFERENCES, ATTITUDES, PERSONAL CHARACTERISTICS	
X5	Family-Farm Progressiveness
X6	Farm Family-Community Relations
X7	Stability Preference
X8	Operator Motivations
X9	Off-Farm Information Seeking
X10	Aggressive Traditionalist
FARM CHARACTERISTICS	
X11	Business Size
X12	Income-Size Intensity
X13	Operation Size-Debt Relation
X14	Type of Farm and Growth
SUCCESS	
X15	External Rating
X16	Farmer Life Satisfaction
X17	Internal Rating
CONTROL GROUP	
BIOGRAPHICS	
Y1	Age
Y2	Job Mobility-Ability
Y3	Desire for Permanency
Y4	Education
PREFERENCES, ATTITUDES, PERSONAL CHARACTERISTICS	
Y5	Operator Motivation
Y6	Farm Family-Community Relations
Y7	Family Farm-Personal Motivations
Y8	Information Seeking
Y9	Family Farm Future Aspirations
Y10	Female Influence-Information Seeking

TABLE 7.5 (Continued)

Factor	Description
FARM CHARACTERISTICS	
Y11	Size-Income Relation
Y12	Business Size
Y13	Operation Size-Debt Relation
Y14	Farm Operation Type
SUCCESS	
Y15	Farmer Life Satisfaction
Y16	External Rating
Y17	Internal Rating

CHAPTER VIII

RESULTS OF REGRESSION ANALYSIS

The factor scores of individuals were obtained by means of the factor score program from original scores and the factor structure matrix. (see Chapter VI). They were utilized to estimate the relationship of the group A, B and C factors to several management indices in order to find those factors which best measure managerial ability and differentiate between levels of ability. As it is often not possible to formulate any expected relationships prior to the regression analysis, stepwise regression is used as a means of obtaining a listing of factors in order of their importance to explain the percentage of variation in each management index. A cutoff was made where $t<1$.

Management indices are of two types: "synthetic" success indices, and recognized monetary measures. The monetary performance measures were net farm income and net farm income per acre. Two variates which are also components of group D factors (F001 and E2).

The "synthetic" indices are comprised of the three success factors isolated previously, and two composite indices, a satisfaction index (A51+A52+A53+A54), and a success index (A50+D101+D103).

The groups (Association and Control) of farmers were tested separately. The final results of the regression of management ability indices on the extracted factors are as follows.

Results of Regression Analysis by Farmer Groups

Regression of Factors in the Association Group on Selected Management Performance Indices

In three out of the five "synthetic" criteria, two factors

explained at least twice as much of the variation in the dependent variate as the other factors combined. In addition to being fairly significant predictors of the dependent variate, these factors also have a significant effect on the dependent variate (Table 8.1).

The factors which explain most of the variation in both the external rating and the success index are factors X12 and X14, "income-size intensity" and "type of farm and growth." Other factors which are common to both sets of results are factors X5 and X13, which reflect "family-farm progressiveness" and the "operation size-debt relation." Of these four, three are concerned primarily with the financial status of the enterprise.

The internal rating of success, on the other hand, appears to be related to other factors. The factors which explain the most variation in this regression are X3, X8 and X10, "farm acquisition," "operator motivations," and "agressive traditionalist," respectively. Thus, while the external success rating and success index, as measures of managerial ability, are related to familiar monetary terms, the farmer's rating of himself as a measure of managerial performance is influenced by other criteria. The discrepancy between internal and external ratings may have a lot to do with ambition. Operators who rank high economic motivation and innovation proneness have a low score on X17 (success in farming coupled with dissatisfaction of living conditions). The three farm ratings all had high multiple R^2 values which were found to be statistically significant at the 1 percent level.

The satisfaction criteria are characterized by two phenomena. First, no one factor carries the load of explaining a high percentage of the variation in the dependent variate, and the multiple R^2 value is low

TABLE 8.1

REGRESSION OF FACTORS IN THE ASSOCIATION GROUP ON INDICES OF MANAGEMENT ABILITY

Ability Index	Intercept	Factor Combinations and Associated Regression Coefficients with Corresponding t-values in parentheses								Multiple R^2 Value
Factor X16 Farmer Life Satisfaction	-0.362	FX5 0.303 (1.74)	FX11 0.276 (1.54)	FX7 0.240 (1.35)	FX8 0.216 (1.25)					23.00
Factor X17 Internal Success Rating	7.343	FX3 0.205 (1.32)	FX5 0.221 (1.3)	FX10 0.450 (2.71)	FX8 -0.451 (-2.8)	FX1 -0.346 (-2.07)	FX12 0.223 (1.57)	FX13 -0.187 (-1.14)	FX4 0.150 (1.02)	* 63.40**
Factor X15 External Success Rating	-8.918	FX12 0.434 (3.15)	FX14 -0.302 (-2.0)	FX13 0.517 (3.0)	FX5 0.406 (2.3)	FX8 0.290 (1.9)	FX1 0.288 (1.59)	FX3 0.256 (1.58)		* 57.34**
Variates A51 + A52 + A53 + A54 Satisfaction Index	-57.470	FX1 1.233 (2.48)	FX2 1.168 (2.44)	FX6 0.782 (1.72)	FX8 0.610 (1.41)	FX13 1.240 (2.21)	FX12 0.543 (1.25)	FX9 0.657 (1.45)	FX5 0.678 (1.23)	40.1
Variates A50 + D101 + D103 Success Index	-30.387	FX12 0.851 (3.47)	FX14 -0.602 (-2.21)	FX13 0.831 (2.76)	FX5 1.012 (3.26)	FX10 0.695 (2.5)	FX3 0.592 (2.33)	FX2 0.366 (1.39)	FX1 0.388 (1.24)	* 69.27**
Variate E2 Net Farm Income Per Acre	-141.333	FX12 9.049 (6.82)	FX11 4.920 (3.72)	FX8 2.299 (1.74)						* 69.11**

TABLE 8.1 (Continued)

Ability Index	Intercept	Factor Combinations and Associated Regression Coefficients with Corresponding t-values in parentheses			Multiple R^2 Value
Variate F001		FX12	FX11	FX8	
Net Farm Income	-114383.72	5906.12 (3.99)	5389.48 (3.65)	1726.83 (1.17)	50.84** *

* Statistically significant at the 5 percent level.

