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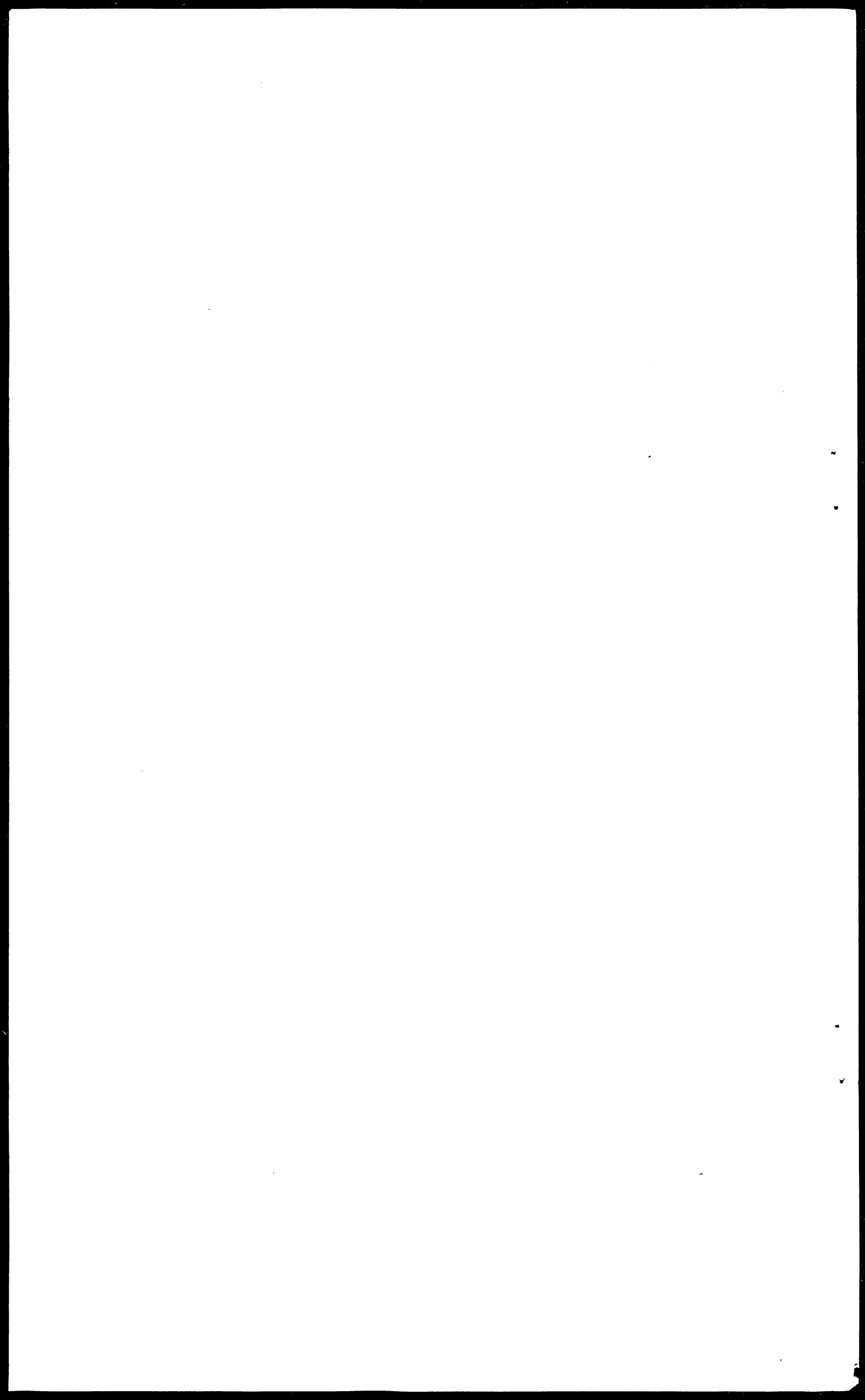
A Comparative Study of Adopters and
Non-adopters of Bulk Milk Collection

by

G. F. C. Mitchell, B.Sc., (Econ.)

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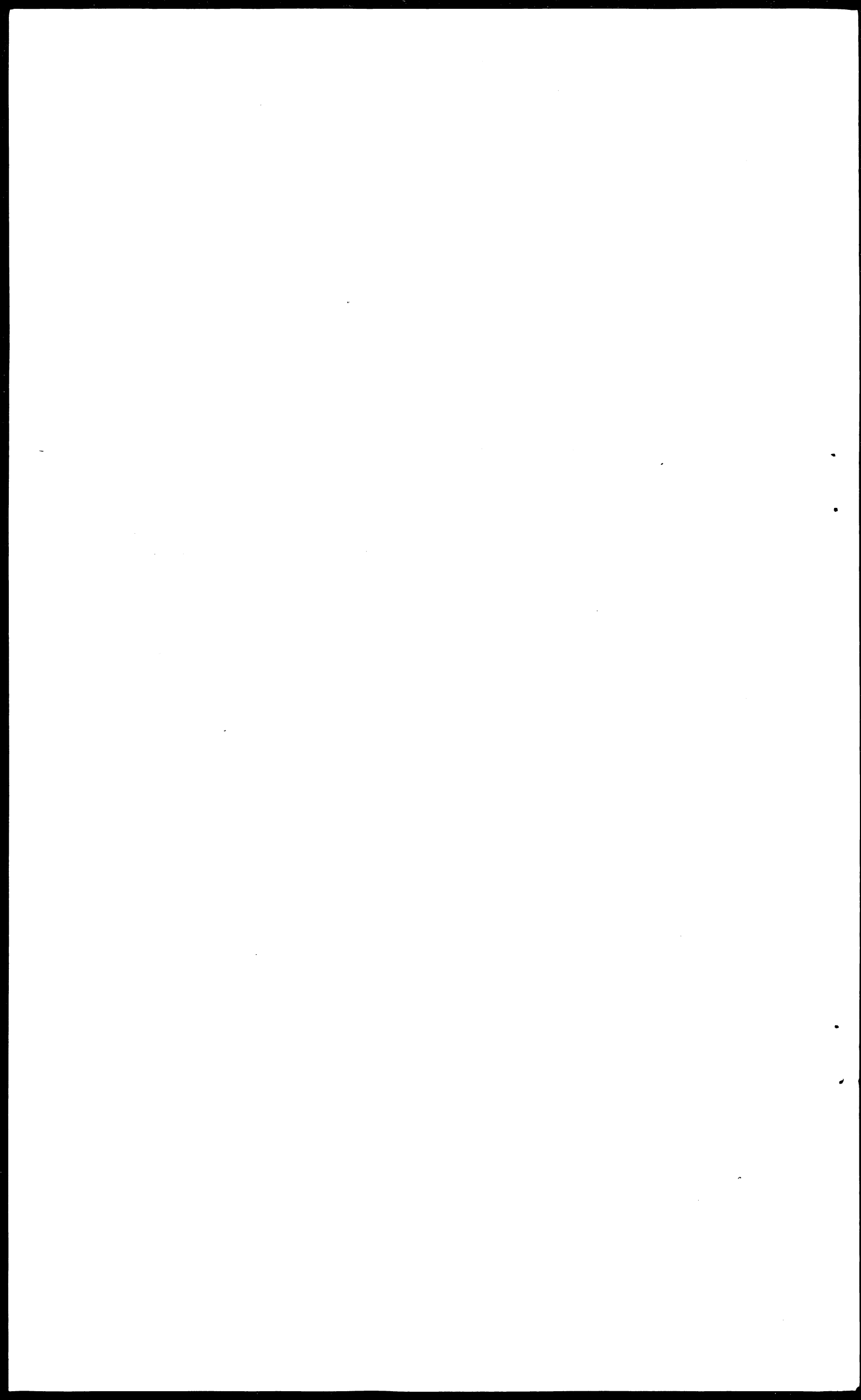
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INTRODUCTION

A better understanding of the reasons why farmers adopt particular courses of action in response to changes in their economic environment is sought by all agricultural economists but is of particular interest to the policy maker and administrator. If knowledge were perfect, forecasting the effect of price changes on agricultural output, to give an obvious example, would be a purely mechanical process. Knowledge is, of course, far from perfect. Economic science has advanced furthest in explaining the functional relationships between those financial and physical factors which can most easily be identified and measured. Less tangible sociological and psychological influences on human economic behaviour are not so well understood. The aim of the work reported in the following pages was to explore further in this field.

In a very simplified model, the making of a decision may be envisaged as consisting of two processes, the recognition that a problem exists and the solution of that problem.

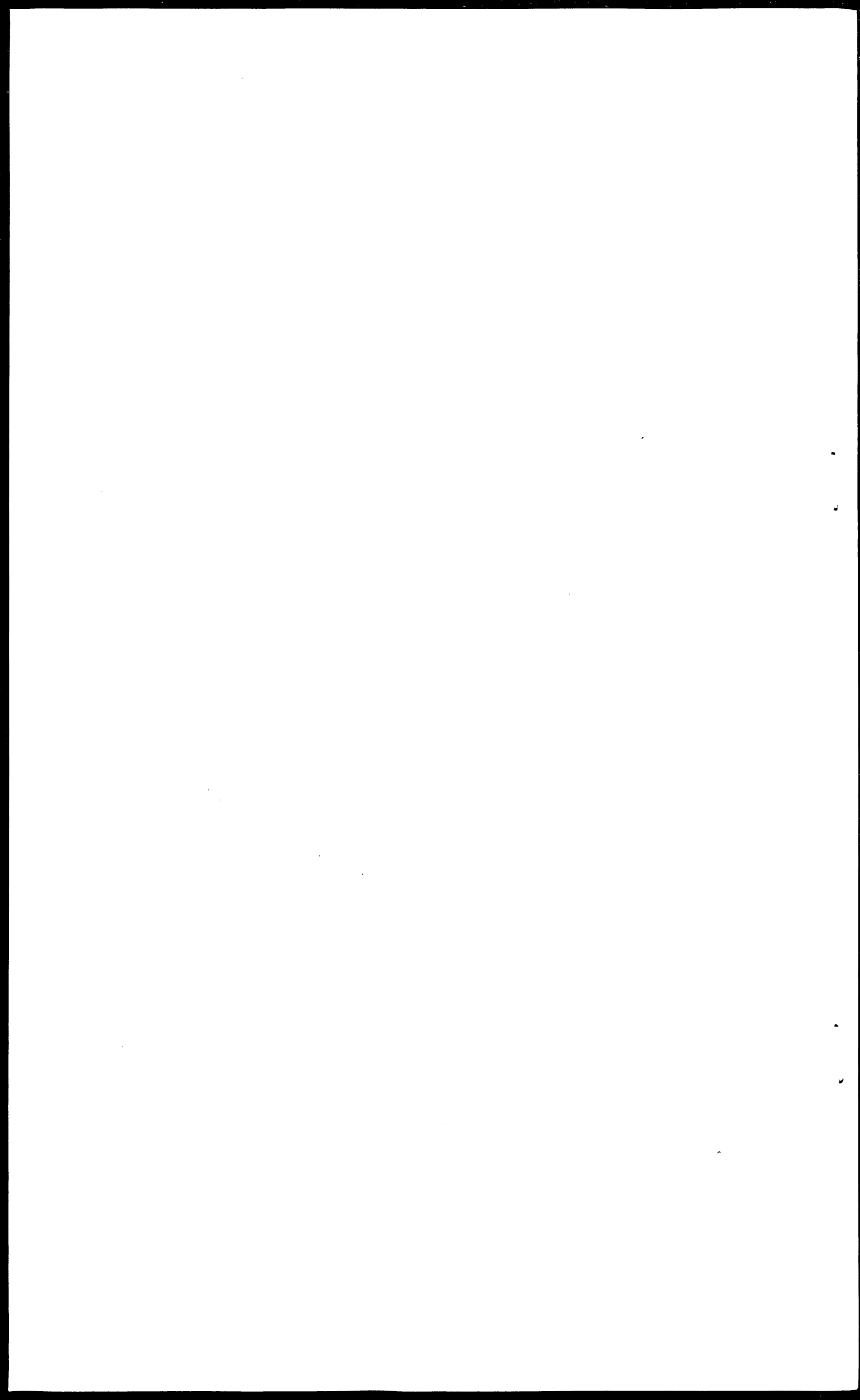
Problem solution consists of conceiving the steps which are necessary to change a less-desired situation into one which is more desired. The less-desired situation may be that which exists at the moment or that which will exist if no action is taken. The process may be complex, involving the collection and assimilation of facts, the inception of a chain of reasoning and the formulation of expectations. Economic analysis is concerned with problem solution; a pre-requisite of its use is that the problem has already been defined.

Conceptually, problem recognition, or definition must precede problem solution although it is only a methodological convenience to consider the two processes as distinct entities. A problem is recognised when a desire for change is experienced which is when the present situation is different from that which is desired, or will be different if no action is taken. A desire for change may arise as a result of an external stimulus, that is, a change in situation, or as a result of an internal stimulus, that is, a change in objective. The recognition of a problem implies no particular degree of intellectual consciousness.

Perhaps understandably, the processes of problem definition have been neglected by economists although their existence is recognised. It has seemed to the writer that a better understanding of the way in which farmers formulate their problems, and a greater knowledge of their factual and normative beliefs and of their objectives, are at least as important as the development of more sophisticated analytical techniques. If the problem is not correctly defined, no amount of sophistication of the analysis can produce the correct solution.

In the following pages some attention has been given to aspects of problem definition although it is not pretended that the work does more than touch the periphery of this subject. Specifically, the study is concerned with the testing of two hypotheses. The first of these contends that the action taken by farmers with regard to the adoption of bulk milk collection is associated with the way in which they envisage the problem, as evidenced by the selection of factors which they consider relevant to the making of a decision. The second hypothesis holds that farmers who have decided to adopt bulk milk collection differ from those who have decided not to do so, as regards certain characteristics of their farms, certain personal attributes, the ways in which they obtain information and in their decision experience. A comparison is also made of the attributes of 'early' and 'late' adopters.

The data collected during the enquiry relate to a large number of dairy farms in the West Midlands and provide information of a sort which is not readily available elsewhere. They are given in some detail in Appendix I in the hope that they may be of interest in contexts outside the scope of this work.



THE UNIVERSE, SAMPLE SELECTION AND RESPONSE

The Universe

The universe was defined as 'farmers in the counties of Gloucestershire, Worcestershire, Herefordshire, Shropshire and Staffordshire who have been concerned in the process of choosing whether, or not, to adopt bulk milk collection'. It was required that the universe should be stratified according to whether the farmer's choice had been positive or negative.

The act of adoption constituted evidence that farmers with bulk tanks had considered the problem and had made a positive choice. The total population of bulk operators in August 1963 was 394 farmers. Their distribution according to county, date of adoption and size of tank is shown in tables 1 and 2 in Appendix I.

The identification of farmers who had made a negative choice presented a greater problem because of the need to exclude non-bulk operators who were unable to adopt the technique because no scheme was available in their area. In Herefordshire, Worcestershire and Gloucestershire schemes had been promoted in a few districts only. In order to ensure that non-bulk operators had been presented with a specific problem for solution, the population to be sampled was defined as 'milk producers who have been approached by the Milk Marketing Board to join bulk collection schemes but have not done so'.

