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THE MANAGEMENT FACTOR IN FARMING

A Thesis Presented For The Degree of
MASTER OF AGRICULTURAL SCIENCE with HONOURS
in AGRICULTURAL ECONOMICS.

CANTERBURY AGRICULTURAL COLLEGE

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With the compliments of

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Canterbury Agricultural College
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1956.
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I. AIMS AND OBJECTS

1. To measure the success of a group of farmers and from it develop an index of management efficiency.

2. To observe and attempt to rate farmers on those personal factors which could possibly influence or be associated with management efficiency.

3. From the observations, to draw conclusions as to which personal factors are associated with management efficiency and show how the data collected support or do not support these conclusions.
II. INTRODUCTION

BACKGROUND AND PREVIOUS STUDIES

It has been the custom, in studies of efficiency of farm management, to analyse the effects of various management practices on efficiency, as measured by any one of a large number of physical and financial measures. As something of an afterthought, it has often been mentioned that personal differences between managers account for large variations.

It does appear that the manager is something more than just one further variable, somewhat annoying in any analysis of factors because he cannot conveniently be assessed. Alternative farm management practices may be likened to the notes a musician may use. A study of these notes will give us some understanding of how a musical composition is constructed. But it is the composer and the musician who make the notes into a symphony. The farm manager chooses the practices he will use, arranges them into a policy and implements them in his day to day management decisions and actions.

The importance of management has long been recognised. Hamilton and Mitchell (1950), presenting the results of their dairy farm survey of Waipa County, state that "... if we could lift the average of all farms in Waipa to what the top two per cent are doing today, effective production would be increased by 80 per cent."

Hutton (1954), in a more detailed study of the area carried out an analysis of nine factors to find their contribution to
between farm variation in efficiency. The nine factors were:

1. Soil rating.
2. Cultivated area.
3. Percentage of grassland topdressed with artificial fertiliser.
4. Percentage of grassland limed.
5. Percentage of grassland cut for hay.
6. Percentage of grassland cut for silage.
7. Percentage of cultivated area cropped.
8. Replacements per 100 cows in milk.
9. Number of tractors.

Measuring efficiency in terms of three physical measurements he found that, of the total variation in each index, the nine factors enumerated could account for the following percentages.

- Carrying capacity: 40%
- Butterfat per cow: 23%
- Cows milked per labour unit: 16%

The remaining variation he attributes to such factors as differences in yield per acre and quality of supplementary feeds, quantity of fertiliser applied per acre, drainage and methods of grazing management. Finally he adds:

"No enumeration of the factors contributing to the residual variance would be complete without inclusion of the ability of the farm operator. This aspect of farm management is rarely treated, yet the discovery of a reliable index of managerial capacity would be very valuable. It is appreciated
that in some measure the farmer's ability is reflected in the farm returns, but some feature, common to all farm operators, that will serve as a means of distinguishing different degrees of ability is required. Undoubtedly, it is of advantage to recognise the important inputs, but ultimately the degree of success that results from their application depends, in large measure, upon the farm operator."

Nelson (1952), using figures from much fewer farms, found little correlation between area in hay and winter crop, percentage of area topdressed and grazing management and efficiency as measured by wool and lamb production per acre. He attributes this to wide variation in individual efficiency of management, the small number of farms surveyed and the fact that his figures are for one season only.

It would appear that the first man to attempt to assess the personal factor was Wilcox of America. Wilcox, Pond & Boss (1932) at the University of Minnesota carried out a survey of 136 farmers in south eastern Minnesota, in the main a dairying district. The farmers were co-operators in a farm management service project of the United States Department of Agriculture and the University of Minnesota. They were keeping financial and production records with the help of a field man.

The first part of the study was devoted to ascertaining farmers' ranking of personal factors. 72 usable questionnaire forms were
5.

returned and the first five factors rated by the farmers were:-

1. Farmer experience
2. Wife's co-operation
3. Ambition to succeed
4. Liking for farm work
5. Getting work done on time

Further study by means of interview checked on these factors and a number of others. The importance of co-operation of the farmer's wife is reaffirmed by the results. Summarising the findings of the study, it is stated that three influences of motivation, and one of ability, were directly associated with earnings.

(a) Interest, as revealed by expressed like or dislike for a number of farm practices, and by reason for taking up farming.

(b) Need, as revealed by the lower earnings of those who had inherited their farms and the fact that having grown sons at home did not increase earnings.

(c) Ambition or will to make economic progress.

(d) The factor of ability - judgment and the wisdom of the decisions made by the farmer. This was revealed partly in success in answering a set of agricultural questions. The ability to make sound judgments is a result of inherent ability and experience.

On the other hand such factors as previous occupational experience, school training and help of children emerged as of no great importance.
Wilcox and Lloyd (1932) carried out a similar survey on a group of 183 Indiana farmers. In the main the results point in the same direction with special importance attributed to wife's co-operation.

Westermarck (1951) in Sweden sent a series of questionnaires to 890 farmers who had taken part in the continuous book-keeping activities of the Board of Agriculture. From the 410 replies the farmers were classified according to:

1. Professional theoretical education.
2. Practical experience as indicated by whether or not the farmer had practised outside his own farm.

These were then correlated with "family earnings per consumer unit". An attempt was made, using statistical methods, to eliminate variations due to farm size. The correlation between professional theoretical education and earnings was thought due to the fact that "a rationalistic way of thinking" seems to be relatively commoner among persons with a professional theoretical education while emotional factors take a relatively more significant place in persons with only elementary education.

The general correlation between earnings and both theoretical and practical experience is asserted to depend on mental capacity.

One of the questionnaires also asked the farmers' ratings for importance of various factors. The five factors rated by Swedish farmers as of major importance are:
1. Interest
2. Practical experience
3. Wife's collaboration
4. Organising capacity
5. Physical strength

These two studies are not strictly comparable because of wide divergence in method and aims but their similar conclusions, in particular the emphasis they both put on "a rationalistic way of thinking", or judgment and wisdom of decisions, is very significant.

Because of the difficulties of description and definition the personal factor has received little attention by way of research; none in New Zealand. It is almost, in fact, one of the intangibles which are so upsetting to the economist. To prove the importance of any individual factors it would be desirable to give mathematical proof of a correlation between the factor and some index of efficiency or success in farming. The factors are so difficult to define, even in a descriptive manner, that mathematical description has appeared impossible. Statistical backing does give added weight to any proposed association.

A further difficulty arises in that, even when a number of factors which may be important have been defined, they are frequently of such a nature that collection of data concerning them is likely to be difficult, to the point of embarrassment, for any investigator.

It is very desirable in any analysis of this kind to eliminate
as far as possible other variables likely to cloud the issue. For a first study of the factor it was thought desirable that, as well as as many independent variables as possible, it would be an advantage if some of the variables in the personal factor could be eliminated. If large differences in efficiency still existed then these could be attributed to definable personal differences with a fair chance of validity.

THE AREA AND THE SAMPLE

Fortunately there is an area which satisfies these conditions fairly well. The Rotorua area has, since the Second World War, been the site of settlement of large numbers of ex-servicemen on dairy farms. Below is a list of the variables which shows how many have been, if not eliminated, reduced greatly from the situation in a normal farming district. This description will also serve to present the nature of the sample taken and the general background of the farms and farmers.

1. Physical Variables

   (1) Soil. The farms selected were all on the Taupo ash shower, which covers an extensive area south and west of Rotorua. The ash was originally deposited as a thick even mantle over earlier showers. By the action of water, running down off the hills, much of this most recently deposited ash has been washed into the gullies, exposing, or bringing nearer to the surface, the older, more fully weathered and more fertile ash of earlier showers. The
coarse ash remaining on top is less weathered, dries out rapidly and is characteristically less fertile. This washing process has been emphasised in some valleys by the formation of lakes with their outlet, the Waikato river, dammed following the eruption. As the river cut gorges through the newly formed dams the lakes subsided and carried down with them much fine sediment.