** Statistically significant at the 1 percent level.

and the computed F-value, when tested, is found to be not significant at the 5 percent level. In addition, there are only two factors common to both criteria, namely factors X5 and X8, which reflect "family-farm progressiveness" and "operator motivations," respectively. Of the remaining eight factors in both results, only three reflect monetary values. Of a total of twelve factors, nine explain satisfaction (hence, indirectly, one dimension of managerial performance) in terms other than monetary measures.

While the multiple R^2 is low and the F-test indicates that the factors are not on the whole, significant in explaining the variation in the dependent variate, the individual computed t-values for each factor indicate that a number of regression coefficients are significantly different from zero and do have a positive effect upon the dependent variate, however small.

Turning now to recognized financial performance criteria, both farm income and net farm income per acre (intensity)--the dependent variate--are explained but by only three factors X12, X11, and X8, i.e. "income size intensity," "business size," and "operator motivations," respectively. Factor X12, intensity, alone explains 50 percent of the variation in the dependent variate "net farm income per acre" and has a computed t-value which is highly significant at the 1 percent level of significance. The remaining two factors account for only 18 percent of the variation in the dependent variables.

"Net farm income," the other monetary criterion, contains the same factors but the results differ considerably. Together, factors X12 and X11 explain almost equal amounts of variation (25 percent and 23 percent, respectively) in the dependent variate. Factor X8 plays a minor

role in the results. The R^2 is relatively low at 50 percent but the F-test indicates this significance at the 5 percent level.

A significant general overall result of the regression analysis carried out on the Association Group is that factors extracted from the data explain managerial performance in terms of the "synthetic" criteria--success and satisfaction measures--equally as well as for conventional recognized monetary measures.

The factors most common in all the results, regardless of the amount of explained variation in each regression, are X12 ("income size"), X8 ("operator motivations"), X5 ("family-farm progressiveness"), X13 ("operation size-debt relation"), and X1 ("age-education").

No factor failed to appear at least once in the results of the regression analysis and of the fourteen used, ten appeared more than once. Those factors appearing only once were X4 ("farm background"), X6 ("farm family-community relations"), X7 ("stability preference"), and X9 ("off-farm information seeking"). None of these four factors accounted for much variation in the dependent success variate did appear. Thus, grounds are apparent for discarding them as they appear of little use in measuring managerial performance.

Regression of Factors in the Control Group on Selected Management Ability Indices

In general, in the Association Group a few dominant factors tend to explain a large amount of the variation in the dependent variate. In the Control Group the opposite applies (Table 8.2). The three success criteria show a large amount of variation in terms of the number of factors explaining the dependent variates and only in the success index

TABLE 8.2

REGRESSION OF FACTORS IN THE CONTROL GROUP ON INDICES OF MANAGEMENT ABILITY

Ability Index	Intercept	Factor Combinations and Associated Regression Coefficients with Corresponding t-values in Parentheses								Multiple R^2 Value
Factor Y15 Farmer Life Satisfaction	-1.358	FY12 0.498 (3.04)	FY8 0.287 (1.8)	FY10 0.202 (1.34)	FY6 -0.230 (-1.46)	FY1 0.199 (1.28)	FY2 0.179 (1.08)			* 46.26
Factor Y17 Internal Success Rating	-1.939	FY12 0.332 (1.9)	FY11 0.279 (1.6)	FY1 0.303 (1.75)	FY5 0.279 (1.61)					26.93
Factor Y16 External Success Rating	6.596	FY7 0.310 (1.7)	FY2 -0.612 (-3.26)	FY9 0.232 (1.23)	FY12 -0.438 (-2.37)	FY8 0.438 (2.49)	FY6 0.306 (1.85)	FY3 0.271 (1.52)	FY11 -0.182 (-1.05)	* 47.58
Variates A51 + A52 + A53 + A54 Satisfaction Index	-33.584	FY12 1.296 (2.47)	FY8 1.208 (2.27)	FY10 0.595 (1.15)	FY1 0.782 (1.48)	FY7 0.552 (1.04)				* 44.57**
Variates A50 + D101 + D103 Success Index	8.300	FY2 -0.817 (-2.9)	FY6 0.393 (1.38)	FY7 0.319 (1.14)	FY8 0.297 (1.07)					* 29.80
Variate E2 Net Farm Income Per Acre	10.012	FY12 3.232 (3.72)	FY4 -1.360 (-1.6)	FY14 -2.073 (-2.29)	FY13 1.644 (1.81)	FY3 -1.513 (-1.72)				* 51.18**

TABLE 8.2 (Continued)

Ability Index	Intercept	Factor Combinations and Associated Regression Coefficients with Corresponding t-values in Parentheses						Multiple R^2 Value
Variate F001		FY13	FY11	FY12	FY14	FY6	FY10	
Net Farm Income	-82852.68	5107.51 (8.43)	2600.52 (4.13)	2519.87 (4.42)	-1039.49 (-1.72)	-854.82 (-1.51)	721.70 (1.27)	* 80.03**

* Statistically significant at the 5 percent level.

** Statistically significant at the 1 percent level.

is there one factor which takes most of the load of explaining the variation in the dependent variate. There are few independent factors common to all three types of criteria of success in the Control Group. Therefore, it is necessary to discuss each one separately.

The internal farmer rating is explained by four factors, namely Y12, Y11, Y4, and Y5, which reflect "business size," "size-income relation," "education," and "operator motivation," respectively. That is, in terms of the farmer's rating of hiw own success, managerial ability is explained fairly equally between monetary values and personal characteristics. The multiple R^2 value for this criteria is low, but the estimate is statistically significant at the 5 percent level.

External farmer rating relates statistically to eight factors: Y7, Y2, Y9, Y12, Y8, Y6, Y3, and Y11. These factors are mainly concerned with biographic and personal characteristics with only two concerned with monetary values. This indicates that the rating given by the interviewer is not so much related to conventional measures of management ability but rather to personality aspects of the farmer. These aspects may be used to describe and distinguish between various levels of managerial ability. The multiple R^2 value is not high but the F-ratio indicates statistical significance at the 5 percent level. Compared to the Association Group, the dependent variables relating to success ratings in the Control Group are far better explained by factors of a non-monetary nature.

In the Control Group, satisfaction measures are considerably more related to monetary measures than to "success" measures. This result again differs from those obtained in the Association Group.

