A RESOURCE AND OUTPUT STUDY OF A GROUP OF DAIRY FARMS IN THE MORETON DISTRICT, SOUTH-EASTERN QUEENSLAND

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SUMMARY

A reconnaissance survey of 51 milk supply farms was made to obtain information on available resources, production and management methods, and output.

One-third of the farms had no irrigation opportunity and had less than 100 ac of arable land; and an additional 17 per cent. had less than 10 ac of irrigable land and less than 50 ac of arable land. The productive opportunity of 30 per cent. of farms was severely restricted because of poor land or inadequate area.

Average labour use was 2.04 adult male equivalents, with 74 per cent. of farms less than 2.5.

The mean value of productive resources was £11,861, comprising land £6,631, livestock £2,469, plant and machinery £1,202 and farm facilities £1,559.

A tractor was owned by 70 per cent. of the farmers, while 64 per cent. had a mower and 80 per cent. a chaffcutter. Only 4 per cent. had a hay-baler.

The mean number of cows milked annually on a farm was 49, but there was a wide range in this value. Pig-raising was not an important enterprise.

Production methods were varied and were most variable in relation to feedng.

The mean value of dairy products output was £2,359, representing 86 per cent. of mean total output.

I. INTRODUCTION

In the East Moreton district, within 40 miles of Brisbane, there are about 3000 dairy farms. These farms include reasonably intensive feedlots, farms with largely unimproved pastures, farms with intensive irrigation and others with intensive fodder crop programmes. The land resource, especially in its quality and the quantity used on individual farms, is perhaps more variable in this region than in any other dairying area of the State.

This report is a reconnaissance, in reasonable detail, of that portion of the dairy farm community in the Moreton district that supplies liquid milk to the Brisbane market.

The object of the survey was to obtain a better appreciation of the natural and other resources available to this group of dairy farmers, of the patterns and methods of dairy production currently practised and of the production opportunities on these farms. Definition of the main barriers to higher output levels and higher incomes was sought.

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Information of this type is of considerable value to technical workers, not only in planning their extension programmes but also in the better definition of research problems and their priorities. This view would seem to be similar to that taken by workers (Joint Planning Committee 1957, 1958) in the Yass district of New South Wales.

II. BRISBANE MILK SUPPLY

The daily liquid milk requirement of Brisbane is about 50,000 gal.

Supply and distribution are controlled by the Brisbane Milk Board, which registers and allots maximum supply quotas to (*a*) individual farms in the Moreton region (aggregate of approximately 40 per cent. of supply) and (*b*) country factories (aggregate of approximately 60 per cent. of supply). The geographical situation of the direct supply farms is shown in Figure 1.

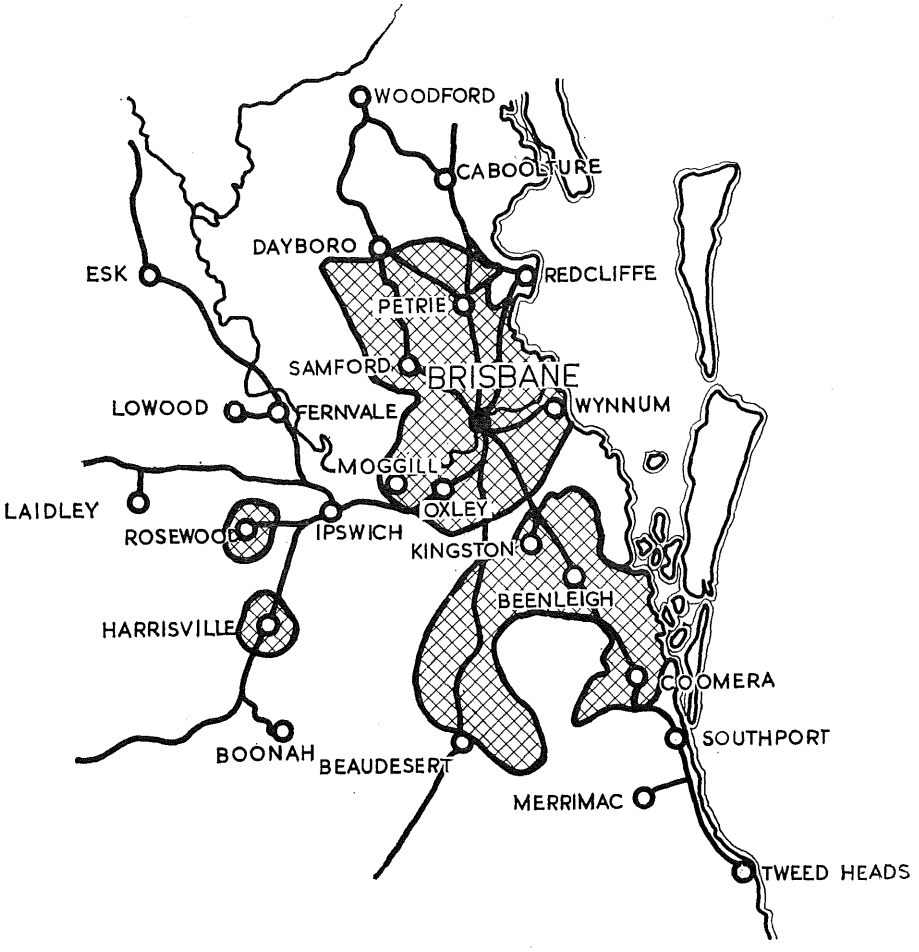

Fig. 1.—Sketch map of location of direct supply milk farms (hachured area) in Brisbane area.

Dairy husbandry policy on the individual quota farms that form the basis of this report is largely determined by the size of the milk quota and by conditions attaching to quota variation. Farm milk quotas are fixed by the Board annually in the spring and are based primarily on deliveries and output of the farm over a few selected months of the previous winter period. The new quota determinations operate from October 1. Sales up to the quota level at liquid milk prices are often not achieved by farms, since the amount which a supplier may sell at these rates depends upon the current demand of the market. Board quotas thus represent maximum sales figures at liquid rates, with surplus production sold for manufacturing purposes or separated on farms and sold for butter manufacture.

The following is an analysis of quotas held by direct suppliers at June 30, 1960:

Quota (gal per day)	No. of Farms
Under 10	30
10–19	105
20–29	114
30–39	93
40–49	75
50–59	44
60–74	42
75–99	35
100–149	16
150–199	4
Over 200	4

The annual variation in the numbers of direct suppliers to wholesale and retail vendors and to consumers (*ex* vehicle) is not great, as is shown by the following figures:

At June 30	No. Supplying Vendors	No. Supplying Consumers
1955	549	44
1956	530	36
1957	543	32
1958	557	26
1959	567	24
1960	559	21

However, while their aggregate output has remained fairly constant, their contribution to the milk requirements of the Board has fallen steadily in recent years.

The inference of wide variation in farm size with a heavy predominance of small farms which may be drawn from the distribution of quotas shown above was found in this enquiry to be in accord with other measures of farm size.

III. SURVEY PROCEDURE

Lists of individual quota farms corresponding to milk carrier routes were available. After the deletion from the lists of institutions and research farms, 61 farms were selected by a systematic sampling procedure. This gave an approximate 11 per cent. sample of suppliers distributed throughout the area depicted in Figure 1.

Wastage was somewhat higher than anticipated and data were obtained from only 51 dairy farmers. The causes of wastage were: farm sold for real estate subdivision, 3; unwilling to participate, 4; ceased dairying, 2; recently sold, 1.