Generally, then fertility depends on area of hill in any farm. In the Mihi area there are some fertile flats where fine sediment has been deposited, due to unusual soil forming conditions. A very important factor is the time for which an area has been grassed. The combined action of superphosphate, clovers and the grazing animal causes a very rapid build-up of fertility.

As far as possible each farmer in a group has been given, with an area of poor flat, a larger area of good flat or hill. The Land Development staff who are responsible for the subdivision have been closely associated with the area during the course of its development and farming prior to settlement. Inevitably inequalities do occur but a number of able administrators are closely on the watch to see that no farmer is settled on a farm greatly inferior to those of his neighbours.

(ii) Climate. There are slight variations between districts but average rainfall would, in all areas, lie between 45" and 60" and distribution is favourable. Temperatures are more extreme in Waikite and Mihi than the more western Maraetai, Atiamuri and Tokororoa blocks. A cold winter wind from the National Park area sweeps all of the districts but is less severe at Atiamuri and Tokororoa.
(iii) **Treatment Before Settlement.** There were, on Mihi, Waikite, Atiamuri and Tokoroa blocks fairly small areas grassed before the Second World War. During the War they received insufficient phosphate and the pastures, to a large extent, ran out. In each case farmers received, as far as possible, an area of new pasture with some old pasture area. The general policy is to settle the farms at about the three year stage, although some farms were used as bases from which further development proceeded. These apart, treatment before settlement is comparable. Differences occurred in grazing just prior to settlement between seasons but provision was made for all farmers.

At settlement there were, on nearly every farm, between five and seven paddocks, watered from a permanent supply. In a few cases the cowshed was not completed until a short time after occupation. There was an implement and manure shed. Housing policy has varied over the years but either temporary accommodation was provided with finance for a house, or a part house with finance available for addition after a few years, or a complete house was available at occupation.

(iv) **Season of Occupation.** This can affect success over a number of years. All of these farms were taken possession of on the 1st or the 8th of July.

(v) **Farm Size.** The size of the farm in terms of butterfat production expected under average management within about five years is described in a joint productive valuation by fields representatives of the Lands Department and the State Advances
Corporation. The aim is for a farm to produce 16,000 to 17,000 lbs. of butterfat in about five years. Few are budgeted as high as 19,000 and few as low as 14,000 lbs. Although anomalies do occur farm size as a whole is comparable. In the first year the farms in the survey nearly all produced between 8,000 and 11,000 lbs. Even if taken on an acreage basis the dairy farms are almost all within the 140 to 180 acre range.

(vi) **Type of Enterprise.** All of the farms selected were settled as dairy (72) or mixed sheep and dairy (6) farms. Since settlement a large number of dairy farms have started carrying some sheep, mainly as a means of ragwort control. However, on all farms studied the dairy herd was the major productive enterprise.

(vii) **The Herd.** Acquisition of the herd at settlement from Lands Department was by the following procedure. Each settler took a run off of a mob of two-year-olds. A Lands Department field officer appeared as vendor's representative, a State Advances representative for the settler, and a farmer member of the local Land Settlement Committee to judge suitability should question arise. Some heifers were rejected and some taken at a lower price, each settler getting an equal number of the poorer animals.

Quality varied somewhat from year to year. As the original sources of purchase by Lands Department were similar, for the most part herds were comparable when taken over.

(viii) **Number of Years Farming.** An established farmer has an advantage over one who is just starting operations, both from
experience in managing the particular farm, and because financial security increases with time in occupation. The farmers in the sample had been settled since World War II, on fully improved units and had been farming for three complete seasons or more. Of these there were, on the Taupo ash shower, 91 dominantly dairy farms. They were distributed as follows:

<table>
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<th>In occupation 7 years at July 1956</th>
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<tr>
<td>&quot; &quot; 6 &quot; &quot; &quot; &quot; &quot;</td>
<td>10</td>
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<td>&quot; &quot; 5 &quot; &quot; &quot; &quot;</td>
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Total farms surveyed 78

Rejections:  Farm had changed hands 5
            Farm left to 50:50 share-milk 2
            Farm under two different managements 1
            Farmer deceased 1
            Co-operation refused (too busy) 1
            After repeated visits no convenient time could be arranged 3

Total 21

This is a well-defined group and there is no reason to believe that the thirteen rejections resulted in a bias in the sample. Of the farmers who had sold out they did so because of health (1), after raising productivity greatly (1) and because of failure (2).
Both farmers who had left a share-milker on their property had prospered. All of the others appeared average farmers.

In this respect both American and Swedish studies can be criticised. They deal only with farmers co-operative in the matter of accounts and are, in this respect, a biased sample. In addition the Swedish survey included results only from farmers who responded to a mailed questionnaire.

(ix) Financial Situation at Settlement. Almost without exception the assets of these farmers (excluding insurance) totalled less than £2,000. Although a condition of settlement of some sections was a deposit of up to £500 for Renewable Lease tenure it was the policy of the Land Settlement Board to waive the deposit if the settler had approved assets to the value of the deposit. Each settler had the choice of a freehold or a leasehold title, the former requiring a larger deposit. Less than five per cent of the farmers chose freehold.

Up to 1950 the terms of finance were as set out in the Servicemen's Settlement and Land Sales Act of 1943. Generally they provided for settlement at 1942 basic values. The Servicemen's Settlement Act of 1950 provides for the sale of land and improvements at current market value, but the difference between 1942 basic value and current market value is lent as a non-interest-bearing, suspensory loan which is written off after ten years, provided the farm is not sold within that period. Since 1949 servicemen have been charged full erection cost for buildings, with the excess over 1942 values being interest free for three years.
At the time of writing a case concerning this procedure was before the Court of Appeal.

Apart from this legislation the basis for the policy of the State Advances Corporation, who finance all of these settlers, is laid down by Act. In Rehabilitation cases the policy of the Corporation as regards loan limits and terms for such further financing as housing, stock replacement and purchase of plant and fencing material, is directed by the Rehabilitation Board. There is some flexibility in policy but the Corporation's appraisers work within a fairly well defined framework.

There are two further major sources of finance, namely the Dairy Companies and the Stock Firms. Within each there is a policy which offers finance on terms which do not vary greatly. Various firms also provide finance under hire-purchase agreements.

The terms on which finance can be obtained are important. The farmer, heavily indebted and yet in need of further capital for development is extremely vulnerable to an over-liberal finance policy from any quarter.

2. Personal Variables

(i) Age. All of the farmers studied were in the age group that served in World War II. At the time of the survey this gave a range from the mid-thirties to the early fifties, a much narrower range than in a normal farming community. Very few of these men have children born before the War and as a result help of grown sons is seldom important.
(ii) Background. Apart from War service in common the farmers had to be graded "A" for dairying before they could enter a ballot for one of these properties. Men graded "A" were defined as "Experienced men, qualified for immediate settlement on farms of their own". In general the Land Settlement Board required, for this grading, at least two years' experience on the appropriate type of farm with special training taken into account. An interview to test knowledge of farming matters was conducted.

Of the farmers under study the earlier ones settled were required to have an "A" grading for the Auckland Province but later ballots were opened to men who received their grading further south.

(iii) Selection Characteristics. These farmers differ from a group who have taken up farms under normal peace-time conditions. The latter are selected mainly on availability of finance. Apart from farms which are inherited, this means that for a man to advance from the status of wage earner to that of farm owner he must have diligently applied himself to the business of saving money and in all probability he has made many contacts with sources of finance. He has plenty of time to sound them out and may even have had experience with them when he bought a herd. Most of those who were settled under rehabilitation were not able to take such semi-permanent jobs as share-milking while entering ballots. The fact that the deposits required were very small, and were freely waived, meant that the normal "capital accumulation" test of farm ownership was virtually abolished.
There is no doubt that rehabilitation, in many cases, served the purpose for which it was designed - i.e. of aiding farmers to obtain farms who, were it not for their war service, would have obtained them without such aid. But neither can there be any doubt that rehabilitation allowed men to start farming who, were it not for the war and rehabilitation, would never have had farms of their own.