Three factors in both regressions are common. These are Y12, Y8, and Y10, reflecting "business size," "information seeking," and "female influence--information seeking." Again, the reflection is on a combination of monetary values and personality characteristics such that managerial ability through satisfaction is a function of both the financial status of the farm and the search for further farm information.

The R^2 values are not high, but the computed F-values indicate statistical significance of the estimates of Y15 and the satisfaction index level. The regression coefficients in most cases, test significant, as may be seen from the computed t-values.

The two recognized monetary criteria, "net farm income per acre" and "net farm income," provided the following results. Factor Y12, "business size," explained about half the total explained variation in the dependent variate "net farm income per acre." The remaining factors all explain the same amount of variation in the dependent variate. Out of the five factors in the analysis, however, three accounting for about two-thirds of the explained variation are factors concerned with monetary values. The other two financial measures are factors Y13 and Y14, "operation size-debt relation" and "farm operation type." The final two factors are biographic in nature reflecting "education" and "a desire for permanancy." The multiple R^2 value is not high, but the computed estimate of E2 is significantly different from zero at the 5 percent level.

Net farm income, as a measure of managerial performance, is related more significantly to financial aspects of the operation. The three major factors, all fairly highly weighted, are factors involving financial characteristics of farming. These factors are Y13, Y12 and Y11-

size-debt relation," "business size," and "size-income relation," respectively. In addition, factor Y14, "farm operation type," is the next most significant factor. The R^2 value is very high and the computed estimate of E1 is significant at the 1 percent level. The calculated t-values indicate that the major factors in this analysis have a statistically significant effect on the dependent variable at the 1 percent level.

In summary, the statistical relations between performance measures and prime factors in the Control Group present the following picture. Synthetic success rating criteria tend to be related to biographic and personality factors while the synthetic satisfaction criteria are adequately explained by certain financial factors. Both the external rating and the satisfaction index have approximately the same R^2 values and F-ratios, indicating statistical significance at the 5 percent level. Also, the majority of regression coefficients of both are significantly different from zero at the 5 percent level.

The financial criteria used as measures of managerial performance are explained largely by financial factors while personality or biographical factors play a small or even negligible role.

The factors most common in the results regardless of contribution to explained variation are: Y12 ("business size"), Y8 ("farm family-community relations"). No factor failed to appear at least once in the results and eleven appeared twice or more. Those factors which appeared only once and which do not in any case account for a high percentage of explained variation (and so can probably be disregarded as having little or no effect

on the results) are numbers: Y4 ("education"), Y5 ("operator motivation"), and Y9 ("family farm-future aspirations").

CHAPTER IX

IMPLICATIONS AND CONCLUSIONS

Implications and conclusions resulting from the statistical analysis of the data will be discussed in terms of the two stated hypotheses (Chapter Two). The results of this study have shown that a large body of seemingly unrelated data can be reduced to a smaller number of composite factors and that these factors are statistically related to certain indices of managerial success or ability. Regarding the second hypothesis, the results do indicate differences between the two groups of farmers. The discussion of the regression analysis cannot fail to bring out comparisons and differences between the two groups. This being the case, no attempt is made to state separately the results pertaining to the two parts of the hypothesis.

Success and Satisfaction Measures as Proxies of Managerial Performance

First, for the Association Group, certain factors regressed against three success criteria show that they possessed a fairly high degree of reliability as determinants of managerial ability. In each case, the R^2 value is high and significantly different from zero at the 1 percent level of significance indicating that there is a relation between the dependent variate and the factors, and that the factors are successful in predicting the dependent variate.

The Control Group, on the other hand, provides a very different picture. In two cases out of three, the multiple R^2 values are very low indicating regression estimates with less statistical significance (above the 5 percent level). The regression relations of the other two criteria just meet the 5 percent probability threshold.

While the managerial performance (in terms of success rating criteria) of the Association Group farmers can be related fairly successfully to certain factors, that of the Control Group farmers cannot.

Three interpretations are compatible with the results. First, it is evident that there is a difference between the two groups to an extent much greater than first indicated by the raw data. The Association Group farmers seem more concerned with success, both present and future, in their ratings of themselves and their operations. Relating back to the initial comparisons of data in Chapter Four, the success criteria in this case are apparently distinguishing between levels of managerial ability between farmers in the Association Group and farmers in the Control Group. Second, the Association Group members may be more "simple-minded" in their goals or methods, have a clearer idea of where they want to go, and express themselves, in degrees, somewhat better than the Control Group. Third, the Association Group, as a Farm Business Association group, is seen to be homogenous (internally similar) in more ways than just having chosen to participate in the Farm Business Association program.

The measure of satisfaction, "farmer life satisfaction" and "satisfaction index" also present some very interesting comparisons. In the Association Group, in both cases, factors representing both financial and personality characteristics rate fairly evenly as determinants of managerial performance. However, the multiple R^2 values are low and so the completed factors do not do a very good job in explaining the variation in the dependent variate. For neither of the satisfaction criteria do the computed F-values indicate a regression estimate better than at the 5 percent level. The conclusion to be drawn from this is

that these isolated factors for the Association Group are inadequate as measures of farmer satisfaction.

The Control Group, on the other hand, presents a different picture. Both factors describing financial characteristics and personality characteristics are contained in the final regression equations of satisfaction criteria, but the emphasis tends to be on personality aspects. While the R^2 values are not particularly high, the computed F-values indicate statistical significance at least at the 5 percent level.

Taken as a whole, the satisfaction measures paint a picture which is different from the one illustrated by the "synthetic" success criteria. Whereas with the success rating criteria it was found that the Control Group factors were rather unsuccessful in "explaining" success measures adopted as measures of managerial performance, in the present case, the same holds true for satisfaction measures of the Association Group. It follows that measures or indices of satisfaction cannot be used successfully as measures of managerial ability in the Association Group, but are useful for the Control Group. Perhaps members of the Control Group are not so much concerned with success in terms of either financial or personality characteristics as they are with satisfaction. Also the Control Group appears to be heterogenous where "success" is concerned, but homogenous with respect to satisfaction. This result lends support to the premise that not all farmers are success-orientated from the point of view of getting the most financially from their operations, but rather are more concerned with their own personal non-monetary goals.

This difference in the composition of the two study groups could hardly be discovered from conventional item-by-item comparison of group averages attempted in Chapter Five.