The writer is indebted to the Milk Marketing Board for supplying the names and addresses of farmers in this group. Because the schedules were, of necessity, compiled by field officers in the M.M.B. regions from their memory of approaches made to farmers over several years and because of the difficulty of ensuring a uniform interpretation of 'approached', it cannot be expected that the names submitted by the Board coincided exactly with the total population as ideally conceived. It did, however, fulfil its purpose of identifying a large number of farmers who had considered bulk milk collection but had taken no action to adopt it.

The absence of action does not necessarily indicate that the farmer has made a negative decision. He may still be actively engaged in the process of choosing, he may be in a situation of 'inaction', or he may have made a positive decision providing for action at a future date. It was found that the population of non-adopters included some milk producers in each of these categories.

Sample Selection and Response

The size of samples and the rates of response obtained are given in tables 3a to 4d. The population of bulk operators was stratified according to whether adoption had taken place before or after the first day of July 1962. Pilot samples were drawn at random from the two strata and from the population of non-bulk operators. The farmers concerned were visited and questioned by fieldworkers.

The object of these pilot enquiries, in addition to the collection of information directly relevant to the study, was to test the questions for possible ambiguity or lack of clarity and to discover if any were generally beyond the farmer's ability to answer.

Whilst the results of these tests were, for the most part, satisfactory, the response of non-bulk operators, which totalled only 56%, was disappointing. Nearly half of the non-response rate was attributable, however, to inability to cooperate rather than to refusal to do so. Twenty percent of the sample had died, retired, moved from the district or were otherwise not available for questioning. In addition, an unduly large proportion of the sample was found to have herds of a size generally considered too small to warrant the installation of a bulk tank.

In preparation for the drawing of further samples, the Milk Marketing Board undertook a revision of its schedule of non-adopters, removing those with herds of less than twenty-five cows, where this information could be ascertained, and adding the names of those who had been approached since the list was originally prepared. The total number of non-bulk operators in the revised population was 1168.

Given the rate of non-response experienced in the pilot enquiries, it was evident that the resources which could be devoted to visiting and personally questioning further samples of farmers would not yield the number of completed questionnaires which was desired. It was decided, therefore, to contact further samples by post.

After excluding the names of farmers drawn in the pilot surveys, a sample was selected at random from each of the following populations; bulk operators installing tanks before 1.7.62, bulk operators installing tanks after 1.7.62 and non-bulk operators. The questionnaires reproduced in Appendix II were circulated to sample members by post; Questionnaire A was sent to all bulk operators, Questionnaire B to non-bulk operators.

The size of samples was determined by the following considerations arising from the type of data analysis which was planned. It was thought desirable, firstly, that the number of respondents from each population should not be less than 50, secondly, that the number of respondents from each stratum of bulk operators should be approximately equal and that their combined total should be about the same as the total number of non-bulk respondents. Sampling fractions, as percentages of total populations, differed considerably, therefore, being for bulk operators installing tanks before 1.7.62, 46%; for bulk operators installing tanks after 1.7.62, 76%; for non-bulk operators 40%.

In the event, the rates of non-response were not so high as might have been expected for a postal enquiry of some complexity and of a subject matter which must have seemed to farmers to be of little practical relevance. Recent adopters of bulk collection responded particularly well, 77.4% of those circulated returning fully completed questionnaires. Other response rates were - bulk operators installing tanks before 1.7.62, 70.9%; non-bulk operators 44.3%. If, as in the pilot enquiry, 20% of non-bulk sample members were unable to respond, as distinct from unwilling to do so, the cost of the postal enquiry was a refusal rate some 10% higher than that to be expected from one carried out by personal interview. Against this cost must be set a very considerable saving in manpower and money.

THE REPRESENTATIVENESS OF SAMPLES

Non-response

A mathematical assessment of the correctness of inferences about a population can only be made if the sample is unbiased, that is, if every individual in the population has had an equal chance of selection. Whilst the names of farmers who were requested to provide data for this investigation were chosen at random, a number of those selected did not respond to the request. The samples must, therefore, be considered biased because the inclusion of individuals depended on their ability or willingness to provide information.

The degree of bias depends on the extent to which the reasons for non-response were related to the attributes under investigation. It might be suspected, for example, that death, which was a reason for non-response, was related to the age of the farmer, which was an attribute studied in the enquiry. It would be more difficult, however, to support the hypothesis that death was related to the age at which the farmer left school, to his membership of an N.F.U. committee or to the size of his milking herd. In the latter cases, the investigator might feel justified in ignoring the possibility of bias although he can rarely, if ever, be certain that it does not exist.

Reasons for non-response may be broadly divided into two classes, inability to respond and unwillingness to respond. Inability to respond included such reasons as death, illness and instances where the farmer could not be contacted by the investigator. By and large, these reasons appear unrelated to the subject matter of the enquiry. Unwillingness to respond included such stated reasons as "too busy to answer questions", "not interested in this subject" and instances where the farmer was suspicious of the purpose of the enquiry. In most cases, the detailed reasons for non-response were not discovered; farmers not willing to answer questionnaires were not usually willing to discuss, in depth, their reasons for refusal. It is the opinion of the writer that the stated reasons for refusal were often excuses for the real reason and that commonly the real reason was reluctance to submit to the mental fatigue involved in answering questions, in short, the farmer did not wish to be bothered. If this was the case, it might be argued that reluctance to undertake mental activity is an attribute of some relevance to the decision-making processes. On the other hand, experience of farmers does not suggest a strong correlation between the mental application which they are prepared to give to business management and the mental application which they are prepared to devote to questions about their management.

Non-response is a phenomenon to be expected in investigations which depend on the voluntary cooperation of human beings. Samples drawn under these circumstances rarely accord with the mathematical conception of randomness. The extent to which efforts should be carried in order to reduce the number of non-respondents is a matter for argument. It seems legitimate, for example, to jog the memory of those individuals who have merely forgotten to return a postal questionnaire. It may be legitimate to press unwilling farmers to provide simple factual information about their farms. It has seemed to the writer that to press unwilling farmers to answer questions which entail self analysis and the dredging of memory is likely to result in increasing the accuracy of sampling at the expense of accuracy of data.

Weighting of Data Relating to Bulk Operators

The universe of bulk operators was stratified according to the date of adoption and samples were drawn from each stratum. The data obtained from

these samples have, however, been amalgamated in comparing the attributes of bulk operators with those of non-bulk operators. It was considered that the differences between 'early' and 'late' adopters were neither sufficiently numerous nor important to warrant separate consideration of the groups. It must be emphasised, however, that in so far as differences exist, the data concerning bulk operators are weighted in favour of 'late' adopters. These differences are fully listed in the section dealing with 'early' and 'late' adopters.

Sample Bias and Tests of Association

Because the populations sampled in this enquiry were uniquely defined, no other data from which their parameters could be determined were available. Thus, no mathematical measurement of sample bias could be made. In this situation, a research worker may either reject the data or he may proceed to draw from it inferences which are based on his subjective estimate of the bias involved. In this case, the writer believes that the degree of bias is not so large as to render the data useless and has chosen the latter alternative. In making this decision, a critical consideration has been the fact that sample data support the existence of those associations which can most strongly be presumed 'a priori'. Whilst this is not proof of their correctness, grave doubt would be thrown on the representativeness of data which did not do so.

In assessing the likelihood of an association between the act of adoption and various farm and farmer attributes, mathematical measurements have been used as if the data were unbiased. It has seemed to the writer that such measures, which may be modified by readers according to their own estimates of the likely error involved, are more informative than terms such as "it seems likely that.....". It is stressed, however, that the measurements, as given, apply only to populations redefined as 'bulk and non-bulk tank operators who were able and willing to answer questionnaires'.

The Use of Chi Square

In comparing two or more frequency distributions, chi square provides a measure of the divergence of the observed frequencies from those to be expected on a certain hypothesis. In this case, the hypothesis is one of 'nullity', that is, that no divergence is to be expected apart from that which would arise by chance in random sampling. Implicit in the 'null' hypothesis is the assumption that the frequency distributions which are being tested are not associated.

The function P provides a means of judging whether, or not, a given value of chi square is an amount commonly to be expected in sampling. If P is large, there is no reason to doubt the correctness of the 'null' hypothesis. If, on the other hand, P is small, one is justified in suspecting that the hypothesis is incorrect and that an association exists between the factors which are being tested.

Whether, or not, a given value of P suggests the existence of an association is a matter of personal judgement. In the following pages the critical value has been set at $P = .05$ i.e. at the 5% level of probability. Increasingly greater probabilities of association have been indicated at the 2.5%, 1.0%, 0.5% and 0.1% levels. Values of chi square which correspond to values of $P = 0.06 - 1.00$ have been termed 'not significant'. It will be appreciated however that there is no abrupt transition from probability to improbability.

THE FARMER'S ATTITUDE TO BULK MILK COLLECTION

Method of Enquiry and Analysis

Farmers were asked to list the features of bulk milk collection which they found attractive and the features which they considered unfavourable, with particular emphasis on the suitability of the technique for use on their own farms. Those who had already installed bulk tanks were asked to recall their opinions at the time of making the decision and to ignore any which they had formed as a result of operating the scheme. In order to obtain an indication of the relative importance of the features which were mentioned, non-bulk operators were asked to distinguish particular and other disadvantages. Bulk operators were asked to make a similar distinction in the features which they thought favourable.

Farmers' answers were classified according to the schedules of incentives and disincentives to adoption which are given in tables 5 and 6, Appendix I, respectively. It will be appreciated that replies were rarely expressed in the exact wording used in the schedules so that their classification called for a certain amount of interpretation. This was done, in all cases, by the writer so that it should be consistent throughout the sample. Care was taken also, that more was not read into the answers than had been written by the farmer.

After classification, the various incentives and disincentives were grouped according to their affinities of emphasis. Groups were selected with the prime object of distinguishing differences between farmers in their way of visualising the problem of adoption rather than of distinguishing basic differences in their motivation for installing tanks or for refusing to do so. An example may make the approach clearer. Two disincentives which were frequently mentioned were the high capital outlay involved in adopting the technique and the circumstance that buildings were not suitable for tank installation. It might well be argued that the latter disincentive was basically the same as the former in that buildings were not suitable because the capital outlay needed to make them so was too high. Nevertheless, the dissimilarity in the way in which the disincentives were expressed indicated a difference in the way of thinking about the problem. Some farmers visualised it in physical terms, others employed financial criteria. The identification of such differences in farmer characteristics was part of the purpose of the study.

The analysis which follows is confined to postal questionnaires only. The importance placed on the farmer's manner of expression as an indication of his line of thought is the main reason for excluding replies recorded by fieldsmen during personal interviews with farmers. In summarising the sometimes voluminous answers to the questions concerning the advantages and disadvantages of bulk collection, fieldsmen are likely to have used their own words rather than those of the farmer and may have interpreted replies in terms of their own discipline. That this has happened is suggested by the fact that the proportion of answers in which the emphasis was placed on profitability or capital was appreciably higher from farmers who were interviewed than from those who were circulated by post.

General Attitude and Explanations of 'Neutrality'

On balance farmers were favourably disposed towards bulk collection. Seventy-two percent of those questioned considered that the technique had some attractive features. Opinion as to whether, or not, bulk collection had disadvantages was evenly divided. The relevant figures are shown in table 7.

Not unexpectedly, a larger proportion of bulk operators than of non-bulk operators believed that bulk collection had advantages whereas non-bulk operators were more frequently of the opinion that it had disadvantages.

A less predictable statistic revealed in table 7 is the number of farmers who saw neither advantage nor disadvantage in the technique. Such 'neutralists' comprised 17.5% of non-bulk operators and 8.5% of those who had already installed tanks.

The questions concerned were the only ones in the questionnaire which could not be answered by the insertion of a tick or a figure but called for a written reply. One cannot ignore the possibility that some farmers avoided this chore by the simple expedient of answering 'none'. An even simpler alternative, however, would have been to leave the question unanswered. Only 2 out of 371 farmers did this and the writer believes that the opinions recorded were those genuinely held, given the limitations imposed by deficiencies in farmers' powers of expression.

In the case of non-bulk operators, the most probable reason for 'neutrality' is thought to be that the farmers concerned had given little or no consideration to the pros and cons of the technique. Although by definition, they had been invited to make a decision regarding adoption, 31% of non-adopters had not done so at the date of the investigation and three-quarters of these were not attempting to do so. Even farmers who had reached a decision could have done so rationally, without consideration of the merits of bulk collection 'per se' if a particular farm, or personal, attribute constituted in their opinion an absolute bar to adoption.

These explanations cannot account, however, for the profession of 'neutrality' given by 8.5% of those who had installed tanks. It seems most likely that these farmers made the mistake of expressing the opinions which they held currently, not those held at the time of making the decision, as had been requested. It seems certain that this mistake was made by the two bulk operators who not only saw no advantages in the technique but also considered that it had positive disadvantages.

An element of irrationality appears to be present also in the case of those non-adopters who professed to see only advantages in the technique. However, several farmers in this group claimed, in fact, to have come to a decision entailing positive action at a future date. Others were still undecided. In some instances it is thought that through misunderstanding, or reluctance to disclose more subjective criteria, farmers attempted to give an objective rather than a personal appraisal of the system.

Incentives to Adoption

Advantages concerning the use of labour were the most frequently mentioned aspect of bulk collection which influenced bulk operators to adopt the system and which also attracted non-bulk producers. They comprised 50% of all mentions. Opinions were usually recorded in somewhat imprecise terms such as 'saves labour' but approximately one-fifth of the replies dealing with this feature referred specifically to the easing of the heavy work entailed in churn handling. Other labour advantages which were cited less often were simplification of the dairy routine and the greater ease with which labour could be obtained or retained.

Next in order of frequency of mention were advantages concerning the maintenance or improvement of milk quality. These comprised 21% of all mentions and usually referred to better keeping quality or improved cleanliness.

They were followed by advantages which have been grouped together as concerning the farmer's relationship with the purchasing dairy, namely, that the measurement and sampling of milk are carried out on the farm, not at the dairy. The order of frequency of mention of the above three groups of incentives was the same for both bulk and non-bulk operators.

Other favourable features of bulk collection which were recorded much less frequently were the potential of the technique to increase the profitability of milk production, to save water and to facilitate other changes in farm organisation.

Bulk operators distinguished between those aspects of the system which particularly attracted them and those which, although considered favourable, were of less attraction. "Labour saving" was more often mentioned as an advantage of particular importance. Profitability was more frequently regarded as a less important factor. Other advantage groups were divided remarkably evenly in the frequency with which they were considered of particular or other attraction.

Disincentives to Adoption

Non-bulk operators were asked to list the aspects of bulk collection which made it unsuitable for their farms or the particular features of their farms which made them unsuitable for the operation of bulk collection. The disincentives mentioned most frequently by this group described the problem in terms of the restrictions imposed by unsuitable farm buildings and roads or by the small size of the milking herd. Disincentives of this type which have been grouped together as emphasising the unsuitability of physical aspects of farm organisation, accounted for 40% of all those mentioned by non-bulk operators, but comprised only 13% of the answers of bulk operators.

It is of interest that one of the two types of disincentives which shared first place in the order of frequency of mention by bulk operators was also of a physical nature. Twenty-one percent of all the features listed by this group as unfavourable referred to farm location which, it was believed, made collection uncertain in winter.

