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SOME ASPECTS OF LAND UTILIZATION ON DAIRY FARMS ON THE LOWER NORTH COAST.*

by

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1. INTRODUCTION.

During the second and third quarters of 1951, the Division of Marketing and Agricultural Economics conducted a survey on sixty-five dairy farms in the Manning River district of New South Wales, with the object of collecting data which would further the understanding of the dairy farm as an economic unit.

Aims of the Survey.

The aims of the survey were:

- (a) To obtain factual information concerning the technical, economic and social structure of the dairy industry in a selected part of the State. In particular, it was hoped to secure information which might serve as a useful guide to further enquiries into the industry.
- (b) To investigate the nature of, and relationships between, the many factors making for variations in the productivity of dairy farms.

The survey was not designed to test any particular hypothesis. It was essentially exploratory in character and therefore sought information on a wide range of topics. In dairy farming, the farm family is responsible for both the management and the bulk of the labour effort so that the pattern of family life infuses a distinctive socio-economic character into the organization of the dairy farm. It is essential, therefore, that this factor should be taken into account, along with technical and economic considerations, when studying the character of land utilization and farm organization on dairy farms.

The information gained during the course of the survey has been analysed at two levels of intensity. First, the material has been assembled and analysed to give an overall picture of the organization of the survey farms as production units. Second, some of the information has been subjected to statistical analysis designed to test the significance of certain hypothetical relationships, such as the relationship between size of farm, size of herd, production levels, and the tenure status of farm operators, etc.

The present article is concerned with the first part of the analysis. It presents a description of the various agronomic, economic, and social conditions on survey farms. Additional information regarding farm population and living conditions on farms will be presented in a subsequent article. The latter article will also contain a discussion of the results of the second part of the analysis.

Selection of Survey Farms.

The survey farms were selected from all farms throughout the survey area which were listed as registered dairies for the year 1950. Using a variable sampling fraction, a sample was systematically selected for each of the four police patrol districts from lists of farmers' names arranged in alphabetical order for each district. The starting points for selection were chosen at random.

The total dairy farm population, the number of farms surveyed, and the equivalent sampling fraction are shown, for the four survey zones and the survey area as a whole, in Table I.

TABLE I.
Proportion of Farms Surveyed.

Survey District.	Total Number of Registered Dairies Constituting District Population.	Number of Farms Surveyed.	Equivalent Sampling Fraction. Per cent.
<i>Police Patrols—</i>			
Taree ...	431	22	5.10
Wingham ...	230	14	6.09
Nabiac ...	269	13	4.83
Comboyne ...	87	16	18.39
Survey Area ...	1,017	65	6.39

2. THE SURVEY AREA.

The district covered by the survey embraces a portion of the Lower North Coast, centred around the Manning River, irregular in shape and extending a distance of about sixty miles from north to south and to a depth of about thirty miles west from the coastline. It comprises the areas covered by the police patrol districts of Taree, Wingham, Nabiac, and Comboyne. The survey farms were not scattered haphazardly over the whole of this area. They were confined to the river valleys, creek courses, and areas of more subdued topography.

The survey area was selected because it embraced a diversity of land form types and included three major coastal topographic forms. These are as follows:

- (a) A basalt-capped plateau area represented by the Comboyne Plateau.
- (b) A major coastal river valley, including both the alluvial flats of the lower river and the more rugged headwater areas. This is represented by that portion of the Manning River Valley covered by the Wingham and Taree police patrols.
- (c) Predominantly ridge and creek country with no extensive areas of river flats, which is represented by the Nabiac police patrol.

The survey area therefore embraced a variety of geographic conditions which were found to have a varied impact on the land use management of dairy farms.

General Land Use Characteristics.

The dominant land use in the Manning River district is dairy farming which occupies the major river valleys and less rugged areas. The production of fodder crops, mostly for the farmer's own use, is undertaken on most dairy farms with suitable land. Whilst the production of cream for butter constituted the chief activity of dairy farms throughout previous years, the production of whole milk, for use by local butter factories and for the Milk Board, has been increasing in importance during recent years. This tendency is causing the displacement of pig production on some farms, although this enterprise is still an important source of additional income on many dairy farms in the area.

Towards the more rugged headwater regions, where intensive production of fodder crops and pasture improvement are less favoured by natural conditions, beef cattle are produced on many dairy farms or displace dairying altogether. Timber getting is also an important enterprise in these areas.

On many dairy farms, vegetable crops, such as peas, potatoes, and pumpkins, are often produced.

Commercial maize growing is undertaken on some farms, but this industry has diminished considerably in comparison with levels of output attained during the latter part of the last century.

Citrus fruit is produced in significant quantities, chiefly in the vicinity of Moorland, to the north of Taree. Passion fruit and bananas are grown on a number of farms throughout the hilly sections of the survey area.

Geographic Conditions and Dairy Farm Organization.

The natural productivity and land-use management of dairy farms throughout the survey area was found to be closely related to variations in certain critical geographic conditions. These included the aspect and gradient of land surfaces, soil fertility and soil drainage conditions, and the quality and continuity of supply of stock water.

A characteristic feature of the pattern of land use on dairy farms in coastal river valleys of New South Wales is the manner in which the general distribution of settlement has been orientated towards the creek and river courses. One important result has been that the boundaries of many dairy farms have been defined so that each farm trends generally at right angles to the longitudinal profile of the valley (i.e. at right angles to the stream course) and the farm occupies sometimes both halves, but in most cases, one half of the valley cross-section. This feature is schematically illustrated in Figure I. The various symbols A, B and C depict broad land types which characterize coastal river valleys and, viewed in cross-section, they often take the form depicted in Figure I. Throughout the survey area, each of these land types was found to vary with respect to minor surface features, but each type appeared to be associated with a particular aspect of land use on dairy farms. An analysis of these land types provides a useful basis for studying the pattern of land utilization on dairy farms.

The relative preponderance of each of the land types varies considerably throughout the survey area. Some farming areas consist entirely of type A (with subtypes A1, A2 and A3), others of combinations of A, B, and C. In some areas, farms are comprised almost entirely of type C, with small areas of type B. As might be expected, significant variations in the quality of the land for dairying purposes accompany changes of this character.

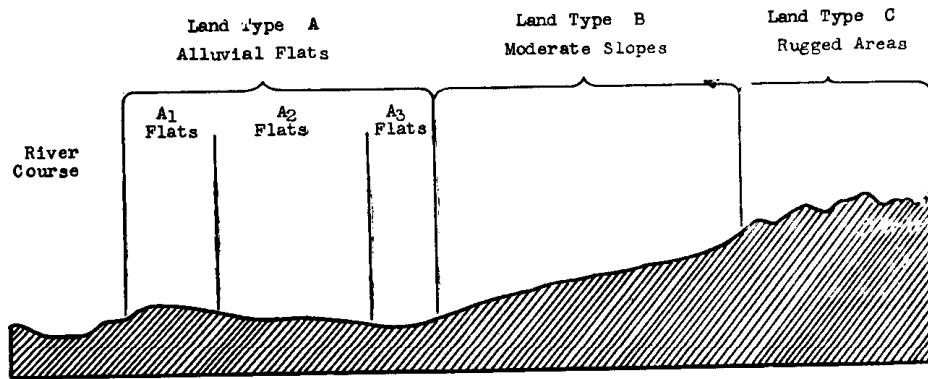


Fig. 1.—Diagram showing land types typical of dairy coastal river valley districts.

The land use found in typical association with these land types on survey farms was as follows :—

Land type A : The alluvial flats.

Sub-type A1—First quality alluvial flats with well-drained soils used for the production of fodder crops, such as maize and lucerne.

Sub-type A2—Second quality alluvial flats used for the grazing of the milking herd on paspalum and improved pasture plants with a level of pasture sub-division and rotational grazing usually higher than in other areas.

Sub-type A3—Third quality alluvial flats mostly badly drained with swamp pasture and vegetation associations, often of little value except as a source of feed in dry times.

Land type B : The moderate slopes, used mainly for the grazing of the milking herd on paspalum pastures with moderate intensities of pasture sub-division and rotational grazing. Some cropping was carried on where the soils were deepest.

Land type C : The hilly and rugged areas used mainly for grazing "dry" dairy stock and beef cattle on natural pastures with the lowest level of pasture sub-division and rotational grazing.

Survey Zones.

Taree Police Patrol District.

This district embraces the valley of the Manning River on its northern watershed, east from the town of Wingham and on its southern watershed east from Charity Creek. Survey farms were not found in the forested areas but occurred in three zones as follows :—

- (a) A belt of hilly country with medium timber cover which fronts the southern bank of the Manning River and stretches south from the stream to an average depth of about six miles. This area embraces the districts known as Kimbriki, Burrill Creek and Bootawah.
- (b) The Upper Lansdowne portion of the valley of the Lansdowne River, mostly covered with a thin timber cover, with characteristics similar to the areas of the northern portions of the Wingham zone.
- (c) An extensive belt of river flat country along the lower sections of the Manning River which includes districts such as Moto, Ghinni Ghinni, Glenthorne, Purfleet, and the river "island" country consisting of Oxley, Dumaresq, and Mitchells islands. The latter areas have been formed by the lower Manning River splitting into two courses.

For the purpose of this article, the above areas will be referred to as the "Taree zone."

One survey farm was located in the Kimbriki district, and another in the Burrill Creek district, both being composed of land types A, B, and C after the fashion described in Figure I. These two farms were similar to those located in the more subdued sections of the Wingham zone, with characteristics as described for that area.¹

Similarly, one farm was located in the Upper Lansdowne district and was composed of land types similar to those described for the hilly farms in the headwater valley section of Wingham zone.²

Apart from these three farms, all of the survey farms were located entirely on river flat country and all were below one hundred feet above sea-level. It is in the river flat country of the Taree zone that the three-fold variation of river flats described previously was most common. On all farms, it was the relative disposition and preponderance of various types of river flats which were basic to changes in the pattern of farm organization and land utilization.

Survey farms in the Taree zone with the largest amount of elevated flats adjacent to stream courses (land type A1) were comparatively more suited to cultivation of fodder crops. Farms of this type were characteristic of such areas as Taree Estate, near the town of Taree, and the various river islands.

A characteristic feature of many farms in the Taree zone is that farm houses and farm buildings are located on the elevated river banks, where conditions of soil drainage are best. These sites also provide nearness to river transport which, although it has diminished in importance, still constitutes an important means of access to farms from local urban centres.

Land type A2—the second class river flats—comprised the bulk of all survey farms on the lowland areas of the Taree zone. Conditions of soil moisture on these flats were found to be conducive to rank paspalum growth, so that the feed value of pastures in these areas varied strongly with the efficiency of pasture management. On some farms, careful mowing and renovation of paspalum pastures, coupled with top-dressing, rotational grazing and correct property subdivision has resulted in pastures of high quality.³

On many survey farms, however, unsuitable pasture management has resulted in large areas of rank paspalum growth.

Badly drained river flats (land type A3) were found on all survey farms located on the river flats of the Taree zone. Considerable amounts of artificial drainage have been introduced to reduce the ill-drained character of these areas. Flats of this type were more widespread on survey farms located in the Pampoolah and Moto districts.

The fact that most of the survey farms in the Taree zone were entirely composed of flats has resulted in greater intensity of property subdivision and smaller farms than is the case in the other survey zones. The lack of warmer hilly country for winter grazing has presented a problem to many survey farmers in the Taree zone that

¹See p. 185.

²See p. 186.

³For a brief description of a well managed farm in the river flat country of the Taree zone see A. J. Gresham "Outstanding Example of Subdivision and Pasture Improvement," *The Milk Board Journal*, December 15, 1950. Pp. 648-649.

most farmers in the other zones have not had to face. In addition, most survey farms in the Taree zone have been handicapped in the past by periodic floods, which have destroyed crops and improved pasture.

Taree, with a population⁴ of 7,120, is the leading centre of the Taree zone for road and rail transport and has two dairy factories which collect and process dairy produce gained from surrounding districts by river and road transport. Taree constitutes the chief administrative centre of the survey area and the leading centre for the provision of social amenities such as tertiary education and hospitalization. It also forms an important nucleus of the sea coast tourist traffic to centres such as Tuncurry, Forster, Old Bar and Harrington.

A well-developed road, rail, and river transport system connects Taree with dairy farming areas of the Taree zone.

Wingham Police Patrol District.

This district embraces the northern portion of the watershed of the Manning River, east to include the valley of Killabakh Creek, i.e. slightly east of longitude of Wingham, and west to include the valley of the Nowendoc River. The overall width of the district is about twenty-four miles from east to west and eighteen miles from north to south. Farms included in the survey were located mainly in the eastern portion of this district; none was found along the Nowendoc River or along the Manning River upstream from its junction with Dingo Creek. Survey farms within the Wingham Police Patrol were found in areas including Wingham "Brush", adjacent to the town of Wingham, and throughout the valleys of Dingo, Cedar Party and Killabakh Creeks, as far north as the foot of the Comboyne Plateau. For purposes of this article, these portions of the Wingham Police Patrol will be referred to as the "Wingham zone".

The Wingham zone is mostly hilly and covered with a camouflage cover of vegetation (mostly Eucalypt) except on the flats and lower slopes, adjacent to the main water courses. Some of the best drained and most fertile river flats in the survey area are found in this zone along the northern bank of the Manning at localities such as Killawarra and Wingham "Brush". Intensive cultivation of fodder crops and pasture improvement are carried on over much of these flats.

With the exception of one farm located on the flats near Wingham, all the farms surveyed in this zone were composed of land types B and C and relatively small areas of type A. The pattern of land forms on most farms followed that described in Figure I.

The major factor which causes changes in the natural productivity of farms throughout the Wingham zone is the variation in the relative preponderance of each of these land types. Along the Manning River and in the lower valleys of tributary streams, such as Dingo and Cedar Party creeks, the topography is less rugged than to the north, so that farms in this area possess comparatively large amounts of flats and moderate slopes and smaller amounts of rugged country. These farms are cleared to a large extent and infestation by bracken fern and lantana is not very prevalent. A typical view of farm lands in these areas is illustrated by Figure 6.

⁴ As at 31st December, 1950.

In the northern section of the Wingham zone, *i.e.*, near the rim of the Comboyne Plateau, the topography is more rugged and valleys more narrow. Survey farms in this area were composed mostly of hilly country with only small amounts of moderate slopes. Small pockets of alluvial flats were found on some farms adjacent to the accentuated meander of major creeks. A typical view of the land surface in these areas is illustrated by Figure 7. Most farms in these rugged areas are fairly heavily timbered and covered with native grass pastures, except for *paspalum* which is found on lower slopes. Heavy infestation of bracken fern and lantana constitutes a problem on many farms.

