A STUDY OF DAIRY-FARM MANAGEMENT IN THE WAIPA COUNTY.

1. A Dairy-Farm Management Survey.
2. A Study of Dairy-Farming Trends Between 1941 and 1950.

BY

J.B. HUTTON

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TABLE OF SYMBOLS AND ABBREVIATIONS USED IN THE PRESENTATION OF THE STATISTICAL RESULTS.

Symbol.	Description.
x	every variable successively.
y	the dependent variable.
$\sigma^2 x$	the variance of x, an independent variable.
$\sigma^2 y$	the variance of y, a dependent variable.
S.S.	sum of the squares.
S.P.	sum of the products.
M.S.	mean square of variance.
n	number of items in each class or group.
d.f.	degrees of freedom.
e.d.f.	error degrees of freedom.
r	correlation coefficient.
R	multiple correlation coefficient from the Doolittle method.
R^2	the fraction of the total variance accounted for.
$1 - R^2$	the residual variance.
β'	the standard partial regression coefficient.
β	the natural partial regression coefficient.
C'	an element of the inverse of the correlation matrix.
"F" test	Snedecor's "F" test.
"t" test	"Student's" "t" test.
N.S.	not significant at the 5% level.
*	significant at or above the 5% level.
* *	significant at or above the 1% level.

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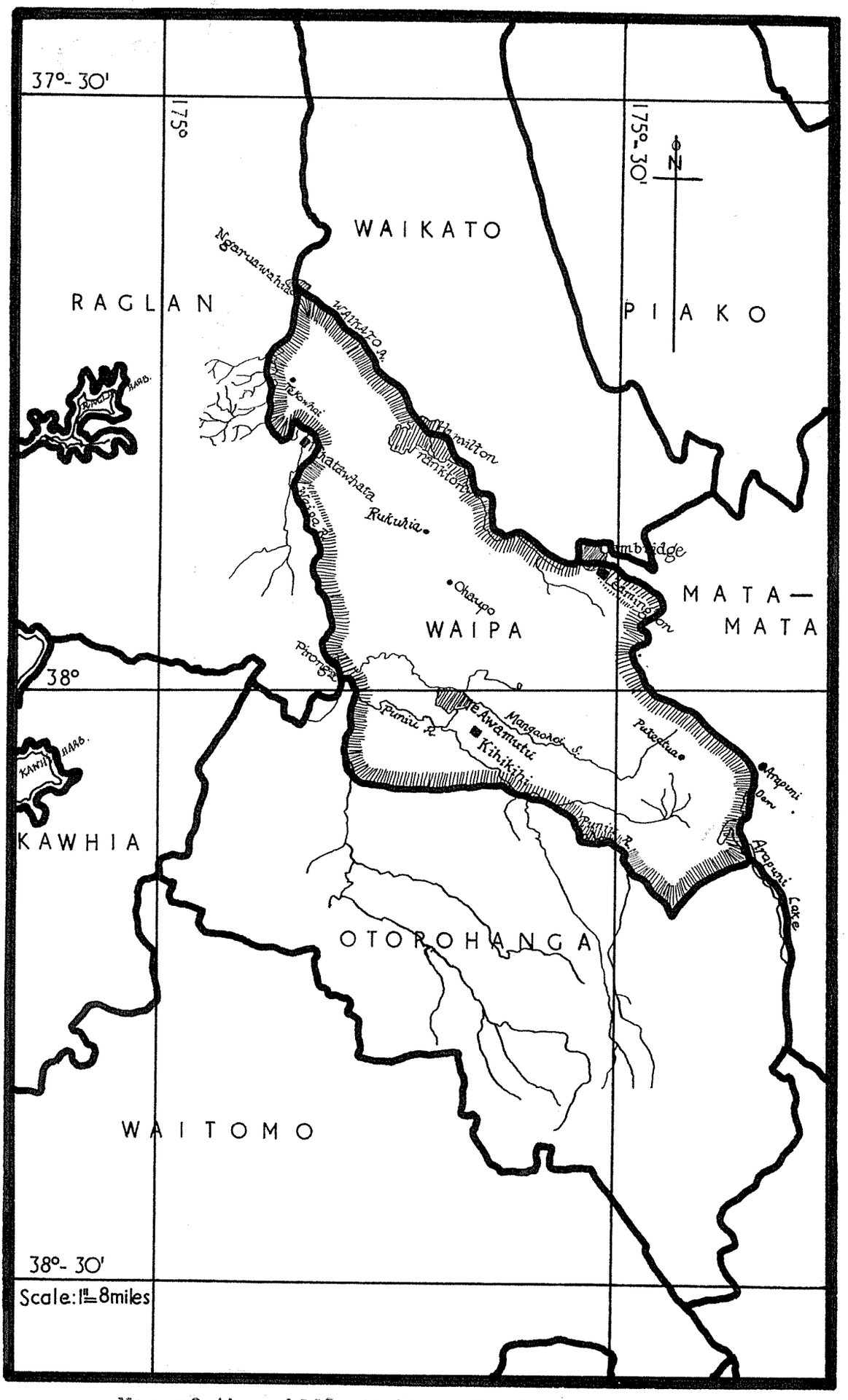