Reference to the financial aspects of adoption was made more frequently by both bulk operators and non-bulk operators when assessing the disadvantages of the system than when judging its merits. The criticism that capital outlay was 'too high' or that capital was difficult to raise ranked with locational disadvantages as the most common disincentive to adoption in the minds of bulk operators and was the second most frequently listed disadvantage in the case of non-bulk operators. The percentage of answers to the effect that the profitability of the technique was not satisfactory was the same for both groups at 13%.

Following profitability in the order of frequency of mention by non-bulk operators was a group of disincentives which had their origin in the inability of the farmer to foresee the future (12% of all mentions). Some of these were concerned with rigidities which the adoption of bulk collection might impose on farm organisation should a change be wanted at a later date. The beliefs that bulk collection committed the farmer to dairying for a long term and that the installation of a tank limited herd expansion were specifically mentioned. However, the majority of answers in this category mentioned doubts concerning the future ownership or tenancy of the farm. In the latter connection, uncertainty often centred on the question of whether, or not, a son would obtain the tenancy on the death or retirement of his father.

It is probable that the emphasis placed by bulk operators on the technical and operational disadvantages of bulk collection was partly due to their operational experience. This seems to be the most likely explanation of complaints regarding the difficulty of cleaning the tank, extracting milk for the farmhouse and inaccuracy in measuring and sampling. No non-bulk operator mentioned these particular disadvantages. They did, however, share with adopters the fear that a mechanical breakdown or contamination by one cow would spoil the whole contents of the tank.

Other complaints regarding the technical merits of bulk collection differed from the above in that they emphasised the disadvantageous effects of adoption on other aspects of dairy management. It was alleged that adoption tended to promote inefficiency because it made more difficult the recording of individual cow yields or because it hampered the establishment of an efficient work routine.

Although, in total, of little importance, a further disincentive to adoption which was mentioned by both bulk and non-bulk operators was a sense of injustice arising from the belief that the scheme was not fairly operated with regard to the interests of all those involved. In all cases but one, complainants considered that farmer operators were not receiving a fair share of the financial benefits which bulk collection brought to the dairy industry. The exception was a bulk operator who was disturbed by the belief that he was being subsidised by those who had not adopted the system.

The distinction which was drawn by non-bulk operators between disincentives considered of especial importance and those thought to be of lesser consequence showed that physical aspects of farm organisation were almost always regarded as particularly important barriers to adoption. On the other hand, profitability and, to a lesser extent, capital difficulties were rarely classed as of particular importance. Nearly 90% of mentions to the effect that the profitability of bulk collection was unsatisfactory were entered under the heading of 'other unfavourable features'.

Basic Motivation

It has been said earlier that the study of farmers' motives for the adoption of bulk collection was not the object of this enquiry. Indeed, a postal questionnaire would be a very inadequate tool to use for this purpose. Nevertheless, the subject invites speculation, particularly as readers may have noted that the conventional assumption regarding the motivation of economic conduct, that is, profit maximisation, featured relatively infrequently among the factors listed by farmers as influencing their decisions. Even when mentioned, profitability was nearly always classed as of secondary importance. Is there, in this particular situation at least, a wide discrepancy between the assumption and the reality?

In the writer's opinion, the answer to the question is 'no'. Many of the advantages which farmers expected to realise by adopting bulk collection can hardly be conceived as ends in themselves. Their attraction derived from the fact that they constituted a step towards the achievement of a further objective. 'Saving labour', which is taken to mean 'reducing the labour hours devoted to milk handling' is most likely to have been valued because of a desire to reduce labour costs. If so, the motive was essentially one of profit. If the goal was an increase in leisure time, it might still not have conflicted completely with the objective of maximising profit. Cases in point were those in which easier working hours were provided for hired labour with a view to retaining or attracting men of superior ability. The desire to improve milk quality or to prevent its deterioration may well have derived from a desire to avoid the rejection of milk by the purchasing dairy, with a consequent loss of revenue, or from a wish to obtain a price premium, in the long term if not immediately.

Similarly, profit maximisation may be adduced as the objective which promoted the desire to avoid many of those aspects of bulk collection which featured as disincentives to adoption. It has already been suggested that the disincentive given as 'unsuitable buildings and farm roads' expressed in physical terms what was fundamentally a financial disadvantage, that is, that the capital outlay needed to make these buildings and roads suitable for the operation of bulk collection was too high. In what respect was capital outlay 'too high'? In some instances it may have been too high in relation to the creditworthiness of the farmer. In most cases, however, it is likely to have been thought too high in relation to the return which it would earn.

It cannot be said that any of the features which influenced farmers in their acceptance or rejection of bulk collection were entirely incompatible with the objective of profit maximisation. Yet the emphasis of the answers creates a strong supposition that other objectives were also sought. In the writer's judgement, the most prevalent of these were the simplification of managerial effort, the achievement of greater leisure and the lightening of manual effort. This opinion has probably been formed more as a result of discussion with farmers than by deduction from the questionnaires although a reduction of the manual effort involved in churn handling was specifically mentioned by about 10% of sample farmers. The advantages offered by bulk collection as regards simplification of the milking routine and from the circumstance that measurement and sampling are carried out on the farm may usually derive their attraction from the profit motive. Yet it is known in some cases and suspected in others that these features were desired because they eased managerial effort in the organisation of dairy routine or in the avoidance of controversy with the purchasing dairy. Although cynics may be sceptical, it is believed that the improvement of milk quality and the advancement of technical efficiency were, to some farmers, satisfactions in themselves, not derived solely from an expectation of financial advantage.

Much of the argument above is speculative, but, it is hoped, informed speculation. It has been established, however, that whatever the farmer's ultimate motivation, he rarely envisaged the immediate problem in economic terms. It is doubtful, in fact, whether he ever defined the problem in the context of his normative beliefs and values or whether he consciously recognised such concepts. The hypothesis to be tested here is that differences in the way farmers envisaged the problem of adoption, as evidenced by the choice of factors they considered to be important, were associated with differences in the type of action taken for its solution. It may be that because of lack of information, misinformation, or defects in analytical processes farmers did not envisage the problem in the way most likely to lead to a solution in accord with their normative beliefs and values. If so, the fact is not relevant to the immediate question at issue.

Relationship between Attitude and Choice

The method of testing the hypothesis was to compare the numerical distribution of bulk operators with that of non-bulk operators according to their mention of combinations of incentives and combinations of disincentives. The associations were tested by means of chi square and the appropriate values of P ascertained. In the application of chi square distributions to tests of significance no theoretical cell frequency should be small. For this reason, only the five most frequently mentioned combinations of incentives and disincentives were included singly in the chi square matrix. The remaining combinations were grouped together. The data are shown in tables 8 and 9.

Significant associations at the 0.1% level of probability ($P = .001$) were established for both incentive and disincentive combinations. The hypothesis may, therefore, be considered correct in that adopters differed from non-adopters in the combination of factors which they thought to be relevant to the making of a right decision.

Inspection of the data suggests, however, that some elaboration of this 'blanket' hypothesis is desirable. To this end, the number of bulk operators was compared with the number of non-bulk operators according to whether, or not, they had mentioned incentives or disincentives of particular types. The data are given in tables 10 and 11.

Relationships between the character of the decision which had been made and mention of the following incentives and disincentives were established. Incentives significantly associated at the 0.1% level of probability were type A (profit), type C (milk quality) and type F (enterprise organisation). Incentive type E (relations with purchasing dairy) was less probably related at the 5% level. Disincentives of type D (unsuitability of farm organisation) and of type E (unsuitability of farm location) were associated at the 0.1% level of probability. Disincentives of type C (uncertainty regarding the future) and type G (technical and operational disadvantages) were associated at the 0.5% level. No other incentive or disincentive was significantly associated.

The hypothesis is seen, therefore, to require some qualification. Adopters differed from non-adopters as regards the emphasis which they placed on the potential of bulk collection to increase profitability, to improve milk quality, to facilitate other changes in farm organisation and on the benefits resulting from measurement and sampling being carried out on the farm. All these factors were mentioned more frequently by bulk operators as being attractive features of bulk collection. Farmers who assessed the value of the technique on these criteria were the more likely to adopt it. Non-adopters differed significantly from adopters in that they more frequently emphasised the disincentives of unsuitable buildings, herd size and placed more stress on their inability to foresee the future. Bulk operators more frequently envisaged the problem in terms of farm location and of operational drawbacks but doubt has already been expressed as to whether these opinions were held at the time of adoption.

Adopters did not differ significantly from non-adopters in the emphasis which they placed on the use of labour as an attractive feature of bulk collection nor on the disincentive provided by low profitability and high capital requirement. Assessment of the problem on these criteria was not likely to lead to action of one sort rather than another. It will be remembered that labour use was, by far, the most commonly mentioned advantage of bulk collection and was more frequently considered of particular importance. High capital outlay and low profitability were also among the more frequently mentioned disadvantages of the system although generally rated as of lesser importance.

To sum up, differences in the character of the decision taken by adopters and non-adopters were associated with differences in the combinations of factors reported as influencing their choice, that is, in the way in which they viewed the problem. The distinction between the two decision groups did not, however, extend to each specific issue. Differences were less frequently established in the case of the main issues, that is, those more commonly mentioned by farmers. By and large, subscription to a more popular opinion regarding bulk collection did not, of itself, indicate the probability of either a positive or negative decision. Such a probability was more frequently

indicated when the farmer took a less usual view of the problem or when a more personal view was held in conjunction with popular opinions. One might speculate, albeit unprofitably, that the more popular opinions tended to be an uncritical repetition of what the farmer had read and heard said about bulk collection whereas less usual opinions resulted from considered judgements of the technique in relation to personal situations. The most obvious explanation, that is, that particular advantages and disadvantages of the system were more frequently mentioned simply because they were more frequently found to apply, seems most likely.

A COMPARISON OF 'EARLY' AND 'LATE' ADOPTERS

Stratification of the universe of bulk operators was primarily undertaken in order to provide a sample of adopters who had had a minimum of one year's experience of tank operation at the time that the investigation was made. The information derived from this sample and from other sources was reported in a previous publication*1.

A subsidiary objective of stratification was to enable a comparison of 'early' and 'late' adopters to be made on the hypothesis that differences would be found in the distribution of their various attributes. Tests were made of the association between the date of adoption, that is, whether it was before or after the first day of July 1962, and those attributes which are listed in the next section of this report which compares bulk and non-bulk operators.

No significant association was established between 'early' or 'late' adoption and any personal attribute of farmers. The writer does not interpret this result as meaning that differences did not exist between first stage innovators and later adopters but concludes that stratification at a much earlier stage of the scheme is necessary if they are to be revealed.

Significant associations were found between the date of adoption and those farm characteristics which are listed below.

- | | | | |
|----|-----------------------------------------------------------------------------------------------|---|-----------------------------------------------|
| 1. | Date of first learning of the existence of scheme for the bulk collection of milk. |) | Significant at the 0.1% level of probability. |
| 2. | Frequency of disagreement with purchasing dairy as to the correct gallonage of milk sales*2.) |) | |
| 3. | Type of housing used for dairy herd*2. |) | Significant at the 2.5% level of probability. |
| 4. | Type of milking system used for dairy herd*2. |) | Significant at the 5.0% level of probability. |
| 5. | Seasonality of calving practice*2. |) | |
| 6. | Percentage of farm in grass. |) | |
| 7. | Frequency of receipt of dirty churns from purchasing dairy*2. |) | |

These associations are discussed in the next section of the report.

*1 A Guide to Farm Investment in Bulk Milk Collection.

*2 Before the installation of a bulk milk tank.

A COMPARISON OF ADOPTERS AND NON-ADOPTERS

It has previously been shown that differences in the way in which farmers envisaged the problem of adoption were significantly associated with the type of action which they took for its solution. But it has been demonstrated also that the act of adoption or non-adoption was not entirely explained by such differences. For example, inspection of the data shows that some farmers who viewed the problem in the same way nevertheless arrived at different decisions.

Various hypotheses may be advanced in explanation of this phenomenon. One which may already have occurred to readers is that the information concerning farmers' attitudes was imperfect; it did not permit the exact identification of viewpoints; opinions which appeared to be identical may not, in fact, have been so. Another explanatory hypothesis, which seems equally plausible, is that differences in the decision making processes of farmers, that is, in the processes by which they solved their problems as distinct from the way in which they defined them, were related to the type of action decided. Neither of these hypotheses could be tested in this enquiry although some light may be shed on the latter by the analysis which forms the subject matter of this section.

The hypothesis to be tested now contends that differences in the action taken by farmers with regard to the adoption of bulk collection were associated with differences in the characteristics of their farms, in their personal attributes, in their sources of information and in certain aspects of their decision experience. This is not an alternative hypothesis to that advanced in the first section if it is assumed, as the writer assumes, that the way in which a farmer defines and solves a problem is related to such characteristics and attributes.

For the most part, only the data provided by the postal enquiries have been used to test the hypothesis. The number of farmers visited by fieldworkers was too small to permit a detailed analysis according to attributes and, at the same time, fulfil the conditions of the chi square test regarding the size of theoretical cell frequencies. There is also some doubt as to the permissibility of amalgamating data obtained by such different methods. Information collected during personal interviews with farmers has been used only when the questions were not included in postal questionnaires.

Farm Characteristics

Chi square tests revealed that a significant association existed between the act of adoption of bulk milk collection and each of the farm characteristics which are listed below.

- | | | | |
|----|-----------------------------------------------------------------------------------------|---|-----------------------------------------------|
| 1. | Size of dairy herd. |) | |
| 2. | Total farm acreage. |) | |
| 3. | Combinations of dairy practice*1 |) | Significant at the 0.1% |
| 4. | Frequency of receipt of dirty churns from purchasing dairy*1 |) | level of probability. |
| 5. | Frequency of disagreement with purchasing dairy as to correct gallonage of milk sales*1 |) | |
| 6. | Source of capital for tank purchase*2 |) | Significant at the 0.5% |
| 7. | System of cooling milk*1 |) | level of probability. |
| 8. | Changes in herd size. | | Significant at the 2.5% level of probability. |
| 9. | System of milking*1 | | Significant at the 5.0% level of probability. |

The following farm characteristics were not significantly associated with the act of adoption.

1. Percentage of total farm acreage in grass.
2. Percentage of total farm acreage rented.
3. Combinations of non-dairy stock.
4. Seasonality of calving practice.
5. System of housing dairy herd for sleeping*1.
6. System of housing dairy herd for milking*1.
7. Type of main farm enterprise.
8. Frequency of rejection of milk by purchasing dairy*1.

*1 Bulk operators = before installing a tank. Non-bulk operators = at the time of the investigation.

*2 Non-bulk operators = expected source of capital.

Bulk operators tended to have much larger milking herds than non-bulk operators and to occupy larger farms. Whereas three-quarters of the herds on farms with bulk tanks comprised 51 cows or more, little more than a quarter of non-bulk operators possessed herds of this size. The average size of farms operating bulk collection was approximately 100 acres greater than that of farms not using the technique.

Seventy-six percent of both bulk and non-bulk operators stated that milk was their main farm enterprise. Similarly there was no significant difference between the two groups as regards the proportion of total farm acreage devoted to arable or to grass crops nor in the type of livestock husbandry, additional to dairying, which was practiced.

