Dairying

Dairy Farm Management and Economics Research Needs

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Discussion Paper No. 37
Department of Agricultural Economics & Farm Management
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NEW ZEALAND.

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DAIRY FARM MANAGEMENT AND ECONOMICS

RESEARCH NEEDS

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PREFACE

This Discussion Paper is based on work carried out for the Farm Management and Economics Sub-Comittee of the Dairy Industry Working Party, of the National Research Advisory Council in July to September, 1964. The delay in the preparation of this Discussion Paper is largely due to the lack of the necessary secretarial staff to type material which had already been prepared.

This Discussion Paper does not include the actual report made to the Dairy Industry Working Party, since this would be contrary to N.R.A.C. policy as expressed in the following quotation:

> "The Council has decided that the reports and recommendations of its Working Parties should remain confidential at any rate until it has completed its own detailed study of them and has made its recommendations. This policy the Council has followed quite strictly.
>
> However, the Council appreciates very much your contribution to the work of the Dairy Farm Management and Economics Sub-committee and understands your desire to make use of the information you have gathered. It has agreed, therefore, that you may make available the material you have collected as a discussion paper together with your own personal assessments provided that you make no reference to the Council or any of its Working Parties or Sub-committees.
>
> Yours sincerely,
>
> W. A. Joiner
> Secretary"

Interested people could no doubt, make a direct approach if they want access to any of the documents prepared for the N.R.A.C.

As far as possible, the discussion paper follows the format requested

by the Dairy Industry Working Party:

1. What are the existing facilities for research? And how are they being used?
2. What other facilities and projects are required?
3. What are the research priorities?
4. Adequacy of the extension of research results?

The sub-committee was assisted by some 31 extension officers (of the Dairy Board, Department of Agriculture, and Farm Improvement Clubs) who answered a mail questionnaire. It is evident that many of the respondents had thought carefully about the research needs of their areas. This paper is being made available to the co-operating extension officers and other interested people for discussion. The paper is signed by Wilfred Candler and David Sargent because somebody should take responsibility for views expressed.

Appendix A contains some introductory comments on the nature of farm management research and extension. Appendices B, C and D summarise the main research suggestions made in the returned questionnaires. Appendix D also contains a glossary of abbreviations covering such terms as "Wallace system of wintering" or r.w.b., which may not be immediately familiar to some readers.

Wilfred Candler

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DAIRY FARM MANAGEMENT AND ECONOMICS RESEARCH NEEDS - 1964

MEMBERSHIP OF COMMITTEE AND TERMS OF REFERENCE

The Dairy Industry Working Committee of the N.R.A.C. had its first meeting on 26 June, 1964. This meeting decided to establish twelve sub-committees, including Farm Management and Economics, with the following membership:

Professor W.V.Candler (Massey University), Chairman

Mr J.W.Stichbury (N.Z.Dairy Production and Marketing Board)

Mr S.A.McKenzie (N.Z.Dairy Production and Marketing Board)

Mr R.Scott, (Department of Agriculture, Head Office)

Mr W.Hadfield (Department of Agriculture, Wellington)

Mr J.N.Hodgson (Massey University)

Mr D.Sargent (Massey University)

Professor B.P.Philpott (Lincoln College)

Dr J.Stewart (Lincoln College)

Mr J.R.Beckett (Manager, F.A.C., Hamilton)

Mr C.U.Plimmer (Manager, Wright Stephenson, Wellington)

Mr G.O.Smart (Beattie and Smart & Co., Public Accountants, Hamilton)

Mr R.J.Davis (N.Z.Pig Production Council)

Mr A.G.Wood (N.Z.Federation of Farm Improvement Clubs Inc., Papakura).

Due to pressure of other work Dr J.D.Stewart indicated he would be unable to serve.

The terms of reference of the Dairy Industry Working Committee were:

"To report to the National Research Advisory Council on :

(1) The existing scientific research and services within the area covered by the Working Committee:

(2) The need for new or modified work and the means by which it should be carried out including estimated costs and manpower requirements:

(3) The relative priorities of projects within existing or planned programmes of research and of new projects recommended under (2):

(4) The existing facilities for the application of research results and for the dissemination of scientific and technical information and means of improving these:

(5) The adequacy of the effort in the basic science which contributes to the applied work."

It was decided that sub-committees should be requested to use the same five terms of reference.

INTRODUCTION

As outlined in Appendix A, there is no clear boundary between technical and management research. For purposes of this paper, the technical research which is felt to be needed by extension officers is detailed in Appendix D, and discussed under item 5 of the terms of reference ("the adequacy of the effort in the basic sciences ...").

Formal and effective research into farm management problems is a relatively new departure. It would probably be fair to say that the bulk of improvements in the efficiency of farm management are still today being made by individual commercial farmers in conjunction with their local extension advisors. Dr. G.F. Warren's observation that "Every farm is a research station, and every farmer the director thereof" is probably as pertinent today as it was when he made it in 1905.

The relatively recent development of professional farm management research work, means that the effort in this field is probably relatively less adequate than in some longer established fields of work.

There is an obvious need to ensure that adequate physical resources, credit and labour, are available for any planned agricultural expansion. In particular, many people have emphasised the current shortage of young dairy

stock. It was felt that recommendations as to the appropriate organisation to plan the supply of physical resources, credit and labour to the Dairy Industry, was outside the terms of reference, for this paper.

1. EXISTING SCIENTIFIC RESEARCH AND SERVICES.

A general indication of formal dairy farm management research and services at present, can be easily given since they are essential nominal.

In the last five years there has been one management survey:- John Graham's Master's study which resulted in the Bulletin, "Cows, Fertiliser, Production, Profit".

In addition, there have been a large number of practical papers on aspects of dairy farm management prepared for Farmers' Meetings, Farm Journals, and the press; by farm management and dairy husbandry lecturers, extension workers, journalists, and innovating farmers.

Valuable as these practical farming talks and articles are, it is doubtful if they are what the N.R.A.C. would regard as research.

New Zealand is rather better served with respect to (small) farm scale dairy farm management trials. In particular, the work at the No.2 Dairy at Ruakura, the Small Farm Experiment at Massey (and now the No.3 Dairy Unit), and Waimate West Demonstration farm could be cited as examples of farm scale experiments. Though even these experiments have been more concerned to study the technical possibilities of production per acre, under more or less equal conditions, than to study the profitability of intensive management systems when all the required complementary changes have been made.

Small farm experiments are relatively inexpensive, since most of the experimental costs should be covered by sales of milk and stock. In the case of Waimate West, the farm is self-supporting except for an annual grant of

£500 p.a. from the Department to cover the cost of field plot observations, which are mainly of technical interest to the Department. On an opportunity cost basis, we could add £750 p.a. for the half-time attention of an Advisory Officer, and £750 p.a. as the rent which would be earned from the property if it was let. Say £2,000 p.a. as a maximum cost of the most ambitious of the small farm management experiments.

Thus it seems reasonable to argue, that the total cost of formal dairy farm management research has averaged less than £10,000 p.a. over the last five years.

2. NEEDED NEW WORK.

In addition to the technical research which farm advisory officers feel needs to be done to enable them to give sound management advice, five types of management and economic research need to be initiated:

(a) Surveys of Advanced Farm Management Systems.

These are surveys of the John Graham type, aimed at producing similar bulletins. Particular studies which deserve attention would be, "Wintering Systems for Wet Soils," "Summer Feeding Problems," "Specialist Production of Replacement Stock," "Management of the 300-plus Cow Herd," and the like.

Even four full-time officers at £4,000 each (for salary, travel, publication of results, etc.) would be a substantial improvement over the present. These men to be at Massey, unless an independent dairy farm management research group is set up. Anyway, say £16,000 p.a.

(b) Surveys of Institutional and Extension Problems

These are surveys of a type which have not been carried out successfully in New Zealand. They would be designed to assist Government policy making (on questions such as land aggregation, subsidies, land settlement and the like). Particular studies which deserve attention would be "Credit for Development," "Sources of Information Used by Farmers," "Share Farming and the Development of Dairy Properties", "Incentive Schemes for Farm Workers", and the like.

Again, two full-time officers at, say, £3,500 each (since there would be less travelling) would be a substantial improvement. These men could also be located at Massey or the independent dairy farm management research group. Anyway, say £7,000 p.a.

(c) Regional Small Management Farms

The further a farm is from a management research farm such as Waimate West, the less use work done there is to him. This is both because of the increasing importance of differences in soil type and climate, and because of the simple inconvenience of visiting the demonstration farm. Thus, there is a need for a net of management research farms scattered throughout the dairying areas of New Zealand. It would not seem unreasonable to aim at one management research farm per thousand farmers. This would imply some 37 dairy farm management research farms, say an additional 34 management research farms. These should not cost more than £2,000 p.a. to run, say, a total of £68,000 p.a.

The experience of Waimate West indicates the value of decentralised control of such farms. One possibility would be for the Government to offer a pound for pound subsidy on out-of-pocket expenses to dairy factories, or local bodies, which established dairy farm management research farms. Alternatively, an outright grant of £2,000 p.a. could be given to encourage the establishment of these farms.

(d) Co-operative Management - Scientific Research.

There are many areas where consultation between technical people (agricultural engineers, plant and animal breeders, nutritionists, and the like) and management workers can lead to much improved acceptance by farmers of new technical findings. The optimum utilization of expensive machinery, the economical design of farm buildings, chemical methods of pest control, improving stock quality, etc. are all fields where co-operative work could be fruitful.

On some other topics, such as farm layout, use of run-offs, adjustment to tanker collection of milk, and the like, there is useful empirical work to be done, without the need for co-operation with technical workers.

This leads to the recommendation that all large agricultural research stations should have a "Consulting Production Economist." (This parallels the concept of a consulting statistician). In particular, we recommend the appointment of two (2) consulting production economists, one at Massey and one at Ruakura, say, £6,000. p.a.

(e) Speculative Management Research.

In addition to the above three types of research which should be expected to pay off more or less at once, there is probably scope for what might be termed some speculative management research.

In particular, a research team aiming to study the optimum calving date would probably be justified. Calving date, together with lactation length, is a very important management decision. This study would produce a large amount of what the Americans in talking of their Space programme call "spill over" effects. To optimise calving date it would be necessary for the research team to know a lot more about pasture conservation, supplementary feeding, methods of feeding out, and the effect of nutritional levels on milk production, amongst other things.

Say, a ten-man research team of technical and management specialists, five technicians, 100 acre farms, £10,000 worth of buildings and machinery and equipment. Or, a capital cost of £33,000 and runing costs of about the same.

Summary, estimated current expenditure	£10,000 p.a.
suggested expansion:	
Surveys of advanced management systems	£16,000 p.a.
Surveys of institutional and extension problems	7,000 p.a.
Regional management research farms	£68,000 p.a.
Consulting Production Economists	6,000 p.a.
Speculative management research - capital	£33,000
- annual	£33,000 p.a.
Research - Extension Liaison service	£15,000 p.a.
TOTAL: £33,000 capital expenditure and	£155,000 p.a.

By comparison, the expenditure by the Grasslands Division of D.S.I.R. in 1961/62 was £134,000, the expenditure of Plant Chemistry Division was £50,000, and the expenditure at Ruakura Animal Research Station (excluding Whatawhata) was £175,000. That is, the needed expenditure on Dairy Farm Management research is comparable with the old Ruakura Research Station, or Grasslands and Plant Chemistry Divisions of D.S.I.R.

3. RESEARCH PRIORITIES

A bulletin such as "Cows, Fertilizer, Production, Profit" cost £2 per farmer, if each farmer in the survey area receives a copy. This £2 includes all the survey costs, and charging a full professional salary for the man employed.

Similarly, a regional management research farm to every 1,000 farmers should cost about £2 per farmer in the area.

This is an extremely low cost per farmer contacted, and suggests top priority should be given to surveys of advanced management techniques, and regional management research farms.

By contrast if a Field Advisory Officer costs £2,000 p.a. to keep in the field, and if he manages to make 300 visits each year, each visit costs over £6.10.0., quite apart from any overhead charges.

It is probable that the other suggested items in the research programme would compare favourably with many types of purely technical research.

4. DISSEMINATION OF RESULTS

Bulletins of the John Graham type, and management research farms, are more or less "self-extending." Certainly, the estimate of £2 per farmer includes the distribution of bulletins, and the availability of the research farm to farmers who wish to visit it.

In general, it would appear that the New Zealand Dairy Industry is well served with farm journals, a variety of extension services, and a network of Farmers' Weeks. As to whether this is as adequate an extension service as it appears, can only be studied by the type of institutional survey on which we have suggested the expenditure of £7,000 per annum.

On the other hand major improvements could probably be made in the use of T.V. and films as a readily understood mass extension media.

5. ADEQUACY OF BASIC RESEARCH.

The adequacy, or otherwise, of "basic" research depends on the target rate of agricultural expansion. The concensus of the advisory officers contacted seemed to be that over the next ten years:

(a) a 10% increase in production could be confidently expected with present knowledge, and the present level of extension,

(b) a 50% increase in production could be expected with present technical knowledge and some increase in extension, and immediately applicable farm management research (i.e. regional small farms, and John Graham type surveys).

(c) a 100% increase in production would require new technical knowledge. Appendix B lists, under several headings, the research (new information) which extension officers feel to be most urgently needed.

Since the Targets Committee of the Agricultural Development Conference (and hence the Government) has not yet established a target rate of expansion for the Dairy Industry, it is impossible to state at all precisely whether current research effort is adequate to this unknown target rate of expansion.

It is, however, clear from Appendix D. that extension officers are well able to specify the information which would be of most use in their own districts.