The result is a marked lack of experience in handling finance and a pronounced, all too common, occurrence of wage earner's attitude. It was often disguised under such assertions as "I won't become a slave to the farm." In its worst form this attitude was exhibited in an unreasonable grudge against the Lands Department and the State Advances Corporation whom they identified with their erstwhile employers, and, who now, they felt, were not treating them fairly. Some farmers objected to working long hours. Others regarded their early dairy cheques overgrown wage cheques and proceeded to spend them recklessly on household and farm requirements, not realising that they were virtually spent before they were received, on manure and other essentials. The inability to handle finance resulted in some farmers becoming hopelessly indebted without realising the extent of their borrowings.

The system of selection removed that process from the control of normal economic forces and placed it in the hands of a Committee. On what basis was the Committee to work? They had had no firm basis and worked on intuition born of experience. It was hoped that this study would reveal features on which more reliable criteria for judgment could be based.
Once the composition of the sample had been decided it was then thought advisable to contact those people in the district who were intimately concerned with the success of these farmers. Among them were officials of the Lands & Survey Department, State Advances Corporation and Soil Survey Office, members of the Land Settlement Board, local stock agents, dairy company credit officers, accountants and members of the farming community. The files of settlers at the State Advances Corporation office were perused, comments of appraisers noted and production records obtained. From the files of the Lands Department and the Corporation certain information on age and assets at settlement were also obtained, along with data on the farm acreage, date of settlement, budgeted production and a description of the section at settlement. From the Lands Department settlement maps were obtained which showed contour, streams, roads and section boundaries. From information collected at the Soil Survey Office a broad soil classification was superimposed upon these maps.

Armed with this information the investigator visited each of the seventy eight farms between 15th December 1955 and 21st February 1956. The farmers were called on, initially, without previous warning. If the time of the call was not convenient for an interview then an appointment was made but in the majority of cases the interview was entirely impromptu.
Because of the variation in length of visit it was found inadvisable to make appointments in advance. On most days it was found possible to interview three farmers, but sometimes only two could be managed, often because of travelling. On the other hand it was found convenient to visit some farmers after evening milking which allowed four visits in the day. This practice was avoided as much as possible because it frequently meant that the farm was not inspected.

Nature of the Visit.

At the time of introduction and statement of purpose, an inspection of the property with the farmer was suggested. Apart from allowing observation of many relevant farm and management details it was found that in general farmers discussed their problems and methods more freely when walking round the farm than when sitting inside.

Nevertheless frequently hospitality was offered and every opportunity to meet the farmer's wife was taken.

The details of the headings by which the interviewer was guided are listed in Appendix A but in general they could be grouped under the following headings:

1. The farm - condition and management practices.
2. Labour - employment to date and future intentions.
3. Background of farmer and his wife.
4. Family factors.
5. Social life.
6. Sources of information and advice.
7. Aims and objects.
The interview did not follow any definite pattern. Questions asked varied with the state of the conversation and essentially a discussion was aimed at, on as many points as possible. No notes were produced during the visit, either to guide the interview or to record information, except when the farmer was handed a small piece of paper on which were written five alternative aims, and which he was asked to rank in order of importance.

Usually the information on the background of the farmer's wife and her help in farming was obtained from the farmer himself. Sometimes the farmer's wife was questioned on these matters and always an attempt was made to discuss the farm with her, to find out her interest in, and knowledge about the farm.

In questioning a farmer the technique of suggestion was found to be very useful in avoiding an "inquisition" atmosphere. It was especially useful in extracting information about which the farmer might be self-conscious. The suggestion of an alternative answer which was the one considered less desirable allowed the farmer to answer easily in the affirmative without embarrassment and he would be quick to give another answer considered more desirable, e.g. "I suppose, Mr. X, that at the time you went to school not many people even went to High School."
IV. A Method of Measuring Success

A large number of measures of success or efficiency in farming have been used. In the main they are physical measures such as

- Pounds of butterfat per acre
- Pounds of wool per acre
- Pounds of lamb meat per acre

Each of these can be severely criticised in that they take no account of value of the output or of the expenditure to produce the given output. Such measures are inadequate when more than one output is being produced. Butterfat per acre is quite the most useful when used on uniproduct dairy farms in a similar soil and climatic environment.

Nevertheless a farmer must be assumed to aim at maximum net returns and net returns are the only true basis for comparison.

Wilcox et al (1932) in their studies used "operator's labour income", composed of cash farm receipts + increase in inventory + farm produce used in the home - (cash expenses + inventory decreases + a charge for board of hired labour + 5% interest on total farm investment exclusive of dwelling + an estimate of the value of unpaid family labour). This measure is open to several criticisms.

1. The size of the investment will cause variations in "operator earnings", e.g. if a farm valued at £40,000 earns 7% then operator
earnings are £800. A farm valued at £20,000 earning 7% results in operator earnings of only £400.

2. Such quantities as farm produce used in the home, board of hired labour and value of unpaid family labour are very difficult to assess.

3. Changes in inventory include a portion due to change in real value and also a portion due to changes in the purchasing power of money. They are very difficult to distinguish, largely because of the difficulty in finding an appropriate index to use in the correction of money values. In absolute terms this change in inventory due to inflation or deflation is much larger than on small farms.

Westermarck (1951) measured success by "farm family earnings per consumer unit", composed of gross cash receipts + net increase in inventory - (cash expenses + value of produce used in the house). The criticisms which apply to Wilcox's method apply to this method also. In addition

1. The return to capital is not at all distinguished from the return to labour and management. This results in much greater anomalies with size variations.

2. The "consumer unit" is not clearly defined and any definition would be difficult.

It is not surprising that in both studies a strong correlation existed between farm size and earnings. Westermarck (1951) does correct for it in his main data.

Garrett (1955) has advanced a method for measurement of
success or efficiency in terms of net return on capital invested. For this purpose a figure must be subtracted for wages of management. To take into account the responsibility involved, wages of management are calculated as the district married couple's wage plus one per cent of total capital involved. The figure is a good basis for use where the ratio of capital to labour involved is roughly constant. The net return includes change in inventory and the rate of return is calculated on capital as assessed on a recent valuation of land stock and plant.

This method has the great advantage of eliminating the bias resulting from size distribution. The figure arrived at is of value to the farmer to compare the earning rate on his capital invested in farming with the rate which it could earn him if invested elsewhere. The figure is an indication of success and whether it is a result of particularly efficient use of land, labour, capital or management is difficult to decide.

But if a number of the factors are constant then variations in earning rate can be attributed to the one or more which vary.

1. Land. As nearly as possible the productivity of these farms is equal. Any great differences can certainly not be attributed to variation in land.

2. Hired labour. Only 18 farmers had at any stage hired labour or used family labour on other than a casual basis. In only six cases did assessed total wages paid since settlement exceed £1,000. It will be necessary to look still further to explain large variations.
3. Capital. Capital provided from Government sources is virtually constant. But it is possible for some farmers to invest more capital in their farms by obtaining greater credit from stock firms, or by investing their larger surpluses. However for the first, the farmer must impress the firm by his ability and success in handling his fixed inputs at the beginning. For the second, he must succeed in his early efforts with fixed inputs to obtain a surplus for investment. In this way any differences in earning which result from differences in such capital investment are an indirect return to management.

4. Management and Labour of the Farmer. This remains as the only variable input. It may justly be assumed that most of the differences in earning will be due to differences in the management factor. Because there is less scope for variation, differences in labour input of the manager will account for less differences in earnings. However they do exist and it is virtually impossible to separate the two aspects of the farmer.

**Method of Calculation**

Garrett's (1955) method has been used and the approach to measurement is through use of farm accounts. Despite their limitations, they have the great advantage over budgeting of being accurate, as they deal with actual revenue and expenses.