During the period to which the investigation refers, large herds were likely to have been able to make more efficient and more profitable use of the bulk collection system than were small herds*. For this reason and because the act of adoption was not associated with any particular pattern of farming, apart from

*A Guide to Farm Investment in Bulk Milk Collection.

the presence of a dairy herd, it is considered, with one reservation, that the size of farm was mainly related to the act of adoption through the circumstance that herd size and farm size were positively correlated. The reservation in mind is that larger farms may be expected to have possessed greater reserves of capital and credit and may, therefore, more easily have invested in the technique.

The sizes of herd compared above were those at the time of the investigation. A majority of bulk operators (58%) had increased the number of their milking cows since installing a tank, although not to an extent that could cast doubt on the validity of the association between herd size and the act of adoption. More relevant to the issue under consideration, bulk operators were tending to increase the sizes of their herds before they adopted bulk collection. There was a significant difference between the percentage of adopters who were increasing the number of their milking cows in the years immediately preceding tank installation and the percentage of non-adopters who were doing so during approximately the same period.

The relationship between herd expansion and the adoption of bulk collection may be direct in so far as possession of a larger herd makes the technique a more viable proposition. This would apply, however, only at some critical stage in the expansion of herd numbers. It is suspected that the relationship is more probably indirect, that is, that the propensity to increase herd size and to install a tank are independently correlated with other farm characteristics or farmer attributes such as the possession of capital or a particular interest in dairying.

Whether, or not, a farmer adopted bulk milk collection was also found to be associated with the type of dairy practice followed before a tank was installed. The facets of dairy practice which were examined were housing for sleeping, housing for milking, system of milking and system of cooling. A significant difference was established between bulk and non-bulk operators in the combinations of the above four systems which were used by the former before installing tanks and by the latter at the time of the investigation. The five most frequently practiced combinations were included singly in the chi square matrix and are shown below. Other combinations were amalgamated into one group.

	Housing for		Milking System	Cooling System	Percentage of farmers	
	Sleeping	Milking			Bulk	Non-bulk
1.	Cowshed	Cowshed	Bucket	In-churn (a)	29.2	50.9
2.	Cowshed	Cowshed	Bucket	Surface (a)	22.4	12.1
3.	Cowshed	Cowshed	Bucket	In-churn (b)	6.8	8.7
4.	Covered yard	Parlour	In-churn	In-churn (a)	6.8	5.8
5.	Covered yard	Parlour	Pipeline	Surface (a)	6.8	3.9
6.	Other combinations				25.5	18.6
	Information not available				2.5	-

(a) = used with tap water. (b) = used with ice-bank.

As inspection of these data suggests, the critical difference between the two groups was in the system of cooling which was practiced. Bulk operators more frequently possessed surface cooling equipment, non-bulk operators more often cooled in churn. It may be that these differences merely reflect the general movement towards modernisation of dairy plant which took place between the inception of bulk collection schemes and the date of the investigation. Support

for this view is provided by the fact that significant differences in the systems of housing and milking were established between 'early' and 'late' adopters. This difference did not, however, extend to systems of cooling. The explanation may lie in the association of surface cooling with pipeline milking, for the percentage of bulk operators using this system of milking before adoption of a tank was nearly double that of non-bulk operators. Or it may be connected with the marginal advantage of in-churn over surface cooling systems as regards hygiene and labour use; those already using the superior techniques may have been less inclined to install bulk tanks.

The failure to establish an association between particular attributes and the act of adoption may be as interesting and informative as the establishment of an association. Two cases in point were provided by the present analysis. Because the change to bulk collection usually involves capital expenditure on alterations to buildings or roads, it might be expected that owner-occupiers would be more likely to adopt the technique than tenants. This was not the case. Similarly, in view of the greater economic efficiency achieved by the maintenance of an even tank fillage, it might be thought that adopters would tend to have a less markedly seasonal production of milk than non-adopters. In the event, there was no significant difference between the seasonality of calving practised by non-adopters and that practised by adopters either before, or, perhaps more surprisingly, after, installing tanks.

Whether disagreement with the purchasing dairy as to the correct gallonage of milk sales and complaint over the receipt of dirty churns are attributes more properly pertaining to the farm, to the farmer or to the dairy are matters for argument which will not be pursued here. The frequency with which both these attributes were recorded by farmers was significantly associated with the act of adoption. Bulk operators, referring to their experience before installing tanks, complained more often than non-bulk operators about the frequency with which they received dirty churns and short measure from their dairies.

It may be that bulk operators were less fortunate than non-bulk operators regarding the dairies with which they dealt. It may be that the former, as a group, tended to be the more particular on these matters or the more vociferous complainants. All bulk operators were referring to their experience of at least a year previously, in most cases, to a period several years before, whereas the opinion of non-adopters was probably coloured by recent experience. The general standard of dairies may have improved over the interval. The fact that 'early' adopters complained more frequently about these matters than did the 'late' adopters may be thought to support this view.

The capital standing and creditworthiness of respondents received little attention in the investigation although it is believed that these were factors of great relevance to the question at issue. They were neglected because of the difficulty involved in the collection of accurate data. It was considered that this was impossible to achieve by means of a postal questionnaire. However, bulk operators were asked to state the methods which they used to finance the installation of a tank and non-bulk operators were asked how they thought they would do so should they decide to adopt the technique in the future. The answers of the two groups differed significantly. Bulk operators had more frequently transferred the capital from funds already owned. The majority of non-bulk operators expressed the belief that they would borrow capital. Although not conclusive, these answers suggest that adopters possessed a greater capital potential than non-adopters.

Farmer Attributes

The following personal attributes of farmers were found to be significantly associated with the act of adoption.

- | | | |
|----|--------------------------------------------------------------------|------------------------------------------------|
| 1. | Degree of interest in dairying. |) |
| 2. | Membership of an N.F.U. committee or occupation of similar office. |) Significant at the 0.1% level of probability |
| 3. | Opinion as to the suitability of farm for dairying. |) Significant at the 0.5% level of probability |
| 4. | Type of agricultural training. | Significant at the 2.5% level of probability |

Tests of the attributes listed below failed to show a significant association.

1. Age at date of enquiry.
2. Age at completion of academic education.
3. Descendence from farming family.
4. Possession of son helping on farm or expected to help in future.
5. Opinion as to degree of importance of adoption of latest techniques and equipment.
6. Opinion as to whether farmers who adopt latest techniques are better thought of by farming community.
7. Opinion as to number of farmers in district more up to date in dairying practices than himself.

There was a tendency among farmers cooperating in the pilot surveys to assume that interviewers regarded the adoption of bulk milk collection as being, of itself, a meritorious act. Whilst excessive importance should not be placed on this tendency, which was obvious in only a small number of cases, one must consider the possibility that the answers of non-adopters to certain questions in the postal enquiries were conditioned by a desire to justify their non-action.

One such question concerned the farmer's opinion of the suitability of his farm for dairying. Because this was a subjective estimate it has been classed as indicative of a farmer attribute rather than of a farm characteristic. Few farmers in either group considered their farms to be 'not very suitable' for dairying although the percentage of non-adopters giving this answer was greater than that of adopters. The significant difference between the two groups was in the relative assessment of their farms as 'very suitable' or 'fairly suitable', bulk operators more frequently recording their opinions as 'very suitable'.

Readers may interpret this result in three ways; that the farms of bulk operators were, probably on technical criteria, generally more suitable for dairying; that bulk operators more often believed their farms to be very suitable for dairying whether or not they would be considered so on objective assessment; that non-bulk operators felt that by characterising their farms as less than ideal for dairying they would help to justify their decision not to install a tank. The writer is inclined to give most weight to the second interpretation.

It could be argued that an element of self justification was also present in the answers of non-adopters to a question concerning their interest in dairying, although this is thought to be less likely. Non-bulk operators were almost equally divided in numbers as regards those claiming to be 'very interested' and those stating that they were 'fairly interested' whereas among bulk operators the 'very

interested' were almost three times the number of the 'fairly interested'. A significant association existed between the farmer's interest in dairying and his estimate of the suitability of his farm for dairying. The reader must form his own opinion as to whether a causal relationship existed between these two factors and, if so, in which direction.

If some non-adopters suffered a 'guilt' complex as a result of their decision and some adopters experienced a sense of self-righteousness, a pertinent question is, in relation to what normative value, or values, were these feelings engendered? Because of the seeming impossibility of delineating the 'guilty' and the 'righteous', the answer could not be sought directly. However, two questions put to farmers by fieldworkers during the pilot surveys, but not included in the postal questionnaires, are thought to be of some relevance. These questions were intended to throw light on the farmer's opinion of himself as compared with his opinion of other farmers regarding the quality of being 'up-to-date'.

Bulk and non-bulk operators were asked if there were any farmers in the district whom they considered to be more progressive and 'up-to-date' in dairying practices than themselves and invited to reply in terms of 'none', 'one or two', 'several' or 'many'. No significant difference was found between the answers of the two groups but some importance is placed on the fact that more than half of each group replied that no other farmer, or only 'one or two' other farmers were more 'up-to-date' than themselves. The writer is unable to believe that this represented the actual situation. To do so would be to accept that sample members were generally the more progressive farmers in their districts. Examination of their dairy practices, which were recorded in some detail, does not suggest that the sample was biased in this way. It might be concluded that farmers were sensitive regarding their status in the hierarchy of 'up-to-dateness' and that they were reluctant to admit to the interviewer, and perhaps, to themselves, any inferiority in this respect. Further evidence to support this view is the denial by many non-bulk operators that possession of a bulk tank constituted progressiveness or 'up-to-dateness'. This denial is implicit in the answers of many non-adopters who considered themselves second to none in progressiveness for most of them must have had bulk operators in their districts.

Answers to a second question concerning the value placed on 'up-to-dateness' do not, however, appear to support the interpretation suggested above. Sample members were asked if they thought that a farmer who habitually adopted the latest techniques was likely to be better thought of by the farming community than one who was not so 'up-to-date'. Much larger proportions of the sample than usual were undecided about the answer. Of those who gave an opinion, the majority stated that more 'up-to-date' farmers were not likely to be better thought of. There was no significant difference between the answers of bulk and non-bulk operators.

If farmers were sensitive regarding their rating as 'progressive', one would expect the emphasis of answers to have been the reverse of that obtained. Readers who are, nevertheless, reluctant to abandon the idea of a farming community hungry for technological status may like to consider that non-adopters who had just claimed to be among the 'up-to-date' were too modest to suggest that for this reason they were well thought of by their neighbours. Alternatively, one might conjecture that farmers valued 'progressiveness' for its own sake or for reasons other than because it raised their standing among colleagues. The writer is not completely satisfied that farmers interpreted the question in the manner intended. There is some reason for suspecting that the inclusion of the word 'habitually' caused some sample members to think in terms of farmers who rushed to adopt new techniques without regard to their merits. One can imagine that the farming communities opinion of such 'addicts' would not be high.

Status of a different sort may also be involved in a question which referred to the membership of a committee of the National Farmers Union or the holding of a similar office of public or semi-public responsibility. The purpose of the question was to determine whether farmers who undertook such responsibilities were the more likely to adopt bulk collection. This proved to be the case. Fifty-three percent of bulk operators were members of committees or of local government councils compared with 33% of non-bulk operators.

Many hypotheses may be advanced as to the reasons for this relationship. Are leading members of the N.F.U. under pressure, self imposed or otherwise, to set an example to other members in technological progress? Is a desire for status the driving force behind both actions? Are N.F.U. committee members perhaps better informed than the rank and file regarding new ideas? A less subtle explanation seems to the writer to be the more probable. Possession of a large farm generally permits the farmer to devote more time to extra-farm activities; large farms generally have large dairy herds and large dairy herds facilitate the operation of bulk collection.

Other farmer attributes investigated during the study were, perhaps, more mundane although not less relevant. There was no significant difference in the age distribution of bulk operators and non-bulk operators nor in the age at which they finished their academic education (excluding specialised education in agriculture). However, a difference at the 2.5% level of significance was established between the two groups in the type of agricultural training which they had undergone. Bulk operators had more frequently received academic instruction in agriculture at a university, agricultural college or farm institute than had non-bulk operators. Conversely, the latter had more frequently received all their training on the farm. In both groups, however, the great majority of farmers had received only practical training.

Differences which were examined in family history did not prove significant. Farmers were asked whether, or not, they came from a farming family. The hypothesis in mind was that those who had established themselves in farming would be the more prone to adopt technical innovations. In the event, this assumption proved to be unfounded, 87% of non-bulk operators and 86% of bulk operators coming from farming families.

The circumstance of whether, or not, the farmer had children to succeed him in the farm was also found to be unrelated to the decision which he had taken regarding bulk collection. Anticipating that direct questions concerning succession - an event to be hopefully relegated to the distant future - would attract a high proportion of 'don't know' answers, farmers were asked only if they had children who helped them on the farm or whom they hoped would help in the future. Sixty-one percent of bulk operators and sixty-five percent of non-bulk operators replied affirmatively.

Sources of Information

Significant association between the act of adoption and the ways in which farmers acquired information about the bulk milk collection scheme were established in the following cases.

1. Initiation of action to find out more about bulk collection after first hearing of the scheme.) Significant at the 0.1% level of probability.
2. Frequency of seeking advise from commercial firms.) Significant at the 1.0% level of probability.

- | | | | |
|----|------------------------------------------------------------------------|---|-----------------------------------------------|
| 3. | Method of first hearing about the scheme. |) | Significant at the 2.5% |
| 4. | Frequency of adoption of new practices first learnt about in journals. |) | level of probability. |
| 5. | Frequency of requests for advice received from other farmers. |) | Significant at the 5.0% level of probability. |

Differences between bulk and non-bulk operators in their respective distributions of the attributes listed below were not significant.

1. Date at which first heard of a scheme for bulk milk collection.
2. Frequency of approach by someone offering further information, after first hearing of scheme.
3. Frequency of acquisition of further information, without taking positive steps to find out more or being approached, after first hearing of scheme.
4. Frequency of attendance at agricultural shows.
5. Frequency of attendance at farm walks.
6. Frequency of attendance at discussion group.
7. Frequency of adoption of new practices first heard of at agricultural shows, farm walks or discussion groups.
8. Frequency of requesting advice from other farmers.

There was a significant difference (at the 0.1% level) between adopters and non-adopters in the numbers of farmers who were able to remember the year in which they first heard about the existence of a scheme for bulk milk collection. Bulk operators had rather better memories of the event than had non-bulk operators, the percentage of those who could remember being 60% and 38% respectively. There was no significant difference between these 'better memoried' farmers in the date of first hearing about the scheme.

A much larger proportion of each group was able to recall how it first heard of the existence of the scheme. Eighty-four percent of bulk operators and 86% of non-bulk operators claimed to remember that they first learnt of the scheme by reading or being told about it and there was a significant difference between the two groups in their methods of acquiring information. Bulk operators were more often told about the scheme than were non-bulk operators. Representatives of the Milk Marketing Board were by far the most frequent source of verbal information. They were followed by other farmers, representatives of purchasing dairies and representatives of firms marketing equipment, in that order. Sources of written information were most commonly recorded as 'farming journals'. Of journals specified by name, the M.M.B.'s 'Milk Producer' was most often mentioned. It is of interest that, of those farmers who first learnt of the scheme by word of mouth, no significant difference was established between adopters and non-adopters as to their type of informant. Likewise, there was no significant difference in the type of publication mentioned by either group as its first source of written information.