Understandably, it has not been possible in the time available (and without technical assistance) to establish precise costs, or likely benefits, from the proposed research topics. It seems obvious, however, that unless costs of solving particular problems are budgetted in advance, and benefits estimated, there can be no question of allocating research funds optimally.

Accordingly, we would recommend that the N.R.A.C., or the Department of Agriculture, or the Dairy Board, establish a five-man Research-Extension Liaison Service to provide a continuing review of research needs, and research expenditure so as to ensure that the bulk of research funds are spent so as to solve the felt problems of extension personnel.

6 COST OF THIS REPORT*

In the belief that efficiency begins at home, we offer the following approximate budget for the cost of the report to the Dairy Industry Working Party and the preparation of this Discussion Paper:

Replies to Questionnaires:

34 @ 4 hours of extension officer time, @ 15/- per hour = 34 x £3	£102

Preparation and Analysis of Questionnaire and Preparation of Report (at Massey)

Professional time	£300	
Technical time	150	
Typing	50	
Phone, paper etc.	100	
		£600

Sub-committee Members

Consideration of Draft Report

10 (non-Massey) committee members @ 12 hours, @ 25/- per hour = 10 x £15	£150

Committee meeting

8 (non-Massey) Committee members for one day @ £15 = 8 x £15	£120
Travelling and Hotel expenses, 8 @ £3 = 8 x £3	£ 24
	£996

*NOTE: It should be emphasised that the above costs have been calculated on an Opportunity Cost Basis. NONE OF THE COMMITTEE MEMBERS HAVE BEEN PAID FOR THEIR PARTICIPATION. They have merely had less time to do the other tasks they are actually employed to perform.

Wilfred Candler
David Sargent

APPENDIX A:

NATURE AND SCOPE OF FARM MANAGEMENT RESEARCH

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APPENDIX A: NATURE AND SCOPE OF FARM MANAGEMENT RESEARCH

Though not requested by the Dairy Industry Working Committee, it seems appropriate here to provide a brief outline of the role of farm management research.

Description of Farm Management: Farm Management consists of the process of making decisions about farm operations. The process has been arbitrarily classed into eight functions:-

1. Formulation of the goals or objectives of the farm.
2. Recognition and definition of a problem or recognition of an opportunity.
3. Obtaining information - observation of relevant facts.
4. Specification of and analysis of alternatives.
5. Decision making - choosing an alternative.
6. Taking action - implementation of the alternative selected (assuming that the decision was, in fact, to take action).
7. Bearing responsibility for the decision or action taken.
8. Evaluating the outcome.

These eight functions are, of course, closely inter-related parts of a single process and should not be regarded as separate entities to be discussed in isolation. It is, however, reasonable to use this definition in discussing the contribution of farm management research to the managerial process. Farm management research is concerned with the first four and the last of these functions. Whilst the motivation of farmers and their education in problem recognition is important, most current farm management research methods are concerned with steps 3 and 4. Step 8 is of lesser significance in a dynamic agricultural situation.

In making these decisions, then, a manager must :-

(a) Have information on the technical possibilities open to him,

(b) Know the prices likely to be received,

(c) Know of any internal restraints (lack of credit, need for a regular income, etc.), and

(d) Be able to analyse the alternatives open to him.

Any new scientific knowledge or other idea must be handled by the management process before it is applied on a farm. Management is therefore an important aspect of agricultural production. Knowledge and ideas will more likely be applied if it can be shown that they are profitable. Until recently, management has been regarded as a matter best tackled in an empirical fashion. Though experience is still important it is now clear that economic theory is a key to many forms of management analysis and that the capacity to organise a farm profitably comes from an integration of technology with economics.

Management, then, consists largely of the co-ordination of information available from economics and specialist technical disciplines to optimise the future behaviour of the farm as a unit. This has important implications for farm management research.

Farm Management Research: The term farm management research can cover a wide range of topics. It may include:

(a) The identification of needed technical information. e.g. "Production function for fattening pigs".

(b) The integration of technical information into a profitable farming system.

(c) Budgetting of long term capital investments.

(d) The development of new farming systems without specific reference to prior technical research, and

(e) The study of institutional limitations such as share farming agreements, credit facilities, taxation and the like.

It is important to note that there is a research continuum from purely technical to purely management research. The control of grass grub provides an example. The question of how much D.D.T. in prills will kill grass grub under given climatic, seasonal and grass growth conditions, is a purely technical question. Whether it is practical and profitable to integrate a control programme, which relies on keeping stock off the pasture for a prolonged period, with the other seasonal operations, is a management problem.

Thus extension officers (or farm management research workers) should be able to provide research adminstrators with a guide as to the technical research which needs doing.[1/]

Farm Management Research Methods:

Farm management research methods can be arbitrarily classified into two broad categories - "methodological" and "empirical" research. Methodological research covers the development of analytical techniques which will assist managers to make better decisions, whilst empirical research refers to the proving of management practices on farms.

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1. This is, of course, a two-sided business. Research workers should be able to provide the best estimates of the cost and time to gain new information. Extension officers should be best able to say what different discoveries would be worth to farmers, and hence the effect on agricultural output.

Methodological research is speculative in nature and embraces a wide field of activity. It may range from the addition of a simple idea to an existing method of reasoning, through specific methods of considering the addition of innovations, to highly sophisticated procedures of analysis derived from the field of applied mathematics, which are examined in the light of their possible application to agricultural problems. An over-simplified definition of methodology would be that "it helps in ways of looking at and thinking about problems". In New Zealand formal methodological farm management research is at present solely confined to the Universities and at best could be described as vestigial.

Farm management methodology can contribute to future technical research by:

(i) Assisting technical researchers in laying out and designing experiments in such a way as to have meaningful results to the manager and extension worker.

(ii) To encourage research workers to specify more completely the conditions under which experiments and trials have been conducted.

(iii) To assist research workers towards a better appreciation of variation between farms and in the quality of rescurces.

(iv) To assist research workers to a fuller recognition of the nature of adjustments on the farm - the idea of marginal additions and marginal increments and the importance of complementarity and substitution.

(v) To assist researchers in making the correct economic inferences for farm management from their data.

(vi) To assist in the dissemination of research results by demonstrating the methods of analysing the economics and contributions of

a practice to a management system.

The above are the sort of contributions which a Consulting Production Economist could help to make at a large research station.

Simulation techniques are currently an aspect of methodology that depends on team work between management specialists and plant and animal workers. The object of simulation studies is to analyse the complex inter-relationships involved in production processes. Most of the current technical research methods involve the study of a restricted number of variables in a component part of the production process. Simulation, on the other hand, tackles the process as a whole. All variables are considered simultaneously and the chances of any important interactions between factors being overlooked are reduced. Simulation helps to pinpoint gaps in present knowledge and might indicate possible lines of research.[2/]

Empirical Research

As has been stated, before a management practice can be considered proven, it must be carried out on a farm. This proof can be obtained on commercial farms or on Management Research farms. Where institutional limitations exist, a study of their influence must be made on commercial farms.

Empirical research includes -

(1) Surveys to study farming methods which are achieving profitable increases in production.

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2. For a fuller discussion of Simulation see Arcus, P.L. "Introduction to the Use of Simulation in the Study of Grazing Management Problems" Proc. N.Z.Soc. Animal Production, Vol. 23, pp. 159-68 (1963).

This type of survey would be conducted within defined districts in the main dairying areas (for example, South Taranaki is a defined area of Taranaki). In the first instance, districts would be selected which would have relevance to large areas in terms of soil type, climate and type of farming. Later, surveys would be extended to smaller areas with their own specific problems.

The object of such surveys is to discover how profitable increases have been achieved and to trace out all the adjustments which have led to such increases, including some which cannot be quantified. The impact of new techniques on the whole farm system would be examined and alternative methods of achieving profitable increases would be evaluated. Evaluation would include study of the effects of taxation. Farms studied would maintain their identify as "cases" rather than losing valuable information by averaging. Case studies provide learning devices for farmers and extension workers and the information gained in the survey might suggest useful approaches which could be tested on regional management research farms.

(2) Surveys to study particular farm practices

Adjustments which are likely to lead to immediate increases in profit are likely to stimulate the widespread interest of farmers. There is a need for the economic evaluation of these innovations on commercial farms. Surveys would enable innovations to be carefully studies, alternative methods or designs to be described and evaluated. Examples of this would be surveys of production line milking systems, of wintering systems on wet soils and of the economics and contribution of subdivision to increased production.

(3) Surveys of Institutional Problems

It is important to understand the restrictions imposed by legal and institutional factors on management decisions. There is no published evidence in

New Zealand of the extent to which production is limited by these customary restraints. This is a serious shortcoming in view of the current national need for expansion in agricultural production.

Surveys should provide factual information on the nature and extent of limitations, many of them traceable to legal decisions or habits of thought, which were quite appropriate ten or twenty years ago, but not perhaps today

(4) Regional Management Research Farms

Research is continually being carried out by the more forward-looking farmers and their extension advisers. In every district there are farmers trying new ways of running their farms. Waimate West, the No.2 Dairy at Ruakura and the (discontinued) Small Farm Experiment at Massey are examples of this type of research being carried out on a more formal basis.

Regional Management Research farms have considerable potential as a means of studying and demonstrating the impact of new technologies on the whole farm system in terms of all adjustments necessary. A major purpose is to synthesise experimental results from the different disciplines of agricultural science. The formulation of a management system will usually be the result of one major changed practice (for example, high stocking rates) which necessitates a number of important consequent adjustments in farming practice. Regional management research farms would indicate the modifications required to techniques before they could be considered suitable for farmer adoption in the areas and would elucidate the problems associated with increased production. In addition, the management research farm would help to show farmers how to get to a given level of production. These farms should show the profitability of management systems - it is not sufficient to show that greater physical production is feasible.

Regional Management Research Farms would be regarded as complementary to the methods of applied agricultural science where factors which may contribute to increased production are studied in isolation and not as part of a complex of adjustments. The objective would be to try new methods out on a farm basis, even though this may mean introducing methods and techniques which are not yet perfectly understood by natural scientists. It may involve attempting to "jump the gun".

A major purpose of the regional management research farm is to increase the rate of adoption of new management systems by farmers. The need to keep farmers and their advisors in touch with the progress of the farm together with the need to take account of variation between areas in climatic, soil and other conditions implies the establishment of a number of such units.[3/]

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3. For a fuller discussion of small demonstration farmers see Brougham, R., Candler, W., and Wright, A.: "Small Farm Experiments" Discussion Paper No.11, Department of Agricultural Economics and Farm Management, Massey University.

APPENDIX B:

RESEARCH PRIORITIES

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APPENDIX B : RESEARCH PRIORITIES

1. INTRODUCTION

Up to the present time the amount of financial support for farm management research per se has been negligible. It could, therefore, be argued that any type of farm management research should be given high priority by the N.R.A.C. However, we realise that the development of farm management research to an adequate level is likely to take some time and a set of priorities must be drawn up.

2. OBSTACLES TO EXPANSION OF PRODUCTION

Research must first be devoted to the chief obstacles to the expansion of agricultural production. The following surveys, extracted from Appendices C and D would seem to have particular relevance to problems of expansion and would provide useful information, at present not available, for the Government in considering the implementation of the recommendations of the Agricultural Development Conference.

Topic No.1 "Obstacles to proven profitable developments including the influence of credit restrictions and taxation penalties."

Time Involved. One-and-a-half to two years' work for one research officer.

Finance Required. Including salary, travel, support costs and publication of findings, £4,500.

Topic No.2 "Farmers' attitudes to credit and the obstacles to its use together with a review of the credit policies of lending institutions in New Zealand including dairy company finance, life insurance company finance, stock and station agency finance and short term credit sources".

Time involved Two years' work for one research officer.

Finance Required. Salary, travel, support costs and publication of findings, £5,000.

Topic No.3 "Farm Labour in New Zealand" - a survey of labour rewards, including wages, fringe benefits, incentives, housing and conditions of employment, linked with a study of the reasons why labour leaves the land, and of the substitutes for labour adopted by farmers who have experienced chronic difficulties in recruiting labour.

Time involved Two years' work for one research officer.

Finance Required £5000 to cover salary, travel, support costs and publication of findings.

Topic No.4 "The fairness and adequacy of the various types of sharemilking agreement with particular reference to provisions for stock numbers, replacements, topdressing, bloat control, etc., and the obstacles to increasing production".

Time involved Two years' work for one research officer.

Finance Required £5,000 to cover salary, travel, support costs and publication of findings.

NOTE: The time involved does not refer to full time work exclusively devoted to the project, but rather, measures the time elapsing between commencement of the survey and publication of results. The four topics listed would probably be handled by three men in two to three years.

All the above projects involve institutional problems. They are nonetheless regarded as farm management problems

because the existing institutional conditions certainly influence farm management decisions.

Facts about the present situation must be known before the Government can formulate palliatives for the felt problems.

3 METHODS OF ACHIEVING EXPANSION OF PRODUCTION

Production increases are likely to arise in two ways :-

3.1 Achieving extra production through the more efficient use of existing resources without the addition of further inputs.

Examples of this type of adjustment would be :

Changes in milking techniques

Improvement in employer-employee labour relations

Improvement of conservation methods

Improving the timing of fertiliser application

Changes in calving date to avoid feed shortages

Changes in wintering systems to avoid feed shortages in spring, and so on.

Farm management research methods which would be appropriate here include the following:

Surveys

The farm labour survey (topic No.3) in Section 2 would perhaps provide useful ideas for improving labour relations.

Surveys of management practices in specific areas would also suggest improvements in wintering systems or adjustments in calv-

ing dates to overcome spring feed shortages in those areas. Similarly, improvements in the timing of fertiliser application may be suggested by studying farms achieving increased production in given areas.