Financial Returns as Proxies for Managerial Performance

As is to be expected, both criteria as measures of managerial performance are explained largely by financial factors in both groups. What was perhpas not to be expected was the difference in the results between groups and the individual measures. While the Association Group factors explain a much higher percentage of variation in net farm income per acre than in the Control Group, the opposite holds true for net farm income. The Association Group averages higher in intensity (net farm income per acre) (See Chapter Five) and the Control Group, higher in measures of size. The Association Group is more homogenous with respect to intensity (return per acre), hence the statistics test out better. Also, the Control Group is more heterogenous with respect to size, hence the reliability of the estimates is lower. From this situation no conclusions can be drawn as to which measure is better. If the goal is to maximise farm income per farm (regardless of the number of farms), net farm income is "best." If the goal is to maximise total net income to agriculture for a given acreage, largely net farm income per acre is "best." A higher net farm income per acre indicates a more efficient use of a fixed resource. Net farm income measures the financial success of the farm as a business, the efficiency of the operator, not only to keep the farm going and choose the right input combination but also to assemble productive resources. Since net farm income is the necessary condition for advancing the farm and to provide necessities and amenities of life the farm family, it is a measure of the effectiveness of the operator. This may explain why it relates better to the satisfaction criteria. In all cases, the regression estimates are significantly different from zero at the 1 percent level indicating a high degree of effectiveness of the factors in explaining the variation in the dependent variates.

Members of a Farm Business Association are distinguished by certain characteristics which have not been previously defined. The most apparent is the preoccupation with "success" over satisfaction. Th Association Group farmers exhibit a desire to succeed which outweighs the desire for satisfaction only. This can be seen in the comparison of raw data in Chapter Five. Questions dealing with attitudes to borrowing and willingness to adopt new methods bear out this premise. In contrast, the Association Group is more satisfied than the Control Group in the important aspects of farm size and net farm income. In terms of other characteristics, the Association Group, by virtue of their collective ability to earn more per acre than the Control Group, would seem to be more successful in their farming enterprise.

Comparisons of biographic information obtained from each group did not show differences of any magnitude (except that many more members of the Control Group obtained away from home non-farm work experience). Questions dealing with preferences and attitudes were also answered fairly uniformly between groups. However, there were a few exceptions. The personal attitude questionnaires (Gordon Personal Inventory and Straus Rural Attitudes Profile) resulted in significant differences becoming apparent between the groups. Also the question dealing with physical activities as a teenager resulted in differences of some magnitude between the groups.

While differences are apparent between groups in the remaining variables, they did not then, nor do they now, that the results of factor analysis are available, appear of sufficient magnitude to have any great effect on the outcome of the factor analysis.

In terms of factors appearing most in the regressions on the various criteria, the differences between groups are not great. Both

groups have factors reflecting financial characteristics and personality characteristics among those most common in the analysis. The Association Group, however, has five common factors (those appearing four times out of seven or more) compared to the Control Group's three. There are obvious differences between the two groups which these factors reflect, and certain implications can be drawn from them. The Association Group common factors reflect the "income-size intensity," "operator motivations," "family-farm progressiveness," "operation size-debt relation," and "age-education." The Control Group factors reflect "business size," "farm family-community relations," and "information seeking."

The Association Group common factors, with perhaps the exception of "age-education," can be directly related to progress and success. On the other hand, the Control Group common factors are far more general in relation to each other and, as well as being aligned to the satisfaction criteria, could probably be interpreted as relating to aspects of managerial ability other than satisfaction. These common factors contain implications for future research into managerial ability. These simply involve the idea that in future research into understanding management abilities of farmers an approach much broader than the conventional economic inquiry into monetary and physical farm characteristics is warranted. The importance of such factors as farming motivations, family-farm progressiveness, farm family-community relations, and farmer information seeking certainly warrants a much broader approach than has regularly been used in farm management research concerned with farm organisation and economics of the firm.

Having taken a measure of the role of motivation and inner commitment to farm management success, the question inevitably arises:

can anything be done to influence these personal characteristics? This question presents a considerable challenge to anyone wanting to improve the chances of individuals attaining a certain level of competence in management. The financial characteristics are, in most cases, directly related to the personal characteristics and background in that they are a reflection of present capacity to manage the particular enterprise involved. It is difficult to see how it will be possible to improve farming motivations or family-farm progressiveness in the same manner that it may be possible to improve the education standards of the children. To put forward proposals for aiding and improving the capacity of farmers, given their individual backgrounds, experience, and goals, to manage their farms would take more space than is desired here. Suffice to say that, for the most part, an individual approach is needed, if not by farmer, at least by product group--grain, livestock, etc.--and by area. This being the case, the problem is one of gigantic proportions. Partial assistance can be rendered through several channels: formal education (such as vocational colleges), learning by doing (as in provision for farm apprenticeship on progressive or "top" farms), and the more expansive use of trained personnel in both government and industry.

There is no way of assessing how much the members of the Association Group have improved, if they have improved, since they became members of the Association (unless the state of their farms prior to joining the Association was known). It is possible that such differences as are apparent between groups were of the same magnitude prior to the members of the Association Group joining the Farm Management Association. There seems to be no justification for concluding that membership in a Farm Business Association will change a farmer's skills, motivations, or

goals. The question remains: Did these farmers become members because they already had a certain penchant for records and record analysis, the desire to make the best from their physical resources, and the innovative spirit, or did it only come with F.B.A. membership? Probably it is more realistic to say that F.B.A.'s don't really change a man very much. The most they can do is to help farmers systematise their operations, realise their goals, and bring out latent potential for successful management. Given that this is the case, we may postulate that F.B.A. membership can be beneficial to certain individuals. Unfortunately, however, this has not been proven in this study.

One determinant is the decision-making process which has come to light is the preoccupation of many farmers with reducing their taxation burdens as much as possible. What has been happening is that farmers needing to replace machinery do so, by acquiring new machines so that their tax burdens are reduced. No thought seems to be given to the increased capital cost over a second hand machine which could do the job just as well. Obviously there is a need for qualified taxation counselling services. This is a line in which extension services should, but apparently do not, operate.

Summary

Having discussed the results in terms of their implications in the search for factors adequately describing managerial ability, it now remains to draw final conclusions as to the validity and uses of the study in relation to the aims of the study.

In that the results indicate that there has been a successful reduction of a large number of farm related variates to a smaller number of

meaningful factors, and also that it is possible to use these factors in the measurement of managerial ability in terms of their influence on the level of managerial ability described by two different types of criteria, the study can be described as having been successful. In addition, the results seem to be consistent in terms of the most common factors appearing in the regression analysis and with their success in explaining managerial ability in the two groups. With these results it has been possible to allude to the different orientations of the farmers in the two groups.