Of the fourteen dairy farms surveyed in the Wingham zone, the number which occurred within the various geographic areas described above was as follows:—

- (a) Five farms were located in the rugged headwater areas dominated by land type C.
- (b) Eight farms were located in the hilly-to-undulating areas where land-types A and B were more important.
- (c) One farm was located entirely on well-drained river flats, similar to those described for the Taree zone.

The hilly topography, porosity of soils, and lower rainfall has accentuated the effects of dry seasons on many farms in the Wingham zone, which often have been more handicapped by droughts than river-flat farms in the Taree zone. However, for similar reasons, farms in the Wingham zone have been less handicapped by excessive rainfall and flood conditions.

Wingham, with a population⁵ of about 2,290, is the chief urban centre for the Upper Manning River district. Most farmers throughout the Wingham zone depend on this centre for more specialized urban functions. Wingham possesses a butter factory, bacon factory and saleyards to which farmers send their dairy produce and stock. It forms the rail head for farmers in the Wingham zone and provides most of their commercial and social requirements. Small local centres, supplying less specialized functions, are scattered at intervals of from three to four miles throughout the Wingham zone. These settlements are fragmentary in character, with rudimentary functional units such as a primary school, a general store, a church and a sawmill. Roads radiate from Wingham along the main valleys, one connecting Wingham with the Bulga Plateau and one connecting Wingham with the Comboyne Plateau. It is to Wingham, rather than Taree, that farmers on the Comboyne Plateau look for their commercial requirements.

Nabiac Police Patrol District.

The Nabiac Police Patrol District lies south of the Taree and Wingham zones and comprises the watershed areas of the Wollamba, Wang Wauk, and Goolongolook Rivers. Excluding an area in the vicinity of Tuncurry and Wallis Lake, it stretches back from the coast to a maximum depth of about twenty-two miles. The survey farms were found scattered throughout the whole of the patrol which will be referred to here as the "Nabiac zone."

⁵As at 31st December, 1950.

The Nabiac zone is composed of creek and ridge country with ridges trending generally from south-east to the north-west. All the more rugged ridge tops are fairly heavily timbered. Most land below about the three hundred foot contour line has been partially cleared. Areas of mostly-cleared country occur on the more extensive flats near Dyers Crossing, Nabiac and Wang Wauk.

Three of the farms surveyed in the Nabiac zone were composed almost entirely of river flats, which were poorly drained in many parts. These farms were located near Dyers Crossing and Nabiac. All of the other farms surveyed in the Nabiac zone were composed of creeks and ridge country with land types B and C predominating. Soils were mostly thin and of poor quality on these farms, although small amounts of arable land were found on the tops of lower ridges and as pockets of alluvial flats. Farm organization followed a similar pattern to that described for the hillier farms in the Wingham zone. A relatively greater deficiency of moderate slopes and flats minimized the extent to which farmers could engage in cultivation of fodder crops, pasture improvement and intensive rotational grazing.

Nabiac is the chief local centre for the zone, but Dyers Crossing and Krambach are also important centres. Dyers Crossing is a centre for the local collection of milk and cream prior to transportation to one of the factories at Taree, as well as a source for provisions required by farmers. Krambach is an important centre for the local buying and selling of cattle. Small local centres, providing less specialized functions such as a primary school, store and church, are found scattered throughout the Nabiac zone.

Most of the farmers in the eastern half of the Nabiac zone look to Taree as a leading urban centre, whilst many in the western half look to Gloucester.

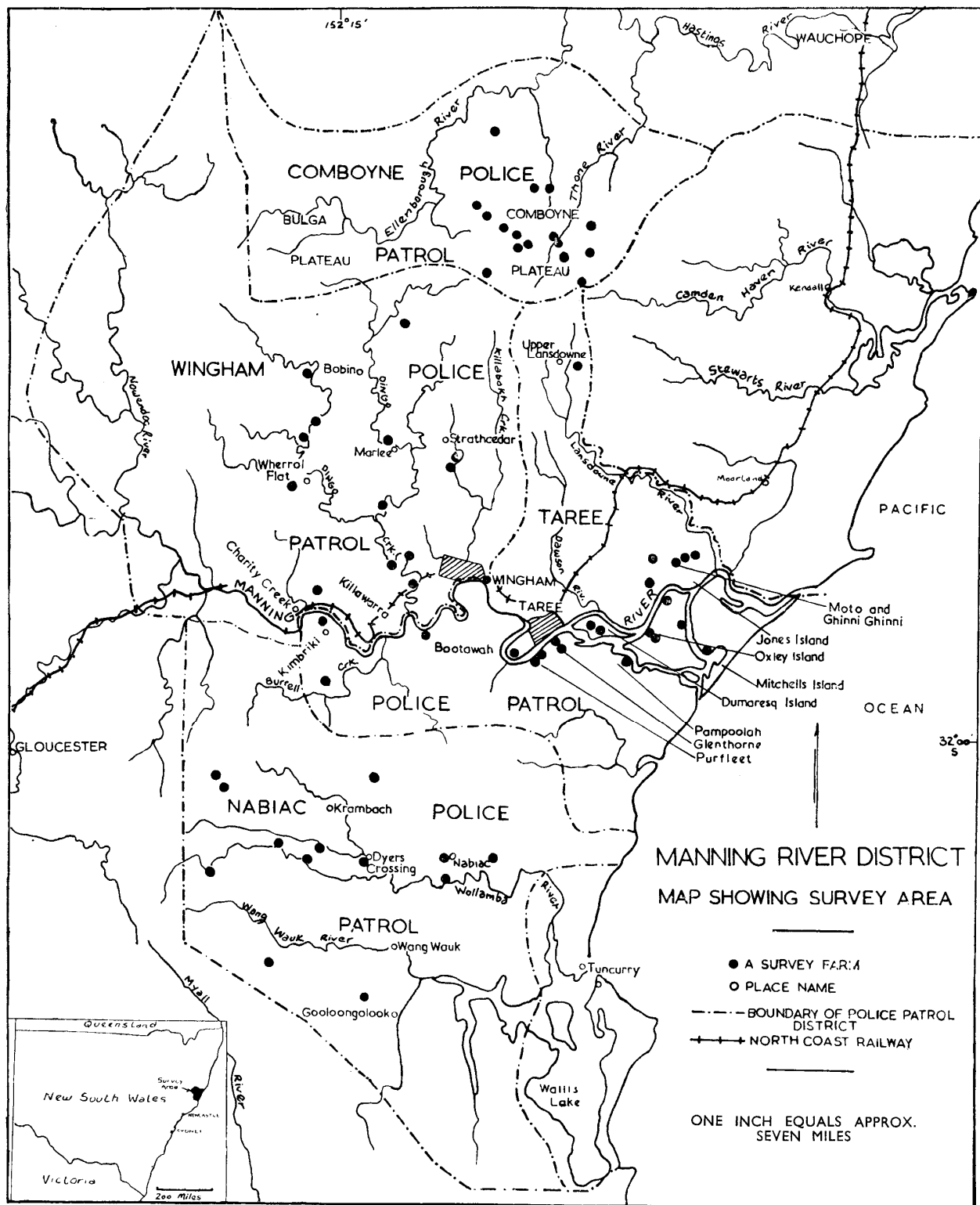
Comboyne Police Patrol District.

The Comboyne Police Patrol District embraces the Comboyne and Bulga Plateaux and the upper reaches of the Ellenborough River which separates these two plateaux and drains northward into the Hastings River. The patrol, therefore, comprises much of the southern and south-western divide between the valley of the Hastings River to the north and the valley of the Manning River to the south.

The Bulga Plateau is considerably more dissected than is the Comboyne Plateau, so that continuous areas of basalt soils are less extensive and the country is more rugged than the Comboyne.

The dairy farms surveyed in the Comboyne Police Patrol have been selected only from those on the Comboyne Plateau itself and, for the purposes of the following article, this area will be referred to as the "Comboyne zone."

The Comboyne zone is a basalt capped plateau occupying about seventy square miles and having an average elevation of about 2,200 feet above sea-level. The highest point of the plateau is Mount Gibraltar, on the south-western rim, which is 2,796 feet above sea-level. Two other high points are Mount Bulli (2,700 feet) and Mount Kopje (2,300 feet), both in the south-eastern section.



About forty years ago, Pederson referred as follows to the Comboyne Plateau:

The country is in a very rough state, the amount of clearing done and grasses sown being small. Paspalum, rye, prairie, and coxsfoot grasses and clover have been sown and all are doing well. There are about eighty settlers on the Comboyne proper and quite a number on the mountainous sides. About two dozen are doing a little dairying, the east end settlers sending their cream to the Lower Manning and the west end settlers to Wingham. None of the roads are yet metalled, and some not formed*.

Since Pederson expressed the above opinions, the Comboyne Plateau has changed considerably. Practically all the dense softwood Brush or rain forest, which was found originally has been cleared and only scattered clumps of small softwood trees are found over much of the surface at the present time. The number of dairy farmers operating on the Plateau exceeded one hundred in the early 'thirties but has remained in the vicinity of eighty to ninety in recent years.

The southern tributaries of the Hastings River drain the northern flank of the Comboyne Plateau and headwater erosion by such streams as Thone River, Bunnoo River, Tom's Creek and Mumford's Creek have given the northern part of the plateau the characteristic shape of a series of finger-like projections which spread between the valleys of these streams. Each of these projections, or spurs, is basalt capped, like the rest of the plateau, and they average about four miles in length and about a half a mile in width. They are flanked on three sides by very steep slopes which descend over one thousand feet to the valleys below. Roads spread out radially from the village of Comboyne along these spurs and dairy farms extend to their extremities and beyond down the steep slopes into the adjacent valleys.

The eastern approach to the Comboyne zone from Kendall is much more gradual than those from other directions, so that this centre is favoured as a rail junction for the heavy transport trade with the Comboyne zone.

The eastern flank of the zone is drained by the Southern Branch of the Camden Haven River with its outlet at Laurieton. A view of the rugged and heavily timbered dairy country on the Upper Camden Haven valley from the eastern rim of the Comboyne Plateau, is shown in Figure 10.

The southern approach to the Comboyne zone from Wingham is perhaps the most precipitous, since the transition from the headwater areas of the northern tributaries of the Manning River is by way of a very steep bluff.

*A short report entitled "Dairying on the Comboyne," *Agricultural Gazette of N.S.W.*, July 2, 1910, p. 566.

The topography of the zone is undulating in its more central parts⁷ but hilly and more dissected to the south-west, in the vicinity of Mount Gibraltar. The soils of the plateau, being basaltic in origin, are a rich red in colour. The depth of soils varies considerably throughout the area; in the central section they reach their greatest depth of more than six feet in places, but become shallow towards the periphery of the zone. To the north and west, soils are thin and overlies sandstone formations, which outcrop in more elevated areas. Transition from softwood species of vegetation on the deeper red soils to hardwood species on the shallow soils overlying sandstone reflects changes in the character of the soil and underlying rock type.

Although the Comboyne zone has changed much from its original state, those interested in the character of the dense softwood forests once found in this area can see them preserved on a smaller scale in pockets. With the exception of the red cedar, which has long since been removed, some of these areas contain a large variety of rain forest associations, including ferns and palms. Many streams are to be found throughout the plateau and these provide a perennial source of stock water for most dairy farms.

Unlike the river valley areas described previously, plateau topographic forms are dominant throughout the Comboyne zone and land types, A, B and C cannot easily be differentiated. Cultivation of fodder crops and the development of improved pastures were, therefore, not restricted to the same extent to particular portions of each farm. However, cultivation of crops was often limited to the deeper soils on low ridge tops and moderate slopes. These areas also provide the best grazing lands. Where slopes are steepest, soils are thin and rocky outcrops common. The chief use of this land on survey farms was for grazing of "dry" stock. Whilst *paspalum* was the dominant pasture plant found on the plateau, improved soft grasses and clovers were found to a greater extent than on farms in the other zones in the survey area. On many of the poorer farms, infestation by bracken fern is common.

The village of Comboyne is the only urban settlement on the plateau and provides the less specialized types of urban functions to all farmers in the zone. The co-operative butter factory at Comboyne receives cream from all the local farmers, the cream being manufactured into butter and trucked to Wingham.

The Comboyne zone is connected by road to Wingham and Taree in the south, Kendall in the east, and Wauchope in the north-east. Regular bus services run to Wingham and Taree. The latter centre provides the Comboyne farmers with services unavailable in Wingham, such as higher secondary education and hospitalization, as well as some of the more specialized public services.

The chief products of the zone are cream and pigs. The latter are marketed at Wauchope and Wingham. A portion of the pigs produced on the Comboyne Plateau are absorbed by the bacon factory at Wingham. Many dairy farms in the zone grow vegetables, particularly potatoes and turnips. Three timber mills in the district draw timber supplies from heavily forested areas, on the margins of the plateau, the timber being sent to railheads at Kendall and Wingham.

⁷ See Figure 9.

Climatic Conditions.

For the period 1890-1950, the average annual rainfall recorded at Taree was 46.16 inches. Figure 2 illustrates the rainfalls recorded each year for this period. It will be noted that considerable variations have occurred about the average rainfall figure. For this period, thirty-five years were below-average and twenty-five years above-average. For the sixty-one year period, the highest yearly rainfall recorded was 80.67 inches in the year 1892. More than sixty inches was recorded in ten separate years. For the same period, the lowest yearly rainfall recorded was 23.89 inches in 1901. Less than thirty inches was recorded in six separate years. A characteristic feature of the pattern of rainfall at Taree has been the tendency for above-average and below-average rainfall years to bunch so as to give fairly prolonged periods of high rainfalls on the one hand and low rainfalls on the other hand.

The average annual rainfall throughout the Manning River District decreases towards the west from the coast. For example, moving from east to west, the average annual rainfalls at various localities is as follows: Manning Heads 53 inches, Taree 46 inches, Wingham 42 inches, Nowendoc 32 inches. The highest rainfalls are usually recorded on the Comboyne Plateau, where the average annual rainfall exceeds 67 inches. During the year 1950, 146.01 inches were recorded at Comboyne. In general throughout the survey zone, this year was marked by record or near-record rainfalls, which resulted in serious flooding in low-lying districts.

The survey area is characterized by summer-autumn maximum rainfalls with minimum falls in late winter and early spring. For Taree, the highest average monthly recording is 5.23 inches in February and the lowest 2.68 inches in September.