Farm earnings vary greatly from year to year. Therefore the returns were calculated over the complete period of occupation. Changes in inventory are thus calculated from commencement of farming to 31st March 1956. At each date total assets were taken
at market rates and total liabilities subtracted. To this figure is added total personal drawings to give the overall net returns. To bring the interest payments more in line with normal farming circumstances the interest payments actually made to State Advances Corporation were added to net earnings. Interest was calculated on half of the total capital involved at 5 per cent and subtracted from the gross figure. The earning rate on the remaining half of the capital is an indication of what a farmer could earn on the farm under normal conditions of credit. Thus it gives a measure of earning from capital invested in farming comparable to dividends paid on money invested in industrial shares.

Calculation of Net Returns

Farm accounts are compiled primarily, if not exclusively, for Income Tax purposes. Commonly classification of income and expenditure is the minimum required to comply with taxation laws. The items are dictated by allowable exemptions rather than by sound accounting or farm business principles. Some of the difficulties encountered in measuring net returns from accounts, by the method described above are:

(a) Capital expenditures are included under such deductible running expenses as "repairs and maintenance" to a greater or lesser extent, depending on honesty of the farmer and the accountant.

(b) Small items of cash income from such sales as pigs and wool are conveniently forgotten when returns are made up.
(c) Double Counting. In the main all non-deductable capital expenses are included in drawings. Very few accountants enter them separately. The result will be that such items will be included twice in the calculated net revenue; as drawings and again as the resultant increase in value of assets. As most land developments are included with running expenses or under deductible development expenditure (Land and Income Tax Amendment Acts of 1950 and 1954) the double counting will apply mainly to expenditure on plant and buildings. It will apply only to such capital expenditure as is made from revenue. Any made from loans outstanding at the end of the period will be deducted as a liability. Borrowing has been very common for major plant and building investments. Two steps were taken to reduce the error.

(i) Net worth at commencement does not include sundry liabilities, as when they are repaid they will be included as drawings.

(ii) The value of the car was not included in net worth at the beginning or the end of the period. As a result, if the same car was held throughout, depreciation is neglected. However most of the farmers have bought cars during the period and in that case double counting on the purchase has been avoided.

The true earning capacity of the farms is probably exaggerated by double counting, but it could only be eliminated by inspection of individual cheque butts and invoices. To the extent that those who have been able to afford to pay for more of their own
capital development and rely less on loan finance are most affected, the error will probably increase variation between earnings.

**Availability of Accounts**

Of the 78 farmers visited only 25 would allow the investigator access to their annual accounts. The following reasons are advanced:

(a) Due to time limitations, there was not sufficient time to make efforts to gain the farmers' confidence in financial matters. Therefore the later approach by mail, with a request for access to their accounts, did not meet with the response it should otherwise have done.

(b) People are reluctant to fill in even the simplest form and post it, even in a stamped, addressed envelope.

(c) A number of farmers were not willing to disclose their true financial progress as they had been misleading everyone, including the investigator.

(d) Despite assurances to the contrary, some farmers persisted in associating the survey with the case for the State in forthcoming applications for revaluation of properties for settlement charges.

(e) Like other people, farmers are suspicious of things they do not understand. This suspicion of anything to do with their accounts manifests itself in reluctance to "let people pry into their private affairs".

To overcome this difficulty an attempt was made to use the accounts available to relate a gross figure, total butterfat
production, to a net figure, net revenue, using the notable uniformity among the farms.

The income from sale of butterfat may be spent in a number of ways:-

Capital expenditure resulting in an increase in net worth \( (n) \)

Drawings \( (d) \)

Interest payments \( (i) \)

Running expenses includes all of the running expenses shown on the Profit and Loss Account except interest and depreciation. From it is subtracted net pig and bobby calf income to give net running expenses. \( (x) \)

Wages where they are paid \( (w) \).

Then \( n + d + i + x + w = kB \) \( \text{(1)} \)

where \( B = \) total butterfat production

\( k = \) a constant determined by butterfat price.

Of these alternative destinations of income \( w \) could easily be assessed from the labour employed as determined in the interview.

Net running expenses were thought to be fairly uniform over the farms. To support this the figure was extracted from the 25 sets of accounts available, and for a further 17 similar farms in the areas of the survey. Altogether this gave figures for 42 farmers covering a total of 170 former years.

Because expenses tended to be low in the first year, and because such events as delayed purchase of manure upset the figures for individual years, an average figure for each farmer
was taken over. The 42 farmers the mean net running expenses were £770 per year and the standard deviation from the mean £180 per year.

Interest was taken at 5 per cent on half of the total capital invested. The best available measure of this capital was total loans from State Advances plus assets at ingoing. Although it did suffer from inaccuracy due to variation in the degree to which finance from outside sources was used, the figure, when checked against the current valuations made for the farmers whose accounts were available, showed good correlation within settlement years. However a serious inaccuracy resulted from the fact that earlier settlements were made at lower prices. The correction for this error was made in the final figures, on the basis that the average efficiency of the farmers settled in each of the years would in fact be the same.

The 25 farmers whose accounts were available were slightly better than the average as indicated by the following table of butterfat production figures.

**TABLE I. Average Butterfat Production of Total and of Sample of Farmers whose accounts were used.**

<table>
<thead>
<tr>
<th>Years of Occupancy</th>
<th>Total of 78 farmers</th>
<th>Sample of 25 Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Av. per yr. prodn.</td>
</tr>
<tr>
<td>4</td>
<td>31</td>
<td>15,530</td>
</tr>
<tr>
<td>5</td>
<td>31</td>
<td>15,465</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>16,323</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>16,117</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>15,869</td>
</tr>
</tbody>
</table>
For the 25 farmers each of the quantities in equation (1) were calculated. \( d, i, x, \) and \( w \) were taken from the accounts for each year since settlement and \( n \) from the declaration of assets at the time of settlement and from a current market valuation of land, stock and plant at 31/3/56. This valuation was made by the investigator with the help of officers of the Valuation Department and the State Advances Corporation. From the balance sheet as at 31/3/56 the position, with respect to cash and sundry debtors and creditors, was taken.

The correlation between \((n + d + i + x + w)\) and \(B\) was 0.9093. A regression equation to predict \((n + d + i + x + w)\) from \(B\) was calculated and it was found that \[ Z = 0.2262 B - 6,722 \]
where \(Z = (n + d + i + x + w)\) and \(B = \) total butterfat production in lbs. The standard deviation from regression was \(\pm 1,600\). In Fig. I page 33 \(Z\) is plotted against \(B\) and the line of best fit is drawn. In Chapter V some interesting implications of the regression are described.

Using this equation \(Z\) was calculated for each of the 78 farms. From this was subtracted \(i\), as calculated at 5% on half of the capital, \(x\) from the mean figure ascertained and \(w\) as assessed from the farmer's own details of previous employment. Wages of management were assessed using Garrett's method and also subtracted.

The figure remaining represented \(n + d\), where the drawings are net of wages of management. This represents the net return, and was used for the assessment of earning rate.

One important source of expenditure has been omitted. It was found impossible to accurately separate, from the trading account,
expenditure on replacement stock. Nor is there any uniformity in the figure, so that it could be included in net running expenses. Because of the widespread loss of stock, especially from bloat, it is necessary to keep this omission in mind when interpreting the results of this survey. There are reasons to believe that quite commonly it is the necessity to borrow to replace stock that is the first step in the high farmer indebtedness, for which the area is noted.

Capital Invested.

From the large number of possible figures of capital which could have been used for calculation of the earning rate, it was necessary to choose, from those which could be determined, the one which best indicated the investment actually involved. The quantities included were:

1. Loans from State Advances Corporation cover the mortgage on land and improvements, very nearly all purchases of stock and plant at ingoing and a large proportion of the subsequent purchases for which loans were raised. Inclusion of these, while omitting stock firm and dairy company debts, is justified because the latter are designed to be short term. In fact, however, many become long term. To the extent that borrowing from other sources was profitable, then the excess in earnings of that capital over interest charges on it form an over-estimation of the calculated earning rate.