Regional Management farms: Practices developed on such farms may be applicable on other farms without the need to add further inputs.

The main purpose of surveys and regional management farms would be to study the adjustments necessary to achieve increases in production. In most cases, the application of findings would require the addition of further inputs and for this reason, the organisation of these types of farm management research will be dealt with in the next section.

Consulting Production Economist Work

The appointment of consulting production economists to research centres would ensure that research was planned and interpreted with due regard to feasibility in farm management systems.

Examples would be :

A re-evaluation of the work on stimulation carried out at Ruakura.

Evaluation of methods of conservation.

Speculative Management Research

Speculative Management research is the term used here to cover investigational work by individuals and/or teams in various fields:

(i) Physical research i.e. the investigation of the limits to which a system of management can be pushed before some breakdown occurs.

(ii) Simulation where farm management workers in co-operation with other technical specialists could make an analysis of problems in their entirety.

(iii) Methodology where improved methods of thinking about problems are

developed.

Physical research should indicate whether a particular system of management has achieved its full potential whilst simulation might indicate bottlenecks to increased production - for example, simulation might indicate an adjustment in calving date which could be expected to result in increased production through better coordination of feed supplies with animal requirements. Methodology might help the farmer to improve his decision making. An example here would be the use of linear programming on diversified farms to maximise profit by re-allocation of existing resources.

3.2 Achieving extra production through the more efficient use of existing resources together with addition of further inputs.

Increased efficiency in the use of existing resources will usually permit further inputs to be handled successfully. The key to achieving extra production in this way lies in carrying extra productive stock. Problems which farm management research seeks to answer lie in maximising, profitably, the number of milking cows which can be carried, and involve questions of what adjustments are necessary to achieve increases and maintain them, the limiting factors to increasing stock numbers and, finally, how to handle the problems arising from the addition of extra stock.

It is obvious from Appendices C and D that the majority of felt problems in extension lie in this broad category. Thus extension workers wish to know about the economics of high stocking rates and the maximum, feasible, profitable rates for difference areas and soil types. Associated problems are :

(i) The influence of pasture pests as limiting factors to increased stocking

(ii) Fertiliser requirements under high stocking rates

(iii) Water supply and drainage problems as obstacles to increasing and maintaining stock numbers.

(iv) Increased stocking rate and necessary subdivisions

(v) Wintering problems with high stocking and methods of overcoming them.

(vi) High stocking rate and supplementary feeding

(vii) Calving date adjustments necessary with high stocking

(viii) Methods of rearing replacements under high stocking systems.

(ix) Labour problems with high stocking including the substitutes for labour.

From the questionnaires returned by extension workers, the following topics are held to be particularly important :

Pasture Pests

More intensive studies on Grass Grub and Porina.

Fertilisers

From the questionnaires returned by extension workers it is obvious that fertiliser practices pose the most important problems to extension workers. More information is needed on N, P, and K, requirements for all soil types, and the timing of applications. Information is also needed on the requirements of various soils for trace elements.

Drainage

Information needed on the most suitable type of drainage for specific soil types.

Subdivision

Information required on the need for subdivision and the types, costs and efficiency of different types of fence.

Wintering Systems

There is a widespread demand for evaluation of feed platforms, barns, split herd wintering, grazing off, sacrifice paddocks and zero grazing, with a view to finding the most suitable systems for specific conditions. This would also appear to be a main topic of interest to extension workers, though no doubt the timing of the questionnaire (early August) would account for this.

Supplementary Feeding

Main topics of interest were :

Information required on the contribution and place of barn hay drying. Quantities of supplementary feed required by stock. Evaluation of the place of meal feeding as a supplementary feed. Evaluation of summer forage crops.

Labour Substitutes

Extension workers requested a study of production line milking systems.

Farm Management research can contribute to the above problems as follows:

3.2.1 Surveys

1 Surveys of Farm Practices

(a) Survey of Production Line Milking Systems

A study of existing shed design and construction, followed by publication of a bulletin containing

principles of design and placement, materials schedules, construction details and plans, together with methods of managing work in the shed.

Time Involved Two years work for a research officer receiving co-operation from extension workers.

Finance Required Including salary, travel, support costs and publication of findings, £6,000.

(b) Survey of Subdivision

A study to evaluate types in relation to capital cost, annual average cost (including maintenance) and contribution to farm organisation. High production farms would be included in the survey to ascertain the intensity of subdivision on these farms and to find out what has been done to subdivision in the process of achieving high production.

Time Involved One year's work for a research officer.

Finance Required £4,000 including publication of results.

(c) Surveys of Wintering Systems on wet soil types:

A study conducted in wet areas to ascertain the types of wintering systems used, the costs of these and their contributions and limitations.

Time Involved Two years' work for a research officer

Finance Required £8,000, including publication of results if undertaking took full time attention of one man.

2. Surveys of Farms Achieving Profitable Increases in Production.

Information on current practices regarding levels of fertiliser application, control of pasture pests, drainage practices, subdivision, wintering systems, supplementary feeding levels and labour management would be forthcoming from surveys conducted within specific areas. Surveys would describe how profitable increases in production had been achieved, taking account of all adjustments and would indicate the profitability of development work.

It is envisaged that surveys of the type conducted by J.V.Graham would be carried out in the main dairying areas. These might precede the establishment of management research farms so that the management system adopted for the latter could benefit from experience already gained. Surveys could be repeated at intervals to ascertain what progress had been made in the area.

Ideally, surveys should be conducted in small areas so that variations in soil type and climate would be minimised and to allow for intensive extension of the findings.

Initially, however, surveys could be conducted within the soil types classified by the Soil Bureau, as being an adequate representation of the soil types used for pastoral activities. This would imply the following distribution:

Northland	3 surveys
South Auckland	1 survey in South Auckland
	1 survey in Hauraki Plains
Waikato	1 survey in East Waikato

	1 survey in West Waikato
	1 " " pumice country
Bay of Plenty	2 surveys
Taranaki	1 survey in North Taranaki
	1 follow up survey in Sth.Taranaki
Wellington/Hawkes Bay	
	2 surveys
South Island	3 surveys.

A total of 17 surveys

Costs No provision has been made in the estimates for this type of survey to precede the establishment of management research farms. If each survey took 12 months to complete the annual cost to include salary, travel, support costs and publication of results would approximate £4,000 per survey.

3.2.2. Regional Management Research Farms

Because these units will demonstrate the relative importance of the felt problems of extension workers and their implications in a management system and because of their value in extension, the establishment of regional management farms should be given high priority.

The point has been made that it is essential for local extension officers and farm management research workers to be closely associated with such farms, not only from the point of view of contributing ideas, but also in assisting farmers to visit them.

The advantages of having progressive local farmers on any advisory committee have been well illustrated in the case of Waimate West. It is equally important to have professionally trained advisors of high calibre to take responsibility for implementing policy.

Because a flexible approach towards financial support has appeared desirable, grants-in-aid might vary from partial to full support. An arbitrary figure of £2,000 has been selected as an average subsidy. Flexibility in the total sum granted as a subsidy is essential and modifications of the average figure of £2,000 might be needed.

It is also desirable that management research farms should not be regarded as the "property" of any specific extension service, but should be open to all extension services to contribute. A body to co-ordinate the results from such farms and to regulate the payment of subsidies to local committees might be found desirable. Any such body should be independent of any particular extension service or political influence. This might well be a function of the proposed Extension - Research Liaison Service.

The same body could be responsible for the financing of the annual publication of physical and financial results from the farms.

Regional Management Research Farms would initially be established on the same basis and in the same areas as for surveys of farm practices (see 3.2.1) less existing farms at Waimate West and Dargarville.

3.2.3 Consulting Production Economists

The place and possible contributions of Consulting Production Economists have been described in Appendix A. Because their contribution is likely to be more of a long-term nature the priority for such services is lower, relative to that for surveys, regional management farms and existing methodological research. Nevertheless, it is felt that they can make a major contribution to research and extension. The duties envisaged for these officers demands high calibre staff and the salary and overheads would need to be at least £3,000 per annum with provision for increases if high quality staff is to be retained. It is suggested that close liaison be maintained between these specialists and the Universities.

3.2.4 Speculative Management Research

This type of research embraces Methodology, Simulation work and speculative physical research.

Methodology. This is at present confined to the Universities. Financial support of projects has been minimal. It is suggested that in view of the existence of trained staff at these institutions and of projects which are pending due to lack of finance that top priority be given to grants to allow the professional workers at Massey and Lincoln to push ahead with research. A grant of £5,000 per annum is the minimum allocation suggested.

Simulation and Speculative Physical Research.

Though this type of work shows promise, the outcome is likely to be less immediate than other methods of research and for this reason, such research is of lower priority than Methodology, Survey Work or Regional Management Farms.

This type of research would probably involve the establishment of a separate research team with the facilities of land, equipment and administration for its own use. The research team would comprise animal and plant scientists together with management specialists. Their work would be complementary to existing technical research.

The costs of supporting the farm management specialists would amount to £3,000 approx. per head per year. Access to a computer would be essential and the costs of computer services have not been included in the estimate.

Early work of such a team would be concentrated on problems of fertiliser practice and wintering systems.

Research Extension Liaison Service

It is suggested that a Research-Extension Liaison Service should be established to provide a continuing review of research needs and research expenditure so as to ensure that the bulk of research funds are spent so as to solve the felt problems of extension workers.

The service would ensure that research workers were up to date with the industry's most pressing problems and would also ensure that extension personnel were kept fully aware of research findings.

Ordering the priorities

The following order of establishment has been suggested to maintain balance. The priorities are relative - there is an urgent need to establish all these types of research.

Priority 0 : Support of Existing Staff at the Universities

Priority 1 : Survey Works

Priority 2 : Regional Management Farms

Priority 3 : Consulting Production Economists

Priority 4 : Speculative Management Research

Priority 5 : Research-Extension Liaison Service

There follows a suggested five year plan for the establishment of farm management research. The minimum number of appointments to each category would be fulfilled at the end of the fourth year and subsequent appointments would constitute expansion of existing services.

It will be seen that minimum expenditure at the end of the fourth year amounts to £77,000 - the equivalent of 513,333 lb. of butterfat at 3/- per lb. This is an annual expenditure equivalent to roughly .09% of the 1962/63 season's production.

FIVE YEAR PLAN TO IMPLEMENT THE RECOMMENDATIONS

YEAR	ESTABLISHMENT	COST	ANNUAL COST
196	Grant to Universities	£5,000	
	3 Survey Research Officers	12,000	
	3 Regional Management Farms	6,000	£23,000
196	Annual Expenditure of existing establishment carried forward	23,000	
	3 Regional Management Farms	6,000	
	1 Consulting Production Economist	3,000	£32,000
196	Annual expenditure on existing establishment carried forward	32,000	
	5 Management Farms	10,000	
	1 Consulting Production Economist	3,000	£45,000
196	Annual Expenditure on existing establishment carried forward	45,000	
	4 Regional Management Farms	8,000	
	3 Officers for Speculative Management Research	9,000	
	5 Officers for Extension-Research Liaison Service	15,000	£77,000
19	Annual Expenditure on existing establishment carried forward	77,000	
	3 Survey Research Officers	12,000	
	1 Officer for Speculative Management Research	3,000	£92,000

DAIRY FARM MANAGEMENT AND ECONOMICS RESEARCH NEEDS

APPENDIX C.

September 1965

Discussion Paper No.37
Department of Agricultural
Economics and Farm Management
Massey University of Manawatu
Palmerston North
NEW ZEALAND.

A P P E N D I X C:

This appendix lists the research suggestions made by the respondents to the questionnaire, by farm management research method.

The classifications listed in Appendix D have been combined because of the legitimate interest of farm management research workers in technical, institutional, economic and extension problems in addition to the topics listed only under "Farm Management" in that Appendix.

The problems have been classified into:

(1) Pasture Pests
(2) Fertiliser requirements
(3) Water Management
(4) Stocking Rate
(5) Subdivision
(6) Wintering systems
(7) Machinery
(8) Pasture, Crops and Supplementary feed
(9) Milking, Shed design and Technique
(10) Credit
(11) Labour
(12) Sharefarming
(13) Farm Records
(14) Development
(15) Extension

In each of the above sections we have listed the suggested problems and identified them with the appropriate section in Appendix D. The most suitable method(s) of Farm Management research to help tackle specific problems are indicated under the following classification:

D - Demonstration Farms - i.e. Regional Management Farms
F.S. - Farm Surveys
I.S. - Institutional Surveys
C. - Consulting work with other disciplines
S. - Speculative Management Research.

1. PASTURE PESTS

PROBLEMS	SEE APPENDIX D.		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
Control Methods	T1	1-5				✓	

Consultant Work

The services of a farm management consultant from a Farm Management Research and Extension Liaison Service to be made available to Government, University and other units investigating the control of pasture pests with a view to advising on the feasibility and economics of control measures in farm management. It is not envisaged that this would be a full time appointment.

2. FERTILIZER REQUIREMENTS

PROBLEMS	SEE APPENDIX D.		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Rates of N,P,K and this effect on pasture quality and animal health	T2 FM4	6 37	✓	✓			
(b) Recommendations for major soil types, including trace elements, liming, ratios, timing and use of nitrogen, cost/unit of nutrient landed on farm for major types of manure	T2 FM3 FM4 I7	6,7,8,9 35 37 46	✓	✓			
(c) Paddock requirements	T2	9	✓				
(d) Technical Research	T2					✓	

Demonstration Farms Problems of manuring - what to use, how much of each element, when to apply are but part of the managers problems. Fertilizer practice must be intergrated with the system of farming on a whole farm approach. Thus importance of fertilizer practice must be related to other aspects of management - the st , the feeding system and so on. This can only be done on a demonstration farm which is committed to achieving high production with profit.