The survey area experiences warm to hot summers and mild winters. Frost incidence is greatest on the more elevated areas such as the Comboyne Plateau. Elsewhere throughout the survey area frosts are neither heavy nor frequent.

3. THE SURVEY FARMS.

Farm Size.

There is no one perfect measure of farm size. Various criteria have been employed to indicate the extent of the physical resources of the farm. Such measures include acres of total farm land, acres under improved pasture and/or fodder crops, and the size of the herd. Economic measures such as the value of production, investment in land and buildings, and the size of the labour force have also been employed for measuring the economic scale of operations of farms. Each of these indices has a value, the extent of which will vary with the objectives of the particular analysis. For the purposes of this article, two of these measures are considered below.

(a) Acreage of Total Farm.

The most generally used basis of indicating the size of a farm is its total area. In some studies, the number of acres owned by an individual farmer in one unit is used as the reference point; in other studies the

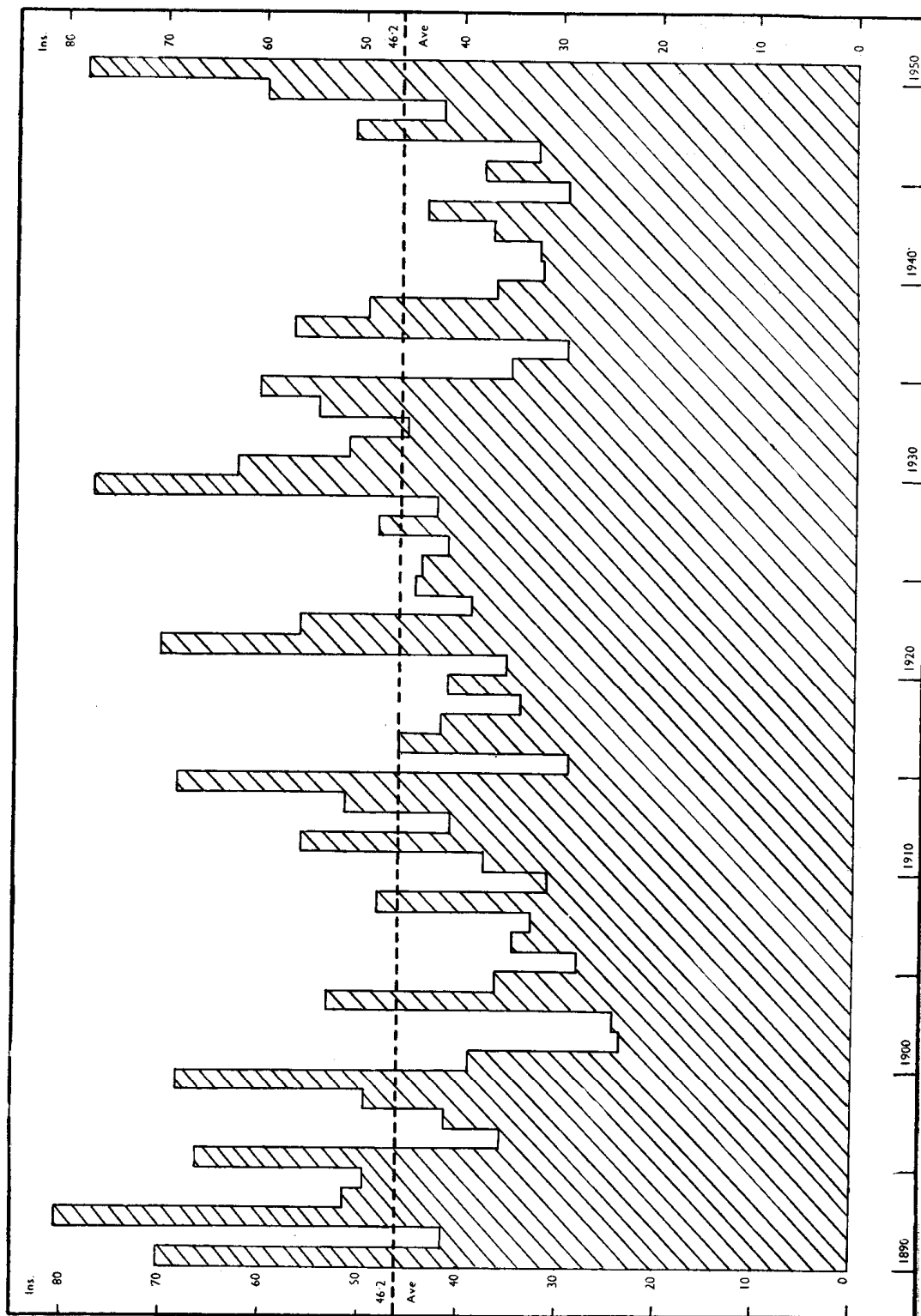


Fig. 2.—Diagram showing annual rainfalls recorded at Taree over the period 1890 to 1950, inclusive, and the average annual rainfall for the same period.

criterion employed is the number of acres managed by one farmer and operated as a co-ordinated unit, whether all or part of the land be owned or leased by the operator. The latter principle has been adopted in this study. All areas (contiguous or otherwise) intimately associated in the organization and management of the total dairy herd (milch and "dry" cows, replacement stock, etc.) have been included.

Table II indicates the number of farms which were found within the various size groups mentioned. Fig. 3 demonstrates, more clearly, similar information in the form of a histogram.

In the survey area, the average size of farms was found to be 235 acres. Farms ranged in size from twenty-four acres to 660 acres, both the smallest and largest farms being in the Wingham zone. Eighty-five per cent. of all farms occurred within the range 50-449 acres; 10 per cent. were above this range and 5 per cent. below it. As indicated by Fig. 3, both the average size of farms and the range of farm size varied between districts. Smaller farms were found in the Taree zone, reflecting the older settlement and more suitable geographic conditions. Relatively large farms were found in the Napiac zone, which, for the most part, presents the poorest geographic conditions for dairying of the four zones studied.

The Wingham zone was found to have farms of the largest diversity in size. It is considered that this reflects the relatively greater contrasts in geographic conditions in this area*.

Experience gained during the course of the survey indicates that, for areas similar to that studied, farm size, when measured in acres of total farmland, provides an index of only limited value. This is particularly the case when some measure of the *intensity* of farming operations is required. For the present survey, such an index was found of restricted value for two reasons. First, with the exception of very small farms, size of farm *per se* did not appear to limit the extent of business operations. Second, a section (18 per cent.) of the farms surveyed were not single unit farms, but were made up of co-ordinated groups of two or more non-contiguous parts. These separate parts were employed in a variety of ways and with varying intensities in the organization of dairy farms. Some farmers, apart from the "home farm," employed several additional areas (both leased and owned) for various purposes, such as raising replacement stock, running "dry" stock in normal years, and for drought-year agistment runs. In a few cases, additional areas were also employed for raising beef cattle along with their role in the dairy farm organization. A reasonably accurate assessment of the acreages employed for usual dairy herd management was extremely difficult for this group of farms.

In view of these limitations, it is considered that some measure of farm size, other than property acreage, is needed.

*Statistical analysis of farm size has shown that the differences in size were less marked within each zone than between zones. The following differences between zones with respect to farm size were found to be significant: Napiac farms larger than farms of other zones. Taree farms smaller than farms of other zones. Comboyne and Wingham farms different from farms of other zones. The difference in farm size between the Comboyne and Wingham zones was not significant.

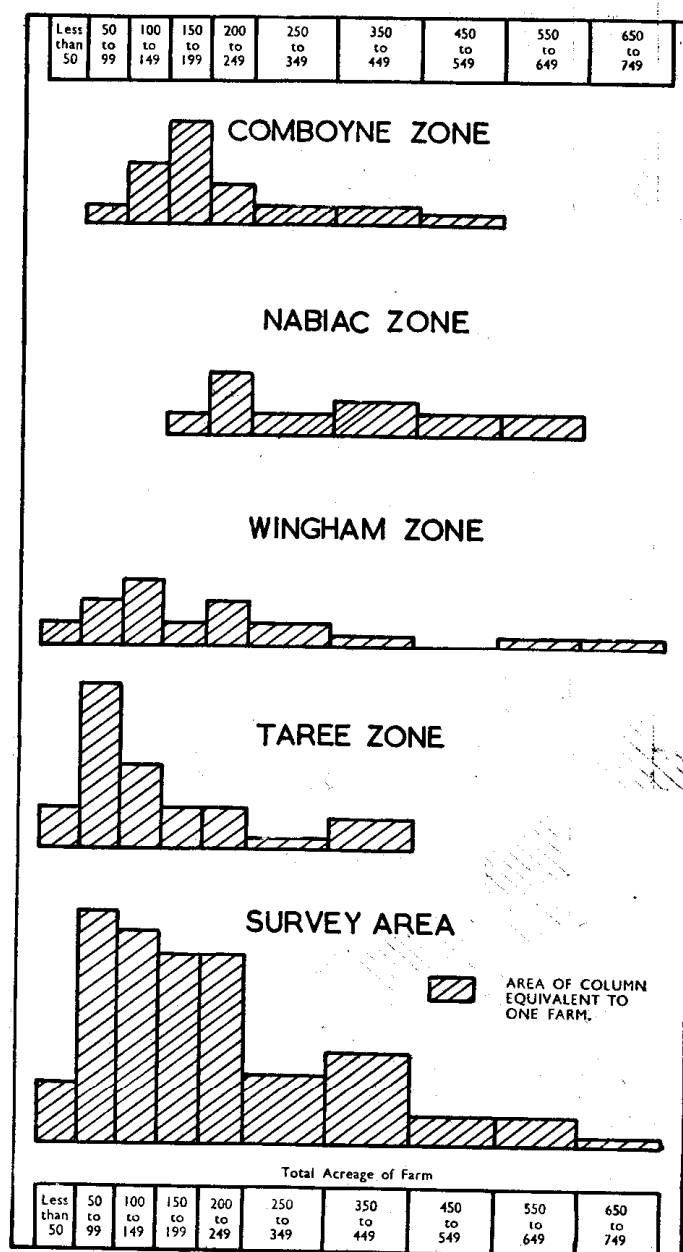


Fig. 3.—Histogram showing the size of survey farms measured by the total area of the farm. The number of farms occurring in each size group is proportional to the area of the respective column.

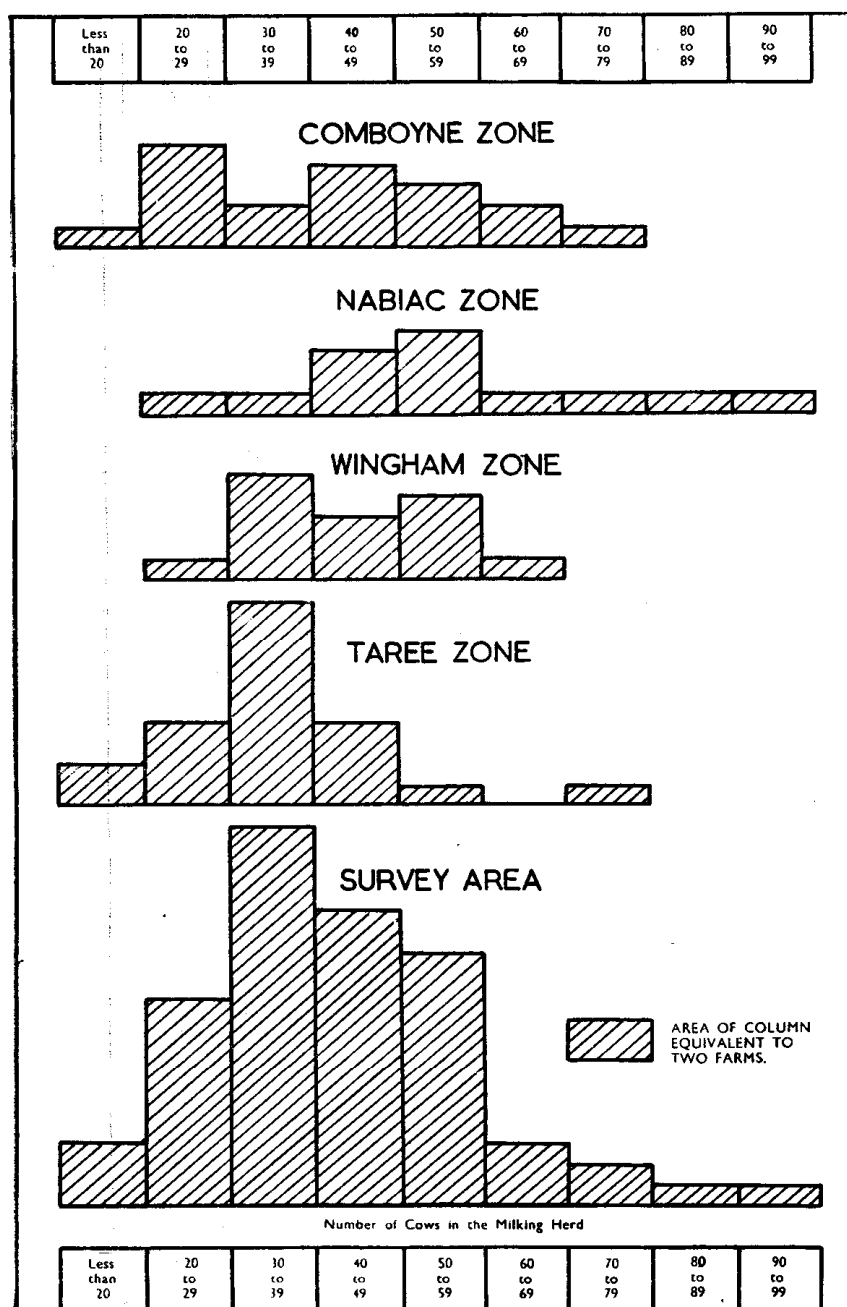


Fig. 4.—Histogram showing the size of survey farms measured by the number of cows being milked in the year. The number of farms occurring in each size group is proportional to the area of the respective column.

(b) Size of Herds.

The number of milking cows in the dairy herd provides a satisfactory physical measure of the size of dairy farms, particularly when the production of dairy products and the sale of culled stock and pigs constitute the sole or dominant income-producing enterprises.

Table III indicates the sizes of dairy herds, measured by the number of cows milked on the average during each of the three seasons ended 31st March, 1951. Similar information is demonstrated more clearly by Figure 4.

For the survey area as a whole, the average size of the herd was forty-two cows. Of the sixty-five farms surveyed, fifty-eight (or 89 per cent.) had herds within the range of sixteen to fifty-nine cows. The smallest herd found was thirteen cows and the largest ninety cows.