2. The car can be considered an essential part of the capital requirements for farms in these rather isolated areas.
3. Cash at ingoing would almost invariably be used for purchase of stock or plant, as working capital, or for development of the property. Only when cash is used, rather than loan money from sources other than State Advances Corporation, does its inclusion result in relative over-estimation of investment in cases where cash at ingoing is high.

Corrections.

The net returns, expressed as an earning rate on behalf of the total capital as defined above, were divided by years of occupation to give earning rate per year. They were then corrected for two sources of variation.

1. Between years of settlement variation. Because the cost of land, stock and plant had been rising over the period of settlement, earlier settlers show higher returns because of a lower investment for similar assets.

2. Between district variation. It was felt during the survey that farmers on the Maraetai and Tokoroa blocks were being more successful than those on Waikite, Mihi and Atiamuri blocks. After correction for year of settlement the earning rate still showed this variation. As there was no reason to believe that farmers were naturally more efficient on some blocks that others, it was assumed that the variation was due to natural differences. This bears out the opinion of many men with long experience in the area. Consequently the earning rate was corrected for the between district variation.
Correction for these fortuitous factors converts the index of success into an index of efficiency. Obviously, after such corrections, each on an arbitrary basis, the actual interest earning rates have no meaning. The fact that capital invested was valued at the commencement of the period also robs the figures of absolute value. Their value was in allowing comparisons of efficiency between farmers. From them farmers were grouped into five efficiency groups.
Fig. 1

Expenditure plus increase in capital £000's 'Z'.

Butterfat Production in 0,000 lb. 'B'.

\[ Z = 0.651B \]

\[ Z = 2.262B + 6.72 \]
V. PRODUCTION AND EXPENDITURE

Figure 1 shows the scatter of points when $Z$ is plotted against $B$ for the 25 sets of accounts available. Apart from the regression line of best fit ($Z = 0.2262B - 6,722$), a second relationship between $Z$ and $B$ is shown. $Z = 0.1533B$ shows the line on which all points would lie if £1 income from butterfat had resulted in £1 worth of increase in net worth, running expenditure, drawings, interest payments or wages. Two features of Fig.1 present themselves as worthy of interpretation and explanation.

1. By far the majority of the farms lie beneath the "unit efficiency of expenditure" line.

2. The slope of the line of best fit is greater than the slope of the line of "unit efficiency of expenditure".

1. **Average Efficiency of Expenditure.**

The fact that most farms lie below the "unit efficiency" line means that, despite the appreciation in the money value of assets over recent years, most farmers have failed to convert £1 worth of income into £1 worth of expenditure or increase in net worth.

The relationship between capital expenditure and increase in net worth, involves changes in the value of money. Changes in the current market value of land reflect these, and also changes in the price of butterfat which are independent of them. In addition to the above, changes in value due to greater provision of local amenities, and the possibility of sale of sections, will
be independent of capital expenditure. Variations in these latter two, and in part of the first factor noted, will be reflected in changes in unimproved value, and will account for all of such changes.

Changes in the value of improvements are more difficult to apportion. It would be possible to ascertain changes in value of improvements on a cost of replacement basis, but this assumes that all improvements are only just worth their cost. Gutman (1955) pointed out that most improvements on farms are supramarginal. As has often been asserted in New Zealand valuation practice, cost is not value. Because the build up of fertility on these farms accompanying good grassland farming, and costing nothing, is considerable, value exceeds any "cost less depreciation" calculated.

These considerations would lead us to expect most farms to lie above the "unit efficiency" line. The excess of value over cost may not have been adequately allowed for in the valuations made. The depreciation on new plant and buildings may have been large enough to offset appreciation. Such an effect would be reinforced by the excess of cost over value in the case of fencing and building expenditure. Further, these farmers may be inefficient spenders, although it seems doubtful whether this tendency is general.

Undoubtedly as a contributing factor expenditure on replacement of stock losses is important.
2. The Distribution of Efficiency.

The greater slope of the regression of best fit shows that those who have produced most butterfat have also spent their income most efficiently. Two explanations are advanced for this tendency.

(a) In part, the distribution of production follows distribution of the number of years of occupation. Those who have been in occupation longer have had time for their capital expenditure to be more fully expressed as increased value. They have had a number of years at high production and have been able to reinvest profits. Because they took over their farms at relatively low prices they have not had high capital charges. They have quickly been able to cease reliance on stock firm or bank finance and in this way reduced interest costs.

The generally observed picture is one of heavy expenditure and borrowing in the early years with a later improvement in the position. In addition the more mature pastures of the older farms are less dangerous from the point of view of bloat losses.

(b) The remainder of the distribution of production is due to variations in production per year. The two are not independent as production per year increases with time of occupancy. But those farmers who are less efficient in production of betterfat are also less efficient in capital expenditure. They also tend to have the greatest stock losses, and spend less efficiently in replacing them. Frequently, to the detriment of their butterfat production, they have been financed into store lambs for fattening.
It is doubtful whether this practice adds to net revenue.

From observation it would appear that a certain butterfat production is necessary for the farmer to "keep his head above water". Above this level, capital development can be done from profits. Below it mortgage, living and running expenses and any capital development costs can only be met by incurring debt. The necessary level appears easier to attain in later than in earlier years. This tendency is reflected in the large parameter in the regression equation. There is a good case for remission of charges in early years of occupation, when production is low and heavy capital expenditure necessary.

This method of calculation of net returns from gross production may be able to be applied in other districts. The following conditions would be necessary.

1. A sufficient, representative number of farm accounts over a number of years must be obtained to calculate the regression and also to establish a method of estimation of net running expenses on a per farm, per acre or per head of stock basis.

2. The farms must be uniform enough to allow the assessed net running expenses to be near the actual figures.

3. A valuation must be made on some comparable basis to allow interest assessment.

4. Where employment of labour varies a means of assessment must be found.
VI. FACTORS WHICH INFLUENCE SUCCESS IN FARMING

The environment in which a farmer must carry out his occupation may be described under two main headings.

(a) The Physical Environment comprising the farm at the time of assuming responsibility, its position in relation to available services, and climatic conditions.

(b) The Financial Environment comprising the farmer's equity in the farm and the extent and terms of his loan and mortgage commitments.

Given the environment the success of any farmer will depend on two types of influences.

1. Direct Influences. These are the practices which form the routine running of the farm and are subject to the decisions of management. They are the use of the electric fence, the balancing of feed supplies throughout the year and management of the herd to improve its productive capacity.

Such influences are easily studied, and relatively easily measured. They have been the subject of a number of surveys and many trials. There has been great difficulty in isolating a consistent pattern because of the importance of integration of practices, with due consideration of the physical and financial environment, into the most profitable overall policy. Only a few of these influences have been investigated in this survey to relate them to influences of the second type. There is an urgent need for work to relate these factors to efficiency as measured in this survey.
2. **Indirect Influences** act through the farmer on the decisions he makes. They are his own inherent personal attributes and those environmental influences, past and present, which influence his ability in policy-making decisions. In this respect we must treat the policy-making unit which will include any other person, such as wife or son, who helps to make those decisions. In the special case of farming energy, acting through the labour of the farmer, is important.

Such influences are difficult to isolate and more difficult to measure. But to the extent that they can be defined and measured they will be useful as an indicator of relative efficiency which is independent of environment. In considering the results it is important to remember that the range of this sample was limited in many respects. A wider sample may have demonstrated influences which were not obvious from these results.

**RESULTS.**

Farmers were divided into groups with respect to each of the influences investigated. The Chi Squared test was used to give some indication of the closeness of the association. In most cases it was necessary to combine categories to conform to conditions required for the $X^2$ test.