Given the success achieved with this particular study, there seems no reason to conclude that the same technique could not be used equally well in other research into the human factor in farm management.

APPENDIX I

University of Alberta
Department of Agricultural Economics and Rural Sociology

FARM MANAGEMENT STUDY 1968

Our department is doing a survey of farms in this area. The survey is part of a study of the characteristics of good farm managers. It is done for the University, not for any other private organization or the government. The purpose is to learn something about the background and experience of farmers in this area.

By a statistical procedure (stratified sampling) we have come upon your name, and we would like to ask you a few questions. Please don't be surprised if some of them are unusual; they are unusual because they are experimental. We plan to change questions as a result of experiences gained with this form.

Of course, we are keeping in strict confidence any answers and other information you may care to give us.

The District Agriculturalist knows about this study and approves of it. If you would like to know more about the study, we will be glad to explain, or write to:

Dr. W. M. Schultz,
Agricultural Economics and Rural Sociology,
University of Alberta,
Edmonton, Alberta.

(Alberta Agricultural Research Trust, project 67-42)

MAIN FARM QUESTIONNAIRE

Farm Code _____

Date Completed _____

1. Circle the last grade of school you completed.

   1. Elementary: 1 2 3 4 5 6

   2. High School: 7 8 9 10 11 12

   3. Post-secondary: 13 14 15 16 17 18
      (includes Agriculture Colleges)

2. How many times did you change schools (elementary and high school)?

   never 1 2 3 4 5 more than 5

2a. How old are you? _____ years

3. Which of the following subjects did you like best in school?

   1. English ( )
   2. Arithmetic ( )
   3. Science courses ( )
   4. History and social studies ( )
   5. None of these ( )
   6. More than one above ( )

4. How many students were in the high school you attended?
   (If you went to more than one, answer for the one you attended longest).

   1. Less than 50 ( )
   2. From 50 to 99 ( )
   3. From 100 to 199 ( )
   4. From 200 to 499 ( )
   5. 500 and more ( )

5. What were your main subjects in senior high school?

   1. Agricultural courses ( )
   2. Business or commerce ( )
   3. General matriculation ( )
   4. Science courses ( )
   5. Trade or shop courses ( )
   6. Other than above: _____

6. What is the first language you learned?

7. If other than English, at what age did you begin speaking English?

1. Under 6 years ( )
2. 6 to 12 years ( )
3. 12 to 19 years ( )
4. 20 years and later ( )

8. How many brothers and sisters have you had who were: (Include foster and step brothers and sisters you grew up with).

1. Younger than you? 0 1 2 3 4 5 ____

2. Older than you? 0 1 2 3 4 5 ____

9. Of all the physical activities you undertook in your teens, which did you enjoy most?

1. Hockey, baseball, football, or soccer ( )
2. Tennis, golf, swimming ( )
3. Fishing or hunting ( )
4. Boxing or wrestling ( )
5. Curling, bowling ( )
6. Something else _____
(please list)

10. Did you live on a farm during your boyhood?

yes ( ) no ( )

(If you answered "yes" above, please answer questions 11 and 12).

11. How many years did you live on a farm before you were 19 years old?

1. Less than 1 year ( )
2. 1 to 4 years ( )
3. 5 to 9 years ( )
4. 10 to 14 years ( )
5. 15 to 19 years ( )

12. How large was the farm on which you lived? (If you lived on more than one, answer for the one you lived on longest).

1. Less than 70 acres ( )
2. 70 to 179 acres ( )
3. 180 to 359 acres ( )
4. 360 to 559 acres ( )
5. 560 to 759 acres ( )
6. 760 acres and over (_____ acres)

13. As a boy (under 19) did your parents or guardian give you (check all that apply):

1. Money only for necessities? ( )
2. A fixed allowance? ( )
3. Cash wages? ( )
4. Spending money when you needed it? ( )
5. A percentage of a crop or livestock sale? ( )
6. Livestock of your own to raise or a peice of land to use? ( )
7. Something other than above? ( )

_____

8. I never had money of my own for any reason. ( )

14. Was your father or guardian a:

1. Farm operator ( )
2. Paid farm worker ( )
3. None of these ( )

(If he was more than one, check the one he was the longest).

15. If you checked "3" in the last question, what was your father or guardian?

_____

16. Did you serve in the Armed Forces? yes ( ) no ( )

If you served in the Canadian Armed Forces or had military service:

1. Years served ( )
2. Year discharged ( )
3. Highest rank attained: _____
4. Combat action: yes ( ) no ( )

17. Farm Experience

Have you ever lived away from this farm since you were 20 years old?

yes ( ) no ( )

If you answered "yes" above, please answer questions 18 through 27.

18. How many years of farm experience have you had as a paid farm hand?

1. None ( )
2. Under 5 ( )
3. 5 to 9 ( )
4. 10 and over ( )

19. Have you operated other farms as (check all that applies)

1. The owner of at least some of the land ( )
2. A tenant ( )
3. None of these, but _____

_____ ( )

20. (If applicable)
What was the size of the farm you operated longest?

1. Less than 70 acres ( )
2. 70 to 179 acres ( )
3. 180 to 359 acres ( )
4. 360 to 559 acres ( )
5. 560 to 759 acres ( )
6. 760 acres and over (_____acres)

21. Did you live on farms within 10 miles of your present farm for

1. Less than 1 year or never ( )
2. 1 to 2 years ( )
3. 3 to 5 years ( )
4. 6 to 10 years ( )
5. Over 10 years ( )

22. Did you live on farms located in the same county (municipal district, improvement district, special area) of your present farm for

1. Less than 1 year or never ( )
2. 1 to 2 years ( )
3. 3 to 5 years ( )
4. Over 5 years ( )

23. Did you live on farms within 100 miles of your present farm for

1. Less than 1 year or never ( )
2. 1 to 2 years ( )
3. 3 to 5 years ( )
4. Over 5 years ( )

24. Did you live on farms located in the Prairie Provinces for

1. Less than 1 year of never ( )
2. 1 to 2 years ( )
3. 3 to 5 years ( )
4. Over 5 years ( )

25. Since you took over the operations of your farm, have you made any changes which could be the result of your farm experience elsewhere?

yes ( ) no ( )

26. Could you give an example of it?

_____

_____

26a. Describe any non-farm employment you took prior to moving to this farm:

Kind of work	Time spent
_____	_____
_____	_____
_____	_____
_____	_____

27. Do you operate your farm

1. As a single proprietorship ( )
2. A partnership without a written agreement ( )
3. A partnership with a written contract ( )
4. A corporation ( )
5. None of the above but _____ ( )

Note to Interviewer: If Partnership or corporation, interview all active partners and shareholders.