Herd size was more uniform in the Taree and Wingham zones than in the Comboyne and Nahiack zones. The latter area possessed herds varying considerably in size (from twenty-seven cows to ninety cows) as well as the largest average herd size^{*}.

Stock on Survey Farms.**(a) Milking Herds.**

Apart from the sizes of herds on survey farms, several other aspects of these herds remain to be discussed, including the breed of cows and methods of herd replacement.

Breeds.

Choice of breed may be governed by a number of factors. It may be largely a matter of personal preference. The type of country, however, will be one consideration, since light breeds may be more suited to rougher terrain whereas the heavy breeds favour flatter and relatively more fertile country.

An important consideration affecting the choice of breed type in New South Wales is the nature of the market for the farmer's product. Farmers supplying whole milk to the Milk Board are paid according to the number of gallons of whole milk supplied. Such farmers have a direct incentive to introduce a breed type high yielding as regards quantity of milk even if relatively low-yielding in butterfat content. On the other hand, farmers who are paid on the number of pounds of butterfat supplied to the factory, have an incentive to introduce a breed type which will enable them to achieve the highest yield of butterfat per acre. For cream suppliers, the advantages of changing the breed type may be small compared with the increased production to be gained from improving the quality of stock within a particular breed. This is the case since as a general rule the variations in butterfat yields between breeds is small in comparison with the variation in production of individual cows within any one breed.

^{*} Statistical analysis of the sizes of herds on survey farms has shown that herd size on farms in the Nahiack zone was significantly different from herd size in the other three zones. Differences in herd size between the other zones were not significant.

TABLE II.
Total Acreage of Sample Farms.

Size of Farms. (Acres).	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Less than 50 ...	3	4.6	2	9.1	1	7.1	...	...	...	...
50-99 ...	11	16.9	8	36.4	2	14.3	...	...	1	6.3
100-149 ...	10	15.4	4	18.2	3	21.6	...	...	3	18.6
150-199 ...	9	13.8	2	9.1	1	7.1	1	7.8	5	31.3
200-249 ...	9	13.8	2	9.1	2	14.3	3	23.0	2	12.5
250-349 ...	7	10.9	1	4.5	2	14.3	2	15.4	2	12.5
350-449 ...	9	13.8	3	13.6	1	7.1	3	23.0	2	12.5
450-549 ...	3	4.6	...	...	...	...	...	...	1	6.3
550-649 ...	3	4.6	...	...	1	7.1	2	15.4	...	...
650-749 ...	1	1.6	...	...	1	7.1	...	...	...	...
Totals ...	65	100.0	22	100.0	14	100.0	13	100.0	16	100.0
Average Size by Districts	acres. 235		acres. 151		acres. 250		acres. 360		acres. 225	

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

TABLE III.
Number of Cows in Milking Herds on Survey Farms.

Number of Cows in Milking Herd.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Less than 20 ...	3	4.6	2	9.1	...	...	...	...	1	6.2
20-29 ...	11	16.9	4	18.2	1	7.1	1	7.7	5	31.3
30-39 ...	18	27.7	10	45.5	5	35.8	1	7.7	2	12.5
40-49 ...	14	21.6	4	18.2	3	21.4	3	23.0	4	25.0
50-59 ...	12	18.5	1	4.5	4	28.6	4	30.8	3	18.8
60-69 ...	3	4.6	...	...	1	7.1	1	7.7	1	6.2
70-79 ...	2	3.1	1	4.5	...	...	1	7.7	...	...
80-89 ...	1	1.5	...	...	...	...	1	7.7	...	...
90-99 ...	1	1.5	...	...	...	...	1	7.7	...	...
Totals ...	65	100.0	22	100.0	14	100.0	13	100.0	16	100.0

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

The Manning River district is on the margin of the Milk Board Zone which was extended to include the more accessible portions of this area in 1948. Milk for Board purposes is received at the three local butter factories. Previously, all the farmers in the area supplied cream for butter manufacture. During the last three years, therefore, many farms, which have commenced supplying the Board, have undergone a process of change in response to the change in market conditions for their product. Such changes are reflected mainly in two directions. First, there has been an ironing out of the hitherto markedly seasonal milking patterns. This has been achieved by a change in breeding programmes to increase the emphasis on winter production. A concomitant feature of this change has been the increasing emphasis on the provision of farm grown and purchased feed for winter and spring months.

Second, many Milk Board farmers have been changing from Jersey breed types to those types which are higher yielding in whole milk. This process is necessarily more gradual than the former and is essentially still in its immature phases.

Table IV sets out the breed types which made up the major portion of herds on Milk Board and non-Milk Board farms in the Taree, Wingham and Nabitac zones¹⁰. The various breed types are arranged in order of the average yield of whole-milk which characterizes the breed types. Group A breeds comprise types with higher average whole milk yields, whilst Group B comprise the lower quantity milk producers.

Of the farms surveyed in the three zones, approximately thirty-nine per cent. had herds of the breeds in Group A and approximately sixty-one per cent. of the breeds in Group B. It will be seen that Jersey breeds are dominant on survey farms.

Twenty-three of the farms surveyed in the three zones (forty-seven per cent.) were Milk Board suppliers. Compared with non-Milk Board suppliers, it will be seen from Table IV that on Milk Board farms a higher proportion of the herd was comprised of Group A type cows. If

TABLE IV.
Breed Types of Herds on Survey Farms in the Taree, Wingham and Nabitac Zones.

Breed of Major Part of Herd.	Survey Area.		Milk Board Suppliers.		Non-Milk Board Suppliers.	
	No. of Farms.	Per Cent. of Total Surveyed. ^a	No. of Farms.	Per Cent. of Milk Board Suppliers.	No. of Farms.	Per Cent. of Non-Milk Board Suppliers.
Jersey x Friesian ...	3	6.1	1	4.3	2	7.7
A.I.S. ...	6	12.2	2	8.8	4	15.4
Jersey x A.I.S. ...	5	10.2	3	13.0	2	7.7
Ayrshire ...	2	4.1	2	8.7	...	...
Jersey x not known ...	3	6.1	2	8.7	1	3.9
Jersey x Red Poll ...	...	...	...	...	...	...
Guernsey ...	2	4.1	...	...	2	7.7
Jersey ...	28	57.2	13	56.5	15	57.6
Totals ...	49	100.0	23	100.0	26	100.0

^a Percentages of total farms surveyed in Taree, Wingham and Nabitac Zones combined (49).

TABLE V.
Pedigreed and Non-Pedigreed Herds on Survey Farms.

Type of Breed.	Survey Area.		Taree Zone.		Wingham Zone.		Nabitac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Whole herd pedigreed ...	4	6.2	1	4.5	...	...	...	...	3	18.8
Majority pedigreed, rest grade ...	5	7.7	2	9.1	2	14.3	1	7.7	...	...
Majority grade, rest pedigreed ...	5	7.7	1	4.5	2	14.3	1	7.7	1	6.2
Whole herd grade ...	47	72.3	15	68.3	9	64.3	11	84.6	12	75.0
Majority grade, rest scrub ...	1	1.5	1	4.5	...	...	...	...	...	...
All scrub ...	3	4.6	2	9.1	1	7.1	...	...	...	...
Totals ...	65	100.0	22	100.0	14	100.0	13	100.0	16	100.0

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

¹⁰ The Comboyne zone has been excluded as it is outside the Milk Board Zone.

this difference between Board and non-Board farms is essentially a product of a deliberate change of breed type, it is significant in view of the comparatively short period of time which has elapsed since the Board's zone was extended to include the survey area.

Close analysis of the total breed composition of the herds on the farms surveyed (i.e., taking minor elements of the herd into account) indicates that the above-mentioned adaption will be more complete in several years time.

Types of Breeds of Dairy Cows.

The various types of dairy stock breeds found on survey farms are summarized in Table V. An examination of this table reveals that approximately twenty-two per cent. of the farms surveyed had some pedigreed stock, although only a small proportion (six per cent.) had herds comprised entirely of pedigreed stock. It will be noted that pedigreed stock were found to be relatively scarce in the Nabiac zone, by comparison with the other three zones. Five of the farms with pedigreed stock specialized in raising stock for sale, apart from normal sale of culled stock.

Grade cows were dominant on the farms surveyed, since more than eighty-nine per cent. of farmers possessed cows of this nature. Most of these farmers had herds entirely composed of grade stock. Only four farmers reported that their herds included scrub stock.

(b) Milking Herd Replacement Stock.

All but one of the farms surveyed had young dairy stock (heifers and calves under one year) in addition to the milking herd. The number of young stock held on dairy farms varies considerably from farm to farm and from time to time reflecting different replacement policies and requirements of farmers.

Table VI summarizes the replacement policies adopted by sixty-three farms providing this information. The bulk of the farmers reported that they reared all their own replacement needs on the farm. Only eleven farmers (about seventeen per cent.) purchased replacements. Of these, five purchased some pedigreed or better-class grade stock when they were needed to improve the quality of their herds. Six farmers relied on purchased replacements alone.

Purchased stock were gained from local farmers, saleyards and through dealers. Four of the farms buying their replacements supplied the Milk Board and did not have skimmed milk for raising their own replacements.

(c) Bulls.

All of the sixty-five farms surveyed had one or more grown bulls for breeding purposes. As indicated in Table VII, sixty per cent. of farms had only one bull. Farms with more than one bull generally had more than forty-five milking cows.

TABLE VI.

Source of Dairy Replacement Stock on Sixty-three Survey Farms.

Source of Replacements.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
All reared on farm ...	52	82.6	16	76.2	10	76.9	12	92.3	14	87.4
Most reared on farm, some purchased ...	5	7.9	2	9.5	2	15.4	...	...	1	6.3
All purchased ...	6	9.5	3	14.3	1	7.7	1	7.7	1	6.3
Totals ...	63	100.0	21	100.0	13	100.0	13	100.0	16	100.0

^a Percentages of sixty-three survey farms.^b Percentages of total farms surveyed in the respective zone.**(d) Pigs.**

Of the sixty-five farms surveyed, thirty (or forty-six per cent.) raised pigs. Of these farms, twenty-five were cream suppliers and five supplied the Milk Board. Table VIII indicates the number of pig-raising farms in each zone. All of the farms visited in the Comboyne zone supplied cream alone and raised pigs with the skimmed milk. The comparatively lower number of pig raisers in the other three areas is to be explained largely by the fact that many farms once raised pigs but discontinued doing so when they commenced production of whole milk for the Milk Board. Twenty-four (or about thirty-seven per cent.) of the survey farms in these three districts had undergone such a change. The raising of pigs is more characteristic of hilly and less accessible areas from which the regular delivery of whole-milk is extremely difficult.

TABLE VII.

Number of Bulls on Survey Farms.

Number of Bulls.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
1 bull ...	39	60.0	17	77.3	7	50.0	7	53.8	8	50.0
2 bulls ...	21	32.3	3	13.6	6	42.9	4	30.8	8	50.0
3 bulls ...	4	6.2	2	9.1	1	7.1	1	7.7	...	...
4 bulls ...	1	1.5	...	...	...	...	1	7.7	...	...
Totals ...	65	100.0	22	100.0	14	100.0	13	100.0	16	100.0

^a Percentages of total farms surveyed (65).^b Percentages of total farms surveyed in the respective zone.**(e) Horses.**

The number of working and saddle horses on survey farms is summarized in Table IX. Working horses were found on most farms (ninety-seven per cent.), where they provided all or part of the motive power for cultivation, pasture improvement and various farm haulage jobs. Two farms had no draught horses. Neither of these farms grew crops or carried out any pasture improvement. The majority of farms had two or more working horses.

TABLE VIII.
Survey Farms Raising Pigs.

Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
No. of Farms.	Per cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
30	46.2	4	18.2	6	42.9	5	38.5	16	100.0

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

TABLE IX.
Horses on Survey Farms.

	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
<i>Draught horses—</i>										
1	6	9.2	2	9.1	2	14.3	1	7.7	1	6.3
2	37	56.9	11	50.0	8	57.1	9	69.2	9	56.3
3 or more ...	20	30.8	9	40.9	3	21.4	2	15.4	6	37.4
Total	63	96.9	22	100.0	13	92.8	12	92.3	16	100.0
<i>Saddle—</i>										
1	22	33.8	6	27.3	4	28.6	5	38.5	7	43.8
2	13	20.0	2	9.1	3	21.4	5	38.5	3	18.8
3 or more ...	11	16.9	2	9.1	2	14.3	2	15.3	5	31.3
Total	46	70.7	10	45.5	9	64.3	12	92.3	15	93.9

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

(f) Non-Dairy Cattle.

A number of dairy farmers in the Manning River district raise beef cattle (weaner and/or fats) as a sideline to their dairy enterprise. Cattle raising areas were found mostly in the lands marginal to the better class dairy lands, i.e., in the more hilly districts, especially towards the headwater regions of the river valleys.

Five of the sixty-five farms surveyed raised beef cattle, two in both the Taree and Wingham zones and one in the Nabiac zone, all using "back-river" agistment country for this purpose. None of the farms visited in the Comboyne zone raised beef cattle.

Pastures on Survey Farms.

Dairy production in the Manning River district, as with other coastal areas of New South Wales, depends heavily on the use of pastures. Pastures supply the dairy farmer with the cheapest of all feed and they constitute the most valuable single component in the maintenance of production levels. A description of the various pasture types employed and the prevalence of certain improved pasture management practices on the sixty-five farms surveyed follows.