After investigating the ways in which farmers first came to hear about bulk collection, attention was directed to the manner in which further information was acquired. Farmers were asked whether, or not, they had themselves taken positive steps to find out more; whether, or not, they had been approached by someone offering further information and whether, or not, they had acquired more knowledge without, or in addition to, making their own enquiries or being specifically approached.

Nearly all bulk operators stated that they had themselves taken action to find out more about the technique. In this respect they differed significantly from non-bulk operators of whom less than half had done so. The initiative of adopters most often consisted of asking the advice of farmers already operating bulk collection and of studying the technique in operation, either at farm demonstrations or at agricultural shows. Non-adopters who sought further advice most frequently consulted manufacturers of the equipment.

There was no significant difference between the two groups as regards the other methods of acquiring further knowledge. Fifty-seven percent of bulk operators and 62% of non-bulk operators considered that they had learnt more without making a positive effort to do so or without being specifically approached. Conversation with other farmers and farming journals were commonly mentioned in this connection. Smaller percentages of each group reported that they had been approached by individuals offering further information, most commonly by M.M.B. representatives.

Further questions regarding potential sources of information were not specifically concerned with bulk milk collection. No significant difference was established between adopters and non-adopters as regards the frequency of their attendance at agricultural shows, farm walks or discussion groups nor in the extent to which they claimed to have adopted new practices or equipment first heard about during these activities.

Significant differences were found, however, in the extent to which the two groups sought the advice of commercial firms and in the frequency with which they claimed to have adopted new practices or equipment first heard about in the farming press. Bulk operators were the more apt to seek advice and to make practical use of ideas gleaned from journals. The latter association is particularly interesting in that it suggests the possibility that bulk operators formed a generally more 'adoption-prone' group.

The communication of ideas and information from farmer to farmer was the subject of two questions which were intended to determine the relative extent to which adopters and non-adopters were 'information givers' or 'information takers'. Bulk operators were found more frequently than non-bulk operators both to ask for advice from their neighbours and to be asked by them for advice. The difference between the two groups was relatively greater as regards the latter characteristic which was associated with adoption at the 5.0% level of probability. The writer is not satisfied that more can be read into this result than that bulk operators comprised the more loquacious group - more ready to talk over with neighbours their common problems.

Decision Experience

Two questions which were put to farmers during the investigation related to the processes of mental activity which were involved in reaching a decision.

Firstly, farmers were asked to indicate the degree of interest which they experienced in the bulk collection scheme when they first heard of its existence. Bulk operators were considerably more interested than were non-bulk operators. The difference between the two groups was significant at the 0.1% level of probability.

Secondly, farmers were asked which of the following alternative statements most closely reflected their own experience when they first heard about the scheme. They were asked to read all of the statements before selecting the most appropriate one. The words in parenthesis indicate the difference in questions put to non-bulk operators.

- a) I realised straight away that it was just the thing (not suitable) for my farm.
- b) I could not make up my mind whether to go in for it or not but, having thought it over, I decided that it was suitable (not suitable) for my farm.
- c) I did not learn enough about it to be able to make up my mind one way or another and I decided to find out more about it.
- d) I did not learn enough about it to be able to make up my mind one way or another and I decided to wait and see how things developed.

These statements represent different 'knowledge situations' as defined by Johnson and Laird*. Statement (a) indicates a situation of 'subjective certainty' in which the farmer considers his present knowledge adequate to make a decision. Statement (b) represents a situation of 'risk action' which is defined as "a situation in which a manager regards present knowledge as adequate for making a decision and in which the cost of additional knowledge is exactly equal to its value". In restricting farmers choice to one of four alternative statements, it may be that some farmers in a situation more correctly regarded as one of 'forced action' have opted for this statement. 'Forced action' is "a situation in which a manager's information is inadequate for him to be ready, willing and able to make a decision subject to the errors involved but in which some outside force makes it necessary for him to act". Statement (c) represents a situation of 'learning' in which "present knowledge is considered inadequate to make a decision and in which the cost of acquiring more knowledge is less than its value". Statement (d) represents a situation similar to that of (c) except that the cost of acquiring more knowledge is greater than its value. It is termed a situation of 'inaction'.

No significant difference was established between bulk operators and non-bulk operators in the frequency with which their first reactions to the scheme were represented by statement (b) ('risk action') or by statement (c) ('learning'). Slightly over one-third of each sample reported their experience as having been one or other of these situations. Marked differences, significant at the 0.1% level of probability, were found, however, in the frequency with which statement (a) ('subjective certainty') and statement (d) ('inaction') were indicated. A situation of 'subjective certainty' was reported by 47% of bulk operators and 20% of non-bulk operators. A situation of 'inaction' was reported by 16% of the former and 42% of the latter.

Because the question emphasised that farmers' experiences on first hearing about bulk milk collection were required, and because the statement included the qualification 'straightaway', it is considered that statement (a) cannot have been interpreted as representing other than the immediate reaction of the respondents to their first news of the scheme. It is of interest and, perhaps, of some surprise, that nearly half the sample of bulk operators experienced an immediate reaction of 'subjective certainty' in favour of adoption. On objective assessment, the problem to be solved must often have been one of some complexity. This result suggests, therefore, that an element of 'impulse buying' may have been associated with the adoption of the technique.

It may not be thought surprising that statement (a) (a situation of 'inaction') was more frequently reported by non-adopters than by adopters. In this situation no process of choice occurs. The process will only be activated if change takes place within the individual or his present environment or in his expectation of future environment should no action be taken.

*A Study of Managerial Processes of Midwestern Farmers' G.L. Johnson and others. Iowa State University Press.

Some attention was given in the investigation to the occurrence of change in present environment. Both adopters and non-adopters were asked if, since first hearing about the technique, any change had taken place in their farm circumstances which had affected their attitude to the scheme. Thirty percent of bulk operators and 21% of non-bulk operators replied affirmatively. Whilst this difference was not significant, a difference between the groups in the direction of changes was significant at the 0.1% level of probability. In the case of bulk operators every change in farm circumstance which was mentioned generated a more favourable attitude to the scheme. Non-bulk operators experienced a relatively higher proportion of unfavourable changes, yet, even in this group, favourable changes outnumbered unfavourable ones in the proportion of two to one. The types of change most frequently mentioned were the easing or removal of physical restrictions on the installation of tanks and increasing difficulties in obtaining, holding or paying farm labour.

Decision Experience of Non-bulk Operators

Although not immediately relevant to a comparison of bulk with non-bulk operators, it was thought desirable to establish the stage in the decision process which had been reached by non-adopters at the date of the investigation. It is recalled that the reactions of this group on first hearing of the existence of a bulk collection scheme were recorded as follows: negative decision reached straightaway, 20%; negative decision reached after thought, 24%; decision not reached, 52%. Of the latter, approximately one-quarter were still attempting to arrive at a decision, the remainder were in a situation of 'inaction'.

At the date of the investigation, the proportion of non-adopters who claimed not to have reached a decision had fallen to 31%. As previously, one-quarter of this group indicated that they were in a situation of 'learning', three-quarters were in a situation of 'inaction'.

Of the 142 farmers who stated that they had definitely come to a decision, 129 had decided not to adopt bulk collection and 13, i.e. 6.3% of the sample, had decided to adopt the system at a future date. Some of the latter group had already initiated action to put their decision into effect.

It will be appreciated that in the case of farmers who had not taken action, whether they had made no decision or whether their decision had been positive or negative, a change in objectives, that is, as a result of stimuli from within the individual, or a change in environment, could re-activate the process of choice and might result in action different from that currently contemplated. Of the 129 farmers who had decided not to adopt bulk milk collection, 66% stated that they would probably do so if their circumstances changed. That they had little doubt, however, that in their present situation they had made a right decision is indicated by answers to a question put to the pilot sample only. Asked how they felt at the time they made their decision not to adopt the system, 94% of respondents stated that they felt absolutely certain that they were making the correct decision. Of the 6% who were not absolutely certain, half stated that they were not disturbed about the risks of being wrong and half indicated that they were disturbed at these risks but that outside circumstances forced them to make up their mind at that time. These three types of experience corresponds to knowledge situations which have been previously defined, being, respectively, situations of 'subjective certainty', 'risk action' and 'forced action'.

CONCLUSION

The correctness of the theoretical assumption that farmers' actions are conditioned by their environment and their subjective values may be thought to have been demonstrated by the study. It has been shown that the act of adoption of bulk milk collection was significantly associated with the possession by the farmer of certain attributes, relating to his farm, his person, his sources of information and his decision experience. It cannot be supposed that every attribute which had a bearing on the process of choice has been recognised, nor has the relative importance of attributes in this function been determined. Even so, the enquiry has served to differentiate, quite sharply, the respective images of the adopter and non-adopter.

Some space has been devoted to discussion of the causes of relationships and it may be argued that any conclusions reached on this subject are only speculative. It might also be charged that the study raises more questions than it answers. The writer accepts these arguments and considers that they demonstrate the need for further research in this field. Readers will appreciate, however, that although it is natural to seek the reasons for the existence of a particular association, lack of such understanding does not vitiate the use of a relationship as a tool of economic analysis. To be useful in this function it is sufficient to know that an association exists, not why it exists.

Some readers will doubtless query the usefulness of an enquiry of this nature. As an exercise in market research, its practical value is obvious. The bulk tank salesman would be well advised to concentrate his attention on those farmers who are most enthusiastic about dairying and the milk producing potential of their farms, who have large dairy herds and who are members of an N.F.U. Committee. If he can find such a farmer who is also in frequent disagreement with his dairy over the quantity of milk sales and the receipt of dirty churns, so much the better - a sale is virtually assured.

It has been said in the introduction, however, and is repeated here, that the potential value of studies which develop a better understanding of the behaviour of farmers is greatest in the field of supply forecasting. The work under discussion contributes only a small fraction of that which is needed if this field is to be adequately developed. Its practical use will be severely restricted in the absence of methodological research into the incorporation of behavioural characteristics in an analytical framework.

Although the study relates specifically to the adoption of bulk milk collection it was undertaken in the belief that the information it yielded would have a wider application. Some relationships obviously apply only to the particular problem investigated, others, of a more fundamental character, seems likely to be applicable in other contexts. Once again, further research is needed to establish whether, or not, this is so, although one pointer to the likelihood that the adopters of bulk collection form an adoption-prone group has been mentioned.

APPENDIX I

Tables

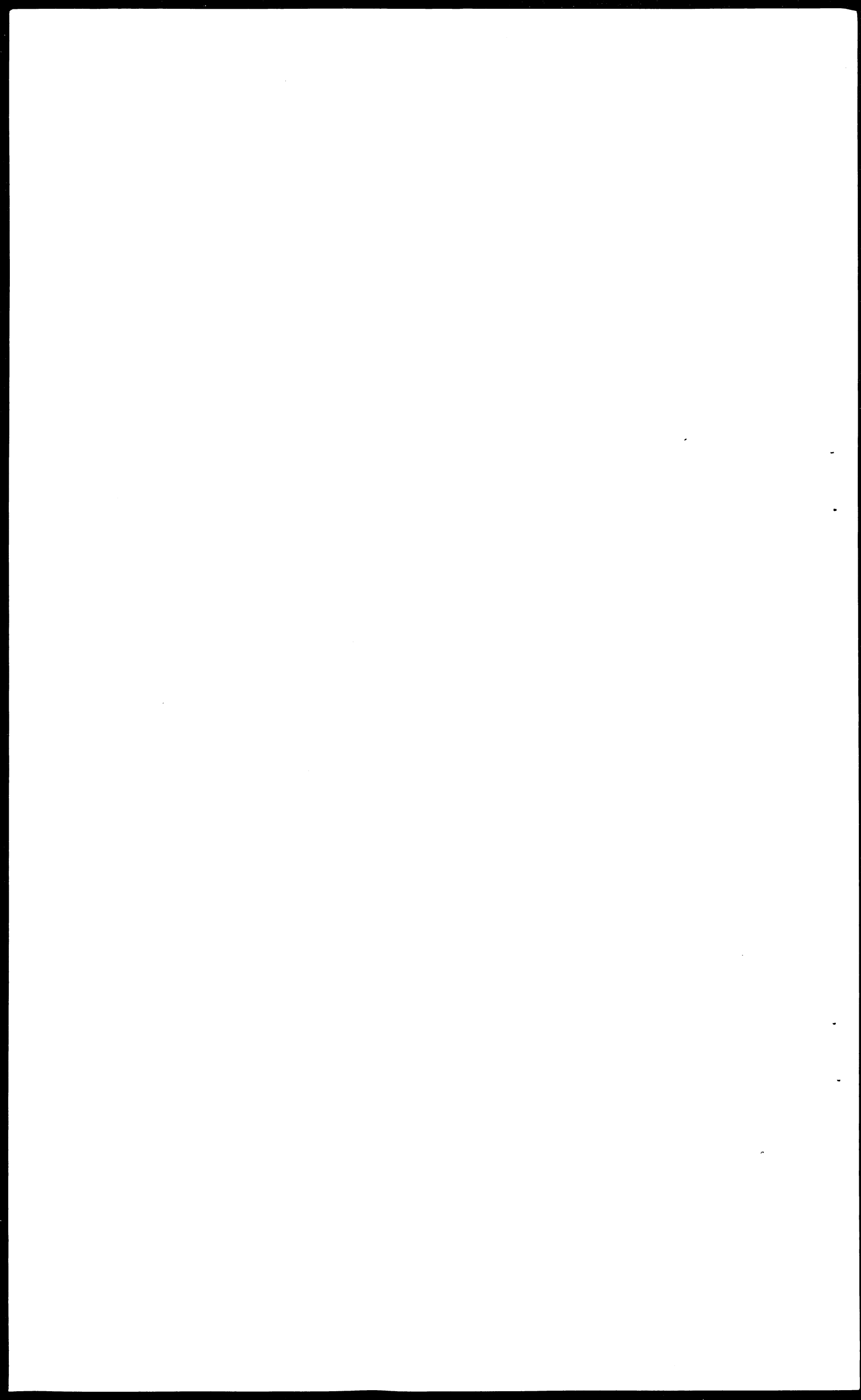


Table 1. Distribution of Adopters of Bulk Collection According to County and Size of Tank. August 1963.