In general, the material presented is based on information from 51 farms. However, a few farms were unable to provide details on a particular aspect. For instance, it was not possible to obtain adequate output data from one farmer who had only recently purchased his farm. Where data are used from fewer than 51 farms the actual number is indicated.

Schedules were used and information was sought by interview with the owner or principal operator. Interviews usually occupied from one to three hours.

Details of dairy production were subsequently obtained from the factories with the written authority of the farm owner. Other quantitative data about the farm and the farm programmes were obtained from the owner for the three most recent years (July 1957 to June 1960). Material in the report is based on average performance over these three years. This procedure was adopted in an attempt to minimize the effects of year-to-year fluctuations and to remove the effects of seasonal variations sufficiently for the data presented to be taken as representing normal farm performance.

IV. FARM AREA

In reviewing farm area, it was decided to consider only that area of each farm which was capable of some use, even though part was in an undeveloped state or only developed to the extent of light grazing. Waste land was deducted from farm area. Any land considered to have no reasonable use whatsoever was considered to be in this category. However, all land available for income-earning purposes, irrespective of tenure or other conditions of occupancy, was

included. The usable farm area was thereby derived for each farm and for most purposes of analysis this is the concept of farm size that is used.

The distribution of usable farm area is as follows:—

Usable Area Class (ac)	Percentage of Farms
Up to 100	15·6
101–200	39·2
201–300	21·6
301–400	11·8
More than 400	11·8

While the mean area of all farms is 240 ac, it is apparent that the region is characterized by a majority (about two-thirds) of farms of below average size and a minority (about one-quarter) of farms well above average in usable land area.

Farm area is, however, a very imperfect criterion of farm size for analysis purposes and particularly so in a region having such diversity of topography and soil quality as this. Included in the smallest farm area categories are those, few in number, which operate virtually as feedlots.

An estimate was made for each farm of the amount of usable land that was considered capable of some form of arable production, the residue being capable only of development for grazing purposes and remaining more or less permanently in pasture. A further estimate of the usable land that is currently unproductive was made (Table 1).

TABLE 1

CLASSIFICATION OF USABLE AREA OF 51 FARMS

Usable Area Class (ac)	Mean Area Potentially Arable (ac)	Percentage of Usable Area Potentially Arable	Mean Area at Present Unproductive (ac)
Up to 100	31	43	7
101–200	66	45	27
201–300	76	32	66
301–400	101	28	65
More than 400	162	25	153

It is apparent that the smaller categories of farm area have the largest proportion of potentially arable land. However, the potential for arable development in terms of absolute area is much greater on the larger farms. On many farms some usable land is now in an unproductive condition. Two

contributing factors are involved. In some cases land remains in a virgin state, and in others secondary growth has rendered previously developed land unproductive. The absolute amount of unproductive land increases with usuable farm area and is of considerable magnitude on the larger farms.

The extent of use of arable and irrigable land was examined and a distribution of arable land on this basis between farms is presented in Table 2. It will be noted that there is a high proportion of farms with limited arable opportunity, 43 per cent. having 40 ac or less. The mean arable area on these farms is 23 ac, of which about half (11 ac) is now in arable production.

TABLE 2

ESTIMATE OF ARABLE LAND RESOURCE (51 FARMS)

	Potentially Arable (Including Irrigable) Area (ac)				
	0–40	41–80	81–120	121 and Over	All Farms
Percentage of farms in each area class	43·1	23·5	17·6	15·8	100·0
Mean arable area (ac)	23	61	106	222	78
Percentage of farms now cultivating ..	43·1	17·6	17·6	13·7	92·0
Mean area cultivated (ac)	11	25	32	34	19
Percentage of farms with irrigation opportunity	23·5	13·7	7·8	11·8	56·8
Percentage of farms now irrigating ..	17·6	3·9	5·9	7·8	35·2
Percentage of farms having—					
(a) 25% or less of arable land in cultivation	13·7	9·8	9·8	13·7	47·0
(b) 26–74% of arable land in cultivation	11·8	13·7	5·9	2·0	33·4
(c) 75% or more of arable land in cultivation	17·6	..	2·0	..	19·6

While all farms were found to include some arable land, there are about 8 per cent. of farms that make only grazing use of all available land and are not organized or equipped for arable production of any description. These farms, virtually grazing farms, tend to be medium to large in area, with a similar range of arable opportunity.

The general picture of arable land in the region is dominated by a very uneven distribution of arable land between farms and at the same time a fairly general lack of development of land having at least some arable capabilities, as seen in the percentage of farms developing various proportions of arable land. The extent of arable land development is apparently inversely related to the area of such land available.

The irrigation position in the region is somewhat similar. About 57 per cent. of farms have a known or existing water resource capable of use for irrigation purposes, with about 35 per cent. now making some use of this resource.

Table 3 presents an analysis of the irrigable opportunity on the farms of the zone. Nearly half of these farms having some irrigation opportunity have less than 10 ac available for the purpose and they would seem to represent 23·5 per cent. of farms in the milk market. It is further apparent from the table that farms having a limited irrigation resource tend to have it developed to reasonable capacity. The unemployed irrigation resources tend to be located on the farms that possess medium to large irrigation opportunities.

TABLE 3

ESTIMATE OF IRRIGATION RESOURCE (51 FARMS)

—	Irrigable Area (ac)						
	0	1–10	11–20	21–30	31–40	41 or More	All Farms with an Irrigable Area
Percentage of farms in each area class	43·1	23·5	11·8	7·8	3·9	9·8	56·8
Mean area irrigable (ac) ..	..	6	15	29	37	66	33
Percentage in each area class now irrigating	..	21·6	3·9	2·0	2·0	5·9	35·4
Mean area irrigated (ac) ..	..	4·5	10·5	10·0	15·0	26·6	9·7

Table 4, illustrating the present irrigation development in the zone, demonstrates the important and major role of irrigation on a very small proportion of farms.

TABLE 4

PRESENT USE OF IRRIGATION RESOURCE (51 FARMS)

—	Area Under Irrigation (ac)				
	Nil	1–5	6–10	11–20	More than 20
Percentage in each area class	64·6	11·8	15·8	3·9	3·9
Mean area irrigated (ac)	..	1·8	8·2	13·0	36·0

Mean area irrigated; 18 farms—9·7 ac

It will be observed from the following statement that 33 per cent. of the survey farms have no present irrigation opportunity and as well have less than 100 ac of arable land, and that an additional 17 per cent. of farms have less than 10 ac of irrigable land and less than 50 ac of arable land:

DISTRIBUTION OF FARMS HAVING VARIOUS COMBINATIONS OF ARABLE AND IRRIGABLE OPPORTUNITIES

Without irrigable land and—		
(a) less than 25 ac arable land	9·8%	33·4%
(b) 25–50 ac arable land	15·8%	
(c) 51–100 ac arable land	7·8%	
(d) more than 100 ac arable land	9·8%	
With 10 ac or less of irrigable land and—		
(a) less than 25 ac arable land	13·7%	17·6%
(b) 25–50 ac arable land	3·9%	
(c) more than 50 ac arable land	5·9%	
With 10–30 ac of irrigable land and—		
(a) less than 50 ac of arable land	7·9%	
(b) 50–100 ac arable land	5·9%	
(c) more than 100 ac arable land	5·9%	
With 31–50 ac of irrigable land and—		
(a) up to 100 ac arable land	..	
(b) more than 100 ac arable land	3·9%	
With more than 51 ac of irrigable land and—		
(a) 51–100 ac arable land	5·9%	
(b) more than 100 ac arable land	3·9%	

The present lack of technical knowledge to enable the development of non-arable land for the production of quality forage in winter makes such land now virtually useless for winter milk production. Farmers having restricted areas of arable (including irrigable) land are thereby limited in the development that they can make of their milk enterprise unless they undertake extensive programmes of supplementary feeding.