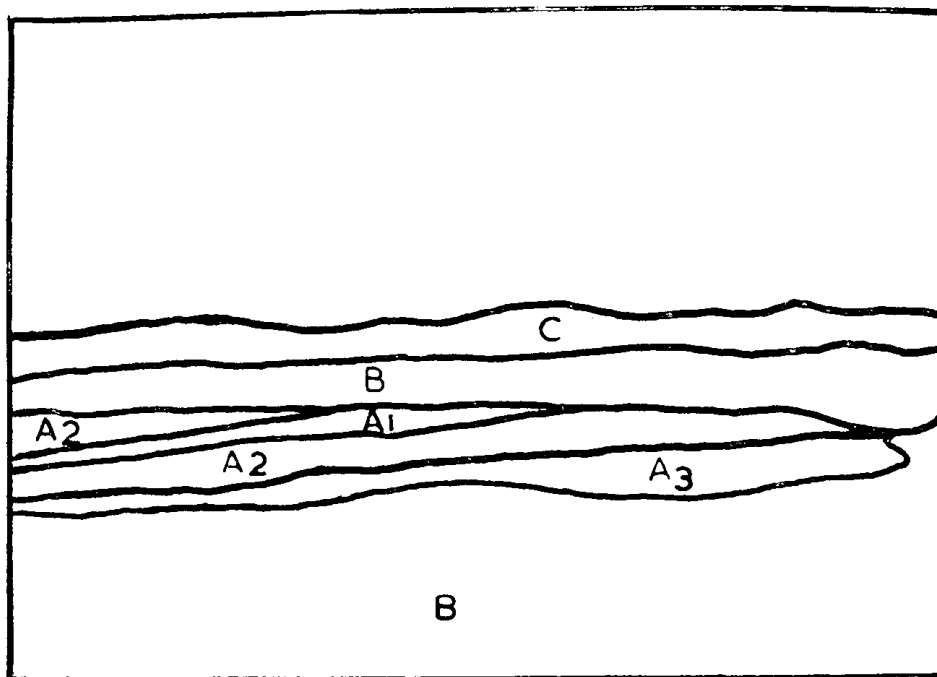


Fig. 6.—A view of a dairy farming area typical of the wider and more subdued portions of the lower reaches of northern tributaries of the Manning River. Farms in these areas usually have relatively small amounts of rugged and timbered country (C) and are mostly composed of moderate slopes (B) and alluvial flats (A). Flats with well drained soils suitable for cropping (A1) and those suited to improved pasture (A2) are common to most farms, whilst the poorly drained flats (A3) are not very extensive.

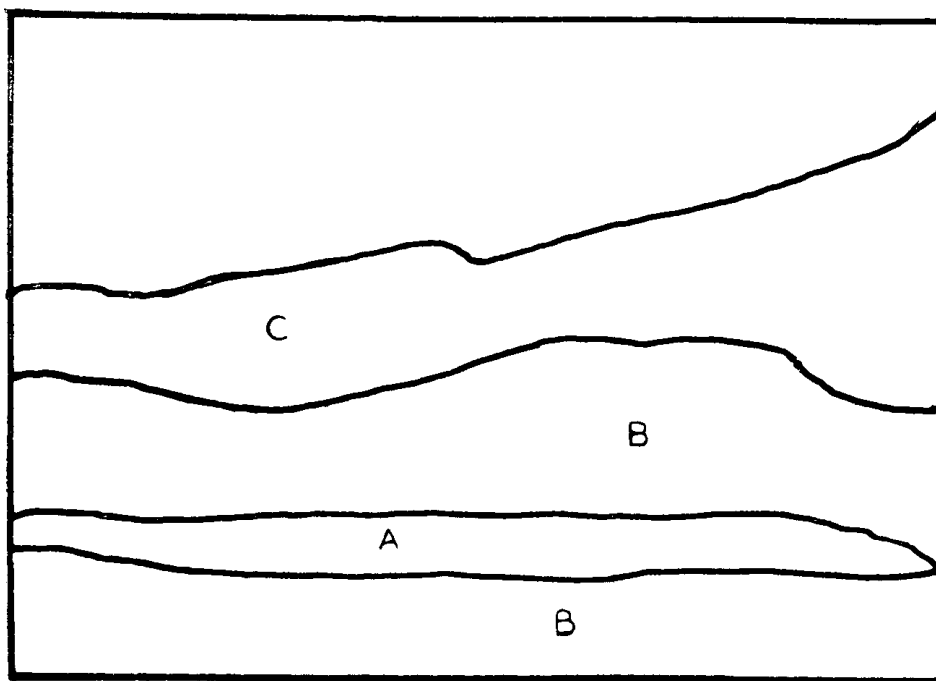
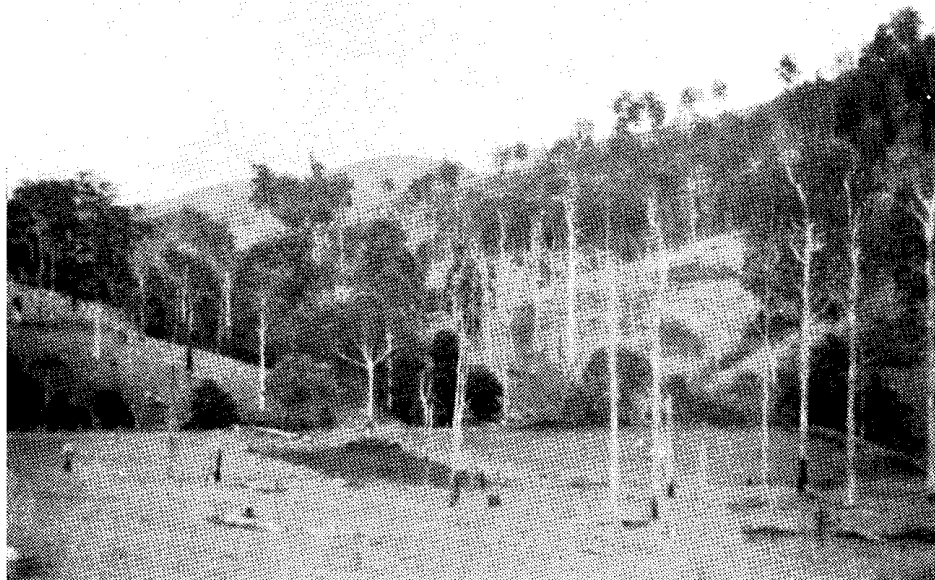


Fig. 7.—A view of the rugged dairy country in the headwater region of a northern tributary of the Manning River. Dairy farms in this type of country are composed mainly of timbered, hilly country (C) with infestation of bracken fern and lantana common. Farms usually possess relatively small amounts of moderate slopes (B) and alluvial flats (A) occur only as isolated pockets.

(a) Pasture Types.

The pasture plants found to be in use on the farms surveyed were of three types, namely (i) natural (or native) forest grasses, (ii) paspalum (*P. dilatatum*) and (iii) improved soft grasses and clovers.

Natural Pastures.

On most timbered and cleared hilly areas, where the soil is thinnest and rocky outcrops are common, natural pasture of native forest grasses was found to be dominant. These grasses included many plant types such as Spear, Bladey, Kangaroo and Parramatta grasses.

Appreciable areas of native grass pasture were found on forty farms (about sixty-two per cent.), including some farms in each of the survey zones.

The native grass pastures are relatively low in feeding value during the hot summer months. Their chief value is as a source of winter feed, particularly in the protected hilly areas, for "dry" cows and young stock. For this reason, such pastures play an important part in the off-seasonal feeding programme on many dairy farms. A number of survey farmers on the low-lying river flats placed stock on winter agistment on these pastures.

Paspalum.

Paspalum (*Paspalum dilatatum*) represents the best summer growing pasture plant in the Manning River district. Throughout the early phases of the development of dairying in this coastal area, paspalum played a very important part and it soon overran most areas, particularly in the more fertile and less rugged districts. Paspalum still provides the bulk of stock feed on most dairy farms, particularly during the peak milking months in late spring and summer. Seasonal growth of white clover (*Trifolium repens*) provides a valuable admixture throughout most of the better class paspalum stands.

On many dairy farms, some of which occupy areas of first-class alluvial flats, paspalum has long since been allowed to outlive its usefulness. Paspalum does not provide the most palatable of feeds in dry times and it makes very little growth during winter months. These characteristics, coupled with its tendency to rank growth in good seasons, means that paspalum requires careful handling if the best nutritional qualities of the pastures are to be attained. It is evident that a majority of dairy farmers in many coastal districts fail to implement the most suitable management of their paspalum pastures.

Large areas of alluvial flats along the lower Manning River are overgrown in better seasons by rank and unpalatable paspalum growth which provides feed of low nutritional value and also serves to inhibit the progress of better grasses and clovers. Problems which spring from rank paspalum growth were less important on survey farms in the hilly areas of the Wingham and Nabiac zones and on the Comboyne Plateau, where rank growth of paspalum was found to be less prevalent under different conditions of climate and soil drainage.

Soft Grasses and Clovers.

To ensure the maximum feeding qualities of pastures (especially during winter months) the sowing of improved grasses and clovers has long been recommended by State agricultural authorities.

Each of the sixty-five farmers interviewed during the survey was asked to nominate the acreages of improved grasses he had sown during the three-year period ending 31st March, 1951. Table X summarizes the information received on this aspect of farm management.

TABLE X.
Survey Farms with Improved Grass and Clover Pastures.

Area of Improved Pasture (Acres).	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
None	30	46.2	14	63.6	5	35.8	7	53.8	4	25.0
Less than 5	12	18.5	4	18.3	3	21.4	3	23.0	2	12.5
5-9	9	13.8	3	13.6	3	21.4	1	7.7	2	12.5
10 or more	14	21.5	1	4.5	3	21.4	2	15.5	8	50.0
Total farms with improved pastures ...	35	53.8	8	36.4	9	64.2	6	46.2	12	75.0
Average area of improved pastures on farms with improved pasture	acres.		acres.		acres.		acres.		acres.	
	8.0		5.1		6.7		13.0		15.0	

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

An examination of this table indicates that thirty-five farms (fifty-four per cent.) had an average of about eight acres of "recently" sown improved pasture. Thirty farms (forty-six per cent.) had no areas of such pasture. Most farms in the Comboyne zone possessed more improved pasture than farms surveyed in the other three zones. The average improved pasture area quoted for the Nabiac zone (thirteen acres) is misleading in that four of the six farms with improved pasture had less than five acres. The remaining two farms had thirty-six acres and twenty acres of improved pasture respectively.

Despite the extensive well-drained alluvial flats characteristic of many farms in the Taree zone, few farmers in this area had sown any improved pasture in recent years.

A variety of pasture plants were found to be in use on surveyed farms, sown both as paddocks of single plant types or as mixtures of several pasture plants in the one paddock. Rye grasses (perennial and Italian) and clovers (red, white and subterranean) were most commonly employed. Cocksfoot (with other soft grasses and/or clovers) was found only on the Comboyne. Oats used for grazing purposes was found on a number of farms both in mixtures with other plants or sown on its own.

Kikuyu was being experimented with on some farms, particularly in hilly areas subject to extensive erosion and/or dry conditions¹².

¹² For a discussion of the comparative feeding values of kikuyu and paspalum see J. Strang, "The Problem of Dairy Production on Red Soils—Kikuyu and Paspalum Compared," *The Agricultural Gazette of New South Wales*, Vol. LXII, Part 9 (September 1, 1951). Pp. 471-472.

(b) Pasture Management Practices.

The sowing of improved pasture plants provides merely the basis of successful dairy farming. The achievement of the best results from these pastures depends largely on the subsequent pasture management.

Topdressing Paspalum Pastures.

Frequent use of superphosphate and lime on renovated paspalum pastures has been advocated for many years in State agricultural programmes because of their value in stimulating the growth of better grasses and clovers. This has been found especially necessary in many coastal areas where soils are often greatly depleted of necessary mineral resources.

TABLE XI.

Survey Farms which Practice Topdressing of Paspalum Pastures.

Topdressing Practices.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
<i>Regular Topdressing—</i>										
(a) Lime alone ...	1	1.5	...	...	1	7.1	...	...	...	...
(b) Superphosphate alone ...	12	18.5	1	4.5	...	...	4	30.8	7	43.8
(c) Both lime and superphosphate ...	6	9.2	2	9.1	2	14.3	...	...	2	12.5
<i>Irregular Topdressing—</i>										
(a) Lime alone ...	3	4.6	1	4.5	...	...	...	...	...	...
(b) Superphosphate alone ...	7	10.8	3	13.6	2	14.3	...	...	2	12.5
(c) Both lime and superphosphate ...	1	1.5	...	...	1	7.1	1	7.7	1	6.2
Total farms topdressing ...	30	46.1	7	31.7	6	42.8	5	38.5	12	75.0

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

Table XI indicates the number of farms carrying out the regular or irregular topdressing of paspalum pastures.

An examination of the table reveals that :

- (i) A total of thirty farmers (forty-six per cent.) reported that they topdressed paspalum pastures; nineteen (twenty-nine per cent.) regularly topdress and eleven (seventeen per cent.) only occasionally topdress.
- (ii) The topdressing of paspalum pastures was found to be more prevalent amongst farmers in the Comboyne zone than throughout the other areas. Three-quarters of the farmers interviewed in that area undertook this practice.
- (iii) Relatively few farmers in the Taree zone were found to be topdressing, but it was somewhat more common in the Wingham and Nabiac zones.
- (iv) Superphosphate alone was the most common topdressing agency employed. Comparatively few farmers were found to be using lime, either alone or in conjunction with superphosphate.

Most of the farmers growing supplementary fodder crops used super-phosphate as a fertilizer. To the extent that such agricultural areas were embodied in a pasture-cropping rotational programme, these farmers were replacing some soil fertility in pasture areas. However, only small areas of each farm are suited to both improved pasture and cropping which has been limited mostly to better soil areas, chiefly on the drier flats.

Why Farmers Do Not Topdress.

Farmers gave a variety of reasons why they did not topdress paspalum pastures. The reasons given are enumerated below in summary form. In each case, the number of farmers giving each reason is indicated in brackets.

- (i) Farmlands are sufficiently fertile without topdressing (*thirteen farmers*).
- (ii) A shortage of farm labour prevents the farmer from topdressing (*eight farmers*).
- (iii) Sufficient quantities of topdressing material, particularly lime, are unavailable (*ten farmers*).
- (iv) Insecurity of tenure and/or lack of compensation under existing tenancy agreements makes topdressing unprofitable (*seven farmers*).
- (v) Under the economic conditions prevalent at the time of the survey (March-July, 1951) farmers were unable to afford the costs of topdressing (*six farmers*).
- (vi) A lack of necessary farm equipment (*three farmers*).
- (vii) The farmer is too old (*three farmers*).
- (viii) Dairying is only a part time interest, which does not warrant the efforts associated with topdressing (*two farmers*).
- (ix) The farmer has only recently occupied the farm but expects to topdress in the near future (*two farmers*).
- (x) The farmer cannot be bothered with a practice such as topdressing (*one farmer*).

The farmers interviewed in the survey, therefore, were by no means unanimous as to why they were not topdressing their paspalum pastures.

It would, of course, be misleading to accept the relative number of farmers tendering various reasons as a firm guide to the relative importance of each reason. Some farmers, no doubt gave "off the cuff" replies, whereas others had probably worked out beforehand in some detail the merits and demerits of the proposal put to them. Despite these limitations, it is thought that the list, as a whole, gives a full coverage of the major factors limiting the adoption of improved practices.

Analysis of the information obtained during the course of the survey has suggested that, apart from the important factors of labour shortages and limitations imposed by conditions of tenure (which are discussed elsewhere¹³, the reasons given can be classified into three types, namely (a) shortages of materials, (b) financial difficulties and (c) an apathy towards the need for adopting improved practices.