1. **Direct influences.**

   (a) Testing. Farmers who tested their herd regularly were very slightly more successful than those who tested irregularly or not at all ($X^2 = 5.8$ and for significance at the 5 per cent level $= 9.5$).
(b) Grazing control. Those farmers who effectively
controlled grazing, either by use of the electric fence or by
virtue of a farm sufficiently subdivided were more successful
than farmers who practised only lax or a completely ineffective
form of rationed or rotational grazing. \(X^2 = 9.5\) and for
significance at the 5 per cent level = 9.5).

(c) Winter supplement. Farmers who cropped for winter feed
were slightly more successful than those who relied on hay and
ensilage or hay alone. \(X^2 = 7.6\) and for significance at the
5 per cent level = 9.5).

These are three accepted practices among the most successful
dairy farmers in the district. Yet considered separately their
influence is only barely discernible.

2. Indirect influences.

(a) Position previously occupied on farms appears to be the
most important feature of a farmer's background. Sharemilking
or managing experience in handling finance and making decisions
is most valuable. The association is confused by the fact that
some farmers who had the opportunity to take a responsible
position remained on wages so that they could ballot for farms.
Farmers who had had previous management or share-milking
experience were more successful than those who had only worked
for wages. \(X^2 = 9.7\) and for significance at the 5 per cent
level = 9.5).

(b) Intelligence as applied to farming is the greatest
single influence on success. The farmer who intelligently
approaches his individual management problems and the problem of their integration into a policy will be more successful than the farmer who either uses a hit and miss method or uses a practice or policy merely because it has been used before, perhaps in a different district, without consideration of the altered circumstances.

It is partly because all of these farmers have come from outside the district and that there were not present old-established farmers whose advice could be sought that the extreme variation in success emerges. The problem of application of previous experience to a new environment is universal and all important.

This is, perhaps, expressing in words what many experienced men have known for a long time. To demonstrate its importance some method of rating farmers according to intelligence, defined as "ability to apply experience to decision and policy making in a new environment", was necessary. The method is described in Chapter VII. Those rated higher by this method were more successful. \( X^2 = 26.1 \) and for significance at the 1 per cent level = 13.277).

(c) Ambition and faith in his ability to succeed is most important. If a farmer has no great wish to improve his position or his rate of progress, or believes that he cannot do so then it is most unlikely that he will. Farmers who were rated high on this factor were more successful. \( X^2 = 20.8 \) and for significance at the 1 per cent level = 13.277).
(d) Energy. Because the farmer supplies labour as well as management to the farm energy is important in its effect on success. However management is involved in deciding whether labour or capital in the form of machinery will be used. Many such decisions balance the extra effort required against the profits to be gained from using his own labour. Within the scope of his own physical capabilities any increase in labour input is costless and the increased revenue will be all profit. ($X^2 = 18.6$ and for significance at the 1 per cent level = 13.277)

(e) The background of farmer and wife. None of these men had previously owned a farm, and none had worked for an appreciable time on pumice land farms. In every case experience elsewhere had to be adapted and the nature of the experience assumes much less importance than the farmer's adaptability.

No association was found between success and:

(i) The proportion of the farmer's life which had been spent living and working on farms.

(ii) The district or districts where he had gained experience.

(iii) The breadth of his farming experience as expressed by the number of different districts in which experience had been gained.

(iv) The type of farm on which experience was gained - dairy, sheep or mixed.

(v) Whether the farmer's wife was brought up on a dairy farm, a sheep farm or in a town.
(vi) The level of education reached by the wife.

(vii) The level of education reached by the farmer. As a factor of the environment this does not appear important. Because of the fact that many of these men left primary school during the depression there is little correlation between this factor and intelligence.

(f) Influence of the farmer's wife. It is impossible to generalise about this influence. The degree to which the farmer will benefit from, or accept help from his wife depends entirely on the individual farmer and the individual wife. Some farmers need help and encouragement. Others are the all-sufficient male and resent any intrusion on their domain. It is probably that a wife active in farm matters adds to the success of a poor farmer. Any relationship here would be cancelled out by the inactivity of the wives of many of the superior farmers who needed no aid. It also appears that interest and encouragement are more beneficial than physical help.

No association could be shown between success and either "interest and encouragement" or physical help given by the wife.

(g) The condition of home and garden and the number of dependent children do not appear either to stimulate greater effort or to increase as a result of success. The garden is probably largely an expression of the interest of the wife in such matters. There was no association between success and condition of the home, or of the garden or success and the number of dependent children.
(h) Age of the farmer over the range in the sample and without the usual association with financial security could not be expected to emerge as significant.

There was no association between age and success.

(i) Social activities are an expression of the social instinct which bears no close relationship to ability. An important factor from the viewpoint of farmer organisation was that present and past office bearers in Federated Farmers included in the survey, almost without exception, were in the top group of success ranking.

There was no association between success and regularity of attendance at Federated Farmers' meetings or at local stock sales.

(j) Holidays. Generalisation is again impossible. The benefits to be gained from regular or occasional holidays depend entirely on the farmer and his wife. Few of these farmers have reached the position where financial security is a reason for taking extended holidays.

No association with success was shown in whether holidays were taken at all, irregularly or annually.

(k) Extension Contacts. The benefits from extension have barely had time to express themselves in success.

No association was found between extension contacts made and success. Rather than this being a slur on efficiency of extension it shows that officers are covering a fair cross section of farmers.
The main conclusion to be drawn from the study of these influences is the overwhelming importance of observable personal traits relative to environmental factors. Only one environmental factor, position occupied on farms, had any effect on success. On the other hand the three personal traits each had a highly significant effect on success.
VII. RATING FOR PERSONAL TRAITS

AN INTELLIGENT ATTITUDE TO FARMING

One of the obvious characteristics to look for in any enumeration of the personal factor is the intelligence of the farmer. Farmers have to reason their management; which of alternative practices to use, when to use them and how to use them.

Methods of Measurement.

Ideally some kind of standard intelligence test could be used. But under the circumstances this was impossible. Wilcox et al (1932) used an ingenious method of classifying farmers into intelligence groups on their children's rate of progress at school. But inheritance of intelligence is multifactorial and hence the heritability value is low. In addition many of the farmers surveyed only had children of pre-school, or early primary, school age. Level of education is, at best, only a partial criterion. It would have been of little value in this case, as many farmers left school during the depression of the 1930's. The school leaving age depended on family finances rather than scholastic talents.

The interviewer, then, had to make his own assessment. Immediately a number of difficulties arose:

1. Could cause and effect be completely dissociated in the mind of the interviewer? With a knowledge of the production of the farmer relative to his neighbours, could a completely unbiased assessment of intelligence be made, or would the interviewer be looking for signs of intelligence to explain the
success? Although an effort was made to avoid knowledge of production, figures seen when farmers' records were being examined and chance remarks by farmers and neighbours made it almost impossible.

2. Personal bias of the assessor. In any individual judgment such as this, poor correlation between any two assessors is the rule. This is largely due to whether the assessor happens to like the farmer, happens to agree with his philosophy on any particular point or happens to have interests in common with him.

3. On what was the assessment to be based? Knowledge of farming was useless because:

   (a) Many farmers are aware of what they should think or do, but do not know how to apply it to their farm and are incapable of reasoning such a problem.

   (b) Apart from well-established practices, any set of questions on farm practices would include some, the correct answers to which, in that district, were a matter of opinion.

   **Technique Adopted.**

   To overcome these difficulties as far as possible, intelligence was assessed on the method of reasoning in the answers to controversial questions. It is not difficult for an investigator, with some knowledge of farming in the district, to find such questions. A list of examples is given in Appendix B. A single question did not always lead to a discussion. Often a number of different fields, e.g. pasture production, calf rearing, had to be covered before a lengthy discussion arose. During the
discussion the reasoning on which the farmer based his conclusions emerged. The way in which he had adapted and applied the knowledge gained from the experience of others and his own experience on this and other farms was the cardinal point in assessment.