V. LAND QUALITY

As the quality and suitability for development of the land available to milk supply farmers vary considerably, statements of absolute area do not provide a reliable indication of the capacity of this resource. In order to obtain a better assessment, several quality classes of land have been distinguished, as follows:

First Quality Group:

Class I—Alluvials and Heavier Clay Soils: Generally level or moderately sloped and capable of arable development. Fertility range fair to good. Capable of development to such grasses as paspalum and kikuyu.

Class II—Good Quality Scrub (Rain-forest): Usually soils of reasonable fertility. Slopes often preclude arable development. Kikuyu, Rhodes and paspalum grasses usually capable of establishment.

Class III—Good Quality Forest: Low to medium fertility with reasonable arable capabilities. Slopes not generally excessive.

Second Quality Group:

Class IV—Inferior Quality Scrub (Rain-forest): Fertility lower than good quality scrub; sometimes stony. Slopes often excessive.

Class V—Inferior Quality Forest: Generally of low fertility and often stony and shallow of soil and sometimes steep.

Class VI—Swamp: Land capable of periodic or seasonal use and often providing quality grazing and forage for short periods. (Swamp land not capable of grazing use at any time excluded as waste land.)

These classifications follow closely terms in common use by farmers in the area and they do permit a ranking of land qualities which the writers consider to be valid. Extension personnel working in the area are also familiar with this terminology.

Table 5 gives an appreciation of the quality of the total area of land occupied by milk supply farms. The generally low productivity of the land is apparent from the small proportion included in the better classes and the large proportion (52 per cent.) of inferior forest land. The figures indicating the proportion of the total area of each class which was considered to be suitable for arable development and the proportion actually cultivated tend to support the ranking of land classes which has been adopted. The lower classes of land —considered to be less productive in any particular use—must be regarded as of still lower value because of their lack of suitability for more intensive use.

TABLE 5

LAND QUALITY ON 51 MILK SUPPLY FARMS

	Land Quality Class					
	I	II	III	IV	V	VI
Percentage of class in aggregate area ..	10	14	14	7	52	3
Percentage of the class considered arable	81	36	48	22	17	0
Percentage of the class cultivated ..	31	13	7	4	2	0
Percentage of farms on which class occurs	35	33	29	12	71	24
Percentage of farm area in each class on farms where that class occurs ..	30	53	48	7	77	12

The proportion of farms having land of each class reflects, to some extent, the incidence of various classes in the aggregate. The fact that inferior quality forest land occurs on 71 per cent. of the farms and occupies 77 per cent. of the area of the farms on which it occurs suggests a poverty of land resource which is not balanced by the alluvial and heavy soils occurring on 35 per cent. of farms.

Some indication of the most important land resources of individual farms is given in Table 6. This table has been laid out on the basis that the chief feature of the land resource of any farm is the best quality of land which occurs in a reasonable area on that farm. Increasing areas of each class are combined with descending land classes as it is considered that a greater area of poorer quality land is required in order to comprise a "reasonable area". The table may be used as a ranking of farms in descending order of their land resources.

TABLE 6

DISTRIBUTION OF LAND CLASSES AMONG 51 FARMS

Farms Having	Percentage of Farms	Average Acreage of						Average Total Area (ac)
		Class I	Class II	Class III	Class IV	Class V	Class VI	
More than 20 ac of Class I	29	81	0	81	0	81	8	251
More than 40 ac of Classes I and II combined ..	27	0	130	8	21	59	0	218
More than 60 ac of Classes I to III combined ..	8	0	8	88	0	80	32	208
More than 80 ac of Classes I to IV combined ..	6	0	13	0	171	59	0	243
More than 100 ac of Classes I to V combined ..	24	2	1	11	5	296	7	322
Other farms ..	6	7	0	10	0	59	17	93

A division may be justified between the first four groups in Table 6 and the last two which have predominantly inferior forest land or a small total area with a large proportion of forest land.

The 30 per cent. of farms included in the last two groups seem to possess land resources so poor in quality or so restricted in area as to impose a severe limitation on their productive opportunity. However, farms with such limited land resources are not necessarily so restricted in their productive opportunity so long as the operators are able to acquire fodders in sufficient quantity at appropriate prices.

Farms having what would appear to be inadequate land resources can be considered in two merging categories which are represented by the following extreme situations.

Firstly, there are those having a virtual complete lack of effective land resources. Profitable production of milk can be carried on under these conditions only by the purchase of large quantities of cheap fodder such as the by-products of urban food-processing industries. A small number of farms now undertake this production method. However, the supply of such by-products is much less than the potential demand of the farms having this requirement.

Secondly, there are those having limited land resources but which could achieve reasonable milk output by the judicious purchasing and stockpiling of suitable fodders. This calls for a liquid cash resource and entrepreneurial ability that would seem to be beyond the capabilities of many in this situation.

VI. LABOUR RESOURCE

(a) Quantity

Amounts of labour used yearly were calculated in terms of adult male equivalents. (An adult male equivalent is the contribution to farm labour resource made by an adult male working on the farm for a full year or the equivalent in terms of female and junior contributions.) Contribution by females and juveniles were weighted by factors corresponding to the relevant basic wage rates. The distribution of labour used is as follows:

Labour Use (Adult male equivalents)	Percentage of 50 Farms
Less than 1	2
1–1·49	22
1·50–1·99	22
2·00–2·49	28
2·50–2·99	8
3·00–3·49	12
3·50–3·99	4
More than 3·99	2

Mean: 2·04 adult male equivalents

The rather wide range in quantity of labour used may best be considered in relation to other measures of the size of the farm enterprise. This has been done in Table 7. As might be expected, greater amounts of labour are generally associated with farms having greater total productive resources and greater land resources.

TABLE 7

LABOUR USED IN RELATION TO OTHER RESOURCES (50 FARMS)

	Labour Units (Adult Male Equivalents)			
	Less than 1·5	1·5–1·99	2–2·49	More than 2·49
Percentage of farms	24	22	28	26
Total productive resources (£)*	9,212	9,230	13,743	15,344
Total productive resources per labour unit (£) ..	8,010	5,697	6,575	4,983
Equivalent farm area (ac)†	162	154	233	302
Equivalent farm area per labour unit (ac) ..	139	95	112	99

* Total farm value (including livestock, plant and machinery and with land and buildings valued as for agricultural purposes) less the value of residences

† The summation of the areas of land presently used in different ways with weights, approximating to relative productivity, applied. The weights are:—

Area in pasture × 1
Area in crop × 2
Area in irrigation × 4

Total productive resources per labour unit and equivalent farm area per labour unit, as defined in the footnote to Table 7, show similar trends in relation to labour units employed. While they give some indication of a decreasing ratio of resources to labour with increasing employment of labour, it is not possible to provide an exact interpretation of this on the basis of available data. However, labour is a reasonably adjustable resource on dairy farms and when adjusted is more likely to be adjusted downwards on family farms in response to low farm income. At higher income levels, which are more likely to be attained on large farms, the pressure for downward adjustment is less, and the opportunity for unnecessary labour specialization increases, family ties no doubt having an influence.