Size of tank	County					All Counties
	Gloucestershire	Herefordshire	Worcestershire	Shropshire	Staffordshire	
gall.	no.	no.	no.	no.	no.	no.
80	-	-	-	4	1	5
110	-	1	1	1	1	4
125	4	2	10	12	9	37
150	4	6	5	6	8	29
175	2	4	17	34	33	90
200	5	1	11	13	18	48
250	6	-	9	39	28	82
300	1	-	6	20	23	50
350	3	1	3	11	5	23
400	1	-	1	10	13	25
500	-	-	-	1	-	1
Total	26	15	63	151	139	394

Table 2. Distribution of Adopters of Bulk Collection According to County and Date of Adoption

County	Date of Adoption	
	Before 1.7.62	After 1.7.62
	no.	no.
Gloucestershire	9	17
Herefordshire	-	15
Worcestershire	47	16
Shropshire	104	47
Staffordshire	94	45
Total	254	140

Tables 3a and 3b

Sample Sizes and Response of Farmers not Adopting Bulk Collection

3a. Information obtained by personal interview

	Number	Percent
Farmers interviewed	115	100.0
Questionnaires a) fully completed	64	55.7
b) partially completed	3	2.6
c) not completed i) refusals	25	21.7
ii) other reasons	23	20.0

3b Information obtained by postal enquiry

	Gloucestershire		Herefordshire		Worcestershire		Shropshire		Staffordshire		Total	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Farmers circulated	23	100.0	33	100.0	49	100.0	199	100.0	161	100.0	465	100.0
Questionnaires returned												
a) fully completed	13	56.5	16	48.5	25	51.0	90	45.2	62	38.5	206	44.3
b) partially completed	-	-	-	-	-	-	3	1.5	4	2.5	7	1.5
c) not completed i) refusals	-	-	-	-	-	-	-	-	1	0.6	1	0.2
ii) other reasons	2	8.7	4	12.1	7	14.3	26	13.1	9	5.6	48	10.3
Total Questionnaires Returned	15	65.2	20	60.6	32	65.3	119	59.8	76	47.2	262	56.3
Total Questionnaires Not Returned	8	34.8	13	39.4	17	34.7	80	40.2	85	52.8	203	43.7

Tables 4a and 4b

Sample Sizes and Response of Farmers Adopting Bulk Collection.
Information obtained by personal interview

4a Tanks installed before 1.7.62.

	Number	Percent
Farmers interviewed	30	100.0
Questionnaires a) fully completed	25	83.3
b) partially completed	-	-
c) not completed i) refusals	5	16.7
ii) other reasons	-	-

4b Tanks installed after 1.7.62

	Number	Percent
Farmers interviewed	17	100.0
Questionnaires a) fully completed	15	88.2
b) partially completed	-	-
c) not completed i) refusals	2	11.8
ii) other reasons	-	-

Sample Sizes and Response of Farmers Adopting Bulk Collection.
Information obtained by postal enquiry

4c Tanks installed before 1.7.62

	Gloucestershire		Herefordshire		Worcestershire		Shropshire		Staffordshire		Total	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Farmers circulated	7	100.0	-	-	34	100.0	39	100.0	37	100.0	117	100.0
Questionnaires returned												
a) fully completed	6	85.7	-	-	24	70.6	25	64.1	28	75.7	83	70.9
b) partially completed	-	-	-	-	1	3.0	-	-	1	2.7	2	1.7
c) not completed	-	-	-	-	-	-	-	-	-	-	-	-
i) refusals	-	-	-	-	-	-	-	-	-	-	-	-
ii) other reasons	-	-	-	-	3	8.8	3	7.7	1	2.7	7	6.0
Total Questionnaires Returned	6	85.7	-	-	28	82.4	28	71.8	30	81.1	92	78.6
Total Questionnaires Not Returned	1	14.3	-	-	6	17.6	11	28.2	7	18.9	25	21.4

4d Tanks installed after 1.7.62

	Gloucestershire		Herefordshire		Worcestershire		Shropshire		Staffordshire		Total	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Farmers circulated	13	100.0	15	100.0	13	100.0	30	100.0	35	100.0	106	100.0
Questionnaires returned												
a) fully completed	12	92.3	14	93.3	10	76.9	22	73.3	24	68.6	82	77.4
b) partially completed	1	7.7	-	-	1	7.7	1	3.4	-	-	3	2.8
c) not completed	-	-	-	-	-	-	-	-	-	-	-	-
i) refusals	-	-	-	-	-	-	-	-	-	-	-	-
ii) other reasons	-	-	-	-	-	-	-	-	1	2.8	1	0.9
Total Questionnaires Returned	13	100.0	14	93.3	11	84.6	23	76.7	25	71.4	86	81.1
Total Questionnaires Not Returned	-	-	1	6.7	2	15.4	7	23.3	10	28.6	20	18.9

Table 5

Frequency of Mention of Incentives to the Adoption of Bulk Milk Collection

Incentive	Bulk operators						Non-bulk operators	
	Mention of particular importance		Mention of other importance		All mentions		All mentions	
	no.	%	no.	%	no.	%	no.	%
<u>A. Profit</u>								
1. Increases profitability of milk production	10	5.2	17	10.2	27	7.5	2	1.0
<u>B. Labour</u>								
1. Saves labour	69	35.8	37	22.1	106	29.4	86	42.2
2. Eases heavy work of churn handling	19	9.8	14	8.4	33	9.2	30	14.7
3. Simplifies dairy routine	6	3.1	6	3.6	12	3.3	5	2.5
4. Increases ability to retain/obtain labour	1	0.5	2	1.2	3	0.8	5	2.5
<u>C. Milk Quality</u>								
1. Improves keeping quality/cleanliness/rate of cooling	39	20.2	39	23.3	78	21.7	37	18.0
2. Eliminates receipt of dirty churns	2	1.0	4	2.4	6	1.7	-	-
<u>D. Resource Use (excluding labour)</u>								
1. Requires less water	5	2.6	5	3.0	10	2.8	7	3.4
<u>E. Relations with Purchasing Dairy</u>								
1. Measurement carried out on farm	18	9.3	15	9.0	33	9.2	18	8.8
2. Sampling carried out on farm	1	0.5	9	5.4	10	2.8	4	2.0
3. Enables change of dairy	1	0.5	-	-	1	0.3	-	-
<u>F. Enterprise Organisation</u>								
1. Facilitates/fits in with other changes	11	5.7	10	6.0	21	5.8	1	0.5
<u>G. Inevitability</u>								
1. Only method in future/better change sooner than later	3	1.6	4	2.4	7	1.9	-	-
<u>H. Other</u>	8	4.2	5	3.0	13	3.6	9	4.4
Total	193	100.0	167	100.0	360	100.0	204	100.0

Table 6

Frequency of Mention of Disincentives to the Adoption of Bulk Milk Collection

Disincentives	Bulk operators		Non-bulk operators					
	All mentions		All mentions		Mention of particular importance		Mention of other importance	
	no.	%	no.	%	no.	%	no.	%
<u>A. Profit</u>								
1. Profitability not satisfactory	11	12.9	24	11.8	3	2.6	21	23.6
2. Capital better employed in other uses	-	-	2	1.0	-	-	2	2.2
<u>B. Capital</u>								
1. Capital outlay too high	18	21.1	35	17.3	13	11.4	22	24.8
2. Capital difficult to raise	-	-	3	1.5	1	0.9	2	2.2
<u>C. Uncertainty regarding the future</u>								
1. Future farm policy/tenancy/ownership uncertain	-	-	19	9.4	11	9.6	8	9.0
2. Commits to dairying for long term	1	1.2	1	0.5	1	0.9	-	-
3. Limits future herd expansion	1	1.2	3	1.5	2	1.8	1	1.1
4. Other	-	-	2	1.0	1	0.9	1	1.1
<u>D. Unsuitability of physical farm characteristics</u>								
1. Buildings not suitable as regards construction/layout	1	1.2	36	17.7	34	29.8	2	2.2
2. Farm road not suitable for tanker	10	11.7	25	12.3	25	21.9	-	-
3. Herd size too small	-	-	11	5.4	7	6.1	4	4.5
4. Other	-	-	9	4.4	6	5.3	3	3.4
<u>E. Unsuitability of farm location</u>								
1. Farm situation makes collection uncertain in winter	18	21.1	7	3.4	3	2.6	4	4.5
<u>F. Promotion of managerial inefficiency</u>								
1. Difficult to achieve satisfactory labour routine	3	3.5	2	1.0	-	-	2	2.2
2. Difficult to record individual cow yields	3	3.5	2	1.0	1	0.9	1	1.1
<u>G. Technical/Operational disadvantages</u>								
1. Breakdown/contamination may spoil whole contents of tank	8	9.4	7	3.4	-	-	7	7.9
2. Difficult to clean tank	2	2.4	-	-	-	-	-	-
3. Difficult to extract milk for farmhouse	2	2.4	-	-	-	-	-	-
4. Measurement of milk may be inaccurate	1	1.2	-	-	-	-	-	-
5. Sampling of milk may be inaccurate	2	2.4	-	-	-	-	-	-
<u>H. Sense of injustice</u>								
1. Bulk operator not receiving fair share of cost saving to industry	1	1.2	5	2.5	-	-	5	5.7
2. Bulk operator subsidised by churn operator	1	1.2	-	-	-	-	-	-
<u>I. Other</u>								
	2	2.4	10	4.9	6	5.3	4	4.5
Total	85	100.0	203	100.0	114	100.0	89	100.0

Table 7

General Attitude to Bulk Milk Collection

Opinion of system	Bulk Operators		Non-Bulk Operators		All Operators	
	no.	%	no.	%	no.	%
Wholly advantageous	82	49.7	41	19.9	123	33.2
Partly advantageous, partly disadvantageous	67	40.6	87	42.2	154	41.5
Wholly disadvantageous	2	1.2	40	19.4	42	11.3
Neither advantageous nor disadvantageous	14	8.5	36	17.5	50	13.5
Question not answered	-	-	2	1.0	2	0.5
	165	100.0	206	100.0	371	100.0

Table 8

Mention of Incentive Combinations

	Incentive group*					
	B	BC	BCE	C	BE	Other
	no.	no.	no.	no.	no.	no.
Bulk operators	23	27	14	6	7	72
Non-bulk operators	66	18	5	8	5	26

*Refer to table 5

Table 9

Mention of Disincentive Combinations

	Disincentive Group*					
	D	B	A	E	C	Other
	no.	no.	no.	no.	no.	no.
Bulk operators	8	12	7	14	2	26
Non-bulk operators	38	16	11	1	7	54

*Refer to table 6

Table 10 Number and Percentage of Farmers Mentioning Incentives
to Bulk Milk Collection according to Type of Incentive

Incentive type	Bulk operators		Non-bulk operators	
	No.	% of total	No.	% of total
A. Profit	26	17.4	2	1.6
B. Labour	115	77.2	101	78.9
C. Milk Quality	80	53.7	37	28.9
D. Resource Use (excl. labour)	10	6.7	7	5.5
E. Relations with purchasing dairy	37	24.8	18	14.1
F. Enterprise Organisation	21	14.1	1	0.8
G. Inevitability (of change)	7	4.7	-	-
H. Other	12	8.1	9	7.0

Table 11 Number and Percentage of Farmers Mentioning Disincentives
to Bulk Milk Collection according to Type of Disincentive

Disincentive type	Bulk operators		Non-bulk operators	
	No.	% of total	No.	% of total
A. Profit	11	15.9	26	20.5
B. Capital	18	26.1	37	29.1
C. Uncertainty regarding the future	2	2.9	23	18.1
D. Unsuitability of physical farm characteristics	11	15.9	70	55.1
E. Unsuitability of farm location	18	26.1	7	5.5
F. Promotion of managerial inefficiency	6	8.7	4	3.1
G. Technical/operational disadvantages	14	20.3	7	5.5
H. Sense of injustice	2	2.9	5	3.9
I. Other	1	1.4	9	7.1

Notes on tables 12 to 72

These tables relate to the section of the report entitled 'A Comparison of Adopters and Non-adopters'. Unless otherwise indicated, they refer only to postal samples. The total number of farmers concerned was 371 of which 165 were bulk operators and 206 non-bulk operators. The symbol n/a indicates the percentage of farmers who did not answer the particular question. This group has not been included in the chi square matrix. It should be emphasised that although the tables show percentage distributions, chi square values were derived from numerical distributions.

Percentage Distribution of Adopters and Non-adopters of Bulk Milk Collection according to various Farm Characteristics

Table 12 Total Farm Acreage

	50 & under	51-100	101-150	151-200	201-300	300 & over
	%	%	%	%	%	%
Bulk operators	0.6	7.3	12.7	18.2	29.1	32.1
Non-bulk operators	8.3	23.3	17.0	18.4	20.9	12.1

Table 13 Percentage of total farm acreage in grass

	50 & under	51-75	76 & over	n/a
	%	%	%	%
Bulk operators	24.9	43.0	31.5	0.6
Non-bulk operators	15.5	46.1	38.4	-

Table 14 Percentage of total farm acreage rented

	Nil	1-25	26-75	76-99	100	n/a
	%	%	%	%	%	%
Bulk operators	33.9	13.9	7.3	6.1	38.2	0.6
Non-bulk operators	30.1	12.6	9.2	5.4	42.7	-

Table 15 Number of dairy cows.

	25 & under	26-30	31-40	41-50	51 & over	n/a
	%	%	%	%	%	%
Bulk operators	-	3.0	7.3	14.5	74.6	0.6
Non-bulk operators	9.2	15.5	27.7	19.9	27.7	-

Table 16 Farm stocking (additional to dairy herd)

	Dairy replacements	Other cattle	Sheep	Pigs	Poultry
	%	%	%	%	%
Bulk operators	90.9	71.3	49.7	43.0	61.8
Non-bulk operators	88.3	75.2	51.5	48.5	68.9

Table 17 Combinations of farm stock (additional to dairy herd)
Combination code*

	A	B	C	D	E	F	G	H	I	J	K
	%	%	%	%	%	%	%	%	%	%	%
Bulk operators	15.2	10.9	9.7	9.7	9.1	7.3	6.7	3.7	2.4	2.4	22.9
Non-bulk operators	16.5	14.1	10.7	8.2	5.3	5.3	2.4	4.4	5.3	4.4	23.4

*Combination code A. Dairy replacements, Other cattle, Sheep, Pigs, Poultry

B.	"					"		"	-	"	
C.	"					"		-	"	"	
D.	"					"		-	-	"	
E.	"					"		"	-	-	
F.	"					"		-	-	-	
G.	"					-		-	-	-	
H.	"					"		-	"	-	
I.	"					-		-	-	"	
J.	"					"		"	"	-	

K. Other combinations.

Table 18 Change in size of milking herd

	Increase	Decrease	No change	n/a
	%	%	%	
<u>Bulk operators</u>				
a) before adoption	46.7	2.4	49.1	1.8
b) after adoption	57.6	0.6	41.8	-
<u>Non-bulk operators</u>				
1962-1964	36.4	7.8	55.8	-

Table 19 Calving practice

	Mainly Spring	Mainly Autumn	All year	n/a
	%	%	%	%
<u>Bulk operators</u>				
a) before adoption	7.9	43.6	46.7	1.8
b) after adoption	6.1	41.8	51.5	0.6
<u>Non-bulk operators</u>				
1964	7.3	38.3	54.4	-

Table 20 Method of housing dairy herd for sleeping

	Cowshed	Yard	Cubicles	Lying out	n/a
	%	%	%	%	%
Bulk operators*	66.1	30.3	-	2.4	1.2
Non-bulk operators	76.2	19.9	1.5	2.4	-

*before adoption

Table 21 Method of housing dairy herd for milking

	Cowshed	Parlour	Bail	n/a
	%	%	%	%
Bulk operators*	72.1	24.9	1.2	1.8
Non-bulk operators	81.6	16.5	1.9	-

*before adoption

Table 22 System of milking dairy herd

	Bucket	In-churn	Pipeline	Other	n/a
	%	%	%	%	%
Bulk operators*	66.1	13.9	17.6	-	2.4
Non-bulk operators	78.1	11.7	9.7	0.5	-