Map of the middle Waikato basin, showing the position of the Waipa County.

PART I

INTRODUCTION

PART I

SECTION I

INTRODUCTION

Farm management differs from the natural sciences in that it can not be studied in the laboratory or on sample plots. It must be studied in the actual operation of real farms. These individual farms differ so widely that large numbers of them must be studied in order to find enough farms similar in any one character to make a sufficient sample. Farm management surveys provide the most practicable method of procuring detailed information, at reasonable cost, on the operation of large numbers of farms. It is now generally accepted that in farm management studies a large number of observations is more important than extreme accuracy in individual observations.

The primary object of farm management research is to determine facts and principles that will aid individual farmers to organize their farms most profitably. As Ashby (1934) has pointed out, "It is not the business of the research worker to tell a man how to run his farm. This is his job. If he can be given information which will assist him in checking up on his policy or actions, then at this point the functions of the research worker cease. A basis for intelligent examination and criticism should be supplied."

There are continual alterations in economic conditions affecting agriculture and it is necessary in meeting these changes, to make adjustments in farm organization. The increased costs of labour and the consequent stimulus to a more intelligent use of resources, is an example of this reaction. Inevitably there is a lag in adjustment, perhaps the result of uncertainty as to the permanency of changes. Research and education can do much to lessen this time lag and the associated financial losses to both the individual and the nation.

Many of the surveys carried out in the U.S.A. through the agricultural experimental stations, and land grant colleges, have dealt mainly with detailed costing and budgetting procedures. Frequently these have proved extremely successful in predicting trends and providing valuable information, especially where diversified farming has allowed flexibility among enterprises. However, under the conditions of specialized farming existing in New Zealand, the demand for costing and budgetting has not been so great.

In spite of guaranteed prices and the fact that returns for dairy products are not affected by local markets to an extent comparable with that observed in certain overseas countries, the relative inelasticity of dairyfarming in New Zealand demands application of efficient farming systems.

In contrast to dairyfarming studies conducted in America and Great Britain, in this country most interest has been focussed on physical rather than monetary inputs and outputs. It has become customary to express farming efficiency in terms of two limiting factors, area and

labour, rather than by some index of profit. The fundamental reason for using different standards in different areas was expressed clearly by Ashby (1937) when he said ..... "There never can be, either in farm management or in the general social economics of Agriculture, any absolute standards of production or efficiency (with respect to) the three simplest standards, per acre, per unit of capital, and per man; each is in fact applied, if not in theory in actual practice, according to those conditions in which any one of the chief factors has to be used to the greatest possible advantage. Where land was plentiful as in Western Canada where it cost a dollar an acre, where labour was scarce and capital cost an average of about 12% per annum, the farmer had to think about the standard of production per unit of capital and per man employed. In parts of India where land is scarce and labour is plentiful and little capital is in use, the standard of production per unit of land will be dominant, and so one might go on."