Because of their situation relative to the metropolitan area, which ensures a source of labour or opportunity for off-farm employment, the farmers in the survey area are able to make fractional variations in labour usage which are not possible in more remote areas. Some indication of the extent to which this occurs is given by the incidence of off-farm work and hiring of labour as shown by the following:

Labour Practice	Percentage on 50 Farms
Off-farm work—labour only	12
Off-farm work—combined labour and machinery services ..	8
Labour hired (full-time or part-time)	26
Machinery services purchased	38
Labour services exchanged	14

Off-farm work involving labour only is shown separately from that which is associated with the sale of machinery services. In the former case, farmers are motivated by low farm incomes associated with inadequate or undeveloped resources. Although income considerations no doubt also affect decisions to take off-farm work with machinery—particularly to assist with the initial cost of machinery purchase—a strong demand from neighbours is an important factor. Much less labour is used in association with machinery than when labour only is provided.

Purchase of machinery services, including the labour of operators, is quite common. However, the amount of associated labour is generally very small in relation to total labour usage.

The practice of exchanging labour services occurs on only 14 per cent. of farms. Discussions with farmers indicated that arrangements to provide mutual assistance in this way were more common in the past, but are generally not renewed when a farm changes hands.

(b) Effectiveness of Labour

In the most common dairy-farming situation the functions of management and labour are performed by the same individual, so a high level of farming efficiency requires skills, aptitudes and abilities in both departments, while lack of either or both may result in relative degrees of farming inefficiency.

Farm labour efficiency is generally recognized as an extremely important variable in the farm organization. Nevertheless, considerable difficulty is encountered in satisfactorily measuring it.

In common with other authors (e.g. Fallding 1958), the writers have approached the problem by enumerating some personal characteristics of the farmers and the extent to which they employ a number of management practices. This provides an objective basis from which some inferences can be made regarding the effectiveness of the farm labour resource.

Apart from the general problem of measuring a factor whose expression depends upon the continual effect of a number of often conflicting variables, the economic optimum, used as a basis for comparison, may not coincide with the optimum position of the individual or group when aspects not capable of expression in economic terms are considered. Thus some individuals may prefer a lower income with less work and worry, rather than the mental and physical effort necessary to make fuller use of their resources. The adoption of optimum resource use as the measuring rod of labour efficiency does not distinguish those persons whose apparent inability is due to choice. During the course of the enquiry some farmers were met who appeared to be disinterested in disturbing their established procedures and way of life although they were not lacking in opportunity.

The extension implications of this attitude are dependent primarily on the basic aim of the extension service and secondarily on the training and ability of the extension officer in rural sociology. Farmers holding these attitudes would seem to be virtually beyond the scope of a purely advice-giving service due to the inability to effect any degree of motivation.

The resources required to measure these tendencies with precision were not available during this enquiry.

The following is an analysis of the ages of resident owners or persons responsible for operating the farm:

Age (years)	Percentage of 50 Farms
30 or less	8
31–40	16
41–50	30
51–60	30
61 or more	16

Mean age: 49·5 years

Almost half the farmers (46 per cent.) are over 50 years old, and the average age is almost 50. While the physical ability to perform farm work may be reduced with advancing age (particularly for the large proportion of farmers over 60), a more important area of labour ineffectiveness may be the mental state of the older operators. There is a general opinion among extension officers that the introduction of changed techniques is more difficult with older farmers. In a situation such as this, where there is considerable scope for improvement in management practices, farmers who are not receptive to such changes are at a considerable disadvantage.

In keeping with their rather advanced age, the majority of farmers have had lengthy experience in dairy farming, as shown hereunder:

Period Dairy Farming	Percentage of 51 Farmers
Less than 6 years	5·9
6–10 years	9·8
11–15 years	17·6
16–20 years	7·8
21–25 years	11·8
26–30 years	15·7
More than 30 years	31·4

Mean period: 25·5 years

The fact that many, despite their prolonged opportunity, have not adopted many practices which are undoubtedly sound suggests some lack of farming ability.

The enumeration of the frequency of adoption of a number of practices virtually fundamental to good dairy husbandry is considered to provide some

evaluation of efficiency in herd management, an aspect of prime importance in dairy-farming and especially for those producing through the winter, using purchased feed and striving to maintain or upgrade milk quotas.

In compiling the following information, an attempt has been made to include only practices which could undoubtedly be profitably employed on at least most of the farms.

Practice	Occurrence on 51 Farms (%)	
Production recording—		
At date of interview	7·8	13·7
During the preceding 5 years	5·9	
Controlled mating	45·1	
Calving dates recorded	54·8	
Services dates recorded	49	
Calves vaccinated with strain 19—		
Yearly	12·7	
Sometimes	11·8	

Production recording of dairy cows is generally accepted as providing a valuable basis for herd replacement and rationing decisions. As a complete service is cheaply available to Queensland farmers, the writers consider that production recording of the herd could profitably have been used by at least 90 per cent. of these farmers.

Controlled mating should be worthwhile on all these farms. Apart from general husbandry and disease control considerations, calving could profitably be timed to obtain highest production during the winter, which is the quota-determining period.

Satisfactory herd breeding records are essential if a high standard of husbandry is to be attained. As the keeping of such records costs practically nothing, there can be little reason for failure in this regard. While only about half the farmers record calving and service dates, the proportion who keep other herd records which are generally considered to be necessary is even lower. For instance, only 25 per cent. record non-service heats.

The use of strain 19 vaccination of heifer calves to prevent brucellosis has been widely advocated for some years. The economic soundness of this practice is indisputable.

From the above considerations it would seem reasonable to infer that some farms in this group are endowed with a labour resource that is to some extent inefficient. This conclusion is supported by the opinions of extension officers who are working in the area.

On both theoretical and empirical grounds it would appear that poor farms (i.e. those lacking in resources or productive potential) will in the long run

tend to be occupied by farmers whose labour resource is relatively inefficient. The complementary association of efficient farmers with good farms may also be expected in the majority of cases, although the process of adjustment may be longer and less certain.

One can presume that a farm offered for sale that is to an extent lacking in opportunity for the particular enterprise, in this case milk production, will tend to be purchased by a person of equal or lower labour ability than the present and intending seller, assuming that the farm is to remain in the present enterprise and present production methods are to be used. An intending purchaser of a higher order of managerial ability than the seller will presumably recognize the limitations of the farm for its present use and will refrain from purchase. Likewise, an occupier of a relatively high order of ability on a farm lacking in natural resources for the enterprise in hand will seek to improve his position by selling.

Because of the impossibility of obtaining a single quantitative expression for the effectiveness of the farm labour resource it has not been possible to include this factor in an expression of the combination of resources available on farms. However, if the relationship discussed above does occur, this is not a serious deficiency. Variations in labour efficiency will generally not alter the picture of differences in relative productivity between farms (based on their available physical resources) but will increase the scale of differences, i.e. farms with low potential productivity because of physical limitations will be even less productive with ineffective labour.

VII. VALUE OF PRODUCTIVE RESOURCES

The value of productive resources has been taken as an appropriate measure of the capital employed in the farming enterprise. It differs from the market value of the farm in three respects which are important in the case of some farms. Land has been included at its value for agricultural purposes as opposed to market value, the latter being sometimes considerably greater because of suitability for residential or industrial sites. The value of resources which were used but not owned, such as leased land, was also included. The value of owner's residence was excluded. Thus a measure of the value of total resources employed in the production process of each farm was sought without consideration of the owner's or occupier's equity.