*before adoption

Table 23 System of cooling milk

	Surface	In-churn (water)	In-churn (ice-bank)	Other	n/a
	%	%	%	%	%
Bulk operators*	37.0	44.8	15.2	0.6	2.4
Non-bulk operators	21.8	63.1	13.6	1.5	-

*before adoption

Table 24 Combinations of dairy practice
Combination code*¹

	A	B	C	D	E	F	n/a
	%	%	%	%	%	%	%
Bulk operators* ²	29.2	22.4	6.8	6.8	6.8	25.5	2.5
Non-bulk operators	50.9	12.1	8.7	5.8	3.9	18.6	-

*¹Combination code

	Housing for Sleeping	Housing for Milking	Milking System	Cooling System
A.	Cowshed	Cowshed	Bucket	In-churn(water)
B.	Cowshed	Cowshed	Bucket	Surface
C.	Cowshed	Cowshed	Bucket	In-churn(ice-bank)
D.	Yard	Parlour	In-churn	In-churn(water)
E.	Yard	Parlour	Pipeline	Surface
F.	Other combinations			

*²before adoption

Table 25 Main farm enterprise

	Milk	Other	n/a
	%	%	%
Bulk operators	75.8	23.6	0.6
Non-bulk operators	76.2	23.3	0.5

Table 26 Frequency of receipt of dirty churns from dairy

	Often	Occasionally	Very infrequently	Never	n/a
	%	%	%	%	%
Bulk operators*	10.9	33.3	35.2	19.4	1.2
Non-bulk operators	2.4	15.5	36.9	44.7	0.5

*before adoption

Table 27 Frequency of disagreement with dairy regarding the correct gallonage of milk sales

	Often	Occasionally	Very infrequently	Never	n/a
	%	%	%	%	%
Bulk operators*	34.6	31.5	21.8	9.7	2.4
Non-bulk operators	18.0	45.6	23.8	11.2	1.4

*before adoption

Table 28 Frequency of rejection of milk by dairy*

	Occasionally	Very infrequently	Never	n/a
	%	%	%	%
Bulk operators	20.0	46.7	33.3	-
Non-bulk operators	10.9	43.8	43.7	1.6

*Pilot samples only

Table 29 Source of capital for purchase of bulk tank*

	Existing funds	Borrowed funds	n/a
	%	%	%
Bulk operators	55.2	44.8	-
Non-bulk operators	34.5	55.3	10.2

*Non-bulk operators: expected source if tank purchased.

Percentage Distribution of Adopters and Non-adopters of
Bulk Milk Collection according to various Personal Attributes

Table 30 Age (at date of investigation)

	30 & under	31-40	41-50	51-60	61 & over	n/a
	%	%	%	%	%	%
Bulk operators	4.3	32.7	31.5	21.8	8.5	1.2
Non-bulk operators	5.8	23.3	33.5	20.9	14.6	1.9

Table 31 Age at completion of academic education
(excluding specialised education in agriculture)

	14 or under	15-18	19 or over	n/a
	%	%	%	%
Bulk operators	34.0	53.9	9.7	2.4
Non-bulk operators	43.7	49.0	6.3	1.0

Table 32 Type of agricultural training

	Farm only	Institute, college, university	n/a
	%	%	%
Bulk operators	73.9	24.9	1.2
Non-bulk operators	84.5	15.5	-

Table 33 Descendance from farming family

	Yes	No	n/a
	%	%	%
Bulk operators	85.5	14.5	-
Non-bulk operators	86.9	12.6	0.5

Table 34 Possession of son helping on farm or expected to help in future

	Yes	No.	n/a
	%	%	%
Bulk operators	60.6	38.8	0.6
Non-bulk operators	64.6	34.0	1.4

Table 35 Membership of N.F.U. Committee or occupation of similar semi-public or public office

	Yes	No.	n/a
	%	%	%
Bulk operators	53.3	46.1	0.6
Non-bulk operators	33.5	65.0	1.5

Table 36 Degree of interest in dairying

	Very interested	Fairly interested	Slightly interested	Not interested	n/a
	%	%	%	%	%
Bulk operators	70.3	24.9	3.0	0.6	1.2
Non-bulk operators	48.6	45.6	2.4	2.9	0.5

Table 37 Opinion regarding suitability of farm for dairying

	Very suitable	Fairly suitable	Not very suitable	n/a
	%	%	%	%
Bulk operators	44.9	52.1	1.8	1.2
Non-bulk operators	28.6	67.0	4.4	-

Table 38 Opinion regarding importance of adoption of latest techniques and equipment*

	Essential	Very important	Important	Of slight importance	Not important	Undecided
	%	%	%	%	%	%
Bulk operators	20.0	33.3	40.0	6.7	-	-
Non-bulk operators	7.8	21.9	34.4	10.9	17.2	7.8

*Pilot samples only

Table 39 Opinion regarding the extent to which a farmer who habitually adopts the latest techniques and equipment is 'better thought of' by the farming community*

	Very likely	Likely	Not likely	Undecided
	%	%	%	%
Bulk operators	13.3	13.3	60.0	13.4
Non-bulk operators	6.3	29.7	48.4	15.6

*Pilot samples only.

Table 40 Opinion regarding the number of farmers in his district who are more 'up-to-date' in dairying practices than himself*

	None	One or two	Several	Many	n/a
	%	%	%	%	%
Bulk operators	20.0	33.3	46.7	-	-
Non-bulk operators	15.6	42.2	28.1	9.4	4.7

*Pilot samples only

Percentage Distribution of Adopters and Non-adopters of Bulk Milk Collection according to various Characteristics concerning the Acquisition of Knowledge about the Scheme.

Table 41 Remembrance of date of first learning of existence of bulk milk collection scheme

	Date remembered	Date not remembered	n/a
	%	%	%
Bulk operators	60.0	39.4	0.6
Non-bulk operators	37.8	61.7	0.5

Table 42 Date of first hearing of the existence of bulk milk collection scheme*

	1957 & before	1958	1959	1960	1961 & after
	%	%	%	%	%
Bulk operators	14.1	14.1	12.2	14.1	45.5
Non-bulk operators	7.7	14.1	7.7	17.9	52.6

*data relating to farmers remembering date.

Table 43 Remembrance of method of first learning of existence of bulk milk collection scheme

	Method remembered	Method not remembered	n/a
	%	%	%
Bulk operators	84.3	13.9	1.8
Non-bulk operators	85.9	14.1	-

Table 44 Method of first learning of bulk milk collection scheme*

	Read	Told
	%	%
Bulk operators	54.0	46.0
Non-bulk operators	67.8	32.2

*data relating to farmers remembering method

Table 45 Written sources of first information concerning bulk milk collection scheme*

	'Milk Producer'	Farm journals	Other sources
	%	%	%
Bulk operators	16.0	77.3	6.7
Non-bulk operators	12.5	71.7	15.8

*data relating to farmers remembering source

Table 46 Verbal sources of first information concerning
bulk milk collection scheme*

	M.M.B.rep.	Farmer	Rep.of firm/ dairy	Other
	%	%	%	%
Bulk operators	51.6	18.8	23.4	6.2
Non-bulk operators	40.4	22.8	17.5	19.3

*data relating to farmers remembering source

Table 47 Initiation of action to find out more about bulk
milk collection scheme after first learning of its existence*

	Action taken	Action not taken
	%	%
Bulk operators	92.9	7.1
Non-bulk operators	42.2	57.8

*Pilot samples only

Table 48 Approach of someone offering further information about
bulk milk collection after first learning of its existence*

	Approached	Not approached
	%	%
Bulk operators	35.7	64.3
Non-bulk operators	46.7	53.3

*Pilot samples only

Table 49 Acquisition of further information about bulk milk
collection not as a result of own initiative or of
being approached by someone*

	Information acquired	Information not acquired
	%	%
Bulk operators	57.1	42.9
Non-bulk operators	62.2	37.8

*Pilot samples only

Table 50 Opinion regarding the usefulness of the farming press as a source of obtaining new ideas about methods of milk production*

	Very useful	Useful	Not useful	n/a
	%	%	%	%
Bulk operators	26.6	66.7	6.7	-
Non-bulk operators	7.8	76.5	14.1	1.6

*Pilot samples only

Table 51 Remembrance of past occasion of adoption of new practice or equipment first learnt about in the farming press*

	An occasion remembered	No occasion remembered
	%	%
Bulk operators	60.0	40.0
Non-bulk operators	26.6	73.4

*Pilot samples only

Table 52 Frequency of attendance at agricultural shows*

	Regularly	Occasionally	Never
	%	%	%
Bulk operators	40.0	60.0	-
Non-bulk operators	45.3	51.6	3.1

*Pilot samples only

Table 53 Frequency of attendance at farm walks or demonstrations*

	Regularly	Occasionally	Never
	%	%	%
Bulk operators	33.3	66.7	-
Non-bulk operators	29.7	50.0	20.3

*Pilot samples only

Table 54 Frequency of attendance at discussion groups*

	Regularly	Occasionally	Never
	%	%	%
Bulk operators	6.7	60.0	33.3
Non-bulk operators	18.7	39.1	42.2

*Pilot samples only

Table 55 Remembrance of past occasion of adoption of new practice or equipment first learnt about at agricultural show, farm walk, demonstration or discussion group*

	An occasion remembered	No occasion remembered
	%	%
Bulk operators	46.7	53.3
Non-bulk operators	31.3	68.7

*Pilot samples only

Table 56 Frequency of seeking advice from Ministry of Agriculture, Fisheries and Food, or a university or college*

	Often	Occasionally	Never
	%	%	%
Bulk operators	33.3	60.0	6.7
Non-bulk operators	21.9	54.7	23.4

*Pilot samples only

Table 57 Frequency of seeking advice from a marketing board*

	Often	Occasionally	Never
	%	%	%
Bulk operators	-	20.0	80.0
Non-bulk operators	-	18.8	81.2

*Pilot samples only

Table 58 Frequency of seeking advice from a commercial firm*

	Often	Occasionally	Never
	%	%	%
Bulk operators	13.3	66.7	20.0
Non-bulk operators	4.7	35.9	59.4

*Pilot samples only

Table 59 Frequency of payment for technical or economic advice

	One or more times	Never
	%	%
Bulk operators	-	100.0
Non-bulk operators	1.6	98.4

*Pilot samples only

Table 60 Frequency of seeking advice from another farmer*

	One or more times	Never
	%	%
Bulk operators	60.0	40.0
Non-bulk operators	32.8	67.2

*Pilot samples only

Table 61 Frequency of having own advice sought by another farmer*

	One or more times	Never
	%	%
Bulk operators	73.3	26.7
Non-bulk operators	43.8	56.2

*Pilot samples only

Percentage Distribution of Adopters and Non-adopters of Bulk Milk Collection according to various Characteristics of their Decision Experience.

Table 62 Interest on first learning of the existence of a scheme for bulk milk collection.

	Very interested	Fairly interested	Slightly interested	Not interested	n/a
	%	%	%	%	%
Bulk operators	61.2	23.0	9.1	5.5	1.2
Non-bulk operators	14.1	23.3	30.6	32.0	-

Table 63 Knowledge situation on first learning of the existence of a scheme for bulk milk collection

	Knowledge adequate for decision	Knowledge not adequate for decision	n/a
	%	%	%
Bulk operators	69.7	30.3	-
Non-bulk operators	46.1	52.0	1.9

Table 64 Decision experience of farmers possessing adequate knowledge for decision on first learning of the existence of a scheme for bulk milk collection

	Decision reached straightaway	Decision reached after thought
	%	%
Bulk operators	67.0	33.0
Non-bulk operators	46.3	53.7

Table 65 Decision experience of farmers not possessing adequate knowledge for decision on first learning of the existence of a scheme for bulk milk collection

	Attempting to learn more	Not attempting to learn more
	%	%
Bulk operators	46.0	54.0
Non-bulk operators	19.6	80.4

Table 66 Occurrence of change in farm circumstances affecting attitude of farmer to bulk milk collection scheme

	Change occurred	No change occurred
	%	%
Bulk operators	29.7	70.3
Non-bulk operators	21.4	78.6

Table 67 Direction of change in farm circumstances affecting attitude of farmer to bulk milk collection scheme*

	Engendering more favourable attitude	Engendering less favourable attitude
	%	%
Bulk operators	100.0	-
Non-bulk operators	68.8	31.2

*data relating to farmers experiencing change

Percentage Distribution of Non-adopters of Bulk Milk Collection
according to various characteristics of their Decision Experience
at the Date of Investigation

Table 68 Knowledge situation at date of investigation

	Knowledge adequate for positive decision	negative decision	Knowledge not adequate for decision
	%	%	%
Non-bulk operators	6.3	62.6	31.1

Table 69 Decision experience of farmers not possessing adequate
knowledge for decision at date of investigation

	Attempting to learn more	Not attempting to learn more
	%	%
Non-bulk operators	25.0	75.0

Table 70 Decision experience of farmers possessing adequate
knowledge for decision at date of investigation

	Absolutely certain that correct decision made	Not certain that correct decision made
	%	%
Non-bulk operators	93.6	6.4

Table 71 Decision experience of farmers not certain
that correct decision made

	Not disturbed at risk of being wrong	Disturbed at risk of being wrong
	%	%
Non-bulk operators	50.0	50.0

Table 72 Possibility of adopting bulk milk collection
in the future if farm circumstances change*