28. For how many years have you operated this farm (by yourself, or as an active partner or shareholder)?

_____ years (Or: since 19____)

29. Did you obtain control of the farm by:

1. Purchase from direct relatives ( )
2. Purchase at a ength ( )
3. Inheritance - umbered ( )
4. Inheritance - w n obl gations to other heirs ( )
5. Contract for deed ( )
6. Father-son contract ( )
7. Renting ( )
8. Homesteading ( )
9. None of the above but _____ ( )

_____

30. Could you give us an account of the land transactions of your farm since you first took over (see the following table):

Period	Acres owned	Acres bought	Acres sold or lost	Acres leased	New leases	Leases ended	Crown leases held
		+	-				
Before							
1935-39							
1940-44							
1945-49							
1950-54							
1955-59							
1960-64							
1965							
1966							
1967							

Note to interviewer: sum of acres owned, acres bought, and (-) acres sold or lost must equal acres owned in next period. (Similar check for rentals).

31. If you purchased or sold any land, what were the prices for each sale? (Per acre or total).

Period	$ per Acre	OR	Total $$$	Percent improved land (cropland, meadow, improved pasture)
Before 1935				
1935-39				
1940-44				
1945-49				
1950-54				
1955-59				
1960-64				
1965				
1966				
1967				

32. If you rented any land, what was the rental rate or the crop share?

Period	rental per acre	OR	total cash rent	OR	crop share
Before 1935					
1935-39					
1940-44					
1945-49					
1950-54					
1955-59					
1960-64					
1965					
1966					
1967					

33. If you bought land, did you go into debt to pay for it?

yes ( ) no ( )

(If you answered "yes" above, please answer the following).

34. How much did you borrow?

Period	Original mortgage	Amount of loan ($)	Interest rate	Payment terms (years)
Before 1935				
1935-39				
1940-44				
1945-49				
1950-54				
1955-59				
1960-64				
1965				
1966				
1967				
Total				

35. How much do you owe now on the loans listed above?

$ _____

(a) Did you ever borrow money for any other farming purposes? (Besides the financing of land purchases). yes ( ) no ( )

(b) (If yes) What was the largest amount of farm debt you owed? (to nearest thousand)

$ _____

in which year? 19 _____

(c) How much do you owe right now? $ _____

(d) Of what kind are your most important creditors? Check each group that applies:

		Owing now:
Chartered Banks	____	$____
Farm Credit Corporation	____	$____
Finance companies	____	$____
Other institutional lenders	____	$____
(____)		
Machinery dealer of manufacturer	____	$____
Merchants, department stores, mail order houses (average monthly balance outstanding)	____	$____
Relatives	____	$____
Other private individuals	____	$____
Other (____)	____	$____

(e) After you subtract your debts from your assets, how much is the remaining Net Worth today?

$____

(f) How much do you think your net worth was when you first started farming (see question 28)?

$____

36. Did you take part-time jobs during slack periods on your farm?

1. Frequently ( )
2. Occasionally ( )
3. Seldom ( )
4. Never ( )

37. Do you have income from sources other than farming?

1. I do not have other sources of income ( )
2. Less than $200 per year ( )
3. $200 to $999 per year ( )
4. $1000 to $2499 per year ( )
5. $2500 to $4999 per year ( )
6. $5000 per year and over ( )

38. Do you have some kind of farm record keeping system?

1. Yes. Do all my record keeping myself. ( )
2. Yes. I get help in preparing tax returns. ( )
3. Yes. An accountant takes care of most of it. ( )
4. Yes. I am a member of a provincial Farm Management Association. ( )
5. Yes. I use ELFAC (electronic farming accounting) through the Farm Credit Corporation ( )
6. No. ( )

39. What has been the value of your sales of farm products in 1967:

1. Under $2500 ( )
2. $2500 to under $5000 ( )
3. $5000 to under $10,000 ( )
4. $10,000 to under $15,000 ( )
5. $15,000 to under $20,000 ( )
6. $20,000 to under $30,000 ( )
7. $30,000 to under $50,000 ( )
8. $50,000 and over ( )

40. What has been the level of your net farm income (=taxable income from farming) this past year?

1. Under $1250 ( )
2. $1250 to under $2500 ( )
3. $2500 to under $5000 ( )
4. $5000 to under $7500 ( )
5. $7500 to under $10,000 ( )
6. $10,000 to under $15,000 ( )
7. $15,000 and over ( )

41. Would you care to let us use your records so we can calculate some comparative ratios like net income to sales, grain sales to livestock sales and so on?

yes ( ) no ( )

(interviewer: If records not at home, please ask for release to be signed).

42. What size of operation are you aiming at in farming?

1. A one-section farm ( )
2. A two-section farm ( )
3. A larger than three section farm ( )
4. None of these ( )

Please explain:

43. How do you feel about going into debt in order to improve your farm income?

1. Prefer to borrow little or none and gradually develop the farm out of current income. ( )
2. Prefer to borrow and improve farm quickly. ( )

44. Which one of the following comes closest to stating what you like least about farming?

1. Government programs and regulations ( )
2. The long hours and amount of work involved ( )
3. Uncertainty due to weather and poor crops ( )
4. Nothing in particular ( )

45. When you need to know about new farming practices or methods from whom or where do you find out most such information?

	Most	Other
1. Other farmers, neighbors	( )	( )
2. Past experience; observations, figure it out for myself	( )	( )
3. My father	( )	( )
4. Feed company or co-op; dealers	( )	( )
5. District agriculturalist	( )	( )
6. University of Alberta	( )	( )
7. C.D.A. Experiment Stations	( )	( )
8. Books, bulletins	( )	( )
9. Veteran's Administration	( )	( )
10. Farm Credit Corporation	( )	( )
11. None of the above: State Source:	( )	( )

46. Did you talk to a district agriculturalist or other extension officer about anything during the last year?

yes ( ) How many times? _____

no ( )

47. Do you subscribe to a daily newspaper?

yes ( ) no ( )

48. Do you subscribe to a farm magazine?

yes ( ) no ( )

49. Do you subscribe to any magazines besides farm and church magazines?

yes ( ) no ( )

50. Compared with other farmers who started farming about the same time you did, how successful would you say you have been in operating this farm?