The following shows the distribution of values of productive resources:

Range (£)	Percentage of 51 Farms
Up to 5,000	5·9
5,001–8,000	23·5
8,001–11,000	27·5
11,001–14,000	17·6
14,001–17,000	9·8
17,001–20,000	5·9
More than 20,000	9·8

Mean value of productive resources £11,861

As with the distribution of component resources, this measure of total resources indicates a very wide range in the size of farming enterprises.

Average values for the various components of productive resources are as follows:

Item	Value (£)
Land	6,631
Livestock	2,469
Plant and machinery	1,202
Farm facilities	1,559
Total	11,861

Comparison of the average values of component resources between farms in various value of productive resources classes did not indicate any outstanding differences in resource allocation between farms of different sizes, i.e. values for each of land, livestock, plant and machinery and farm facilities were generally proportionally greater for farms having greater total productive resources.

VIII. FINANCIAL RESOURCES

Whether physical resources are used effectively or the best combination of resources is used on any farm may be largely dictated by the availability of financial capital.

Twelve farmers, representing 24·2 per cent. of those who answered this question, stated that financial limitations, including restrictions on borrowing, had impeded the development and operation of their farms.

Statements and inferences have been made that there is a widespread and pressing need for additional financial capital for the fuller and more effective use of existing and available resources on dairy farms. While an examination of the available resources and present resource use supports this view, it would seem to be fallacious that the mere provision of such additional finance would necessarily call forth the resources that are presently unemployed. It would seem that a substantial number of dairymen, in this region anyway, are unaware of these potentialities for development.

This inference would appear to follow from the large proportion (approximately 50 per cent.) of farmers who stated that they have not been financially restricted and are not now financially indebted, while the undeveloped land resources on their farms are similar to those of the group as a whole.

IX. PLANT AND MACHINERY

For the purpose of this survey plant and machinery has been defined to include all mechanical equipment (other than hand tools) with the exception of milking machines and associated dairy-shed plant and water-handling equipment (except irrigation plant). This initial division was based on the hypothesis that differences in milking plant were likely to be of little consequence in determining farm output. On the other hand, it was expected that the type of farm enterprise and its present and potential outputs would be considerably affected by the other agricultural machinery on the farm.

The total value of plant and machinery is shown in Table 8. In arriving at a resonable value for plant and machinery items it was decided to use a figure, mutually acceptable to farmer and interviewer, that represented the value of the implement to the owner and took into account its age and present condition and ruling prices for similar machines. It thus represents a reasonable estimate of the amount the present owner would be prepared to pay for it for use on his own farm. Thus, modifications of function and design (not infrequently undertaken on farms) and care and maintenance over the life of the item are given appropriate weight.

TABLE 8

VALUE OF PLANT AND MACHINERY (50 FARMS)

Value (£)	Percentage of Farms	Equivalent Farm Area (ac)	Equivalent Cultivated Area* (ac)
0	4	180	0
1–500	16	156	20
501–1,000	34	156	40
1,001–1,500	20	199	55
1,501–2,000	8	234	40
2,001–2,500	6	173	72
More than 2,500	12	521	48

Mean value £1,225

* The summation of the areas in cultivation with a weight applied to area irrigated. That is:
Dry land cultivation × 1
Irrigation × 2

The outstanding feature is the markedly unequal ownership of plant and machinery. More than 50 per cent. of farms have less than £1000 worth, while

18 per cent. of farms have plant and machinery valued at more than £2000. Although similar sets of plant may differ greatly in market value, depending upon age and condition, a considerable variation in the extent of mechanization of farms is apparent.

Averages of equivalent farm area and equivalent cultivated area, as defined in the footnote to Table 8, for the farms in each machinery value range are included in Table 8 for comparison. It would appear that greater investment in plant and machinery tends to be associated with larger values of each of these measures of land resource.

In Table 9 the distribution of ownership of the four major classes of plant and machinery is presented. In all cases the position is similar to that with total plant and machinery, low values being recorded on a large proportion of farms.

It will be noticed that the total of the average values of various classes of plant and machinery does not equal the average total value. A further item of £21 is the average value of various other items of equipment (e.g. posthole diggers, welders) which although they occur fairly frequently cannot be regarded as usual or necessary components of plant on a normal dairy farm.

The lack of farming plant on a large proportion of farms, which is suggested by the tables of values, is supported by the extent of ownership of various items of equipment:

Machine	Percentage of 50 Farms with One or More of the Machines
Tractor	70
Combine or seeder	4
Maize planter	12
Fertilizer spreader	4
Mower	64
Hay-rake	32
Hay-baler	4
Hammermill or grinder	28
Chaff-cutter	80

Although 70 per cent. of farms have tractors (together with one or more tilling implements), very few have equipment for planting or for fertilizer spreading. Except for mowers and rakes (horse-drawn in many cases) and hay-balers (on 4 per cent. of farms), no harvesting equipment is owned.

The widespread possession of chaff-cutters is associated with the practice of cutting and chaffing fodder crops rather than grazing them. However, the summer crops commonly used for this purpose (fodder canes and sweet sorghum) cannot usually be cut with the mowers available on these farms, so the operation is not highly mechanized.

TABLE 9

VALUE OF PLANT AND MACHINERY*

Haulage and Carriage Type		Land Preparation Type		Harvesting and Conservation Type		Irrigation Type	
Value (£)	Percentage of 50 Farms	Value (£)	Percentage of 50 Farms	Value (£)	Percentage of 50 Farms	Value (£)	Percentage of 50 Farms
0	4	0	12	0	12	0	56
1–300	24	0–100	32	1–100	42	1–250	18
301–600	36	101–200	30	101–200	24	251–500	12
601–900	8	201–300	12	201–300	16	501–750	8
901–1,200	10	301–400	8	more than 300	6	751–1,000	6
1,201–1,500	8	more than 400	6				
More than 1,500	10						
Mean value: £709		Mean value:		Mean value:		Mean value:	
		All farms £163		All farms £155		All farms £177	
		Farms with this type of plant £185		Farms with this type of equipment .. £176		Farms with irrigation equipment £403	

* Haulage and carriage type includes tractors, trailers, wagons, &c., and *pro rata* valuation of motor vehicles used only partly for farm cartage

Land preparation type comprises tillage implements, including planting equipment

Harvesting and conservation type includes all fodder-handling equipment but not cartage or storage equipment

Additional machinery services were obtained with the frequency indicated below.

Practice	Percentage of 50 Farms
Machinery services exchanged	14
Machinery services purchased	38

Borrowing is generally done on an exchange basis and is thus possible only for those having suitable items of plant to offer as their part of the deal. The figure for purchase of machinery services includes non-recurring services, such as bulldozing, but a sizable proportion of farmers also employ contractors to perform normal cultural operations. However, the areas partly or wholly farmed in this way are small.

In a diverse situation such as this, it is difficult to make any meaningful general statements regarding the present adequacy of machinery resources, which must be considered in relation to other resources and the present or optimum level of output. Individual farms can be distinguished where excessive plant capacity is available and others where insufficient financial resources appear to have been devoted to mechanization.

However, if present machinery resources are considered in relation to optimum output and resource allocation, the majority of farms have extensive deficiencies.