Although it avoided the difficulties and inaccuracies resulting from dishonesty, misinterpretation of questions and the fact that the interview technique, being very flexible, was not constant between farmers, it left only impressions. It was in an attempt to put these judgments on a more scientific footing and to broaden them somewhat that a number of categories of characteristics indicative of intelligence were devised. Inevitably the categories are general and reflect the opportunities for display of intelligence in management. The following is a summary of the system used. It is explained in detail in Appendix B.

The categories were:

1. Planning
   (a) Comprehensiveness of the plan as judged on the covering of:
      (i) Pasture production
      (ii) Pasture utilisation
      (iii) Shelter
      (iv) Herd improvement
      (v) Weed control (where weeds were a major problem)
      (vi) Development of unimproved area (where such an area was present on the farm.)
(b) Completeness of his plan and whether or not it has been carried through to its logical conclusion.
(c) Thoroughness of reasoning of all the implications of the plan.
(d) Consistency to his plan.
(e) Flexibility of the plan in the light of new knowledge.

2. Balance of emphasis between different facets of farming.
3. Reflectiveness and thoughtfulness.
4. Ability to express himself.
5. Originality and ingenuity.
6. Attitude to education for farmers:— whether he appreciated its true value, valued it as a technical training or did not value it at all.

**TABLE 2. ASSOCIATION BETWEEN "AN INTELLIGENT ATTITUDE" AND SUCCESS.**

<table>
<thead>
<tr>
<th>Index of Success</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<td>7</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
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<td>4</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>23</td>
<td>22</td>
<td>15</td>
<td>5</td>
<td>78</td>
</tr>
</tbody>
</table>

For the categories la, lb, lc, ld, le, 2,3,4,5,6 each farmer was rated on a five point scale. Giving categories la to le
inclusive a weight of 1, and categories 2 to 6 inclusive a weight of 2 a total score was obtained and each farmer was rated 1 to 5 on that scoring.

No claim is made for the success of this approach. Its reliability is untested and quite unknown. Any success in substantiating theories from its use may be only a reflection of the failure to dissociate completely cause and effect.

**AMBIGTION AND FAITH IN ABILITY TO PROGRESS.**

Although these may appear to be two distinct factors, they are closely interwoven in that part of the farmer's mind which is concerned with the future. An attempt has been made to classify the farmers on both of them together. They may be more closely associated with the progress that the farmer will make than with the progress he has already made. Individual instances of farmers who have done well but are not striving to, or believe that they will be unable to, progress further were noted. But on the whole those who had aimed high were still aiming high and appeared to have progressed further than those who had set their sights at a lower level.

Any method of rating on this character by the mathematical relationship between present production and expected production (established from the answer to the question "What do you expect to take off the farm in five to ten years' time?") was inconsistent. Those who had been settled longer had progressed further towards the potential of their farms. Farmers, in answering such a question, meant different things. Some gave
a conservative estimate and hoped for more. Others set a high goal which they did not really expect to achieve. Such tendencies were discernible in the interview. Farmers were merely divided into two classes on an assessment of their actual aims and the confidence with which they seek their fulfilment.

**TABLE 3. ASSOCIATION BETWEEN "AMBITION AND FAITH IN ABILITY" AND SUCCESS.**

<table>
<thead>
<tr>
<th>Index of Success</th>
<th>Index of &quot;Ambition and Faith in Ability&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
</tr>
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<tr>
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<td>10</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td><strong>44</strong></td>
</tr>
</tbody>
</table>

**THE ENERGY FACTOR**

The energy factor on these farms was shown markedly in the progress which had been made with three facets of farming. In addition a general observation was made.

1. Subdivision. All farmers visited realised the value of subdivision and hence the extent of subdivision was largely a result of energy, especially as low cost, temporary subdivision is quite satisfactory. Farms were subdivided to a very similar
extent of settlement. When corrected for years of occupation, the number of paddocks was taken almost directly as an index of subdivision with an allowance for difficulty of subdivision.

2. Weed Control. On 57 of the 78 farms in the survey ragwort was a serious problem. The rating for weed control was given on freedom from weeds, relative to adjacent properties. Where sheep are used it was obvious that sheep control ragwort, but do not reduce its incidence for a long time.

3. Development of Unimproved Area. Such an area was present on many farms at settlement. The extent to which it has been improved is a good indicator of the energy of the farmer.

<table>
<thead>
<tr>
<th>Index of Success</th>
<th>Index of Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>5   5</td>
</tr>
<tr>
<td>2</td>
<td>4   6</td>
</tr>
<tr>
<td>3</td>
<td>2   4</td>
</tr>
<tr>
<td>4</td>
<td>1   1</td>
</tr>
<tr>
<td>5</td>
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<td>Total</td>
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In the present programme of Serviceman Settlement there would appear to be two main objectives.

1. That men who served the country overseas should be given the opportunity to gain a position, not less favourable than if they had not been in the Services.

2. That farm production should be increased as efficiently as possible.

As the settlement of servicemen nears completion the second objective becomes more important. This study has indicated that the most important factor in achieving this objective is settlement of the most able managers on the farms available. Because of the abolition of the capital accumulation test of ability, every endeavour should be made to ensure that the farmers selected for settlement are the best equipped for their occupation.

1. Background should be investigated, but not only with the object of ascertaining the district, or the breadth of farming experience. Care should be taken to find out how much responsibility has been taken, how well his job was handled, and the energy, initiative and intelligence shown in his previous occupations.

2. At the selection interview the emphasis should be less on knowledge of the particular district of settlement, and more on the farmer's ability to reason out a problem for himself.
The question should not be:

"If you had 60 cows how many sows would you need?"

but

"How would you go about working out a system of pig farming on a 60 cow dairy farm?"

3. A farm school could be held for new settlers in each district. An extension officer, familiar with the district, could give a small group much valuable information in a short time. In addition this would serve as an initial contact between farmer and extension worker. At present, because of staffing difficulties, extension workers are quite unable to give new settlers the time and attention they need.

These measures may appear cumbrous and unnecessary but if they can help to ensure a reasonable standard of management among new settlers they will pay handsome dividends.

MARGINAL LANDS FINANCE

Administration of the 1950 Marginal Land Act has been difficult. The Act aimed at providing credit for development, for creditworthy farmers on marginal lands who were unable to obtain it through normal channels. The decision as to whether or not any particular farmer is creditworthy has been left to members of the local committees. It has been done, in the past, largely on the basis of the experience and personal judgment of members.

If application of the methods can do no more than give the
committee members a guide as to the most important factors; if it can do no more than lend objectiveness to their skill and experience then it must be a considerable help. By the nature of the assistance they are giving, members will come in contact mainly with the less successful. To distinguish whether this is due to the farmer, or to lack of finance on the farm is difficult. However I believe that with experience in the method used here, and possibly the use of a rating sheet for the major attributes, the distinction can be made.

EXTENSION

If it has shown nothing else, this survey has shown that the farmer cannot be considered as a manager, a separate part of whom deals with each different aspect of management. The farmer who is advised on shed methods, herd improvement and feeding, pasture management and financial aspects by different advisers is a single reasoning and decision-making human being.

Extension workers must view the farmer more as a man and less as a stubborn being who must be persuaded to use an electric fence. They must take into account every aspect of farm organisation. They must not only know the farmer's problems and be able to advise him on all matters concerned with management of every aspect of the farm, they must also know the financial position, not casually but from a close study of the accounts. Their advice should take the financial situation as the starting point, rather than the limiting factor, in an improvement policy. They must become acquainted with family factors likely to influence the farmer's
decisions. Advice must be given taking all of these factors into consideration and particularly the farmer himself.

But most important, is that the extension worker should give the farmer more than the answers to his problems. He should be more interested in helping the farmer to work out the answers to his own problems. Not only should he explain all of his own reasoning in arriving at the answer he gives, but he should stimulate the farmer to think by asking the reasons for the various decisions made by the farmer himself. Administratively such a programme could best be handled by a single worker, covering every aspect of a few farms, instead of the present inadequate coverage of many farms by a number of specialists from different organisations.
IX. SUMMARY & CONCLUSIONS

Previous studies of factors affecting management efficiency have largely neglected personal factors. In the Rotorua area serviceman settlement has resulted in a number of farms which, because of the elimination of many important variables, are particularly suitable, both for the measurement of success from accounts and for the assessment of the personal factor in an interview.