¹³See pp. 233-5 for discussion of farm labour and pp. 235-47 for a discussion of farm tenure.

Shortage of lime was found to be a very real problem throughout the Manning River district. Most farmers interviewed were of the opinion that local demands for lime could be met if large deposits, to be found in several local areas, were effectively utilized.

Despite the costs involved in purchasing materials for topdressing the increased production which farmers can expect as a result of adequate top-dressing is considerable and has been found to outweigh the relatively small initial cash outlay involved. It is evident that some of the farmers interviewed were not conversant with the production increases which can be achieved by top-dressing paspalum pastures.

Pasture Mowing.

On coastal areas of New South Wales, where comparatively heavy rainfall results in rank seasonal pasture growth, regular summer mowing has been recommended as a means of improving paspalum pastures, particularly where rotational grazing cannot cope with grass growth. The aims are to remove tall and unpalatable grass of low nutritional value and to stimulate the growth of better soft grass and clovers¹⁴.

Table XII summarises paspalum mowing practices of the sixty-five farmers in the district from whom such information was obtained.

An examination of this table reveals:

- (i) About seventy-one per cent. of the farmers never mow paspalum. About twenty-nine per cent. of the farmers mow paspalum, but most carry out this practice infrequently, so that the maximum benefits to be expected from annual mowing are not obtained.
- (ii) The practice of mowing paspalum was found to be relatively more common in the Taree zone than elsewhere, although a fairly high percentage of farmers in the Nabiac zone undertook the practice. In the latter case, most of the farms involved were mostly comprised of river flats, subject to rank summer paspalum growth. A relative lack of such rank growth in the higher Wingham and Comboyne zones has meant that farmers have had less necessity to mow paspalum pastures. In addition, many farms in these areas are too steep for mowing to be an easy task.

Since many of the farmers were not handicapped by a lack of mowing equipment and their farms were flat and comparatively free of stumps and other obstacles, a general apathy towards the benefits to be derived from mowing appeared to be the only reason why such farmers failed to carry out the practice, even to a very limited extent.

Renovation of Paspalum Pastures.

It is recognized that renovation of paspalum pastures by ploughing and harrowing at regular intervals can play an important role in pasture improvement, particularly when associated with topdressing and overseeding with improved grasses and legumes.

¹⁴ Several farmers interviewed during the course of the survey expressed the opinion that the best results from mowing are achieved if the grass when cut is left in the paddocks to provide humus for the soil rather than removed for paspalum hay.

Table XIII summarizes renovation practices on the sixty-five farms surveyed in the Manning River district. As indicated, only about forty-three per cent. of the farmers ever practice renovation; of these farmers, thirty-one per cent. reported that they renovated a portion of their paspalum pastures annually, gradually working over the better areas (i.e., areas with a more subdued topography). Twelve per cent. practiced renovation only infrequently. A majority of farmers never renovated. Many of the farms are subject to rank seasonal growth and failure to renovate pastures has resulted in hundreds of acres of very uneven and unpalatable paspalum growth, with little or no additional improved grasses available to stock.

Pasture Subdivision and Rotational Grazing.

An important element of sound pasture management is adequate pasture subdivision and careful control over grazing by means of a rotational use of paddocks. These factors are inseparably bound up in any scheme for achieving the best use of the feed available on a farm, as well as the carrying out of pasture improvement programmes.

TABLE XII.

Number of Survey Farms on which Paspalum Pastures are Mown.

Frequency of Mowing.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
1. Never ...	46	70.7	12	54.6	12	85.8	9	69.3	14	81.2
2. Annually ...	7	10.8	3	13.6	1	7.1	1	7.7	2	12.5
3. Occasionally ...	12	18.5	7	31.8	1	7.1	3	23.0	1	6.3
Total mowing ...	19	29.3	10	45.4	2	14.2	4	30.7	3	18.8

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

TABLE XIII.

Renovation of Paspalum on Survey Farms.

Frequency of Renovating.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Annually ...	20	30.8	8	36.4	3	21.4	5	38.5	4	25.0
Occasionally ...	8	12.3	4	18.2	2	14.3	1	7.7	1	6.3
Total farms renovating ...	28	43.1	12	54.6	5	35.7	6	46.2	5	31.3
Total farms not renovating ...	37	56.9	10	45.4	9	64.3	7	53.8	11	68.7

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

(i) *Pasture Subdivision.*

An inspection of the sixty-five farms surveyed has emphasized that many farms did not possess an adequate intensity of property subdivision. In general, paddocks were too large, with the result that, however astute the farmers have been in rotational grazing programmes,

most farms, by their rank and/or unevenly grazed pastures, reveal the inherent shortcomings in property subdivision. Very large paddocks have meant also that herds have had to travel long distances for food and water over large portions of each farm.

On the average, survey farms in the Taree zone were more intensively subdivided than those in other zones. As indicated elsewhere, nineteen of the twenty-two farms in this area were composed entirely of river flats. Analysis shows considerable variations in the intensity of property subdivision for these nineteen farms. Only part of these variations could be explained in terms of variations in the natural productivity of the land.

The most intensively subdivided farm in the Taree area was comprised of forty-eight acres on Dumaresq Island; it had sixteen pasture paddocks averaging three acres apiece. The largest paddock was six acres; and the smallest three acres. About thirty milkers were run on this farm. In marked contrast to this farm are conditions on the least intensively subdivided farm in this zone. This farm, with a total area of 250 acres had five paddocks averaging fifty acres apiece; the largest paddock was 140 acres, and the smallest four acres. This latter farm possessed almost six times as much land as the former (land of comparable natural fertility); yet it ran only about forty-four milkers.

On the average, farms in the Wingham and Comboyne zones were of comparable intensity of subdivision although Wingham farms displayed a greater variety of subdivision reflecting the comparatively more varied character of the area.

For the most part, the least intensively subdivided farms were found in the Nariac zone, particularly in the hilly areas. However, one farm in the lower levels of the Wallamba River Valley near Dyers Crossing was as intensively subdivided as the best in the Taree zone.

All survey farms in the Wingham and Nariac zones and to a less extent the Comboyne zone displayed much more variation in the pattern of subdivision than farms in the Taree zone. This reflects a difference in the effects of topography on the organization of farms in these areas¹⁵

(ii) *Rotational Grazing.*

The farmers interviewed during the survey were questioned on the rotational grazing practices which they followed. Information was sought particularly on (1) whether the farmer followed some definite plan and (2) the frequency and duration of grazing of paddocks of various sizes. The following summarizes the practices adopted:

- (i) All of the sixty-five farmers stated that they employed some system of rotational grazing.
- (ii) Of the sixty-five farmers interviewed, forty (sixty-one per cent.) gave details of a definite plan followed. The balance were indefinite about such plans and the impression was gained that these farmers adopted only a rudimentary scheme of rotational grazing.

¹⁵ It is not possible with the data available to express these variations in a statistical fashion.

- (iii) Farmers were unanimous that any plan of rotation grazing needed to be quite variable in sympathy with changes in seasonal conditions. The frequency with which paddocks were used and the length of time cows were permitted to graze a paddock were found to vary with (a) the size of the paddock, (b) the type of pasture plants within the paddock, (c) the seasonal conditions, and (d) the number of paddocks.
- (iv) Most farmers following definite rotational plans stated that they grazed paddocks for a period of one to three days. Farmers with large numbers of paddocks spelled each paddock for one to two weeks, whilst those with few paddocks could only spell paddocks for several days. A few farmers following intensive rotational programmes stated that, during the flush milking months, they changed cows from smaller soft grass paddocks after several hours grazing.

Supplementary Feeding Practices.

Despite the heavy reliance which dairy farmers in coastal New South Wales place upon pastures as a cheap source of feed for dairy cows, most dairymen look to additional sources of stock fodder particularly to offset the effects of seasonal shortages of pasture feed. Farm grown fodder crops and purchased feed are employed to maintain production at desired levels.

TABLE XIV.
Supplementary Feeding Practices on Survey Farms.

	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
<i>Number of farms supplementary feeding ...</i>	58	89.2	20	90.9	12	85.7	11	84.6	15	93.8
(a) Each year, (farm grown and/or purchased) ...	54	83.1	18	81.8	12	85.7	10	76.9	14	87.5
(b) Only in critical years (purchased feed only) ...	4	6.1	2	9.1	...	...	1	7.7	1	6.3
<i>Duration of regular supplementary feeding—</i>										
(a) All year round ...	21	32.3	2	9.1	7	50.0	5	38.5	7	43.8
(b) Only off season of each year ...	32	49.3	16	72.7	5	35.7	5	38.5	6	37.4
(c) Only milking season of each year ...	1	1.5	...	...	...	...	...	...	1	6.3
<i>Source of supplementary feed for regular users—</i>										
(a) Farm grown only ...	20	30.8	10	45.4	3	21.4	3	23.0	4	25.0
(b) Purchased only ...	5	7.7	2	9.1	1	7.1	2	15.4	...	...
(c) Both farm grown and purchased ...	29	44.6	6	27.3	8	57.2	5	38.5	10	62.5

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

Table XIV summarises the supplementary feeding practices on the survey farms. An examination of this table reveals that:—

- (i) About eighty-nine per cent. of the farmers practised supplementary feeding; eighty-three per cent. at some time throughout each year and six per cent. only in periods of critical shortages, such as during and after floods. The practice of feeding supplementary feed was more common to farmers in the Comboyne and Taree zones than in the other two zones. In the Comboyne zone, all-year-round feeding was more prevalent than mere off-seasonal feeding, whilst the latter was considerably more significant in the Taree zone.
- (ii) Less than twelve per cent. of the farmers relied solely on pastures and such farms were more common in the Wingham and Nahiab zones than elsewhere.
- (iii) Most farmers (seventy-five per cent.) grew supplementary fodder crops on their farms.
- (iv) About fifty-two per cent. of farmers regularly purchased feed, although this included only about eight per cent. who relied solely on purchased feed. The rest combined farm grown fodder with purchased feed to attain the desired ration.
- (v) The majority of farmers who annually practised supplementary feeding did so only during certain parts of the year, chiefly in the winter months, this being much more common in the lower river areas (Taree zone) than elsewhere throughout the survey area.
- (vi) All-year-round supplementary feeding was practised by about thirty-two per cent. of farmers. In comparison with the other three survey zones, this practice was very much less common in the Taree zone. A possible reason for this is that during the peak milking months of the year, Taree farmers rely more heavily on paspalum and have comparatively less need to look to supplementary feed to maintain production at the desired level.

(a) Purchased Feed.

With the exception of a few farmers who purchased lucerne hay (chiefly after the 1950 floods) most farmers reported that proprietary concentrates were the types of feed mostly purchased. Such feed supplies were obtained from local merchants and from co-operative stores allied to butter factories in Wingham, Taree and Dyers Crossing. Purchased feed was fed either in feed boxes at the bails or in separate feed stalls.

(b) Farm Grown Fodder Crops.

A variety of fodder crops can be grown to meet the requirements of dairy cows. Recommended types vary to some extent from district to district to allow for peculiarities of local conditions. Likewise, certain crops are advocated to meet specific seasonal needs. Many of the farmers in the Manning River district grow fodder crops to supplement feed from pastures. Table XV summarises the types of fodder crops grown on the farms surveyed.

TABLE XV.
Supplementary Fodder Crops Grown on Survey Farms.

Type of Crop.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Maize	35	53.8	9	40.9	9	64.3	5	38.5	12	75.0
Saccaline... ..	23	35.4	13	59.1	4	28.6	4	30.8	2	12.5
Lucerne	18	27.7	10	45.4	4	28.6	3	23.0	1	6.3
Cow cane	7	10.8	3	13.6	2	14.3	2	15.4	...	...
Turnips	18	27.7	3	13.6	1	7.1	4	30.8	10	62.5
Oats	17	26.2	2	9.1	5	35.7	7	53.8	3	18.8
Artichokes (for pigs)	2	3.1	...	...	...	...	...	...	2	12.5
Field peas	2	3.1	...	...	1	7.1	1	7.7	...	...
Barley	2	3.1	...	...	1	7.1	1	7.7	...	...
Japanese millet	1	1.5	...	...	1	7.1	...	...	...	...
Total farms growing fodder crops...	55	84.6	19	86.4	11	78.6	10	76.9	14	87.5

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

Cereals:

Maize.—The growing of maize formed one of the chief agricultural enterprises in the Manning River district during the middle and latter parts of the last century. This industry catered especially for the coastal steamship trade to the Sydney and Newcastle markets to meet the demand for horse feed. Whilst maize growing as a commercial undertaking has declined greatly in recent decades, the crop still represents the most important summer grown fodder crop for most local dairy herds.

An examination of Table XV reveals that, of the sixty-five farms surveyed, thirty-five (fifty-four per cent.) regularly plant a crop of maize. Comparatively more farmers were found to be growing maize in the Comboyne zone (seventy-five per cent.) and throughout the Wingham zone (sixty-four per cent.) than elsewhere, a reflection of the excessive "wetness" of the Taree area during recent seasons and the scarcity of land suited to maize in the Nabiac zone. In the latter area also, some of the low-lying farms have been prevented from growing maize, in recent years, owing to excessive rains.

Saccaline.—About thirty-five per cent. of the farms surveyed regularly grew saccaline which was cut and fed in paddocks during the autumn and winter months. None of the farmers turned it into silage. The growing of saccaline was found to be more common in the Taree zone than elsewhere throughout the survey area.

Oats.—Seventeen of the survey farms had planted a crop of oats for feeding in winter and spring months. All of these farmers fed the oats by grazing and none made oaten hay.

The growing of oats was found to be relatively more common in the Wingham and Nabiac zones than in the other zones.

On ten farms, oats was sown down in special plots without accompanying plant types. On the remaining farms oats was mixed with rye grass (perennial and Italian) and clovers (subterranean, red and white).

Other Cereals.—Other cereals found on farms included *barley* (two farms), which was grazed as winter feed, and *Japanese millet* (one farm) which was fed by turning the cows into the crop during summer.

Legumes:

Lucerne.—This crop was grown on eighteen of the farms surveyed¹⁶. The practice was found to be most common in farming areas characterized by fairly extensive flat areas of well drained alluvial soils. Throughout the survey area, lucerne beds were found to be localised to the fertile and better drained alluvial soils (river silts) immediately adjacent to watercourses (*i.e.*, on land form type A1). Many farms in the hilly section of the Wingham and Nahiab zones are not very suited to lucerne except on the occasional pockets of alluvial flats found beside the accentuated meander of the larger creeks.