X. FARM FACILITIES

The term farm facilities includes all structures apart from fences and owner's residence (but including workers' accommodation), and in the case of the dairy buildings, milking shed equipment is also included. The distribution of values of farm facilities is as follows:

Value Range (£)	Percentage of 51 Farms
Up to 500	5·9
501–1,000	29·4
1,001–1,500	21·6
1,501–2,000	15·7
2,001–2,500	15·7
2,501–3,000	3·9
More than 3,000	7·8

Mean value £1,529

Although farm facilities represent a considerable amount of capital investment on some farms, the value of these structures would not appear to be a determinant of farm output. This proposition becomes more obvious when the major components are considered separately. There is no reason to believe that the scale of dairy buildings and the associated milk-handling equipment affects the volume of dairy production to any considerable extent.

Machinery sheds may affect net income by reducing the depreciation rate of the equipment which they shelter, but the extent to which they are used is unlikely to affect the volume of farm output.

Fodder storage and feeding facilities form the third major component under this heading. While fodder storage and hand-feeding may have a very considerable effect on dairy output, it appears that whether permanent buildings are available for the purpose does not provide a reliable guide to actual practices. Thus, in many instances, costly facilities (e.g. concrete tower silos) are unused, while in other cases heavy supplementary feeding is practised on farms with very small investment in storage and feeding facilities. For instance, the feeding of concentrates in the milking shed is a very common practice, with the concentrates being purchased in relatively small lots and as required.

For these reasons it is considered that a detailed analysis of farm facilities would be of little value in a survey of this type.

XI. LIVESTOCK

Dairy herd sizes, in terms of total dairy stock and cows milked annually, are shown in Table 10. As with all other aspects of these farms, there is a considerable range in herd numbers.

TABLE 10

DAIRY HERD SIZE (51 FARMS)

Cow Equivalents*	Percentage of Farms in Class	No. of Cows Milked Annually	Percentage of Farms in Class
30 or less	7·8	20 or less	7·8
31–45	15·7	21–30	13·7
46–60	35·3	31–40	19·6
61–75	19·6	41–50	25·6
76–90	11·8	51–60	17·6
91 or more	9·8	61–70	3·9
		71 or more	11·8
Mean (all herds) : 61		Mean (all herds) : 49	

* Based on a weight, approximately equivalent to nutritional requirements, applied to the various age classes in the herd. The weights used were:

Adult cattle, including bulls x1
Heifers from 12 months to 1st calving .. x⅔
Calves under 1 year .. .. x⅓

Although the dairy herd represents a considerable proportion of the value of resources on dairy farms, and may be variable in quality or efficiency, it can generally be considered as converting the products of other resources into the final product rather than primarily determining the volume of production. As has been pointed out (Anon. 1958), production differences between herds are principally the result of environmental rather than inherent factors, and thus variations in feed supply are, to a considerable extent, transmitted to dairy

output even when the herd size is fixed. Moreover, except in short-run seasonal changes in fodder availability, herd numbers are readily variable to cope with excesses or shortages of feed. In fact, 63 per cent. of farms purchase some dairy stock. While an important factor in the timing of purchases is the need to maintain production throughout the winter period, whether additional cows can be used at this time depends on the available feed supply.

Only a few farms had livestock other than dairy stock and only very few of these had considerable numbers of such stock.

Pigs are not an important enterprise on the majority of milk-supply farms. Pigs are maintained on only 30 per cent. of all farms and in the majority of cases the numbers are small. On those farms maintaining sows for breeding purposes, 75 per cent. have either one or two sows. This is not unexpected, since few farms expect or hope to have a milk surplus requiring separation and most arable land is devoted to the production of feed for cows. However, a very few farms (not more than 2 per cent.) have a substantial development of the pig enterprise but it is invariably dependent upon the opportunity to acquire a contract for the removal of urban food waste and in these cases tends to be of the "factory" type of production.

Beef production for purposes of this enquiry was considered as separate from the usual meat production programmes found on dairy farms, namely the sale of bobby calves at ages up to about one month and transactions in adult cows culled from the milking herd. Output from these two categories has been included in considerations of total dairy output.

With this reservation on definition, it is apparent that beef production is undertaken on 6 per cent. of the dairy farms with a maximum herd size of about 50 head. The average beef herd is equivalent to 29 head.

Other livestock enterprises, e.g. poultry and sheep, are of even less significance on these milk-producing farms.

XII. PRODUCTION METHODS

Discussion is here confined to a consideration of production techniques employed in the dairying enterprise. Although a large proportion of farmers engage in other avenues of production, the contribution of non-dairy output to total farm output is not large in most cases:

Dairy Output as Percentage of Total Output	Percentage of 50 Farms
Less than 50	8
50–60	6
61–70	8
71–80	0
81–90	12
91–100	66

Mean percentage dairy output: 86

While the relative importance of sideline production does not suggest that an evaluation of methods employed in such production on dairy farms would not be desirable, it would require consideration of larger numbers of farms producing particular products than is available in this sample of dairy suppliers.

Unfortunately, a somewhat similar consideration to that concerning sideline production occurs in regard to dairy production on this group of farms. Although the product is common, there are many variations in production techniques and resources in use, so it is not possible to find any reasonably sized group of farms in the sample which use many common methods.

Although variations occur in all aspects of the production process they are most readily apparent, and probably most important, in relation to feeding methods. Feeding practices vary from almost complete dependence on unimproved pasture, through progressively more intensive use of improved forages with varying degrees of hand-feeding and irrigation, to intensive hand-feeding under conditions that approach a feedlot.

In order to quantify the effects of the main fodder components, their relationship to dairy production, with the number of cows milked as an additional variable, has been estimated in the form of a production function (Rayner and Young 1962).

The extent to which various techniques are used on milk supply farms is set out in the remainder of this section. The following supplements information given earlier on the frequency of occurrence of some practices which can be usefully considered on this basis, i.e. whether they are practised or not on farms:

Practice	Percentage of 51 Farms
Pasture renovation—	
Mowing	6
Ripping	18
Fertilizing	16
Strip or rotational grazing	53
Feeding mineral supplements	27
Foraging of—	
Summer crops	80
Winter crops	71
Fodder cane	39

As indicated in Table 11, while 49 per cent. of farms have some improved pasture other than pasture species under irrigation, only 12 per cent. have areas likely to be large enough to be of any importance.

The rather wide range in stocking rates indicated by Table 11 is not unexpected in view of the variations in land quality discussed earlier. However, the variations in stocking rate are not very closely related to land quality variations, being modified by varying intensities of land use and by the use of purchased fodders.