Farm Surveys

Surveys of farms achieving increased production (cf. Graham) will give an indication of current practices and problems. Surveys carried out prior to the establishment of a Demonstration farm will provide useful information for the latter to use as a starting point. Fertilizer practice, again, would be considered as only part of the larger problem of intensifying production.

Consultant work

It is envisaged that a farm management consultant would be seconded to Rukuhia from the proposed Farm Management Research and Extension Liaison Service. His services would be made available to other research units.

3. WATER MANAGEMENT

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Importance of drainage in achieving high production	T3 FM2	pp10-12 34	✓	✓			
(b) Water supply problems as obstacles to high production	T3	pp10-12	✓	✓			
(c) Need for and economics for irrgation			✓	✓			

Demonstration Farms

Farm Water Management would be looked at in the context of the whole farm.

Surveys would show up water management methods as part of the larger problem of intensifying production on farms that have achieved high production.

Speculative Management Research Methodology demonstrates the method of analysing the economics and place of irrigation by farm management thinking.

4. STOCKING RATE

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Achievable rates for different areas and soil types	T4 FM2	14 33	✓	✓			
(b) Wintering Problems with high stocking including pugging, methods of avoiding pugging damage, level of feeding, economics of yards and sheds	T4 FM1 FM1 FM2 FM3 T6	13,14 31 32 33 36 17,18	✓	✓			✓
(c) Increased stocking rate and necessary subdivision	FM2	33,34	✓	✓			
(d) High Stocking rate and supplementary feeding, including concentrates, hay and/or silage	T4 T8 FM3 T7	13 22,23 36 21	✓	✓			
(e) Calving date adjustments necessary to correlate animal requirements with available feed	T4 T9	14 25	✓	✓			
(f) Off farm rearing	T4	13	✓	✓			
(g) Economics of high stocking	T4	13	✓	✓			✓
(h) Economics of short lactation	T4	14	✓			✓	✓

Demonstration Farms

To illustrate the adjustments necessary with increased stocking and the financial outcome of increasing stock.

Farm Surveys

Surveys of farms achieving high production with increased stocking - current practices and problems and financial implications.

Consultative Work

Experimental projects designed to examine the implications of short lactations must have the benefit of farm management advice particularly in relation to realism of design and the inferences to be drawn from such work which have practical implications.

Speculative Management Research

Methodological work would be aimed at methods of analysis of new techniques and the profitable incorporation of these into farm systems.

Physical research would include farm trials of the following:

(a) The extent to which stocking rate can be carried before specific wintering systems break down, how they break down and possible adjustments to prevent breakdown.

(b) Minimizing the level of supplementary feeding and sorting out the implications of this.

(c) The impact of changes in calving date on lactation yield and feed supplies, including the economics of short lactation.

(d) Investigating the maximum possible levels of stocking and the factors which contribute to success and failure.

Simulation

Research team to draw up a simulation programme to investigate optimum production per acre in terms of a system analysis rather than concentrating on a limited number of the constituent parts.

5. SUBDIVISION

	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D	F.S.	I.S.	C	S
(a) Types of Fencing (including contour fencing, electric fencing, flexible fences). Amount needed on high producing farms, i.e. number of paddocks. How subdivision has changed with increasing stock.	T5 FM2	15,16 33	✓	✓			✓

DEmonstration Farms: Once again it can be seen that subdivision can only be considered in relation to all other inputs on the farm in studying a system of farming arrived at high production. Fencing problems will vary in nature according to area.

Farm Survey (a) Points on subdivision adjustments would be gathered in surveys of farms which have increased production compared with other farms.

(b) Could be studies in a special survey aiming to evaluate types in relation to capital cost, annual cost and contribution made. Impact on labour organisation.

Speculative Management Research:

Methodology Survey data used by farm management people to demonstrate how the knowledge gained could be adapted for individual farms by using the appropriate patterns of farm management thinking.

Physical

Trials of the influence of intensity of subdivision on production per acre in management systems.

6. WINTERING SYSTEMS.

	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D	F.S.	I.S.	C	S
(a) Place of and evaluation of methods of wintering viz: Split herd, block grazing, sacrifice paddocks, feeding platforms, loafing barns, feeding sheds, feed racks, feed areas.	T6 FM1	17,18 31,32	✓	✓			✓
(b) Interrelation of stocking rate and wintering systems.	FM1	32	✓	✓			✓

Demonstration Farms

To evaluate the apparently most suitable techniques for a particular soil type and district and to demonstrate the integration of techniques into a system. Demonstration of adjustments directed towards improvement of systems after adoption.

Farm Surveys (1) Surveys of farms which have increased production will demonstrate how wintering systems have been developed as part of the overall adjustments needed on the farm.

(2) Special Surveys (in the main dairying areas) of wintering systems including methods, capital cost, annual cost and contribution to production (farmer's opinion).

Speculative Management Research

Methodology How technical know-how on wintering systems can be integrated with farm management thinking on individual farms.

Physical Exploration of the breakdown point in wintering systems and the contributory factors.

Simulation Exploration of the management sytem under different wintering methods.

7. MACHINERY

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Economics of contractors versus own equipment	FM3	36		✓			✓
(b) Barn drying of crop and grass	T7	19		✓		✓	✓
(c) Equipment research in field drying of hay	T7	19				✓	✓
(d) Comparative costs of early hay drying	T7	19				✓	✓
(e) Study of harvesting machinery	T7	20	✓			✓	✓
(f) Vacuum silage	T7	20	✓	✓		✓	✓
(g) Long term storage	T7	20				✓	✓
(h) Ensilage and hay making methods	T7	21	✓	✓		✓	✓

Demonstration Farms

Machinery use would be integrated economically into each system.

Farm Surveys (1) Methods of harvesting studied on farms that have achieved profitable (and unprofitable) increases in production.

(2) Special surveys of contractors services and usage and the economics of contract work versus own machinery.

Consultant Work

(1) To engineers developing and testing new methods.

(2) To experimental stations conducting trials on storage.

Both from the point of view of applicability to farming systems.

Speculative Management Research.

Methodology Development of methods of analysing the profitable application of machinery to management systems.

8. PASTURE, CROPS AND SUPPLEMENTARY FEED

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Maximum Production off grass alone	FM3 T9	35	✓	✓			
(b) Economics and value of Concentrate feeding	FM3 T8 T9	36 22 26,27	✓	✓			✓
(c) Economics and value of Maize Feeding	FM3	36	✓	✓			✓
(d) Hay or Silage	FM3 T9	35 26	✓				✓
(e) Minimum Per Cow Requirements for supplementary feed in relation to stocking rates and level of pasture production	FM3 T9	35,36 26	✓	✓			
(f) Economic levels of concentrate feeding at High Stocking (particularly before spring flush)	FM3 T8 T9	36 22 26,27	✓	✓		✓	
(g) Value of summer crop and utilization methods	T8	22,23	✓	✓			✓
(h) Suitability of species to different areas (e.g. Lucerne, Prairie etc.)	T8	23,24	✓	✓			
(i) Winter supplements	T8	23	✓	✓			
(j) Hay making methods, Place of barn drying and field conditioning	T7 T7	19 21	✓	✓			✓
(k) Silage making methods and place of silage	T7	21	✓	✓			✓

Demonstration Farms

Management of pastures, cropping and other supplementary feeding shown as part of the system of farming in attaining increased production. New developments tested within the restriction of adding to profit.

Farm Surveys.

Methods of feeding reviewed on farms achieving increase in production.

Consulting Work

On Farm Management aspects to Applied Research teams at Ruakura.

Speculative Management Research.

Methodology

Evaluation and Integration of New Methods into systems of farming using farm management principles.

Physical

Trials to explore the limits of profitable production from grass alone trials to find minimum levels of supplementation necessary to profitable production.

Trials on the extent to which concentrates, particularly barley, could be incorporated in the diet of cows whilst maintaining high profit levels. Exploration of the snags likely to arise.

Simulation

Investigation of the management systems necessary to cope with zero grazing.

9. MILKING, SHED DESIGN AND TECHNIQUE

PROBLEMS	SEE APPENDIX B		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Production Line Milking Systems Design, Planning, Construction and Operation	T10 E1 T8	29,30 31 22		✓			✓
(b) Necessity for Stimulation Re-evaluation of Phillips work	T10	29				✓	
(c) Milking Intervals Cost/Benefit	FM5 T9	37 27				✓	

Farm Survey

A special survey to evaluate production line milking systems, to cover each feature of design (including concentrate feeding facilities - see T8), methods of construction, materials and operation. Results published in book form with plans.

Speculative Management Research.

Methodology

The integration of the production line shed into the farm organisation would be demonstrated with particular reference to the methods of farm management evaluation. This would be included in the publication.

Consultant work.

A Farm Management Liaison Officer to advise on the design of trials with reference to their realism and to interpret the results of such work in terms of the circumstances where new techniques would be appropriate.

10. CREDIT

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Review of credit policies with particular reference to Dairy Company Finance, Life Insurance Company Finance, Short term sources	12	40,41		✓			
(b) Survey of Farmers attitudes to credit and obstacles to use				✓			

Farm Surveys

Such surveys are particularly relevant in view of the need for increasing production. The surveys would assist Government in formulating new policies. It is envisaged that these surveys would be joint efforts with economists.

11. LABOUR

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D.	F.S.	I.S.	O.	S.
(a) Labour Rewards - wages, conditions, fringe benefits, incentives, housing	14	43		✓			✓
(b) Why labour leave, the land and the effect of labour shortage on farm practices (labour substitution)	14	43		✓			✓

Farm Surveys. A farm survey of current labour management and a further survey on the reasons for labour leaving the land would clarify the situation which at present is tangled with emotionalism and lack of knowledge.

Speculative Management Research:

Methodological Results of the surveys could be reported along with suggestions for improving the lot of farm workers and analysis of other proposals. Methods of substitution would be proposed for those incapable of handling labour.

12. SHAREFARMING

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D	F.S.	I.S.	C	S
The farmers and adequacy of various types of agreement with particular reference to provisions for stock numbers, replacements, topdressing, bloat control obstacles to increasing production	I	6		/	/		

Institutional Surveys. A review of the various agreements with particular reference to variations in 50:50 agreements.

Farm Surveys A review of rewards under the various types of agreement, production limitations of agreements, variations made to intensify farming and criticisms of agreements with a view to making improvements.

13. FARM RECORDS.

PROBLEMS	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHODS				
	SECTION	PAGE(S)	D	F.S.	I.S.	C	S
Determine the most useful form of standard farm account (useful to the farmer for management purposes)	I7 E1	46 48		✓			✓

Speculative Management Research

Methodological: The Farm Management Specialist to advise the accountant on the form of financial recording and reporting most useful for decision making. To educate the farmer in using this in his thinking and how he can use the accountant's services.

Farm Survey: A survey of high producing farms to ascertain how farm records have assisted in decision making and what could be done to improve the service from the accountant.

14. DEVELOPMENT

PROBLEMS	SEE APPENDIX D.		FARM MANAGEMENT RESEARCH METHODS			
	SECTION	PAGE(S)	D.	F.S.	I.S.	C. S.
Obstacles to proven developments including the influence of credit restrictions and taxation penalties	I2 I3	41 42		✓		
Worthwhileness of development projects			✓			/

Farm Surveys

A special survey on development expenditure limitations - urgent in view of the proposed agricultural development in New Zealand.

Demonstration farms

Profitable development projects would be demonstrated on these farms.

Speculative Management Research

Concentrated effort needed on methods of evaluating different categories of development plans.

15. EXTENSION

	SEE APPENDIX D		FARM MANAGEMENT RESEARCH METHOD				
	SECTION	PAGE(S)	D.	F.S.	I.S.	C.	S.
(a) Achieving a wider understanding of proven practices	E1	49,50 51,52	✓	✓			
(b) The use of T.V. as a mass medium						✓	

Demonstration Farms.

A larger number of demonstration farms will allow practices to be demonstrated to a wider audience of farmers and will be more applicable if located in a similar area.

Farm Surveys

Results from farm surveys on farms which have increased production would be published in bulletins that would be readily available to farmers and extension workers.

Consultant Work

A T.V. farm programme of one hour each week is needed for mass extension. This would be very effective if the type of programme was selected by a panel of advisors comprising extension workers and farm management specialists. The object would be to "look" at Demonstration farms and "the other man's farm."

APPENDIX D.

RESEARCH REQUESTS BY DAIRY EXTENSION WORKERS

Discussion Paper No.37
Department of Agricultural
Economics & Farm Management
Massey University of Manawatu
Palmerston North:
NEW ZEALAND

September 1965

APPENDIX

RESEARCH REQUESTS BY DAIRY EXTENSION WORKERS

This appendix lists under a number of classifications, research suggestions made by 31 extension officers in response to a questionnaire circulated in August 1964.

The prime purpose of this appendix is to record the suggestions made. To provide any really meaningful priority to the suggestions, would require considerably greater time and greater resources of manpower and money than were available to the sub-committee on Dairy Farm Management and Economics.

The research suggestions have been classified, somewhat arbitrarily, into:

A. National Problems

- I. Institutional and Economic Problems.
- F.M. Management Problems.
- T. Technical Problems.
- E. Extension problems.

B. Regional Problems

- R.1. Northland
- R.2. Waikato
- R.3. Taranaki
- R.4. Pumice
- R.5. Elsewhere.