Field Peas.—Only two farmers grew crops of field peas (Poona variety) which were fed to stock in the spring by grazing in one case and by cutting and feeding loose in the other case.

Turnips

Small areas of turnips were grown on eighteen of the survey farms (twenty-eight per cent.) for use in late winter and spring feeding. The crop was found to be particularly common on Comboyne farms (sixty-three per cent.) and comparatively uncommon on Taree and Wingham farms (fourteen per cent. and seven per cent., respectively). It was found that turnips were most commonly fed by pulling the crop and feeding them whole in pasture paddocks.

Cow Cane.

Cow cane has been used by some farmers on the north coast as a source of winter feed. A variety of sugar cane, the crop is grown in much the same manner as that crop and is usually cut and fed green.

A total of seven farmers was found to be growing the crop. On hilly farms it was mostly grown on the deeper soils of low ridge tops in fairly frost-free situations.

Fodder Conservation.

State extension programmes have stressed the need for the conservation of feed in the form of hay, silage and grain for many years, but statistics show that comparatively few farmers actively conserve fodder.

(a) How Many Farms Conserve Fodder?

Table XVI summarises the fodder conservation practices (hay, grain or silage) of the sixty-five farmers from whom such information was obtained.

¹⁶The eighteen farmers growing lucerne represent all farmers who normally grew lucerne, including those farmers who were prevented from doing so or whose crops were destroyed by flooding and excessive rain that have characterised the Manning area in recent seasons. Of the ten farmers regularly growing lucerne in the Taree zone, no less than five had the 1950 season crop destroyed or their planting stopped by the floods and heavy rains.

TABLE XVI.
Fodder Conservation Practices on Survey Farms.

Survey Zones.	No. of Farms Surveyed.	No. of Farms Conserving Fodder.	Types of Fodder Conserved.			
			Lucerne Hay.	Red Clover Hay.	Maize Grain.	Silage.
Taree ...	22	12	12	1	...	...
Wingham ...	14	6	6	...	...	...
Nabiac ...	13	3	...	...	2	...
Comboyne ...	16	1	1	...	...	...
Totals ...	65	22	19	1	2	...

An examination of this table reveals that:

- (i) No farmer made silage.
- (ii) Only twenty-two of the sixty-five farmers regularly conserve any fodder (*i.e.*, about thirty-four per cent.).
- (iii) Lucerne hay was by far the most important type of fodder conserved; and
- (iv) A higher proportion of farmers conserved fodder in the Taree and Wingham zones than in the Nabiac and Comboyne zones.

(b) Farmers' Reasons for Not Conserving Fodder.

Farmers gave a variety of reasons why they did not practice fodder conservation or did not intend to extend their present efforts in this direction. The reasons given are enumerated below:

- (i) Land was unsuitable for the production of conservable fodder crops, at least in sufficient quantities to permit of a conservable surplus (*twenty-five farmers*).
- (ii) Shortages of farm labour restricted fodder growing and, for the most part, prohibited fodder conservation (*nineteen farmers*).
- (iii) Conserving fodder was unnecessary—it was easier to rely on the growing of supplementary fodder crops and purchases of feed in lean seasons (*five farmers*).
- (iv) Fodder conservation involved too much trouble, and farmers could not be bothered (*five farmers*).
- (v) Farmers lacked the necessary money and facilities (this referred particularly to silage) (*three farmers*).
- (vi) They were too old to worry about fodder conservation (*three farmers*).
- (vii) It was more economic to rely on purchased fodder when there was a shortage of feed (*three farmers*).
- (viii) Farmers produce mainly in spring and summer, and in these circumstances there was no need to conserve fodder for winter feeding. Farmers were willing to risk the damaging effects of drought (*two farmers*).
- (ix) Farmers were satisfied with the level of farm production without worrying about fodder conservation (*two farmers*).

(x) Individual farmers said:—

- (a) Dairying was only a sideline and did not warrant the trouble associated with fodder conservation.
- (b) Fodder conservation did not pay.
- (c) Cows did not like silage—his experience was that they would not eat it.
- (d) No time was available for fodder conservation; all available time was spent in ordinary dairy work and in clearing bush country on the property.
- (e) Fodder conservation could not be afforded owing to the fact that the share of the overall farm income under present tenancy arrangements was too small.
- (f) Insecurity of tenure reduced the incentive to conserve fodder—the farmer could not be bothered undertaking farm management practices from which he might not reap any benefit.

In the district surveyed, therefore, farmers were by no means unanimous as to why they were not undertaking regular fodder conservation. With some farmers, the basic reason was a general apathy towards improved production methods and the advantages which may be expected from fodder conservation. However, for the majority of those not practising conservation, there were other and more vital reasons.

Some Farms are not Suited to Fodder Conservation.

The factor of agronomic unsuitability was the most frequent reason for non-conservation given by the farmers interviewed. Those farmers who advanced this reason for not conserving fodder were situated in three main areas: (i) the Comboyne zone, which was stated to be climatically unsuited to lucerne growth and general fodder conservation practices (eight of the sixteen farmers interviewed in that zone advanced this reason); (ii) the rugged sections of the Wingham and Nabiac zones away from the main creeks, which lacked arable land of suitable size for economic working; and (iii) the ill-drained sections of the lower Manning River (Taree zone) which were said to be unsuited to lucerne growing, in particular, and generally unsuited to extensive fodder-growing practices.

Of the four areas surveyed, the Taree zone possessed the highest proportion of farmers conserving fodder. The next highest proportion was in the Wingham zone. In both these districts, but particularly Taree, the farms which were surveyed possessed, on the average, larger amounts of arable land suited to the growing of conservable surpluses of fodder crops than farms in the Nabiac zone. More favourable agronomic conditions then, would appear to be the chief reason why farmers in the Taree and Wingham zones are regularly conserving more fodder than are farmers in the Comboyne and Nabiac zones.

Shortages of Farm Labour.

As mentioned in other sections of this article, one of the most important factors inhibiting the adoption of improved production methods, including fodder conservation programmes, on many dairy farms at the present time is the shortage of farm labour.

Most of the farmers interviewed in this survey were unanimous that programmes for the conservation of fodder (particularly silage) required the use of considerable labour—at least during certain critical periods of the year. The same farmers stated that, in general, dairymen were either unable to muster the necessary labour, or they preferred to rely on other methods of maintaining stock feed supplies at desired levels.

Despite the harassing effects of labour shortages, most of the farmers interviewed said they did not co-operate with other farmers on tasks which required more than their own labour, except on infrequent occasions (such as a neighbour's illness). One way farmers might partly overcome current labour shortages is for groups of neighbouring farmers to co-operate for their mutual benefit in carrying out farm work, which does not necessitate simultaneous action on all the farms concerned. Fodder conservation programmes could come within the scope of such co-operative activity.

Tenancy Problems.

Whilst only explicitly stated by one farmer, the survey indicated that conditions of tenure on non-owner-operated farms had caused some farmers to view with disfavour the work and expense associated with fodder conservation practices and some other methods of improved husbandry such as pasture renovation and maintaining soil fertility. The description of the tenure status of farmers and some problems associated with farm tenure are discussed elsewhere.

Shortages of Finance.

Although only explicitly stated by a few farmers, it was evident during the course of the survey that a basic reason why many farmers fail to improve their production methods is a shortage of capital and in some cases an ignorance of the value of credit as a means of financing many developmental programmes.

Few of the farmers interviewed appeared to be conversant with the credit facilities available to them for fodder conservation purposes for example. The New South Wales Government has made credit available to farmers for fodder conservation through the Rural Bank at low rates of interest. However, very few farmers have taken advantage of these facilities. In the area surveyed, at least, it seems that failure to use these credit facilities is, in part, due to lack of knowledge of their availability.

The impression was gained throughout the survey that very few farmers are sufficiently aware of the profits to be obtained from wise employment of credit to assist them to develop more productive farm practices. Rather than viewing credit as an essential part of any developing business organisation, many farmers seem to look upon it as something to be avoided at all costs!

Reliance on Pastures and Supplementary Fodder.

A fundamental reason why most dairy farmers interviewed regard fodder conservation as "uneconomic," or as a "waste of time," is their concentration on summer production. Such a production programme relies heavily on the seasonal flush growth of paspalum and white clover. As indicated elsewhere in this article, these two pasture plants together form the major source of feed supplies on most dairy farms during the peak milking months.

With the emphasis on such a production programme, many farmers fail to carry out measures to even out the feed supplies on their own farm but prefer to rely on the spasmodic bounties of nature. The serious decline in production evidenced on such farms in poor seasons bears witness to the limitations of these methods.

Most farmers, however, although placing heavy reliance on seasonal pasture growth (essentially "natural" in character), prefer to employ methods other than fodder conservation to maintain production at levels desired by them.

Analysis of the information on stock feeding practices of the farmers in the survey area suggests that the most common reason why farmers were not conserving fodder was their preference for farm-grown supplementary fodder crops and purchased concentrates when pasture feed was not adequate, and in some cases improved pasture for off-seasonal feed.

Farmers' attitudes towards fodder conservation are undoubtedly bound up in their attitudes towards *risk* in farming. Viewed simply as an insurance policy against possible shortages, there is an element of doubt as to whether conserved hay, grain or silage will or will not be needed over a particular period. Those farmers who conserve such fodder apparently place sufficient emphasis on the risks of production and income losses, through climatic hazards, to embark on the steps and expense entailed. Their attempts are aimed at maintaining continuous maximum production.

On the other hand, farmers who do not conserve fodder, but whose farming conditions will permit it, are convinced, apparently, that such risks do not warrant the time, expense and trouble associated with hay, grain or silage conservation.

The survey has demonstrated that, in general, the dairy farmer's unwillingness to conserve fodder in the form of hay, grain or silage cannot be explained merely in terms of economic ignorance or obstinacy. Lack of such fodder conservation must be considered in the light of the highly seasonal production pattern which characterises most dairy farms. To explain more fully the farmers' attitude to fodder conservation, it would be necessary to undertake a detailed examination of the economics of the various feeding practices viewed in the light of the dairy farmers' attitudes to the whole field of farm husbandry. Such a survey would need to consider the physical and economic merits of various forms of stock feeding (particularly for off-seasonal purposes) including improved pastures, winter producing fodder crops and purchased feed. Until the results of such a survey are to hand, it would be impossible to determine to what extent the farmers' reluctance to conserve fodder, in the abovementioned sense of the term, is a sound approach to the feeding problems and risk element with which they are faced.

Farm Mechanization.

(a) Hand and Machine Milking Practices.

The adoption of milking machines has done much to ease the lot of the dairy farmer by greatly simplifying the major task associated with this type of farming. By speeding up the milking process, it has enabled the dairy farmer to handle a larger herd and also to devote more time

to improved farm management practices. To this extent, the use of milking machines has enabled many dairy farmers to expand their production.

Table XVII summarises hand and machine milking practices on the sixty-five farms surveyed. An examination of this Table reveals that:—

- (i) Only about seventeen per cent. of the farms hand milked their cows. The practice was more common in the Taree zone than elsewhere.
- (ii) Approximately eighty-three per cent. of the farms used milking machines and the majority (seventy per cent.) employed equipment with either two or three units. Only one farmer had one-unit equipment, while eight farmers had four units.
- (iii) Various types of power were employed to drive milking machines, including electric, diesel, petrol and kerosene engines.

Electric powered machines were not found to any extent in areas where the normal electricity reticulation was not extensive, since they only occurred on the few farms generating their own power. For this reason, few farms in the Comboyne and Nabitac zones employed electric power on farms. By contrast, electricity reticulation was more widespread in the Wingham and Taree zones, especially the less rugged areas towards the main valley floors. Hence, more farms in these zones used electric power.

On the fifty-four farms with milking machines, the number of cows per milking unit varied considerably and this data is summarised in Table XVIII. The average number of cows per milking unit was eighteen. Between the Taree, Wingham and Comboyne zones, herd size did not vary significantly, the average number of cows per milking unit was between fifteen and sixteen. In the Nabitac zone, where herds were found to be significantly larger than those in the other three zones, the average number of cows per milking unit was twenty.

Of the sixty-five farmers interviewed, fifty-three (eighty-two per cent.) hand stripped their cows, nine (fourteen per cent.) machine stripped, and three (four per cent.) did not make a practice of stripping.

(b) Farm Machinery and Implements.

Tractors.—Statistics show that, compared with immediate pre-war years, the number of tractors in use on rural holdings in the Hunter and Manning Division of New South Wales has increased considerably. In 1939, the number of tractors used was 454 and this had increased to 1,974 in 1951¹⁷. It is not possible to determine accurately to what extent dairy farms have participated in this increase, as distinct from non-dairy farms. However, it is evident that, in recent years, the numbers of tractors employed on dairy farms has greatly increased.

¹⁷ As at the 31st March, 1951. Data supplied by Bureau of Economics and Statistics, Sydney.

TABLE XVII.
Hand and Machine Milking on Survey Farms.

District.	Farms Hand Milking.		Farms Machine Milking.		Farms With Various Numbers of Machine Units.				Power Used in Driving Machines.			
	No. of Farms	Per cent. <i>a</i>	No. of Farms.	Per Cent. <i>a</i>	1 Unit.	2 Unit.	3 Unit.	4 Unit.	Electric. Alone.	Plus Diesel or Petrol.	Diesel.	Petrol or Kerosene.
Taree Zone	7	10.8	15	23.1	1	6	7	1	4	2	6	3
Wingham Zone	1	1.5	13	20.0	...	7	4	2	5	...	1	7
Nabiac Zone	...	...	13	20.0	...	6	6	1	...	...	4	9
Comboyne Zone	3	4.6	13	20.0	...	4	5	4	1	...	2	10
Survey Area as a Whole	11	16.9	54	83.1	1	23	22	8	10	2	13	29

a Percentages of total farms surveyed (65).

TABLE XVIII.
*Number of Cows per Milking Unit on Survey Farms with
Milking Machines.*

District.	Number of Cows per Unit.					Average Number of Cows Per Unit.
	5-9.	10-14.	15-19.	20-24.	25 and above.	
	(No. of Farms.)	(No. of Farms.)	(No. of Farms.)	(No. of Farms.)	(No. of Farms.)	
Taree Zone ... ..	...	5	8	1	1	15.6
Wingham Zone	1	5	4	3	...	15.2
Nabiac Zone ... ..	...	2	2	6	3	20.3
Comboyne Zone	2	5	4	2	...	15.2
Totals and Average for Survey as a Whole ...	3	17	18	12	4	17.7

TABLE XIX.
Farm Tillage Equipment on Survey Farms.