The measure of success taken was the net returns, including capital gains, expressed as an earning rate on capital invested. To give a figure more in line with normal conditions of farm financing, the farmers were assumed to have borrowed half of the total capital at ingoing. When other inputs are very nearly constant, marked differences in this earning rate can be attributed to management and the rate used as an index of efficiency.

Use of farm accounts, derived mainly for income tax purposes, results in double counting of items (under drawings and capital gains) when used for this purpose. By ignoring sundry liabilities at ingoing and changes in the value of the car double counting was minimised.

Only 25 of the 78 sets of accounts were available for perusal. Therefore a regression equation for predicting total expenses plus increase in capital \(Z\) from total butterfat production \(B\) was calculated for the 25 farmers from annual accounts and current market valuations of land, stock and plant. The correlation was
0.9093 and the regression equation \[ Z = 0.2262 B - 6,722. \]

Total wages were assessed for all farmers from information given at the interview. Interest was taken at 5% on half of the total capital at ingoing. Wages of management were assessed at £12 per week plus one per cent of total capital invested.

When total net running expenses, wages, interest and wages of management were subtracted from the figure for total expenses plus increase in capital net returns remained. They were expressed as an earning rate per year and corrected for between year of settlement and between district variations.

The line of regression of best fit was found to lie below the line of an equation, representing unit efficiency of expenditure, for the greater part of its length, and to slope downward to the left more steeply. In part the latter is due to difference in years of occupation and in part to differences in production per year. Lower production due to either factor is associated with lower efficiency of expenditure.

Direct influences (management practices) were found not to greatly influence success. Three personal traits (intelligence; energy; ambition and faith in ability) were found to be closely associated with success. Other indirect influences investigated were background of the farmer and his wife, help given by the wife, condition of the home and garden, number of dependent children, age, social activities, holidays taken and extension contacts. Of these, only the responsibility of the position previously occupied on farms was found to show any obvious
association with success. It appears that the personal traits of the manager, especially intelligence, are of much more importance than environmental factors. They express themselves in the management policy.

The intelligence rating was based on ability to adapt knowledge gained elsewhere to the present conditions. Energy was assessed from the progress made with subdivision, weed control and development of unimproved area. Rating for ambition and faith in ability to succeed was based on the farmer's aims and the confidence with which he expected their fulfilment.

It is suggested that the methods used in assessing the personal factor in management may be applied in the fields of choice of farmers for future settlement and decisions regarding advancement of marginal lands finance. The results of the survey would point towards the farmer being treated, by extension workers, more as a man engaged in integrating a policy and the farm more as a single unit.
APPENDIX A  GUIDE TO THE INTERVIEW.

The following is a list of the main fields covered in the interview. Rather than a complete list it represents starting points from which discussion arose.

The Farm.  Stock numbers and policy.
          Subdivision and water supply
          Shelter
          Pasture and grazing management
          Winter and summer feed
          Fertilisers
          Breeding policy
          Bloat
          Ragwort
          Improvement of unimproved area.

Labour.  Past, present and future employment.

Background. Farmer - Education level.
          Previous occupations and farming experience.
          Wife - Where brought up.
          Education level.

Family.  Aims in education of children.
          How much does wife help on the farm and give advice.
          Number of children and ages.
          Condition of home and garden.
Social

Federated farmers activities.
Sales attendances.
Holidays.
Other sport or social activities.

Information and Advice. Department of Agriculture.
Dairy Board.
Neighbouring farmers.
Ruakura conference.
Journal of Agriculture.
Herd Testing.

Aims and Objects to be listed in order of priority.
1. Pay off loans.
2. Education of children.
3. Home appliances.
4. Farm development.
5. Travel and recreation.

Future Aims.
Butterfat production in five to ten years and how it is to be achieved.
APPENDIX B  INTELLIGENCE RATING.

The categories outlined in Chapter VII are described in more detail below.

1. Planning, in itself is an exhibition of intelligence. Almost every farmer has a plan, however hazy it may be. Because classification on degree of planning is difficult, a number of subsidiary indices were constructed. In the interview, all of these aspects became obvious when the future of the enterprise was discussed at some length.

(a) How comprehensive was the plan for the future of the enterprise? The score for comprehensiveness was derived from the number of the following aspects covered in the plan and the adequacy of the coverage.

Pasture production, Pasture utilisation, Shelter, Herd improvement, Weed control, Improvement of unimproved area.

(b) How completely thought out was the plan? Has it been carried to its logical conclusion. In some cases plans were only taken to a certain stage. Beyond that the farmer had not thought.

(c) Has the plan been thoroughly reasoned? Have all of the implications of the plan as a whole, and of each section and step separately, been taken into account?

(d) How consistent was the farmer to his plan? Did the farmer give the impression, from his farming so far, that he would put his plan into practice? Or was it a model shown to visitors.
but never to be used?

(e) How flexible is the plan? Is the farmer able, and prepared to modify it if some knowledge he gains allows him to see ways in which it could be improved?

2. The Balance of Emphasis. An intelligent farmer will preserve a nice balance in the time, thought and attention he gives to his herd, pastures, pigs and other activities. In some cases an emphasis became obvious and eventually led to neglect of other aspects. In general an unintelligent farmer is less able to emphasise any one aspect without others suffering. The categories for rating were:

(1) A good balance

(2) A slight imbalance without detriment to other aspects

(3) A more pronounced imbalance usually leading to slight neglect of other aspects.

(4) A pronounced imbalance with marked detrimental effects.

(5) Inbalance leading to outright neglect of other aspects.

3. Reflectiveness and Thoughtfulness was observed with respect to life in general and farming matters in particular. A particularly good time for observation was when the farmers were presented with the five alternative avenues of expenditure which they were asked to rank in order of priority.
4. Ability to Verbalise. In particular directness in answering questions and the ability to support the answers with concise reasons was taken into account.

5. Originality and Ingenuity. Some farmers have the ability to do things cheaply and well, or easily and well.

6. Attitude to Education for Farmers. During the interview each farmer was asked, "Do you think that education is of much value to a farmer today?" From their answers, and the subsequent discussion, farmers were grouped into the following categories.

(1) A full appreciation of the broad significance of education and its value in promoting thought and adaptability.

(2) "The value of an education is essentially to fit a boy for his vocation." Three aspects - the accounting, technical (mainly mechanic) and scientific may frequently be distinguished.

(3) An emphasis on the value of one or two of these aspects only.

(4) "Education doesn't do any harm."

(5) A frank opinion that education is of no value to a farmer.

Below are some examples of questions asked and the discussions to which they were designed to lead. During these discussions the farmer's reasoning ability was gauged.

Question: "Do you have much trouble with bloat?"

Discussion: Possible causes and methods of prevention of bloat.
Question: "Do you think that sheep effectively control ragwort?"
Discussion: Methods of ragwort control and the place, and management, of sheep on a dairy farm.

Question: "Do you crop for winter or summer?"
Discussion: The role of crops in supplementary feeding in this area and the desirability of pasture renewal.

Question: "Do you have any difficulty rearing young stock?"
Discussion: The methods of rearing young stock and their grazing management. The possibility of mineral deficiencies, apart from cobalt, in the area.
ACKNOWLEDGEMENTS

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The people who gave me the benefit of their experience in different aspects of this survey are too numerous to mention. To each of them I owe a debt of gratitude. In particular am I indebted to Mr. J. B. Brown, Mr. J. E. Holmwood, Dr. T. H. Scott and those accountants who co-operated in the matter of farmers' accounts.

Finally I wish to thank my supervisors, Mr. H. E. Garrett and Assoc. Professor L. W. McCaskill, for their willing and helpful guidance.
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