Within each region we have classified, where appropriate, into Economic Management and Technical Problems (R.E., R.F.M., R.T.). Within Economic problems we have classified into:

1. Scale of Farming
2. Credit
3. Taxation
4. Labour
5. Land Tenure.
6. Sharefarming
7. Sundry

Within Management problems we have classified into:

(1) Winter Feeding Systems

(2) Stocking Rate and Subdivision

(3) Pasture Crops and Supplements

(4) Fertilizer requirements

(5) Sundry.

Within Technical problems we have classified into:

(1) Pasture Pests

(2) Fertilizer Requirements

(3) Drainage

(4) Stocking rate.

(5) Subdivision
(6) Wintering Systems
(7) Pasture conservation
(8) Pasture supplementation
(9) Nutrition and milk production.
(10) Milking, shed design and technique.

Under extension we have indicated where in the opinion of the panel degrees and types of emphases are required.

Thus classification R3, FM is a regional problem applying to Taranaki, which is primarily a management problem.

Within this classification system we have described each suggested research probject by:

1. The Number of Answers which listed this type as desirable.

2. A brief title,

3. A description of the suggested problem

4. A suggestion as to how the required information could be obtained.

5. The range of suggested costs.

6. The range of suggested benefits.

The latter two estimates have been taken direct from the questionnaires. As such the cost/benefit estimates must be accepted as extremely unreliable. Better cost/benefit estimates could undoubtedly be obtained, but this would require greater resources than were available to the sub-committee.

Thirty-one replies were received. These replies were contributed by:

NORTHLAND

F.R. Barnes, Keri Keri.
C.M. Blick, P.O. Box 16, Warkworth.
A.H. Denford, Maungaturoto.
J.W. Keir, Ruakaka.
H. Kirton, 35 Bertram Street, Warkworth
E.L. Young, 13 Montgomery Avenue, Dargaville.

WAIKATO

J.R. Beckett, P.O. Box 443, Hamilton.
M.G. Boyer, P.O. Box 510, Te Awamutu
S.D. Clay, R.D.4, Cambridge.
H.C. Hildreth, 7a Normandy Avenue, Hamilton.
J.R. Murray, Department of Agriculture, Hamilton.
G.O. Smart, P.O. Box 191, Hamilton.

TARANAKI

S.A. McKenzie, 234 Huatoki Road, New Plymouth
B. Parker, P.O. Box 90, New Plymouth.
J.S. Parker, P.O. Box 415, Hawera.
B.A.J. Smith, Department of Agriculture, Hawera.

PUMICE

R.W. Moody, Department of Agriculture, Rotorua.
E.P. Nielsen, Dairy Board, Box 304, Taupo.
M. O'Connor, 39 Lord Cobham Avenue, Whakatane.
J. Southcombe, 71a Hinemoa Street, Whakatane.

ELSEWHERE

(L.W. Blackmore, Department of Agriculture, Dannevirke
(K. Retter, Dannevirke

H. McM. Bull, Department of Agriculture, Private Bag, Auckland (Manakau).
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I. McM. Eva, P.O. Box 1233, Palmerston North.

(J.A. Graham, Department of Agriculture, Palmerston North.
(P.R. Hockey, Department of Agriculture, Palmerston North.

J.M. Hopkins, Department of Agriculture, Box 241, Levin.
J. Hughes (Dairy Board), 131 Washington Road, Nelson.
D. Johnston, R.D. 6, Kopane, Palmerston North.
H.W. McIntosh, 78 Petrie Street, Shirley.
R.B. O'Reilly, Upper Queen Street, Pukekohe.
Dr. J.W. Stichbury, Herd Improvement Association, Box 866, Wellington.

If it does nothing else, this survey goes a long way towards refuting the suggestion that the only people qualified to assess research priorities, are research workers.

APPENDIX D

Key to Abbreviations and Technical Glossary

o/o's	(Benefits). Unless otherwise restricted, mean overall District Potential Gains.
A.B.	Artificial Breeding
A.S.P.	Autumn Saved Pasture (W.S.P. - Winter .....)
B.F. B/ft.	Butterfat (total district amount of anticipated gain unless obviously per cow or per acre - frequently not stated).
C.P.A./C.A.	Cows per acre
CHlor/Hydro Cr.:	D.D.T./Dieldrin/Aldrin Group of Insecticides
C.O.P.	Cost of production
D.A.	Department of Agriculture
D.B.	Dairy Board
D.M.	Dry matter content of forage material (approx. 20% of green weight).
Demo.Farm	Demonstration Farm : As Waimate West. A Unit designed to prove under local conditions the practical application, ancillary effects, and economics of a recommended practice. Used also for extended period testing of development practices on a practical commercial scale.
D.S.I.R.	Department of Scientific and Industrial Research
F.A., F.A.O.	Farm Adviser (Advisory Officer)
F.I.C.	Farm Improvement Club
F.M.	Farm Management
H.B.	Herringbone
I.C.I.	Imperial Chemical Industries
Id.Twins	Technique using identical twin cows to evaluate two systems of management with highly comparable results
I.P./ O.P.	Input / Output
J.of Ag.	Journal of Agriculture
K.	Potash
x lb/acre	Butterfat gain in pounds per acre
L	Lime
L.I.	Life Insurance
M.L.B.	Marginal Lands Board
N.A.	North Auckland

P	Phosphate
O.P.	Output (I.P. - Input)
P.A. P/Acre	Per Acre
Past.	Pasture
P.C.	Per cow
R.S.	Research Station
S.A.C.	STate Advances Corporation
S.I.	South Island
S.L.	Short Lactation
S.N.F.	Solids not fat
Split Herd	Dividing the herd as evenly as possible to give comparable reaction between two systems of management (see Id. twins).
Split Herd Wintering	System of stock dispersal over farms to reduce treading damage etc.
Split Farm	Technique of dividing paddocks in half to ensure starting and progressive conditions are even to give comparable results under two systems of management
S.T.	Soil Testing
W.S.P.	Winter saved pasture (A.S.P. Autumn saved pasture)

* * * * *

Don Edmonds	type work (Grasslands). See "Split Farm".
Carson	Apparently developed an oversowing technique (in North Auckland ?)
D.Phillips	Ruakura. Milking techniques
J.V.Graham	(Department of Agriculture, New South Wales), author of "Cows, Fertiliser, Production, Profit" - Massey, 1963. Correlation of stock rate/fertilisers etc.
Hutton J.B.	Ruakura.Specialist in studies of Dairy Cow Nutrition.
Karlovsky	Rukuhia. Fertiliser measurement work.

INDEX TO APPENDIX D TABLES

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE GROWTH

CLASSIFICATION: PASTURE PESTS (T1)

No. of Requests	Short Title	Description	Technique	Estimated Cost	Estimated Benefit
3	Porina - Subterranean Grass Caterpillar Oxycanus Spec.	Find best control, kill and long residual value at best cost	Chemical Technique	£6,000 per annum	5 - 10%
3	"	Test for permitted insecticide (Not Chlor.HydroC's). Plot and field trials	"		
3	"	Controls suitable for mature stages	"		
1	"	Heavy Stocking at present time (August) may give control, as undergrazed areas are worst.	Grazing trials		5%
1	"	Basic Research	Biological Study		
	"	Field Survey June/July Questionnaire? Estimate spread and degree of damage.	General Survey		

PASTURE PESTS (T1) (continued)

No. of Requests	Short Title	Description	Technique	Estimated Cost	Estimated Benefit
2	Grass Crub Costalytra Zealandica	Locate most effective chemical at best cost	Chemical Technique	£6,000 p.a.	5%
4	"	Locate insecticide outside Chlor. Hydro C's. D.D.T. Resistances showing. Plot and field trials.	"		Considerable. 40%.
1	"	Heavy stocking when grubs nearest surface. Periodic population counts. Plots and field scale.	Grazing Technique		
2	"	Research Level	Biological Technique		
2	"	Evaluate production loss of var. pops. p.sq.ft. Mowing trials against treated controls - object is to interest farmer in treating light infestations or in early stage.	Field work	£200	10% overall
1	"	Relax regulations on Dieldrin D.D.T. Publish withholding as desirable not mandatory.	Legislative		
1	"	Basic Research and D.D.T. Resistance trials	General trials	£2,000	5% butter fat plus
3	"	Field Survey June/July questionnaire - estimate spread and degree of damage	Survey		

PASTURE PESTS (T1)(continued)

No. of Requests	Short Title	Description	Technique	Estimated Cost	Estimated Benefit
1	Black Beetle control (Heteronychus Sanctaehe-lenae)	Disc Drill Dieldrin (to obviate withholding period)	Chemical Technique		3% (1m lb)
1	"	Alternative control to standard Dieldrin treatment			50% in cases.
1	"	Find optimum treatment			5-20%
1	"	Publicity needed to show losses and rate of spread	Publicity		3%
2	"	Complete study of this pest	Study	2 men for 2 years	to 20%
1	Army worm (Tersectania Aversa/Pseu-datetia Separata)	Tabulate degrees of infestation at which treatment is economic (Measure consumption of X no of worms).			1½% over-all (500,000 lbs.)
1	"	General Research Programme	Research		
1	White fringed weevil	Study project	Study		
1	Wireworm	Study Project	Technical Study		
1	Crickets Acheta Commodus	Assess losses. Locate Optimum control evaluate by mowing trials over 12 months	Trials		20-30% of pasture

PASTURE PESTS (T1) (continued)

No. of Requests	Short Title	Description	Technique	Estimated Cost	Estimated Benefit
2	Crickets Acheta Commodus	Institute General Research Programme	Research		
1	Soldier fly	**Field** Work Study of life cycle. Evaluate production cost. Devise control	Research	£2,000	30% on 10,000 acres
5	Argentine Stem Weevil	Locate control Plot and field trials	Trials	£3,000	1% Manawatu product. 50lb/acre worthwhile
1	Springtails	Evaluate production losses find control	Trials		
1	"	General study	Study		
1	"	Better kills for Winter crops	Trials	£200	5% overall
1	Rush and Tall Fescue	Paraquat and 24 d Trials Work by suppliers?	Trials		6% (2,000,000 lbs.)
1	Micro-organisms	Field Trials, general study of Production Costs of Microbio. pests at research level	Trials		
1	"	General study of fungi and bacteria populations of pastures	Study		

PASTURE PESTS (T1) (continued)

No. of Requests	Short Title	Description	Techniques	Estimated Cost	Estimated Benefit
1	General Research	Entomological study of all types present on farmland	Study	£5,000?	
3	"	Work on production loss v. cost of treatment at various levels of infestations	Trials		
3	"	Methods of determining populations	Study		
3	"	More work on life cycles, history and control of all recognised pests	Study		
1	"	More work on subsurface pests. Suggest reduce Dairy Div. staff, increase entomologists.	Study		
2	"	More education to farmer on life cycles and control methods	Publicity		
1	"	Further research on insecticides	Study		
1	"	Further research on management practices to minimise depredations. Use of life cycle data to attack at weakest point.	Survey		
1	Rabbits	Investigate superior S.I. techniques	Study		5% coastal areas
1	Opossums, Deer, Rabbits	Should be Rabbit Board Function? Farmer gains by soil erosion factors - crop depredation	Study		

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE GROWTH

CLASSIFICATION: FERTILIZER REQUIREMENTS (T2)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	General (L,P,K) Rates	Effect on pasture quality and animal health	Trials		
3	"	Estimate reliable fert. recommendations	Large scale trials on major soil types	£20,000 p.a.	20%
2	"	IP/OP analysis on soil types	General study		
1	"	"	Karlovsky approach	£100,000 p.a.	50%
3	"	"	Field assessment		
1	"	"	Trials		
1	"	"	Rukuhia type		
1	Phosphate rates	Amount to increase soil phosphate levels			
1	"	Profitability and rate of doing above			
2	"	Max. initial economic rate and minimum maintenance rate on soil type			

FERTILIZER REQUIREMENTS (T2) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Trace Elements	Requirements of elements (other than LPK) for past./animal	local survey		
2	"	Soil mineral status re plant growth and soil test figures	Basic and applied Research	£500,000	
3	"	Effect or stock infertility and deficiency complaints	Regional Surveys		
1	"	Reassessment of soil fertility requirements for elements	Field trials		
1	"	Responses on heavily fertilized land			
1	"	Investigate importance			
1	"	Fertility requirement of lucerne including minor elements			
1	Soil Testing	Assess reliability of S.T. by correlation with pasture production			
2	"	More widespread use of S.T.	More advisors, technicians.		

FERTILISER REQUIREMENTS (T2) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Lime rate	North Auckland requirements			
1	"	Effects	Plots and field trials	£200	10%
1	Ratios	Levels and ratios of P & K	Local work		25% B.F.
2	"	IP/OP work on ratios	Trials	£10,00 p.a.	25% less C.O.P.
1	Timing	Timing of K.applications	Plot trials on various soils		
1	"	Pasture utilisation of fertiliser at particular times	"		
1	"	In relation to feed requirements	Local work groups		
1	"	In Horowhenua/Manawatu	Trials	£5,000	5-10%
4	Nitrogenous	Economics of, for increasing seasonal production	Regional Surveys		
1	"	On Special plants and pastures	Trials		

FERTILIZER REQUIREMENTS (T2) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Value of liquid and pig manure		Ruakura type aplit farm		Reduce COP 5%
1	Pasture renovation		Carson technique on selected farms		
1	"		Heavy fert. dressings	£800 plus fertilizer	
1	Paddock requirements	Get reliable method of estimation			
1	Soil type research				
1	Residual effects	Work on hill country and newly developed areas	1 acre plots heavy applications	£500	5%
1	Raw organic layer on pumice	Cause of build up	Trials		25% on affected farms

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE GROWTH

CLASSIFICATION: DRAINAGE (T3)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Moles v. Tiles	Demonstration under local conditions (N.A.)	10 acre demo. trial by team (Massey?)	?	?
1	Moling Peats	Study of Techniques and gains	General trials		
1	Peat Drains	Study of control of water levels in peat			
1	"	Overdrainage study	Demonstration	£250?	2%
1	Irrigation	Subsurface trials in peats and pumice	?	£200	?
1	Rolling Country	Instilling value of and need for draining rolling country	Drainage advisory team - education	?	?
1	Surface drainage	Study by specialist needed		?	?
1	Plastic tube drains	Study of economics and efficiency of plastic tube moles.	?	Share with I.C.I.?	?
1	Plant tolerance	Study of tolerance of high producing plants to surface water	Trials		10%

DRAINAGE (T3) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Soil moisture and pasture yield	Measure comparative pasture yields on soils with different water levels and contents	Trials	?	?
1	Flood Pumping	Steady ramification	Trials and cost study	?	?
1	Best Pumps?	Evaluation of local against imported pump on cost and efficiency	Study	?	?
1	Underground water survey	Undertake national survey of resources	Utilize data from oil and well drillers survey	?	?
1	Promote specialist Contractors	To establish contracting draining teams	As Massey training Course ?	Self-supporting	?
2	Cheaper Methods	?	?	?	?
1	Range of soils test	Ascertain the possibilities of draining various soils. Local problem - Warkworth	?	?	?