	Possibility foreseen	No possibility foreseen
	%	%
Non-bulk operators	65.9	34.1

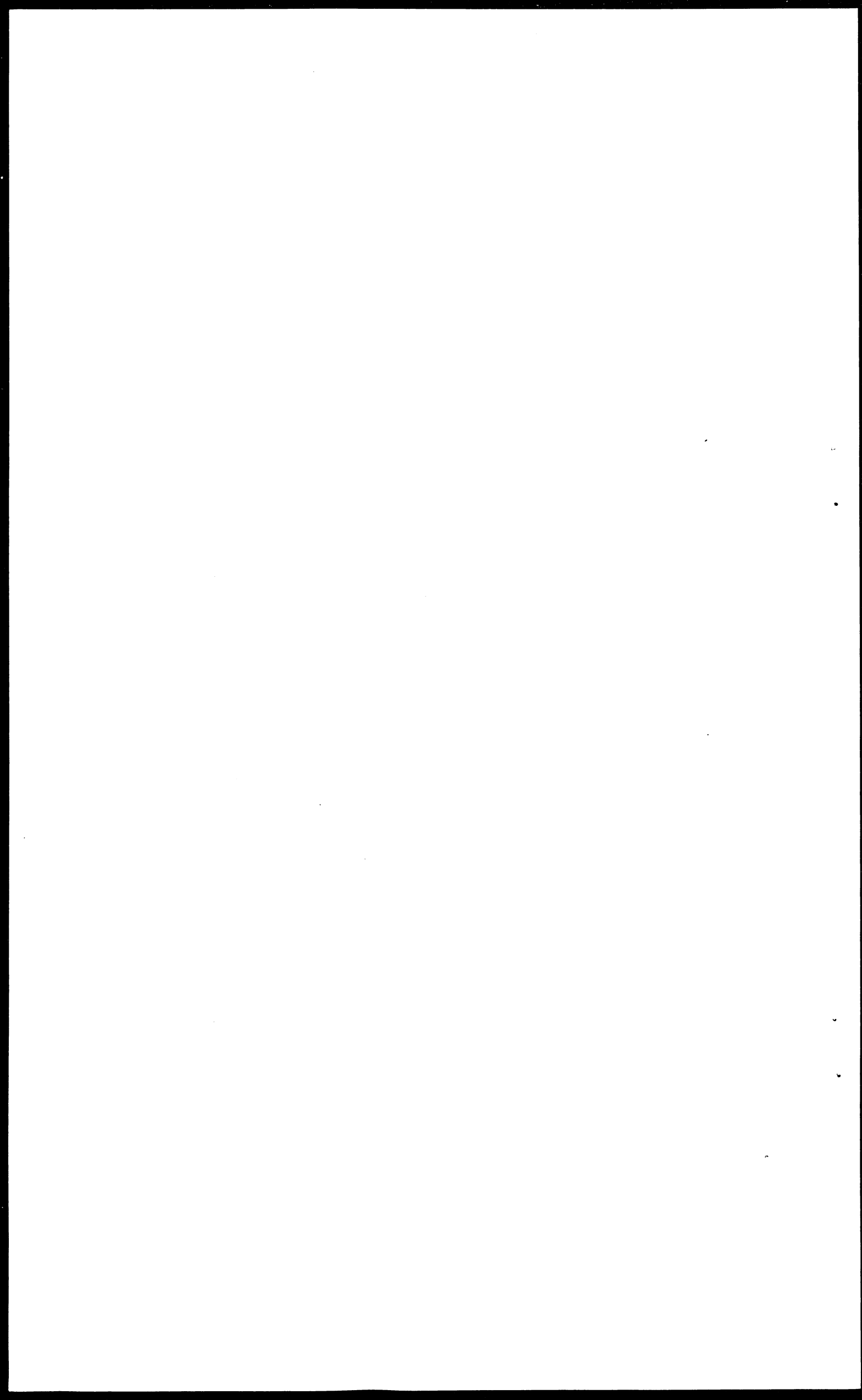
*data relating to farmers who had decided not to adopt bulk milk collection in present farm circumstances

Table 73 Mean and standard error of mean of total farm acreage
and total dairy herd size, pilot and postal samples of
adopters and non-adopters of bulk milk collection

Variable	Bulk operators				Non-bulk operators	
	Installation before 1. 7. 62		Installation after 1. 7. 62		Pilot sample	Postal sample
	Pilot sample	Postal sample	Pilot sample	Postal sample		
<u>Total farm acreage</u>	acres	acres	acres	acres	acres	acres
Mean	287.3	298.4	230.1	261.8	185.1	177.0
S.E. of mean	40.4	16.5	35.9	14.3	15.0	10.6
<u>Total dairy herd size</u>	cows	cows	cows	cows	cows	cows
Mean	66.5	71.0	67.7	70.1	44.8	43.9
S.E. of mean	5.4	2.7	5.0	2.9	2.3	1.5

APPENDIX II

Questionnaires



Questionnaire A

UNIVERSITY OF BRISTOL

Department of Agricultural Economics

Method of answering questions

1. Questions for which a list of alternative answers has been given
Please mark a tick / in the box against the answer which is appropriate to your own case. If none of the listed answers seems appropriate, please write in your own answer below the question.
2. Other questions. Please write in your answer on the line provided

QUESTION

1. a. What is the total acreage of your farm? _____ acres
b. How many of these acres are in grass? _____ acres
(include ALL short-term leys)
c. How many of your total farm acres are rented? _____ acres
2. a. How many dairy cows (in milk and dry) have you? _____ cows
b. " " dairy replacements (all ages) " " ? _____ dairy repl.
c. " " other cattle " " " " ? _____ other cattle
d. " " sheep " " " " ? _____ sheep
e. " " pigs " " " " ? _____ pigs
f. " " poultry " " " " ? _____ poultry
3. a. Have you increased or decreased the size of your dairy herd SINCE you installed a bulk tank? i. Increased ii. Decreased
iii. Stayed about the same
b. Were you increasing or decreasing the size of your dairy herd BEFORE you installed a bulk tank? i. Increasing ii. Decreasing
iii. No change
4. a. When do most of your calvings take place? i. Mainly in Spring
ii. Mainly in Autumn iii. Spread throughout the year
b. When did most of your calvings take place BEFORE you installed a bulk tank? i. Mainly in Spring ii. Mainly in Autumn
iii. Spread throughout the year

5. What was your dairy practice in the following respects BEFORE you installed a bulk tank?

A. Housing for sleeping

- i. Cowshed ii. Covered yard iii. Cubicles
iv. Other (write in) _____

B. Housing for Milking

- i. Cowshed ii. Parlour iii. Bail
iv. Other (write in) _____

C. Milking System

- i. Bucket ii. In-churn iii. Pipeline
iv. Other (write in) _____

D. Cooling System

- i. Surface ii. In-churn (tap-water)
iii. In-churn (ice-bank)
iv. Other (write in) _____

6. When you installed a bulk tank, did you change your dairy practice in any of the following respects?

- A. Housing for sleeping i. Yes ii. No
If 'Yes', write in change made _____

- B. Housing for milking i. Yes ii. No
If 'Yes', write in change made _____

- C. Milking system i. Yes ii. No
If 'Yes', write in change made _____

7. Is milk your main farm enterprise?

- i. Yes ii. No

8. How suitable do you consider your farm to be for dairying?

- i. Very suitable ii. Fairly suitable
iii. Not very suitable

9. How interested are you in dairying?
 i. Very interested ii. Fairly interested
 iii. Slightly interested iv. Not interested
10. How many years have you been a milk producer?
 (write in) _____ years
11. When did you FIRST learn of the existence of a scheme for the
 bulk collection of milk?
 (write in) i. _____ year. ii. Don't remember
12. a. How did you FIRST learn about the scheme? Did you read about it,
 or were you told about it? i. Read ii. Told
 iii. Don't remember
- b. Where did you read about it, or who told you about it, on that
FIRST occasion?
 (write in) _____

13. How interested were you in the possibility of installing a bulk tank
 on your own farm when you FIRST learnt that such a scheme existed?
 i. Very interested ii. Fairly interested
 iii. Slightly interested iv. Not interested
14. Which of the following statements most closely reflects your own
 experience when you FIRST heard about bulk collection? (please read
 ALL of the statements before ticking the most appropriate one)
 i. I realised straight away that it was just the thing for my farm
 ii. I didn't learn enough about it to be able to make up my mind one way
 or another and I decided to wait and see how things developed
 iii. I didn't learn enough about it to be able to make up my mind one way
 or another and I decided to find out more about it
 iv. I couldn't make up my mind whether to go in for it, but, having
 thought it over I decided that it was suitable for my farm
15. Between the time when you first heard about bulk collection and the date
 when you installed a tank, did your farm circumstances change in any way
 which affected your attitude to the scheme? i. Yes ii. No
 If 'Yes', write in change in circumstances _____

16. a. Which of the following methods of finance did you use to acquire your tank?
- i. Bank loan ii. Hire purchase
 iii. Rental iv. Existing capital funds
- b. If you made other changes in your dairy practice at the time you acquired your tank, how did you raise the capital for these?
- i. Bank loan ii. Existing capital funds
 iii. Other (write in) _____

In answering the next four questions it is important that you try to recall how you felt when you were making up your mind about bulk collection. Please try to ignore any opinions which you have formed as a result of operating the scheme.

17. Was there a particular aspect of bulk milk collection which attracted you above all others, when you were deciding whether, or not, to go in for it? i. Yes ii. No
- If 'Yes', write in the particular aspect which attracted you
- _____
- _____

18. Were there any other features of bulk milk collection which influenced you in favour of it? i. Yes ii. No
- If 'Yes', write in the features which you considered favourable.
- _____
- _____

19. Were there any features of bulk milk collection which you considered unfavourable? i. Yes ii. No
- If 'Yes', write in the features which you considered unfavourable.
- _____
- _____

20. If, at the time you installed a tank, you also made changes in other dairy practices (e.g. in system of housing or in system of milking) would you say that
- i. the decision to make other changes in your dairy practice arose as a result of your decision to install a bulk tank?
- ii. having decided to make changes in your method of dairy management, you decided that it would be advantageous to go in for bulk collection at the same time?
- iii. the installation of the tank and the other changes were inseparable, that is, you did not consider one without the other?

21. Now that you have had experience of bulk collection, have your opinions regarding its advantages and disadvantages changed in any respect?
 i. Yes ii. No
 If 'Yes', write in details of change in opinions _____

22. Have you any criticisms of the bulk collection scheme which you have not mentioned above? i. Yes ii. No
 If 'Yes', write in criticisms _____

23. Before you adopted bulk collection, did you ever differ from your dairy as to the correct gallonage of your milk sales? i. Often
 ii. Occasionally iii. Very infrequently iv. Never
24. Before you adopted bulk collection, did you ever receive dirty churns from your dairy? i. Often ii. Occasionally
 iii. Very infrequently iv. Never
25. Do you come from a farming family? i. Yes ii. No
26. Have you a son(s) who helps you on the farm, or is likely to do so in the future? i. Yes ii. No.
27. Are you a member of a N.F.U. committee, a committee of any other public or semi-public, organisation, a local government councillor, or do you hold any other office of a similar sort?
 i. Yes ii. No
 If 'Yes', write in office held _____

28. Has all your agricultural training taken place on the farm?
 i. Yes ii. No
29. At what age did you finish your education, apart from specialised training in agriculture?
 i. 14 or under ii. 15 - 18 iii. 19 or over
30. What age are you now? i. Under 30 ii. 31 - 40
 iv. 51 - 60 v. Over 60

Questionnaire B

UNIVERSITY OF BRISTOL

Department of Agricultural Economics

Method of answering questions.

1. Questions for which a list of alternative answers has been given.
Please mark a tick ✓ in the box against the answer which is appropriate to your own case. If none of the listed answers seems appropriate, please write in your own answer below the question.
2. Other Questions. Please write in your answers on the line provided.

QUESTION

1. a. What is the total acreage of your farm? _____ acres
b. How many of these acres are in grass? _____ acres
(Include ALL short-term leys)
c. How many of your total farm acres are rented? _____ acres
2. a. How many dairy cows (in milk and dry) have you? _____ cows
b. " " dairy replacements (all ages) " " ? _____ dairy repl.
c. " " other cattle " " " " ? _____ other cattle
d. " " sheep " " " " ? _____ sheep
e. " " pigs " " " " ? _____ pigs
f. " " poultry " " " " ? _____ poultry
3. Have you increased, or decreased, the size of your dairy herd in the past two years? i. Increased ii. Decreased
iii. Stayed about the same
4. When do most of your calvings take place?
i. Mainly in Spring ii. Mainly in Autumn
iii. Spread throughout the year
5. What is your present dairy practice in the following respects?
A. Housing for sleeping
i. Cowshed ii. Covered yard iii. Cubicles
iv. Other (write in) _____
B. Housing for milking
i. Cowshed ii. Parlour iii. Bail
iv. Other (write in) _____

C. Milking System

- i. Bucket ii. In-churn iii. Pipeline
iv. Other (write in) _____

D. Cooling System

- i. Surface ii. In-churn (tap water)
iii. In-churn (ice-bank) iv. Other (write in) _____

6. Are you thinking of making changes in any of the above dairy practices during the coming year?

- i. Yes ii. No

If 'Yes', write in change anticipated _____

7. Is milk your main farm enterprise? i. Yes ii. No.

8. How suitable do you consider your farm to be for dairying?

- i. Very suitable ii. Fairly suitable iii Not very suitable

9. How interested are you in dairying?

- i. Very interested ii. Fairly interested
iii. Slightly interested iv. Not interested

10. How many years have you been a milk producer?

(write in) _____ years.

11. When did you FIRST learn of the existence of a scheme for the bulk collection of milk?

(write in) i. _____ year ii. Don't remember

12. a. How did you FIRST learn about the scheme? Did you read about it, or were you told about it?

- i. Read ii. Told iii. Don't remember

b. Where did you read about it, or who told you about it, on that FIRST occasion?

(write in) _____

13. How interested were you in the possibility of installing a bulk tank on your own farm when you FIRST learnt that such a scheme existed?

- i. Very interested ii. Fairly interested
iii. Slightly interested iv. Not interested

14. Which of the following statements most closely reflects your own experience when you FIRST heard about bulk collection? (Please read ALL of the statements before ticking the most appropriate one)
- i. I realised straight away that it was not suitable for my farm.
 - ii. I didn't learn enough about it to be able to make up my mind one way or another and I decided to wait and see how things developed
 - iii. I didn't learn enough about it to be able to make up my mind one way or another and I decided to find out more about it
 - iv. I couldn't make up my mind whether to go in for it, or not, but having thought it over I decided that it was not suitable for my farm
15. Have you learnt more about the scheme since you first heard of it's existence? i. Yes ii. No
16. Since you first heard of bulk collection, have your farm circumstances changed in any way which has affected your attitude to the scheme?
- i. Yes ii. No
- If 'Yes' write in change in circumstances _____
-
17. Has your interest in bulk collection changed since you first heard about the scheme?
- i. Increased ii. Decreased iii. No change
18. Is there a particular aspect of bulk collection which makes it unsuitable for your farm, or, some particular feature of your farm which makes it unsuitable for bulk collection? i. Yes ii. No
- If 'Yes' write in unsuitable feature _____
-
19. Are there any other features of bulk collection which you consider unfavourable? i. Yes ii. No
- If 'Yes' write in unfavourable features _____
-
20. Are there any features of bulk collection which you find attractive?
- i. Yes ii. No
- If 'Yes' write in attractive features _____
-
21. Do you ever differ from your dairy as to the correct gallonage of your milk sales? i. Often ii. Occasionally
- iii. Very infrequently iv. Never

22. Do you ever receive dirty churns from your dairy?
- i. Often ii. Occasionally
 iii. Very infrequently iv. Never
23. Which of the following statements most closely reflects your PRESENT feelings about bulk collection? (Please read all of the statements before ticking the most appropriate one)
- i. I see no possibility of my going in for bulk collection
 ii. I have not finally made up my mind about whether, or not, to go in for bulk collection and I am letting the matter rest for the time being
 iii. I have not finally made up my mind about whether, or not, to go in for bulk collection and I am still trying to come to a decision
 iv. I have decided not to go in for bulk collection in my present circumstances but I shall probably do so if circumstances change
24. If you should decide to go in for bulk collection in the future, which of the following methods of finance do you think you would be most likely to use? i. Bank loan ii. Hire purchase
 iii. Rental iv. Existing capital funds
25. Do you come from a farming family? i. Yes ii. No
26. Have you a son(s) who helps you on the farm, or is likely to do so in the future? i. Yes ii. No
27. Are you a member of a N.F.U. committee, a committee of any other public or semi-public organisation, a local government councillor, or do you hold any other office of a similar sort? i. Yes ii. No
 If 'Yes', write in office held _____

28. Has all your agricultural training taken place on the farm?
 i. Yes ii. No
29. At what age did you finish your education, apart from specialised training in agriculture?
 i. 14 or under ii. 15 - 18 iii. 19 or over
30. What age are you now? i. Under 30 ii. 31 - 40
 iii. 41 - 50 iv. 51 - 60 v. Over 60