TABLE 11

ANALYSIS OF AREA OF IMPROVED PASTURE, DAIRY HERD STOCKING RATE, MILKING RATIO AND PURCHASES OF DAIRY CATTLE (51 FARMS)

Improved Pastures (ac)	Farms (%)	Stocking Rate*	Farms (%)	Milking Ratio†	Farms (%)	Cattle Purchased (cow equivalents)	Farms (%)
Nil	51	<2·1	16	<0·61	6	0	37
0·1–5·0	27	2·1–3·0	30	0·61–0·70	12	1–5	27
5·1–10·0	10	3·1–4·0	32	0·71–0·80	34	6–10	16
More than 10 ..	12	4·1–5·0	16	0·81–0·90	22	11–15	10
Mean: 18·6 ac		>5·0	6	0·91–1·00	16	16–20	2
		Mean: 3·1		>1·00	10	>20	8
				Mean: 0·82		Mean: 6·5	

* Stocking rate is expressed as equivalent dairy forage area per cow equivalent (see footnotes to Tables 7 and 10). In this table, only land used by the dairy herd is considered

† The ratio of cows milked annually to total dairy herd size expressed in cow equivalents

Variations in the milking ratio (Table 11) are due to different herd replacement policies. These range from the rearing to the purchasing of all replacements. The extreme value (greater than 1) occurs where cows in lactation or about to commence lactation are purchased to replace others which are sold as they dry off. In fact, as shown by Table 11, the purchasing of relatively large numbers of cows occurs on only a small proportion of farms. The high prices for cows in, or on the point of, production (which are occasionally a feature of the Brisbane market) must be associated with the coincidence of demand by milk suppliers (due to the quota-determining winter production period) rather than heavy purchases of cows being a general feature of milk-supply farms.

Table 12 indicates considerable divergence in the use of forage crops in terms of area of crops per cow, with a large proportion of farms using little or none. As extra arable land is available on practically all farms, this form of feed production is capable of considerable expansion. It seems reasonable to expect that net returns on many farms could be increased by the greater use of forage crops to replace purchased fodders. However, the extent to which this substitution can be profitably made requires more detailed investigation. Available information in this field is so inadequate that a rather comprehensive inquiry would seem desirable, involving (*a*) comparison of performance of available crops and cultural methods, and (*b*) comparative budgetary (or similar) analysis of the alternatives.

The relative unimportance of irrigated forage crops is shown in Table 12.

The conservation of fodder is carried out on a very limited scale on these farms (Table 12), particularly when viewed in relation to the volume of hand-feeding. Although, in general, more intensive land use on these farms (including increased fodder conservation) would seem to be profitable, the position is not unambiguous. Land resources on some farms (lacking in land quality and/or area) would be best developed for intensive forage production with their requirements for conserved fodder being purchased.

The rather heavy purchasing of fodder (Table 12) by these farmers has been considered above in relation to the use of forage crops. It appears that the proportion of the dairy herd's fodder supplied by purchases is unnecessarily large.

While there is a rather wide range in hand-feeding allowances (Table 12), the majority of farms use less than average amounts, very heavy feeding being confined to a small proportion of farms. Some evaluation of hand-feeding has been made in the production function mentioned earlier.

TABLE 12

ANALYSIS OF FORAGE AREA, IRRIGATED FORAGE AREA, CONSERVED FODDER, PURCHASED FODDER, AND HAND-FEEDING OF MILKING COWS ON 51 FARMS

Forage Area Per Cow* (ac)	Farms (%)	Irrigated Forage Area (ac)	Farms (%)	Fodder Conserved Annually†	Farms (%)	Fodder Purchased†	Farms (%)	Fodder Fed Per Cow‡	Farms (%)
Nil	14	Nil	74	Nil	56	Nil	6	Under 470	18
0·01–0·20	20	1–5	14	1–5	20	1–10	30	470–900	34
0·21–0·40	22	6–10	6	6–10	8	11–20	24	901–1,350	16
0·41–0·60	14	11–15	2	11–15	6	21–30	22	1,351–1,800	18
0·61–0·80	14	16–20	2	21–30	4	31–40	6	1,800–2,240	4
0·81–1·00	10	more than 20	2	31–40	2	41–50	6	2,241–4,480	6
More than 1·00	6			41–50	2	more than 50	6	4,481–6,720	4
Mean: 0·42 ac		Mean: 2·1 ac		61–70	2				
				Mean: 6 tons grain equivalent		Mean: 31 tons grain equivalent			

* Expressed as equivalent cultivated area of forage per cow milked annually (see footnote to Table 8)

† Fodders combined on the basis of their estimated total digestible nutrients content and the total expressed in terms of the amount of grain having an equivalent feed value

‡ Expressed as lb of grain equivalent. Only conserved and purchased fodders, including by-products of food processing plants, considered. The immediate feeding of mechanically or manually harvested forage material which might otherwise be grazed has been excluded

In order to provide a better appreciation of the many variants of production method prevailing among the group, four farms have been selected for more detailed description. These are as follows:

Farm A: *A grazing farm using some purchased feed supplements.*—The area of 320 ac comprises two quality classes. An area of swamp (40 ac) provides grazing of reasonable quality for a period after the summer in most years and the remainder of the available area is the forest type. Native summer-growing species and paspalum in the more favoured situations are the pasture components. Very little clover is found in the sward and it has not been the practice to renovate or fertilize in recent years. No livestock apart from the dairy herd are kept and the sale of dairy products is supplemented solely by the output of young calves and cull cows. The farm is not equipped for any crop programmes, and the main item of plant, other than dairy shed equipment, is a motor vehicle used for feed and milk cartage. Concentrates are bought regularly, usually in small lots monthly, and are fed throughout most of the year at flat rates.

Farm B: *A farm with intensive hand-feeding programmes.*—The area of land available is 115 ac, most of which is leased. Of the 25 ac of arable land, 15 are used for dairy feed production and are cropped twice yearly. Some irrigation is used for small crops. Dairy income is derived from about 120 lactations each year. The herd of 92 cow-equivalents is supplemented by the purchase of 30 adult cows annually. The farm supports, also, an intensive pig enterprise and for this programme city food wastes are acquired. The dairy herd feed supply is derived largely from sources off the farm. The bulkiest item purchased is cannery waste but concentrates are also used extensively. The handling of feed requires the use of several motor trucks, and in addition the farm is equipped with extensive feed storage sheds and handling equipment.

Farm C: *A farm with intensive irrigation programmes.*—Although the area of the farm is 800 ac, most of it is forest type and generally too stony and steep for arable work. However, good quality alluvial flats are available and provide the bulk of the herd feed supply. Usually 38 ac of this land are cropped and irrigated each year.

The farm is practically self-sufficient in feed and very little feed is purchased. An extensive suite of machinery, including a hay-baler, is available. A wide range of winter and summer crops, irrigated as required, are grown for forage and conservation.

Farm D: *A farm with intensive crop programmes.*—While the farm is small (124 ac), it is intensively cropped to summer and winter cereals and lucerne. The soil is good quality. The farm is self-sufficient in dairy feed, and haymaking is a regular feature of the farm operations.

Table 13 lists a number of characteristics of each farm.

TABLE 13

CHARACTERISTICS OF SELECTED FARMS

Characteristic	Farm A	Farm B	Farm C	Farm D
Land used for dairying:				
Irrigated (ac)	..	..	38	..
Cultivated (dryland) (ac)	..	30	..	83
Grassland (ac)	320	89	735	41
Dairy herd:				
Total (cow equivalents)	79	92	113	40
Cows milked (annually)	65	120	90	41
Annual purchases (cow equivalents) ..	12	30	..	9
Labour use: (A.M.E. yearly)	1·3	4·2	3·0	1·7
Plant and machinery:				
(Main items—excluding dairy shed equipment)	Utility truck	Motor trucks (3) Tractor	Motor trucks (3) Tractors (3) Ploughs (3) Hay baler Irrigation equipment	Tractors (2) Tillage implements
Fodder conservation:				
Conserved (tons grain equivalent) ..	..	..	50	28
Type	..	..	Silage, Hay	Hay
Fodder purchase:				
Quantity (tons grain equivalent) ..	26	478	7	0
Type	Concentrates Lucerne Chaff	Cannery Waste Concentrates	Concentrates	..
Herd feeding:				
Stocking rate (ac per cow)	4·0	1·6	7·5	4·2
Cultivated forage per cow milked (ac) ..	..	0·25	0·64	1·56
Hand-feeding per cow milked (tons of grain equivalent)	0·40	2·92	0·30	0·49

XIII. FARM OUTPUT

The outstanding feature of the farm situation in East Moreton generally, and in this milk-supply area in particular, is the diversity of farm resources and their degree of employment between farms and also the large degree of variation in production techniques among the farms. In such circumstances, the classification of farms into several groups and the use of mean figures derived therefrom has limited utility.