DRAINAGE (T3) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Pugging	Study of general problem and cures	Don Edmonds Massey No. 3 type work	?	?
1	Conservation	Study contour drains in heavy hill country	Expand soil conservation service	?	20 lb. [illegible] drained
1	Retention Dam	Study of value and practice to reduce hill country runoff	?	?	?

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE GROWTH

CLASSIFICATION: STOCKING RATE (T4)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Bull size	Effect of large and small males on animal well being	Measure per cow production v. body weight under various stocking rates	?	?
1	Why not higher ?	Ascertain why high stocking is not general	Survey	?	?
1	Rearing off farm	To what degree does rearing off farm affect production?	Survey	?	?
1	Integration of Factors	Correlation of stock p.a./ butterfat p.a./cost per lb. butterfat	?	?	?
1	Platform and feed barns	Stocking gains by adoption Of barns etc.	Research	?	?
1	Supplements	Value of supplements to allow pasture to recover after ... checks	Research	?	?
1	Trampling	Proportion of feed harvested by newly calved cows @ 10 per acre and 50 per acre and pasture recovery observation	Research	?	?

STOCKING RATE (T4)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
6	Optimum rates	Ascertain optimum stocking rates/fertility rates-ratios	Trials	?	?
1	Soil type study	Study Stocking rates on soil types	Major study	?	?
1	Agr. Group study	Study optimum stocking of age groups	?	?	?
1	In relation to calving dates	Study better correlation of grass and feed requirements	?	?	?
3	Short Lactation	Economics of S.L., increased stock	Test, say, Aug-Jan. lactation		
1	DM Intake/ B.F. Production	Finding max. D.M. intakes in term of green feed&economic optimums of D.M. Level	Identical Twin Technology	£50,000	30-40%
2	Pugging Losses	Study effects of pugging on pastures	?	?	?
1	Optimum Stocking	Extension of known data	?	?	?
1	Overstocking Problems	Pumice area problem	Demo. Farm on pumice soils		50%

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE UTILIZATION

CLASSIFICATION: SUBDIVISION (T5)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Revision	Evaluate existing work. Decide whether subdivision grows more grass, gives better utilization or is used for rationing.	?	?	?
1	Types of Fencing	Ascertain minimum requirements and costs.	Survey		
1	Contour Fencing	Evaluate	1 man 1 year	£1500	20% where needed
5	Electric Fencing	Extend availability etc. of non-shorting electric fence	Research		? - 10%
1	Maximise grazing	Guage grazing pressure attainable per 12 and 24 hours	field trials with co-operating farmers	?	?
1	Pasture Damage	Rate proportion of feed harvested by freshly calved cows @ 10 per acre v. @ 50 per acre and pasture recovery	Tests mainly under full field moisture capacity conditions		

SUBDIVISION (T5) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	General Plan	Define optimum size and number of paddocks	?	?	?
1	Hedge or Fence	Value of permanent shelter	Survey		

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE UTILIZATION

CLASSIFICATION: WINTERING SYSTEMS (T6)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Barns & yards	Evaluate types on cost and efficiency	Survey	?	?
1	Feed Racks	Evaluate	Survey by farmer groups	?	?
1	Roofing Platforms	Evaluate advantages of roofing	Trial with control	?	?
1	Critique of feed systems	Evaluate capital cost of "gimmick" systems against later calving etc.	Survey.	?	?
3	Zero grazing	Tests on range of soils	?	?	?
1	Wintering off	Evaluate pugging damage against costs of wintering off	Ascertain D.M. gain Tests on medium/ heavy soils (a) 3-5 cpa (b) 50-100 c.p.a.		
1	Volcanic soils	Effects of treading study	Extend current work to volcanic soils		
1	Paddock wintering	Energy consumption of large and small mobs			

WINTERING SYSTEMS (T6) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Autumn saved pasture versus Winter saved pasture	Evaluate merits: Ascertain why cows do not reach max. production until spring flush irrespective of calving date.			
1	Shelter	Evaluate			
1	Extension	Minimise winter problem in farmer's mind	Change farmer's attitude	?	?
1	"	Field days on farms using good systems			
1	Feed areas	Merits of carting crop to feeding area?	?	?	?
1	Paddock feeding	Is silage paddock feeding wasteful?	?	?	?
	Programming grazing	Optimum grazing interval/ under winter conditions			

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE CONSERVATION (T7)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	Barn drying grass	Study economic factors	Relate North Auckland climate and rainfall data to fuel cost figures ex Massey	?	?
3	" " "	Study economic factors	General	£10,000??	5-10% ??
1	Barn drying crop and special purpose pasture	Study economic factors	Feed out on food value basis - Stall feed	£800	-
2	Equipment Research	Field drying of hay	Research Station		
2	Hay drying	Study of comparative costs	Study	?	?
1	Early hay drying	Ascertain and relate costs to quality gains	Study	?	?
1	Reducing over-mature paspalum hay	Losses of feed value not appreciated	Extension		
4	Labour requirements of silage making	Minimising labour for making and feeding silage	Engineering Sector Research	?	?

1 PASTURE CONSERVATION (T7) (Continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Spring saved pasture	Test value of November saved pasture fed in January	?	?	?
1	Autumn saved pasture	Extend knowledge of use of A. S. P.	Extension		
1	Machinery	Study all types of harvesting, conditioning and drying equipment	Research Station	?	?
1	Drought incidence	Analyse and distribute available data on cyclical risk	Map service format		
1	Frost damage	Try nitrogen to combat frosts on late pasture	?	?	?
1	Maize for silage	?	Massey trials ?	-	Worthwhile
1	Minimising silage costs	Accent on vacuum silage	Research station		
1	Vacuum silage	Develop better sealing techniques	" "		
1	Long term storage	Study methods and losses in nutrient values of stored materials			

PASTURE CONSERVATION (T7) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
2	Silage v. grazing	Study available data on merits of silage/direct utilization in summer trials	Vary topdressing and calving dates to synchronize max. growth and max. requirement		
1	Ensiling methods	Study for maximising quality and feed value			
2	Haymaking methods	" "			
	Measuring feed value	Simple method needed to assess feed value of hay and silage (D.M. Content?)			

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH PASTURE SUPPLEMENTATION (T8)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
3	Concentrates	Meal feeding 3 weeks before spring flush	Research Station		
4	"	In temporary feed shortages (high stocking)	"	£2,500 p.a.??	Worthwhile
1	"	Feeding in herringbone sheds	"		
1	"	According to seasonal production	"		
1	"	Instead of hay at high stocking rates	"		
3	"	Economic level of feeding	"	£5,000	5-10% post calving
1	Summer forage crops	Need for good type for light country	Plant Breeding Station		10-15% in places
1	"	Value in Production			

PASTURE SUPPLEMENTATION (T8) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Summer forage crops	Carry over value			
1	Chou utilization		Research		
2	Crop/Hay/Silage	Evaluate. Summer and winter			
1	Lucerne	Establishment on light soils	Buy block of sand country	£500,000	15%
	Lucerne	Superior strain. Rhyzomatous Lucerne	D.S.I.R.		to 15%
1	Prairie Grass	Breeding and selection	D.S.I.R.		
1	Winter supplements	Crop Variety trials	Research Station		
1	Summer supplements	"	"		
1	Crop Irrigation		Trials		
1	Pasture species	Weakness in summer plant range apparent	Trials ?		

PASTURE SUPPLEMENTATION (T8) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Pasture species	Are better species or strains available	?		
1	" "	May plants not now used have a place			

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH : NUTRITION AND MILK PRODUCTION (T9)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Stock numbers calving dates related to output studies	Extension problem			
3	"	Leave the study to Hutton to pursue			
1	"	Condition of cows at calving re later feed supply			
2	"	Desirable shape of lactation curve study. All grass			
2	"	Ascertain method of judging cow requirements in autumn for production maintenance	Research Station		
	Solids not fat	Economic remedy for fluctuation			
1	"	Research solids not fat in town milk			
1	"	AB testing for S.N.F.			
1	"	Improving availability of top quality bulls in A.B.	U.S.A.Share system?		
1	Fertility	Relation to levels of feeding			
1	"	Infertility - Study	Research Station		

NUTRITION AND MILK PRODUCTION (T9) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	Disease factors	Effect of nutrition on pre and post natal complaints	Research Station		
4	Mastitus Control	Further work required	O'Seas(U.K.) research visit. Field study		£4,000,000 p.a. plus less culling
1	Black Fox	Study Problem	Research Station		
1	Bloat	Control by meal feeding			
1	"	Control by non clover pasture			
1	"	Control by oil on water troughs			
3	"	Basic Research			100-150 lb. butterfat
1	Maintenance Rations (Winter)	Effect of different levels	Research Station		
1	"	Studies on all grass wintering			
1	"	Studies on all hay wintering - output ?	Study variations between farms		
1	Concentrates	Effects of 1-2 lb/day in spring			

NUTRITION AND MILK PRODUCTION (T9) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Concentrates	Higher energy value concentrates	Biochemistry research		
1	"	Force feeding by concentrates grown and dried on property			
1	"	Relating critical feeding period to meal feeding			
1	Pre and post calving feeding	More Ruakura type work	Research Station		
1	"	Full or restricted feeding?	Field Survey. Tie up research results.		
1	"	Lack of nutrition in early lactation on (a) total output (b) Infertility	Research Station		
1	Once daily milking	Study effects/animal health, output			
1	Inconsistent Returns	Study why abnormally poor seasons experienced when herd health and pasture see O.K.	Study		
1	"	Some herds apparently well managed range 10% below district average - why?	Case Study		

NUTRITION AND MILK PRODUCTION (T9) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Carry over cows	Effect on Fat/Acre			
1	Pasture Composition	Effect of variations on butterfat.			

NATIONAL TECHNICAL PROBLEMS CONCERNED WITH MILKING, SHED DESIGN AND TECHNIQUE (T10)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Herringbone Shed	Defining max. slopes that are practical (from pit, and down length of shed) before comfort and movement of cow affected	?	?	Essential knowledge
1	"	More extension required on advantages	?	?	
1	"	Study of size requirement per man and per cow number	?	£1,000	Capital saving
2	"	Plan service required (Department of Agriculture ?)			
1	Rotary Shed	Study	Research Station	? High	
1	Shed Drainage	Complete study needed under Water Pollution Act	?	£5,000 p.a.	
2	Is stimulation necessary ?		Extend Phillips' work	?	
2	Evaluation of Inflations and Cups	Work to locate and publicize relative efficiencies	Ruakura ?	?	

MILKING, SHED DESIGN AND TECHNIQUE (T10) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Machine testing	Biennial checks ?	Department Divisional officers		
3	"	More publicity on value	"		
2	"	Voltage Detection	Technical Staffs		
2	"	Training milking machine men	Course and Registration?		
7	Shed design	Study and publicity			
1	" "	Are sheds necessary? Examine alternatives.			
1	" "	Milking times and intervals - Labour optimising.			

NATIONAL FARM MANAGEMENT PROBLEMS CONCERNED WITH: WINTER FEEDING SYSTEMS (FM1)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Winter feeding systems	Split herd v. sacrifice paddock	Whole farm		
1	Winter feeding systems	Optimum method where finance does not permit barns or platforms	Split herd	?	?
3	Winter feeding systems	Evaluation of feeding platforms with range of soil types	Split herd	?	? ? 20%
1	Winter feeding systems	Split herd and block grazing v. feed platforms	Farmlet scale		
1	Winter feeding systems	Split herd and block grazing v. feed platforms	Buy wet town milk farm	£50,000	0 - 20%
1	Winter feeding systems	Evaluate loafing barns	Split herd		
2	Winter feeding systems	Define minimum winter feed level (and optimum)	Whole farm/ Research Station		

WINTER FEEDING SYSTEMS (FM1) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Winter feeding systems	Ascertain most profitable system for high stocking rate in Taranaki			
1	"	Under wet winter and spring conditions	Research Station		
1	"	Continue feed platform loafing barn/run off trials (e.g. current project - £200/60 cow unit).		£200	
3	"	Rate advantages of drainage systems : winter block v. feed platform			
1	"	Interrelation of stocking rate and wintering systems			
1	"	Raising winter carrying capacity for town supply			
3	"	Define stocking rates at which wintering barns and platforms become economic on range of soils	Demonstration farms and survey		
1	"	Economics of zero grazing on wet soils c.f. drainage, subdivision etc.			