On each farm the problem confronting the investigator is not the choice and integration of a combination of farming systems, but rather the determination of an association of managemental factors which will permit the most efficient production of a single commodity. Since the farm management survey deals with large numbers of farms operating at varying levels of efficiency, the information provided can be extremely valuable for the evaluation of the absolute and relative importances of the various managemental and organizational measures considered in the survey. Past experience has shown, however, that some of the most valuable information derived from the

application of survey methods has consisted of evidence questioning the efficacy of currently accepted practices and indicating the need for research in certain specific problems. As an example, the present questioning of the widespread use of heavy dressings of artificial fertilizers on dairyfarms may be cited (Mitchell (1948)). The results of this type of research may well save the country as well as individual farmers money and resources which otherwise would be expended needlessly.

Where decisions affecting agricultural finance have to be made, the results of farm management studies can fulfil the important function of supplying reliable, basic information. The misdirected land policies of the depression years still remain vivid in the memories of many farmers and it should be the aim of all who are concerned with agriculture, to prevent a repetition of these conditions. It is suggested therefore, that such organizations as money lending institutions, both private and state controlled, which are advancing money on land, should make full use of the results of present and potential land use surveys.

On the national scale, investigations such as these can be valuable in providing data of use in the formulation of public policies, for it is important to consider how measures on taxation, land and credit affect the individual farmers comprising the agricultural community.

Ignorance and neglect of farm management principles have, in the past, resulted in considerable loss and suffering. Nowhere is this better illustrated than in the United States where, between 1920 and 1930, public lands were divided into 160 acre farms, regardless of rainfall, topography or soil type. In the drier regions,

years of slow starvation and great economic loss resulted, before farms were combined into holdings adapted to economical operation under the particular conditions obtaining in each locality. It was not until the obvious weaknesses of this system were so graphically illustrated, that attention was focussed upon the results of land utilization surveys and only then was the real value of these data appreciated. Governments began to realize how vital was the need for a prosperous farming community and thenceforward the object of agricultural research became, in the words of A.N. Duckman (1930), "to increase the purchasing power of the farming population." In his opinion this ideal could be attained "by measuring the problems which limit rural prosperity, solving them, and blending the solution into farming practice."

Although under the circumstances then existing, it was essential to improve the financial status of farming, with the passing of two decades, in New Zealand at least, some qualification of the original aim has become necessary. The purchasing power of the farming population has increased and in 1936 the institution of guaranteed prices inaugurated a period of comparative security. Those who formulated and presented to the farming population this system of stabilization also considered the necessity of maintaining the efficiency of the dairy industry. Hamilton (1944) provided information which, supplemented by more recent data, (N.Z. Dairy Board Annual Report, 1952, and N.Z. Official Year Book, 1951) queried whether this objective was being achieved, and indicated the necessity for discovering new methods and extending the application of others in promoting greater efficiency in the industry.

The second section of this investigation, viz., the study in farming trends, developed as a natural consequence of the possibilities suggested by Hamilton (loc.cit). Thus, although the objects of this particular research project could scarcely be expected to conform to the primary aim of farm management research as stated previously, its ultimate though indirect value to the farmers should not be overlooked.

There has been a real need to determine whether or not some loss in efficiency has resulted from the birth and growth of a stabilized price system. As a natural corollary, the problem of whether increased purchasing power functions as an obstacle or as an incentive to progress required a solution. The logical approach entailed the collection of detailed information from dairy farms, and from these data, contributions to the total production pool of all sections of a sample of the dairy-farming community were assessed. By supplementing the combined results of the survey and trends sections, with those from land utilization studies, sufficient information was made available to detect farm units producing below capacity.

Not only does the farm survey technique provide a method of determining varying degrees of efficiency among farms, but it also enables an evaluation of the inputs distinguishing farms located at these different levels. The results of this type of research find wide applications, not through demonstrating new techniques of greatest value to properties of established high productivity, but in what is currently a far more pressing problem, of indicating for the benefit of those farming at less efficient levels, what combinations of inputs have previously produced the best results.

Although in certain overseas countries much has been accomplished in the past, it appears that in New Zealand, the possibilities of the survey approach are scarcely appreciated, yet here may be an opportunity for agricultural research workers to achieve what should be their primary aim - to increase the prosperity of the whole population and to retain any such advances, rather than to increase the purchasing power of one section of the community.