However, so long as the limitations inherent in grouped and averaged data are recognized, the examination of such data adds substantially to the existing level of knowledge of the farms and the circumstances of the farmers.

The farms in this sample were grouped into the following three classes on the basis of the magnitude of the total value of the farm output:—

(1) Low output—value of gross output less than £2000 per annum.

(2) Intermediate output—value of gross output between £2000 and £3000 per annum.

(3) High output—value of gross output over £3000 per annum.

The figures are a mean of three years (1957-58 to 1959-60) and comprise the gross value of the total output of dairy products delivered to factories, together with an estimate of the gross value of other crop and animal products sold. For cash crops, including horticultural products, reasonable average output figures were used for each farm involved at standard and reasonable prices prevailing over the period. In the case of livestock transactions, standard prices for cattle classes involved, chiefly bobby calves and culled cows, were used, with the gross value adjusted downwards in accordance with the magnitude of the mature cow purchases.

The more important characteristics of the farms in each class are presented in Table 14. The farms are fairly equally distributed between the output classes, with approximately one-third in each.

TABLE 14

CHARACTERISTICS OF 50 FARMS IN OUTPUT CLASSES

Farm Characteristic	Value of Farm Output			All Farms
	Under £2,000 p.a.	£2,000 to £3,000 p.a.	Over £3,000 p.a.	
Percentage of farms	30	36	34	100
Mean usable farm area (ac)	140	210	353	240
Mean potential arable area (ac)	47	78	108	78
Mean area in cultivation (ac)	10	18	29	19
Mean irrigible area (ac)	8	12	20	18·9
Mean area irrigated (ac)	0·6	2·6	6·3	3·4
Percentage farms without irrigation opportunity	60	39	41	43
Mean annual expenditure on purchased fodders (£)	453	496	668	562
Feed expenditure as percentage of value of total farm output	28	20	15	19
Mean value of total output (£)	1,598	2,528	4,545	2,935
Mean value of dairy products output (£)	1,436	2,208	3,676	2,359
Dairy output as percentage of total output	90	87	81	86
Percentage of operators taking off-farm work	33	..	..	10
Labour resource (adult male equivalents per year)	1·7	1·8	2·6	2·04
Average length of farm ownership (years)	13	12	21	15
No. of cows milked annually	32	45	67	49
Production per cow milked (gal)	336	322	388	349
Total value of plant and machinery (£)	458	984	2,222	1,225
Value of—				
(a) land preparation equipment (£)	68	158	256	163
(b) harvesting and conservation equipment (£)	96	108	258	155

The most marked feature of the land resource, however measured, is that it varies directly and nearly proportionately with total output. In addition, the relationships between usable area and potentially arable area, and also between potentially arable area and area in cultivation, are similar for each output class. There is no reasonable explanation for this apparent similarity between classes in the degree of land use.

The fact that average areas of cultivation and areas in irrigation in the high-output group are less than the corresponding potential areas in the low-output group tends to support the view that the possibilities for increased output in all classes are reasonably good. This would be of special significance for those in the low-output class, where the amount of arable land per farm (47 ac) is greater than the land actually in cultivation on the average farm of the high-output class (29 ac). A similar situation seems to prevail between high and low output classes in respect of irrigable land and land in irrigation use.

However, a consideration of farms individually, without the impediments to interpretation inherent in average data derived from groups, presents a picture of many farms and especially those in the low-output group with very limited land resources. For instance, while few farms are found that do not have at least some arable land, it is apparent that a higher proportion (60 per cent.) of the low-output farms are without any irrigation opportunity at all.

A characteristic feature of the fodder programme on the farms of East Moreton, and especially on those supplying milk in winter, is the use that is made of purchased feed inputs. The expenditure on this item is understandably higher on milk farms than on those supplying mainly cream, and in either case is concentrated in the quota-determining winter period. The mean annual expenditure in the three output classes is high not only in absolute terms but also relative to the value of the farm output. Feed purchases represent the largest cost item on this group of farms, with relatively heaviest expenditure occurring on the farms of the low-output class.

The aspects that have greatest significance to extension and those supplying technical services in the region are, on the one hand, the use of feed inputs on such a scale while opportunities for the home production of feed supplies in many cases are under-employed, and, on the other hand, the apparent inefficiency in the use of the feeds that are purchased.

While it is not readily possible to measure the efficiency of purchased feed usage, it is nevertheless apparent that there is the opportunity, on many farms, for improvement in this matter. In the majority of cases, feed purchases are made in relatively small quantities and at frequent intervals, usually monthly and sometimes weekly, with the purchase financed out of recent revenue. Thus the advantages of bulk purchase at times when the local feed market prices are depressed is lost. However, this activity would require a liquid cash resource

that seems to be generally not available. In addition, it would presumably involve additional capital expenditure on more permanent and durable storage facilities on many farms.

In addition to this loss of financial advantage from bulk purchase, it is also apparent from discussion with the farmers at the time of interview that there is a large measure of inefficiency resulting from the purchase of feed supplements that are not appropriate to the current farm feed requirement. For instance, a low-protein feed may be purchased and used when a high-protein feed supplement is required; again, the feeds that are used as supplements tend to be fed at flat rates, when greater efficiency may be possible by differential feed rates that take due account of stage of lactation and current output level. In some cases supplementary feeding with purchased feeds seemed to be virtually a traditional activity, the same quantities of the same fodder being regularly used irrespective of circumstances.

Another characteristic of the farms is the relative insignificance of enterprises other than dairying.

The financial insecurity and low income position of the low-output class of farm is reflected in the large proportion (33 per cent.) of owners or principal operators in this class who indicated that it had been necessary in recent years to take off-farm work either periodically, perhaps one or more days a week, or else seasonally, perhaps continuously for a month or more annually.

While herd size measurements are generally in accord with and vary similarly to measures of farm size, there is the possibility of better degrees of herd and property management prevailing on the high-output farms, and this is reflected in the greater output per cow. This is possibly not of very great importance, since the general level of performance in any case is low at 350 gal per cow per annum. The main conclusion is that differences in farm output are principally dependent on the general scale of operations, with the high-output class having a greater opportunity for other enterprises and consequently a lower relationship of dairy output to total output and also achieving slightly higher productivity per cow as a result, presumably, of better feed programmes.

Though the land resource is generally not developed to capacity, it would seem that additional capital would be needed to achieve much fuller development. This capital would be especially needed on the low-output farms, principally in land preparation and harvesting machines, provided, of course, that the land was available in sufficient quantity and was of a quality that would warrant development.

It is tentatively concluded that one reason for the relative prevalence of the use of purchased feed inputs rather than home-produced fodders is the lack of availability of ready cash to make the initial machinery purchases and the apparent reluctance to incur debts. An additional factor seems to be the general level of pessimism about future long-term prospects in the industry.

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