NATIONAL FARM MANAGEMENT PROBLEMS CONCERNED WITH: STOCKING RATE AND SUBDIVISION (FM2)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Stocking rate and subdivision	Pasture effects, Influence of heavy stocking on pasture composition and production	Farms scale trials		
1	"	Heavy stocking. Study problems with one and a half c.p.a. in W. Waikato	Demonstration farms	Self Supporting	10% - 50%
1	"	Optimum stocking rates in Northern Taranaki	"		
3	"	Calving dates in relation to stocking rates and other factors	local trials Demonstration farms	Negligible	20%
2	"	Is subdivision necessary production wise? Use intensive and extensive subdivision and high stocking	Waimate type farmlets		
1	"	Optimum levels under high stocking	Demonstration farm		
2	"	Rate benefits of subdivision to (a) management effort (b) pasture	Farm scale trials		
1	"	Permanent subdivision v. intensive electric fencing	Whole farm		capital cost Reduction
1	"	Study U.K.-Australian type flexible fences	Farm Scale		10-20%

STOCKING RATE AND SUBDIVISION (FM2) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
3	Stocking rate and subdivision	Optimum stocking rates	Demonstration farm and survey		
1	"	Optimum stocking rates Ruakura farm approach	Data collection (by groups) processing (e.g. by Massey)		
2	"	Study stock levels, lactation period, comparative returns for different areas.	Field Survey		
1	"	Profitability of drainage at various stocking rates			

NATIONAL FARM MANAGEMENT PROBLEMS CONCERNED WITH: PASTURE CROPS AND SUPPLEMENTS (FM3)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Pasture crops and supplements	All grass farming. Maximizing production/acre off grass alone	W. Waikato demonstration farm	Self-supporting	10-20%
1	"	Labour optimization off grass. Investigate short lactation, shed design, calf feeding methods		Self-supporting	Substantial
1	"	Full supplements, no grass	Farm scale trials		
1	"	2 cows/acre, 200 day lactation plus meal feeding in Spring (coastal sands)	Subsidised farms	£1,000	Benefit to short season dry coastal
1	"	Economics of nitrogenous fertilizer in spring	Farmlets		
1	"	Hay v. Hay plus silage	Split herd		
2	"	Hay v. silage, re labour			
1	"	Correlate requirements hay and silage/cow and - stocking rates - levels of pasture prod'n	Collect farm data		
1	"	Study of silage/hay costs pasture to cow and efficiency of each	100 farm statistical survey	£1600	5%

PASTURE CROPS AND SUPPLEMENTS (FM3) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
4	Pasture crops and supplements	Economic levels of concentrate feeding (particularly at high stocking)	Identical twins Co-operating farmers	£5,000 per annum	5-10% post calving
1	"	Oversowing of weevil pasture	Groups; D.A. implements		
1	"	Economics of maize cropping	Farmer co-operation		
3	"	Value of summer cropping	farms and returns (district basis)	£300/ district	Reduce C.O.P.
1	"	Less conserved feed for maintenance	Whole farm		
1	"	Economics of contract v. own equipment	Economist job		

NATIONAL FARM MANAGEMENT PROBLEMS CONCERNED WITH: FERTILIZER REQUIREMENTS (FM4)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	Fertilizer requirements	P rates of application K rates of application. Timing of applications	Whole farm approach		100-200lb B/F. acre
2	"	General (L, P, K) requirements	Field or farm trials		
5	"	IP/OP analysis on soil types. Levels of fertility	Farm trials	Substantial	50%
1	"	Raise district level of P application 3 - 5 cwt/acre (North Auckland)	Demonstration farm	£12,000	15 m. lb B.F.
1	"	Influence of fertilizers and stocking on botanical composition	Farm scale trials	£50 ea.	50-100lb. B/F.Acre
1	"	Current fertilizer practices and influence on trace elements and stock health		£3,000 to £5,000	5000 lb. BF/farm

NATIONAL FARM MANAGEMENT PROBLEMS CONCERNED WITH: SUNDRY REQUIREMENTS (FM5)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Sundry Research	Winter milking in drought prone areas	Whole farm		
1	"	Isolation F.M. practices that control metabolic diseases	Twin herds	£5,000 p.a.	1% net.
1	"	Effects of various milkings under 14 times/week			
1	"	Effect of irregular milkings on total production over season.			
1	"	Diversification v. specialisation			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: SCALE OF FARMING (I - 1)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Optimum unit size	Rationalise unit size at 2 man unit. Query economics of one-man farm.	Study legislative and credit limitations		
1	Scale and Tenure	Study land tenure/size of holdings			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: CREDIT SOURCE AND NEED FOR (1 - 2)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	Short term	Need for low rate simplified credit for preliminary development capital until develop. work becomes self-supporting			
1	"	Special problem in Great Barrier Island.			
1	"	Place of Dairy Cos. in finance - clarify			
3	"	S.A.C. To guarantee Bank	As U.K.		
1	"	Reconstitute S.A.C. as Agricultural Bank (exclude non-productive financing)			
1	"	Replace Stock Firm Credit	"Farmers Bank" adjunct to Reserve Bank		
1	Medium/Long Term	More state Development money	More field officers for S.A.C. M.L.B.		
2	"	Implement rural credit survey			
1	"	Assistance financing Capital assets			
2	"	Subsidize or long term finance for high outlay development			

CREDIT SOURCE AND NEED FOR (1-2) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Long Term	Investigate excessive Life Policy requirements of L.I. finance.			
1	"	Extension of S.A.C. M.L.B. loans where farm not purchased through these sources			
1	"	Study all possibilities. Short term credit adequate.			
2	"	Special cheap finance for commencing farmer. Deferred payments.			
1	General	Define types of expenditure for which credit spending is jusfified			
1	"	Study degree to which cap. repayments under loans and overdrafts prevent development expenditure	Survey		
1	"	Trading stock. Special source for finance	Nat. Dairy Development Corpn. with industry participation		

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: TAXATION (I - 3)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
6	Incentives Income Tax	More and better directed tax incentives			
4	P.A.Y.E.	Study withholding, change of due dates, general. Quicker rebate payments	Survey and study		
1	Stock - capital item?	Should stock be capital or revenue item			
1	As prime cause in static policies	Study why farmers do not take development opportunities	Survey	£1,000	20%
1	Incidence of tax	Reduce middle bracket raise higher			
1	Capital expenditure	Instalments of develop. loans cap. repayments to be tax free			
1	"	All capital improvements to be tax free			
1	Death Duties	Abolish			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: LABOUR (1 - 4)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Labour market	Study availability and quality of labour	Survey		
1	Superannuation	Superannuation scheme ?	Study		
1	Tax Concessions	Special Tax exemptions for employees? (School, transport etc.)			
2	Training	More Practical Farm Training schemes ? Expand cadet scheme			
1	Housing	Low interest housing loans for farmers?			
1	Job amenities	Full study of wages, conditions, and fringe benefits			
1	Effect on progress	Effect of labour shortage on change of practice (labour substitution) and static policy (where labour increase indicated).			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: LAND TENURE (1 - 5)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
2	Aggregation	Alter Land aggregation Law To allow farmer of proven ability and resources to buy reverted country. Could resell to Crown?			
2	Maori Land	Provide longer and renewable leases - compensation for improvements.			
1	Crown Land	Large scale renting or leasing of Crown properties			
1	Price stabilisation	Price stabilisation of land inhibits development work - Prove			
1	Superviser Farms	Study levels and methods of improving supervision of farms by Departments, Stock Firms, Solicitors etc.			
1	Estate Farms	Effects of profit disbursement on policy and development of old estate farms.			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: SHAREFARMING (I - 6)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
8	Agreements	Critical examination of provisions for fairness and adequacy	Survey and Study		
3	"	Ascertain if present Agreement formats encourage production increases - bonuses etc. ?	Survey		
1	Fertilizer	More flexibility in fertilizer programme			
1	"	Should topdressing be related to output (1000 lb.fat) rather than acreage ?			
1	Advisory Service	Supply F.I.C. services at joint cost			10-15%
1	Training	Institute Certificate of suitability for sharemilkers?			
1	Substitution of	Replace sharefarming by easy terms purchase system			

NATIONAL INSTITUTIONAL AND ECONOMIC PROBLEMS CONCERNED WITH: SUNDRY (I- 7)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Inflationary influences	Effect of rising costs			
1	"	Effect of rising farm prices			
1	Better Recording	Introduce standard form of accounting for farmers			
1	Fertilizers	Study of costs and freights			
1	"	Establishment of local depots to ensure availability of supply - off season subsidy ?		£1,000,000	

EXTENSION SECTION

Specific projects listed under this subdivision have been separately mentioned in their relevant sections.

The Extension Section that follows has been broken up into:

(1) Direct Instruction by extension workers

(2) Demonstration farms - where this technique is recommended or appears to be the logical approach

(3) Mass Media - journals, T.V., Radio, Brochures.

NATIONAL EXTENSION PROBLEMS CONCERNED WITH:

DIRECT INSTRUCTION BY EXTENSION WORKERS (E1)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Sociological Research	Employ University psychologists			
2	"	Ascertain phychological attitude of farmer to development. Removal of mental blocks	Survey - F.A. & psychologist	£1,000	20%
1	Farm records	Education in degree of recording, and methods			
5	More Extension workers	Increase salaries, better use of present officers			
1	Organization of Extension	Investigate benefits of 1. Government specialists in all fields of Agriculture 2. Extension under private enterprise			
1	"	Charge for service. Make place for skilled farm manager.			
2	Organization of extension	Survey various systems of extension - F.I.C. - D.B. Discussion groups etc.			

DIRECT INSTRUCTION BY EXTENSION WORKERS (E1) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Extension needed	(1) Dissemination of information and technique adoption (2) Assessment of limitation of technique			
1	"	Conversion of research findings to farmer level by more intensive D.A. advisory aervices			
2	"	How to reach poor producer who has most need but is more unreceptive			
1	"	More on-farm extension			
1	"	Arousing interest with good publicity (extension and demonstration can be overdone)			
1	"	One week course in elementary budgetting for new managers			
1	"	High demand and good reception to advisors in North Auckland. Combine D.A. & Dairy Board.			
4	"	Show clear economics of recommendation including net tax results.			
1	"	Break down conservatism			

DIRECT INSTRUCTION BY EXTENSION WORKERS (E1) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COSTS	ESTIMATED BENEFIT
1	Extension needed	1/3 fail to get message 1/3 misuse suggestion. ∴Research suggestions to be more fully explained.			
1	Specific Extension on pasture conservation	Extension of knowledge held			
1	"	Use of A.S.P.			
1	"	Less overmature paspalum hay			
1	Specific extension on nutrition and milk production	Best combination of stock, c calving dates, output.			
3	Specific extension on drainage	Drainage techniques all media			
1	"	Drainage benefits			
1	"	Instilling value of drainage on rolling country. Drainage Advisory Team.			
1	Specific extension on Wintering Systems	Minimise winter problem in farmer's mind.			
2	"	Field days with farmers using good systems.			

DIRECT INSTRICTION BY EXTENSION WORKERS (E1) (continued)

NO. OF REQUESTS	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Specific extension on stocking rates	More J.V. Graham type work and extension			
7	Specific extension on milking shed design and technique	Study herringbones etc. Publicity.			
3	"	Extend machine testing			
1	Attitude to proven practice and development	Adequate subsistence level and no ambition			
1	"	Lack of incentive to expand			
1	"	Farmer's attitude is as good as the extension work.			
1	"	Improving			
1	"	Poor in some Government Departments. Instruction to other Government Departments by qualified officers is needed			
1	"	How to change unfavourable adoption attitudes			
1	"	Why are not more farmers adopting trusts, companies etc. if these have a place?			

DIRECT INSTRUCTION BY EXTENSION WORKERS (E1) (continued)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
1	Attitude to proven practice and development	Why are Hauraki Plains farmers not increasing production ?			
2	Knowledge of proven practices	Good understanding among better farmers (minority group but growing)			
2	Suggestions for reducing current research and extension expenditures	Transfer spending from research to extension. Too much long range research			
1	"	Restrict D.A. to research. Extension by groups and individuals employed by farmers			
1	"	Train certain farmers to become honorary advisors.			
1	"	T.V. for mass coverage. Let farmer pay (F.I.C.) for intensive extension			
1	"	Reduce farm management surveys Conclusions too broad.			
1	"	Increase efficiency of F.A.O's by providing technicians for routine work.			

NATIONAL EXTENSION PROBLEMS CONCERNED WITH DEMONSTRATION FARMS (E2)

no. of Requests	SHORT TITIE	DESCRIPTION	TECHNIQUE	ESTIMATED COST	ESTIMATED BENEFIT
4	Extension of Demonstration farm approach	Simple comprehensible projects, of direct and immediate need in district			
4	"	Commercial; in all areas (locally proved practice is accepted)			
1	"	Compensate farmers in each district for demonstrating new techniques			
1	"	60-70 cow herd (400 lb/acre) Cash or credit to reliable farmer. More farms later.			
	"	Use demonstration farms as post-graduate training for F.A.'s - 1 year submanager, 1 year manager			
1	"	More workers, publicity and D.A. association with demonstration farms.			
1	Group Instruction	Extension of D.A. type group instruction			
1	"	Extension by demonstration. Local effort farm groups.			