1.	Among the least successful one-quarter	( )
2.	Among the lower middle one-quarter	( )
3.	Among the upper middle one-quarter	( )
4.	Among the top one-quarter	( )

How would you rate your satisfaction with

	51. Your farm	52. Living conditions	53. Social life in your community	54. Your present income
1. Not at all satisfied	( )	( )	( )	( )
2. Slightly satisfied	( )	( )	( )	( )
3. Moderately satisfied	( )	( )	( )	( )
4. Almost completely satisfied	( )	( )	( )	( )
5. Completely satisfied	( )	( )	( )	( )

55. We brought along several standard self-inventories which have been used elsewhere. We would like you to read these forms and answer the questions according to the instruction provided. We could wait for you to complete them, (or call again tomorrow to pick up the forms).

56. Room for notes on reactions volunteered about the questionnaire, the purpose of the study, etc.:

APPENDIX II

University of Alberta

Department of Agricultural Economics and Rural Sociology

1968 Farm Management Study

Experimental Success Rating Sheet

rate (coded) _____ farm code _____

Please refrain from using names on this form to assure anonymity for the person involved.

101. How good a farmer is he? Consider in making your rating such things as skill at farm plans, cropping plans, knowledge of good farm practices, care expended on his crops, livestock, farmstead etc.

1. among the poorest ( )
2. below average ( )
3. about average ( )
4. good ( )
5. one of the best ( )

102. How willing is he to adopt recommended farm practices?

1. unwilling ( )
2. sometimes willing ( )
3. willing about half the time ( )
4. often willing ( )
5. always willing ( )

103. Many farmers have quit during the last ten years. How likely is this farmer to be successful and still in business ten years from now?

1. not likely ( )
2. with a lot of luck ( )
3. about average chances ( )
4. better than average chances ( )
5. almost without a doubt ( )
6. he may quit for reasons other than lack of farm success (retirement, change of interest, etc.) ( )

University of Alberta

Department of Agricultural Economics and Rural Sociology

1968 Farm Management Study

Interview Report

date _____
interview no. _____
(farm code) _____

coding space

104. Was the interviewed personally known to the D.A.?

yes ( )
no ( )

105. Was the interviewed personally known to the Assistant D.A.?

yes ( )
no ( )

106. Was the interviewed personally known to the Regional Agriculturalist or Regional Specialist?

yes ( )
no ( )

107. Appearance of the farmstead:

1. in good shape ( )
2. about average ( )
3. somewhat neglected ( )

108. Appearance of machinery:

1. well kept. Mostly in shed ( )
2. O.K. Some machines in open ( )
3. most machinery in the open, appear in poor shape ( )
4. no opportunity to observe ( )

109. Appearance of livestock:

1. in good shape ( )
2. about average ( )
3. poorly fed. In poor health ( )
4. no opportunity to observe ( )

110. Appearance of household

1. orderly and friendly ( )
2. livable ( )
3. decidedly disorganized ( )

111. If there were children in the house (2-14 years) what impression did they give you?

1. polite but uninhibited ( )
2. shy and anxious ( )
3. boisterous, inconsiderate, noisy ( )

112. Reception:

1. courteous if reserved ( )
2. cool ( )
3. suspicious ( )

113. Your personal first impression:

1. sympathetic ( )
2. neutral ( )
3. hostile ( )

114. Interview performance:

1. answered all questions quickly and to the point ( )
2. answered readily but tended to trail off ( )
3. misunderstood questions often. Required additional explanations ( )
4. refused answers frequently ( )

115. Time taken for interview (less supplementary tests)

Arrival: ____ hr. ____ min. Time taken for interview:
Departure: ____ hr. ____ min. _____ min.

116. Other remarks (interruptions, back calls, other persons present):

APPENDIX III

Straus Rural Attitudes Profile

Form M_2

INSTRUCTIONS

The questions in this part contain a number of descriptions of people. These descriptions are grouped in sets of four. Please examine each set and find the one description that is most like you. Then put an "X" between the brackets beside the statement, in the column headed Most.

Next examine the other three statements in the set and find the one description that is least like you. Then put an "X" between the brackets beside that statement, in the column headed Least.

Here is a sample set:

	Most	Least
Has an excellent appetite	( )	( )
Gets sick very often	( )	(X)
Follows a well-balanced diet	( )	( )
Doesn't get enough exercise	(X)	( )

Suppose that you have examined the four statements in the sample and have decided that, although several of the statements apply to you to some degree, "Doesn't get enough exercise" is more like you than any of the others. You would place a mark beside that statement in the column headed Most, as shown in the sample above.

You would then examine the other three statements to decide which one is least like you. Suppose that "Get sick very often" is less like you than the others. You would place a mark beside the statement in the column marked Least, as shown in the sample above.

For every set you should have one (and only one) mark in the Most column, and one (and only one) in the Least column.

In some cases it may be difficult to decide which statements you should mark. Make the best decisions you can. Remember, there are no right or wrong answers. You should mark those statements which most nearly apply to you. Be sure to mark one statement as being most like you, and one statement as being least like you. Please mark every set. Turn the page to begin.

	Most	Least
feels that farmers have to work too many hours	( )	( )
feels a family should do things together	( )	( )
sees little value in a farmer studying agriculture in school	( )	( )
is a good farm business manager	( )	( )
new discoveries and changes in farming methods interest him greatly	( )	( )
dislikes being tied down to chores or irrigating	( )	( )
likes the fact that farming gives the whole family a chance to help earn the family living	( )	( )
would rather make $3,000 a year and be free of debt than make $5,000 and be in debt	( )	( )

	Most	Least
farming gives him a sense of achievement	( )	( )
usually discusses farming plans with his wife	( )	( )
believes the old idea that anyone who is ambitious and works hard can get ahead is no longer true	( )	( )
usually waits to see what results neighbors get before trying out a new farm practice or seed variety	( )	( )
feels that a farmer has to keep learning and trying new things to stay on top	( )	( )
finds most articles in farm magazines impractical	( )	( )
feels that the city gives people more new and interesting experiences than does living in the country	( )	( )
feels that working together with friends and neighbors is the key to success	( )	( )
farm life puts too many restrictions on his social activities	( )	( )
has a hard time finding people of similar interests in the country	( )	( )
attends field days and farm meetings whenever possible	( )	( )
believes that the ideal farm is one on which all the work can be done by the farmer and his family	( )	( )
thinks it is wrong to charge interest when money is loaned to family members	( )	( )
has tried out several new farm practices in the last few years	( )	( )
independence or being your own boss is what he most likes about farming	( )	( )
good neighbors are one of his biggest assets	( )	( )
likes the exercise in the open air and sunshine involved in farming	( )	( )
gets enjoyment out of learning new ways of doing things	( )	( )
all he wants from his farm is to make a reasonable living for the family	( )	( )
doesn't really like to exchange work with neighbors	( )	( )
security and permanence are what he most wants out of farming	( )	( )
gets little pleasure out of visiting neighbors	( )	( )
farming offers a challenge to him	( )	( )
believes that the traditional ways are the best ways of doing things	( )	( )
thinks high school is enough education for a practical man like a farmer	( )	( )
finds that one of the greatest helps in farming is to keep good records	( )	( )
tries to participate actively in community activities	( )	( )
living in a city would give him the opportunity for new and interesting experiences	( )	( )

	Most	Least
gets great enjoyment out of working with plants or animals	( )	( )
listens to farm programs to get new ideas and keep up on farming methods	( )	( )
hates to borrow money even when he knows it is necessary to run the farm properly	( )	( )
knows only a small proportion of his relatives well	( )	( )
seldom makes an annual donation to his church	( )	( )
would have more fun living in a city than on a farm	( )	( )
keeps up to date on the latest farming methods	( )	( )
would rather exchange work with a neighbor than hire things done	( )	( )
seldom discusses farming plans or buying farm equipment with his wife	( )	( )
maximum profit is more important to him than improving the land	( )	( )
has gotten a number of good ideas from farm magazines	( )	( )
likes to watch things grow	( )	( )

	I	R	P	E	T
+					
−					
T					

Straus Rural Attitudes Profile

Form F_2

INSTRUCTIONS

This form contains a number of descriptions of people. These descriptions are grouped in sets of four. Please examine each set and find the one description that is most like you. Then put an "X" between the brackets beside the statement, in the column headed Most.

Next examine the other three statements in the set and find the one description that is least like you; then put an "X" between the brackets beside that statement, in the column headed Least.

Here is a sample set:

	Most	Least
Has an excellent appetite	( )	( )
Gets sick very often	( )	(X)
Follows a well-balanced diet	( )	( )
Doesn't get enough exercise	(X)	( )

Suppose that you have examined the four statements in the sample and have decided that, although several of the statements apply to you to some degree, "Doesn't get enough exercise" is more like you than any of the others. You would place a mark beside that statement in the column headed Most, as shown in the sample above.

You would then examine the other three statements to decide which one is least like you. Suppose that "Gets sick very often" is less like you than the others. You would place a mark beside the statement in the column marked Least, as shown in the sample above.

For every set you should have one (and only one) mark in the Most column, and one (and only one) in the Least column.

In some cases it may be difficult to decide which statements you should mark. Make the best decisions you can. Remember, there are no right or wrong answers. You should mark those statements which most nearly apply to you. Be sure to mark one statement as being most like you, and one statement as being least like you. Please mark every set. Turn the page to begin.

	Most	Least
feels that farm wives have to work too many hours	( )	( )
feels a family should do things together	( )	( )
sees little value in studying home economics in school	( )	( )
is a good money manager	( )	( )

	Most	Least
new discoveries and changes in homemaking methods interest her greatly	( )	( )
dislikes being tied down to housework	( )	( )
likes the fact that farming gives the whole family a chance to help earn the family living	( )	( )
would rather make $3,000 a year and be free of debt than make $5,000 and be in debt	( )	( )
farming gives her a sense of achievement.	( )	( )
usually discusses farming plans with her husband (or parents)	( )	( )
believes the old idea that anyone who is ambitious and works hard can get ahead is no longer true	( )	( )
usually waits to see what the neighbors do before trying out something new	( )	( )
feels that a farmer has to keep learning and trying new things to stay on top	( )	( )
finds most magazine articles about homemaking impractical	( )	( )
feels that the city gives people more new and interesting experiences than does living in the country	( )	( )
feels that working together with friends and neighbors is the key to success	( )	( )
farm life puts too many restrictions on her social activities	( )	( )
has a hard time finding people of similar interests in the country	( )	( )
attends talks and meetings on home problems or child care whenever possible	( )	( )
believes that the ideal farm is one on which all the work can be done by the farmer and his family	( )	( )
thinks it is wrong to charge interest when money is loaned to family members	( )	( )
has tried out several new ways of doing things about the home in the last few years	( )	( )
likes farming because her husband has independence and is his own boss	( )	( )
good neighbros are one of her biggest assets	( )	( )
likes the close contact with nature involved in farming	( )	( )
gets enjoyment out of learning new ways of doing things	( )	( )
all she wants from the farm is to have a reasonable living for the family	( )	( )
does not really like to borrow and lend or exchange work with neighbors	( )	( )
security and permanence are what she most wants out of farming.	( )	( )
gets little pleasure out of visiting neighbors	( )	( )
farm life offers a challenge to her	( )	( )
believes that the traditional ways are the best ways of doing things	( )	( )

	Most	Least
thinks high school is enough education for a practical person like a farm wife	( )	( )
finds that keeping good records and budgets is a great help	( )	( )
tries to participate actively in community activities	( )	( )
living in a city would give her the opportunity for new and interesting experiences	( )	( )
gets great enjoyment out of working with plants and animals	( )	( )
listens to homemaking programs to get new ideas about home and family	( )	( )
hates to borrow money even when she knows it is necessary to run the farm properly	( )	( )
knows only a small proportion of her relatives well	( )	( )
seldom makes an annual donation to her church	( )	( )
would have more fun living in a city than on a farm	( )	( )
keeps up to date on the latest developments concerning home and family	( )	( )
would rather exchange work with a neighbor then hire things done	( )	( )
seldom discusses farming plans or buying farm equipment with her husband	( )	( )
maximum profit is more important to her than improving the land	( )	( )
has gotten a number of good homemaking ideas from magazines	( )	( )
likes to watch things grow	( )	( )

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