NATIONAL EXTENSION PROBLEMS CONCERNED WITH: MASS MEDIA (E3)

NO. OF REQUESTS	SHORT TITLE	DESCRIPTION	TECHNIQUES	ESTIMATED COST	ESTIMATED BENEFIT
1	Tax rates	Public education on tax rates			
1	Bankruptcy rate	Publicise to instil confidence to use credit, take justified risks.			
2	Communication	Utilize all known means			
1	"	Mass extension			
5	"	Utilize T.V. (industry and/or Government finance)			
1	"	New appreach for J. of Ag. Better payment for contributions.			
1	"	Which forms of advice get message over best - field days, radio, T.V. etc.			
1	"	How often does the average farmer need a personal visit?			
1	Specific Extension on fertilizer	Greater publicity to manure benefits T.V.			
4	Specific Extension on pasture pests	Publicity. Education of farmer on life cycles and control methods			
1	Specific Extension on Black Beetle control	Publicity to show losses and rate of spread			3%

SPECIFIC REGIONAL PROBLEMS: NORTHLAND (R1)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
4	Pasture Pests	Black Beetle	T1
3	"	Crickets	"
2	"	Army Worm	"
1	"	Grass Grub	"
1	"	White Fringed Weevil	"
1	"	Wire Worm	"
1	"	Spring Tails	"
1	"	Sub-surface pests	"
1	Fertilizer Requirements	Raise district level of application of P.	F.M.4
1	"	Lime requirement	T2
1	"	Soil Research station	T2

SPECIFIC REGIONAL PROBLEMS: NORTHLAND (R1) (continued)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
1	Drainage	Drainage of Warkworth area soils	T3
1	"	Need for local demonstration and instructional service	T3
2	Pasture Conservation	Barn drying under Northland conditions	T7
1	"	Overmature paspalum hay Education problem	T7
1	Attitude to proven practice and development	Adequate subsistence level and no ambition	E1
1	Pasture supplementation	2 cows/acre, 200 day lactation plus meal feeding in spring (coastal sands)	FM3

SPECIFIC REGIONAL PROBLEMS: WAIKATO (R2)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
3	Pasture Pests	Grass Grub	T1
1	Stocking	Maximizing production/ acre of grass	FM2
	Stocking	Study high stocking (one and-a-half c.p.a.) in W. Waikato - Demonstration farm	FM2
1	Wintering	Evaluate pugging damage v. wintering-off in N. Waikato.	FM1

SPECIFIC REGIONAL PROBLEMS: TARANAKI (R3)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
3	Pasture Pests	Porina	T1
1	"	Grass Grub	"
1	"	Argentine Stem Weevil	"
1	"	Spring Tails	"
1	"	Fungi and Bacteria	"
1	Wintering	Ascertain most profitable system for high stocking in Taranaki	FM1
1	"	Effects of treading volcanic soils	T6
1	Stocking	Optimum stocking rates in N. Taranaki	FM2

SPECIFIC REGIONAL PROBLEMS: PUMICE (R4)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
3	Pasture Pests	Grass Grub	T1
1	"	Soldier Fly (Whakatane)	T1
1	"	Argentine Weevil	T1
1	Ragwort	Problem in Tokoroa	
1	Fertilizer	Maintenance of soil fertility and fertilizer requirements in Tokoroa area	
1	Pastures	Grasses and pasture composition. Pasture runout. Tokoroa area.	

SPECIFIC REGIONAL PROBLEMS: ELSEWHERE (R5)

NO. OF REQUESTS	TOPIC	DESCRIPTION	RESEARCH CLASSIFICATION
6	Pasture Pests	Grass Grub	T1
5	"	Porina	T1
1	Fertilizer	Timing of applications in Horowhenua Manawatu	T2
1	Pasture Supplementation	Summer forage crop on light country	T8
1	"	Lucerne establishment on light soils	T8
1	Credit	Development difficulties for Great Barrier Island (large potential)	I2
1	Attitude to proven practice and development	Why are Hauraki Plains Farmers not increasing production?	E1

DEGREE OF REGIONAL INTEREST IN NATIONAL RESEARCH PROBLEMS.

This section comprises a summary of Appendix B, pages 1 to 54, to show the degree of District interest in the problems.

Within the limitations of the sample (31 original replies, plus a further 3 received too late for full processing, but included in this section), it is hoped to give some indication of the importance attributed to such problems in each District.

With this aim, broad groupings of the research projects have been used.

Codings for Districts are as follows: (as shewn in Appendix B introduction.

R 1 Northland
R 2 Waikato
R 3 Taranaki
R 4 Pumice Areas
R 5 Elsewhere.

REGIONAL INTEREST IN NATIONAL PROBLEMS - PASTURE PESTS

R1	R2	R3	R4	R5	TOPIC
		4	1	5	Porina Studies
1	3	2	3	8	Grass Grub Studies
2				1	Black Beetle Studies
2					Army worm
2				1	Wireworm
3				1	Crickets
			1	1	Soldier Fly
		1	1	3	Argentine Stem Weevil
1		1	1		Springtails
		1	1		Micro organisms
		1			Research on Insecticides
2		1			General overall insect studies including subsurface pests, management practices etc.
			1	3	Methods of determining populations

REGIONAL INTEREST IN NATIONAL PROBLEMS - FERTILIZERS

R1	R2	R3	R4	R5	TOPIC
4	3	4	4	5	General L.P.K. requirements. Rates of application
2	1	1		2	Phosphate rates
1		1			Potash, lime rates
	1	2		1	Ratios
		2	2	1	Timing
1				3	Nitrogenous
3	1	2	2	2	Trace elements, stock, health etc.
1		1		1	Soil testing
2					Extension - fertilizer requirements, advice and credit, more publicity.
1					Soil research station in the north
1					Detailed Research on Major Soil Types
.2		1	1	1	Sundry

REGIONAL INTEREST IN NATIONAL PROBLEMS - DRAINAGE

R1	R2	R3	R4	R5	TOPIC
2				2	Moles - Tiles v. drains
			1	1	Peat draining - methods and overdraining risks
1				1	Rolling country - extension on value
			1		Surface irrigation. Peat and pumice
			2		Surface drainage - tolerance of high production pasture plants
			1		Plastic drains
			1		Rating of pasture yields under various water levels and soil moisture conditions.
			1		Flood Pumping - merits and costs
				1	Pumps - overseas v. local
				1	National survey of underground resources
1					Establishing contracting teams
				2	Search for cheaper methods - all types
				1	Reducing Hill Country runoff - retention dams?
			1	1	More extension

REGIONAL INTEREST IN NATIONAL PROBLEMS - STOCKING

R1	R2	R3	R4	R5	TOPIC
2					Tabulation of fertilizer application rates by stocking rates
			1		Effect of large and small males on animal well being
		1			Survey to learn why higher stocking not practised
2	1			2	Study wintering barn etc. Techniques as factor in high stocking. Economics of.
		1			Rearing on and off farms
3		3		4	Optimise stock/Bfat p.a. Butterfat per cow.
1					Supplements to allow pasture recovery
	1				Maximum rate of stocking for maximum utilisation, minimum waste of pasture
			1	1	Minimum stocking recommendations for age groups
	2	2			Short lactation studies
			1		Rating of D.M. intake/Bfat O.P.
			1	1	Cost of Pugging

STOCKING (continued)

R1	R2	R3	R4	R5	TOPIC
			1		Overstocking
	1				Shed design limitation Maximising prod/man off grass Calf feeding. Short lactation
			1		Influence of stocking on pasture composition
1			2		Variation of calving dates
				1	Town milk. Raising winter carrying capacity

REGIONAL INTEREST IN NATIONAL PROBLEMS - SUBDIVISION

R1	R2	R3	R4	R5	TOPIC
1	1	1		4	Electric Fencing studies - types, costs, effeciencies.
1		1	1	2	Evaluate purpose of, and need for subdivision
	1	1			Optimise level of subdivision
1		1			All fence types comparative study
			1		Flexible netting fence (as U.K., Aust)
		1			Shelter v. Fence
1	1				Optimum stocking intensity in terms of feed utilised/wasted
			1		Contour fencing

REGIONAL INTEREST IN NATIONAL PROBLEMS - WINTERING SYSTEMS

R1	R2	R3	R4	R5	TOPIC
4	3	3	1	10	Evaluation of feed platform, barns, split herd, grazing off, sacrifice paddocks, zero grazing.
		1			Effects of treading volcanic soils
	1				Energy consumption of paddock wintering in large and small mobs.
		1	1		Evaluate A.S.P. v. W.S.P.
		1	1		Define minimum winter feed level
			1		No grass. Just crop and meal
			1		Evaluate shelter
		1			Minimise winter problem in farmers mind
				2	Extension

REGIONAL INTEREST IN NATIONAL PROBLEMS - PASTURE CONSERVATION

R1	R2	R3	R4	R5	TOPIC
1		1	1	4	Barn Drying Projects
1			1	2	Field Drying Techniques - earlier harvesting - machinery
1			1	4	I.P. studies - hay and silage Minimising cost Maximising quality
1					Maize for silage
1		1			Vacuum silage work
			1		Long term storage of supplements
		3		1	Conservation v. better adjustment of stock/feed
1					Assessing feed value of hay and silage - method
1					Drought incidence study
			1		Nitrogen application to combat late frosts

REGIONAL INTEREST IN NATIONAL PROBLEMS - PASTURE SUPPLEMENTATION

R1	R2	R3	R4	R5	TOPIC
		2		10	Meal feeding studies
1	1		2	3	Summer forage crops
	1				Winter forage crops
				2	Lucerne
				1	Choumoellier
		4	2	4	Prairie Grass Evaluation Hay - Ensilage - Crop
	1				Irrigation
2	1				Pasture species - improving existing or developing new types
1				1	Extend Hutton's work
1					Maize - economics - harvesting
				1	Oversowing on weevil attacked pastures

REGIONAL INTEREST IN NATIONAL PROBLEMS - MILKING SHED, DESIGN AND TECHNIQUE

R1	R2	R3	R4	R5	TOPIC
1	2	2	3	2	Herring bone sheds - study of designs, plans, and extensionof known data.
1	2	1		4	Efficiency rating - checks. Voltage checks
		1		1	Training installation and maintenance mechanics
		1			Need for sheds - alternatives
				2	Rotary shed
				1	Shed drainage study
		1	1		Evaluation of available types of cups and inflations
			2	1	Milking times and intervals study
					Relative efficiency of machine and calf milking

REGIONAL INTEREST IN NATIONAL PROBLEMS - NUTRITION

R1	R2	R3	R4	R5	TOPIC
1					Optimising O.P. - calving dates - stock Nos. etc. study
		1		1	Pursue Hutton's work
			1		Optimum lactation curve all grass
			3	4	Seasonal requirement studies
				4	S.N.F. studies
	1			3	Relation of feeding, fertility disease/O.P.
	1		1	2	Mastitis
			2	1	Black Pox
	1	1			Infertility studies
	1				Infertility studies - influence of trace elements
				1	All hay wintering studies
	1		2	1	Concentrates. Sundry studies.
	1	2		4	Bloat studies: General
			1	3	Post calving studies

NUTRITION (continued)

R1	R2	R3	R4	R5	TOPIC
		2			Irregularity of O.P. with consistent conditions
	2				Metabolic Diseases
			1		Influence of root crops on calving and post calving disorders
				1	Effect of carry over cows on production
				1	Effect of different pasture composition on butterfat

REGIONAL INTEREST IN INSTITUTIONAL AND ECONOMIC PROBLEMS: SHAREFARMING TOPICS

R1	R2	R3	R4	R5	TOPIC
	1	2	3	3	Develop "ideal" agreement form to cover all contingencies necessary for farm running: e.g. bloat control replacement rate topdressing rates and ratios labour v. capital conflicts etc.
1					Evaluation of comparative rewards under 50%, 39%, 29% and lease on various land values basis
		1		1	Survey share milked farms to find: (1) criticisms of agreement (2) production limitations of agreement (3) variations to intensify farming
				1	Replace sharemilking with easy terms buying where present owners unable to continue working farm.
				1	Institute certificate of suitability for sharemilkers

REGIONAL INTEREST IN INSTITUTIONAL AND ECONOMIC PROBLEMS: CREDIT TOPICS

R1	R2	R3	R4	R5	TOPIC
1		1	1	5	Short Term Credit
		1		6	Medium Term Credit
				1	Special trading stock financing outside of stock firms
				1	Present restriction of development imposed by overdraft and mortgage repayments

REGIONAL INTEREST IN INSTITUTIONAL AND ECONOMIC PROBLEMS: TAXATION TOPICS

R1	R2	R3	R4	R5	TOPIC
2	2		1	4	Increase tax incentives, remove disincentives. Encourage efficient farmer
		1	2	1	Improve P.A.Y.E.
	1				Education on tax rates
					Study influence of taxation on profitability of development. What limits development?

REGIONAL INTEREST IN INSTITUTIONAL AND ECONOMIC PROBLEMS

R1	R2	R3	R4	R5	TOPIC
	1			1	Scale of farming topics
	1		1	6	Labour topics
1	3	1		3	Land tenure topics
1	2				Sundry topics

REGIONAL INTEREST IN INSTITUTIONAL AND ECONOMIC PROBLEMS: EXTENSION TOPICS

R1	R2	R3	R4	R5	TOPIC
3	1	3	2	2	Utilize all known means of communication: - mass extension (T.V.) - more on-farm extension - improve Journal of Agriculture etc. Want more rapid dissemination of information
1	1	2		3	Change organization e.g. - transfer spending from Researdh to Extension - combine Dept. of Agriculture and Dairy Board - private enterprise extension etc.
1	1	3	1	2	Want more workers. Increase efficiency of F.A.O. Use of farmer ?
3	2	4	2	1	Problem of attitudes - conservatism, no ambition etc.
2		3		6	Extension of demonstration farm approach
				2	Extension of "group" instruction
			1	2	Evaluate extension systems
			1	4	Show clear economics of proposals
		3	1	1	Specific proposals such as extend recording, expert advisory panels, travelling "Farmers Week" team etc.