Type of Equipment.	Number of Farms.	Proportion of Total Farms Surveyed.
		Per Cent.
Disc Plough—		
One furrow	19	29.2
Two furrows	18	27.7
Three furrows	2	3.1
Four furrows	1	1.5
Mouldboard Plough—		
One furrow	48	73.8
Two furrows	9	13.8
Three furrows	2	3.1
Cultivators—		
Scarifier	43	66.2
Spring Tooth	3	4.6
Rigid Tyne Harrows	59	90.8
Bog and Bush Harrows	19	29.2
" Sundercut " Type Plough... ..	1	1.5
Roller	38	58.3
Pasture Renovator	7	10.8

Whether a dairy farmer can profitably operate a tractor on his own farm will depend on a number of factors. It will depend, among other things, on the size of his farm and the diversity of enterprises that can be carried on. Investment in a tractor would have to be considered in the light of the increased net return likely to be derived as compared with the use of horse-power or contract tractor operators¹⁸. Apart from these economic considerations, some farmers, for purely personal reasons, may employ a tractor which may be an uneconomic proposition. Personal factors may include mere pride in a tractor or a desire to eliminate tedious tasks in farming.

¹⁸ As yet, little research has been directed, under Australian conditions, into the economic aspects of dairy farm mechanization, including the subject of the costs of operating tractors in relation to the business of dairy farming.

Of the sixty-five farms surveyed throughout the Manning River district, only eleven farmers (about seventeen per cent.) owned, or shared, in the ownership of a tractor. All of these farmers were owner-operators. Nine farmers owned a tractor, whilst two farmers shared the ownership of a tractor with a neighbouring farmer. Eight of the eleven tractors were purchased new.

On all farms having tractors, tractors were employed for the heavier tillage and haulage operations. Draught horses were used by all the farmers with tractors for lighter work, including hauling drays, single and inter-row cultivators, mowers and seed droppers. Only three farmers used tractors as a source of power for belt work.

Two farmers, one in the Comboyne zone and the other in the Nabiac zone, used their tractors for local contract work in addition to work on their own farms.

Farm Implements.

Most dairy farmers possess a variety of implements used for ploughing and cultivating work. Equipment of this type was found on more than ninety per cent. of the sixty-five farms surveyed. The types of tillage equipment on the farms are summarised in Table XIX.

One or two furrow disc and mouldboard ploughs were the most common types of ploughs found on the farms. Mouldboard ploughs were more widely used than disc ploughs. Three and four-furrow ploughs were not used to any extent and were mostly confined to farms with tractors.

Many types of cultivators were employed on survey farms. The most common types used were scarifiers, tyne harrows and bog and bush harrows. Rollers were found on nearly three-fifths of the survey farms. Only one-tenth of the farms owned a pasture renovator, although other ploughs and harrows were used for renovation by some farmers.

Seed droppers represented a common type of equipment found on survey farms. About eighty-two per cent. of the farmers possessed a maize dropper, including ten per cent. who had a seed drill in addition. In several cases, farmers employed maize droppers for spreading fertiliser.

Less than eight per cent. of the farmers interviewed possessed equipment designed to spread manure or distribute fertiliser. In some cases, alternative implements were employed, such as chain harrows for spreading animal manure. However, the general lack of equipment of this kind reflects the low level of soil fertility maintenance, characteristic of most survey farms.

About forty-eight per cent. of the farmers had mowers and thirty-one per cent. had rakes. This type of equipment was more prevalent among farms in the Taree and Wingham zones, where comparatively more farmers conserved fodder.

At least one-quarter of the farmers with mowers had not used them in recent years, either for mowing paspalum or mowing pastures for hay. Less than forty per cent. of the farms possessed either a maize sheller or chaff cutter.

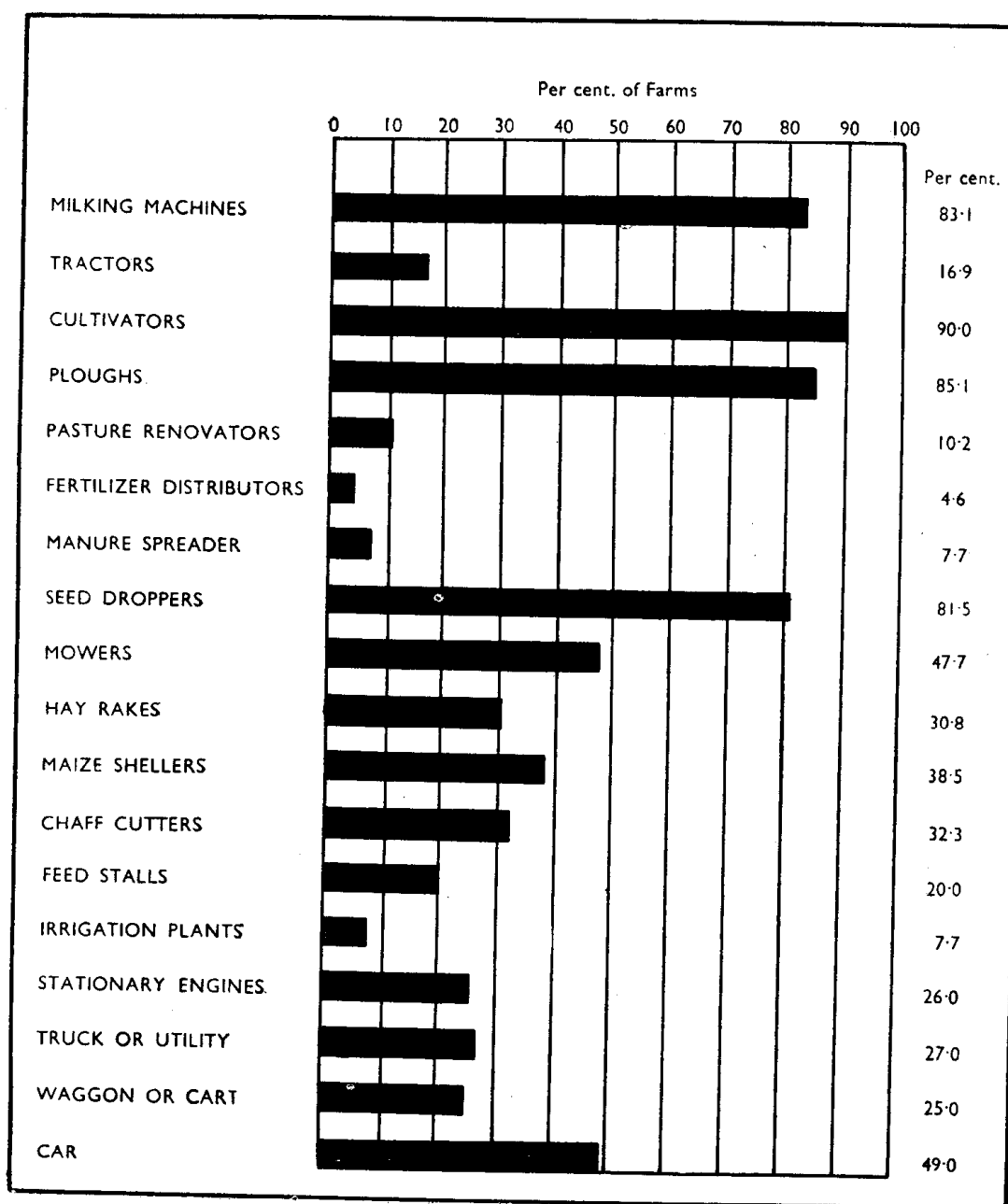


Fig. 5.—Proportion of survey farms with various machines and farm implements.

Feed Stalls.

About twenty per cent. of the farmers used feed stalls for feeding concentrates and other supplementary fodder, mainly during off-seasonal months. The number of stall units varied considerably between farms, reflecting the variations in the number of cows fed in stalls. The largest number of stalls on any farm was forty-two and the smallest nine. The average number of stalls, on farms with stalls, was twenty-two.

Irrigation Plant.

Especially in coastal districts of New South Wales, where summer droughts are common, irrigation can be used to great advantage to ensure the provision of adequate feed reserves and thereby provide the basis for maintaining continuity of production.

Although many coastal farmers have adopted irrigation in some form during recent years, comparatively few dairy farmers in the Manning River district appear to be irrigating. Only four of the sixty-five farmers interviewed had irrigation plants.

Of these four farmers, two used small plants solely for domestic vegetable gardens. The other two had larger spray irrigation plants, which they used for irrigating river flats to be used for the production of lucerne, corn and improved pasture.

Stationary Engines.

Of the sixty-five farms surveyed, seventeen (twenty-six per cent.) owned one or more stationary engines, apart from those used for driving milking machines. This equipment was put to a variety of uses on farms.

Engines were used as drive power for corn grinding, chaffing, pumping water to bail yards, cutting wood, and, in one case, to drive a home electricity generating plant.

Motor Vehicles.

About seventy-six per cent. of the farmers interviewed possessed a motor vehicle, including forty-nine per cent. who owned a car, and twenty-seven per cent. who owned a truck or utility. Several farmers possessed both a truck and a car.

There was no marked difference between the zones surveyed with respect to the relative proportions of farmers owning a truck or utility. However, about sixty per cent. of the farmers interviewed in both the Taree and Nabitac zones possessed cars, compared with only thirty-five per cent. in the Comboyne and Wingham zones.

Commercial Cropping on Survey Farms.

The production of commercial crops, such as stock feed, fruit and vegetables (particularly winter crops), is carried on by many dairy farmers on the North Coast. However, the sample of farms included in this survey did not include many farmers who undertake such practices.

Types of Crops.

The various types of commercial crops grown are summarised below:—

Maize.

One farmer reported that he grew maize for seed which he sold to city merchants. His farm was located on rich river flats in the Wingham zone. During recent years his net income per year from maize seed had been more than £400. This farmer employed his own and a partner's labour in the enterprise.

One farmer in the Nabitac district sold maize grain to local farmers for stock feed when surpluses arose.

Potatoes.

The growing of potatoes, chiefly for metropolitan markets, is an important enterprise on many dairy farms, especially in the Comboyne zone. Of the sixty-five farms surveyed, however, only three grew potatoes. All of these farms were on the Comboyne, where climatic and soil conditions are better suited to the crop than in many other areas throughout the Manning River District.

On the average, about three acres were grown by each of the farmers producing potatoes. In one case, the crop was harvested in January, and in the other cases between March and June. From the Comboyne zone, potatoes were sent by truck and by bus to Taree and Wingham for distribution to local and more distant markets.

Each of the three farmers growing potatoes for commercial purposes relied mostly on his own labour, although one farmer usually hired a youth to assist in the harvesting of the crop.

Peas.

A total of six dairy farmers (nine per cent.) regularly grew crops of peas and regarded the crop as a valuable winter enterprise. The average acreage grown was eight acres.

Peas were grown on hilly locations with warm northerly aspects. Of the farms growing peas, three were located in the hillier sections of the Taree zone and two in the rugged areas of the Nahiack zone.

Family labour was mostly used in growing the crop, although one farmer, who grew peas on newly cleared hilly country in the Bootawah area of the Taree zone, employed a contractor with a bulldozer to clear and break up new ground. Pea cultivation on newly cleared ground, followed by sown pastures, was adopted by this farmer as an essential element in the improvement of hilly farm areas.

Of the five farmers growing peas, two employed seasonal pickers (mostly women) from local centres. One farmer employed aborigines from the settlement at Purfleet to pick his crop.

The farmers growing peas marketed their crops early, between June and September, to take advantage of the higher prices usually to be obtained early in the season. The peas were mostly sent to centres such as Newcastle, Maitland and Sydney by rail direct from Taree or after having been roaded to Gloucester by the local commercial bus service.

Mixed Vegetables.

Mixed vegetables, including lettuce, pumpkins and cucumbers, were grown on two farms for consumption by residents of local urban centres.

Stock Water Facilities.**(a) Source and Adequacy.**

One of the most important aspects of the routine care of dairy cows is the provision of abundant drinking water. Investigations have proved that considerable increases in milk yields can be achieved by the installation of suitable watering facilities in convenient positions throughout the farm to ensure that the herd will have ready access to drinking water. For example, facilities installed on the track to milking sheds and close to the milking yard will enable cows to drink water at least twice per day.

Table XX indicates the dominant sources of stock water on farms surveyed and the number of farmers employing each type as a major source. It will be seen from the table that heavy reliance is placed upon natural water facilities, since seventy-one per cent. of the survey farms depended on such sources, including forty-nine per cent. entirely dependent on natural sources and the balance with supplementary installed facilities. Natural sources included gullies, creeks and springs. Fifty-one per cent. of farms had installed facilities (windmills, gully dams and troughs). Of these farms, twenty-nine per cent. relied on these sources alone because natural supplies were unavailable.

Table XX indicates certain regional differences in sources of farm stock water. In contrast with other districts, Comboyne farmers relied solely on natural water supplies (mainly creeks and gullies) of which the zone, with its heavy average annual rainfall, is mostly well endowed. Only three of the sixteen farmers interviewed in this zone reported experience of stock water shortages.

In contrast with other areas, Taree farmers relied mostly on improved facilities such as dams and windmills. One farmer on "Taree Estate" (near the town of Taree) obtained permanent water fit for human consumption from subterranean gravel beds on river flats by means of spear pumps.

The low-lying character of most survey farms in the Taree zone, together with the tidal salination of the major water courses, precluded use of gullies and streams as the natural source of stock water, except on farms in the hilly areas.

TABLE XX.

Source of Stock Water on Survey Farms.

Source.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
1. Installed facilities alone (dams and windmills) ...	19	29.2	15	68.2	2	14.3	2	15.4	...	...
2. Creeks and-or gullies alone ...	32	49.2	3	13.6	10	71.4	3	23.0	16	100.0
3. Both 1 and 2 ...	14	21.6	4	18.2	2	14.3	8	61.6	...	...
Totals ...	65	100.0	22	100.0	14	100.0	13	100.0	16	100.0

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

About twenty per cent. of farmers interviewed in the Taree zone reported that they had experienced damaging shortages of stock water in dry times and had been forced to cart water at considerable expense. Other farmers reported that, prior to the installation of present improvements, they had had a similar experience. Areas of the Taree zone where farmers reported that stock water shortage occurred included such low-lying districts as Moto, Purfleet and parts of Oxley Island.

Several groups of farmers in the Taree zone have united for the purpose of alleviating shortages of stock water and have installed schemes for supplying water from distant reservoir sources. One such scheme was operating in the Moto district and water was gained from a reservoir at Coopernook. Even improvements of this kind have proved inadequate in some cases. The Coopernook source was reported to be unavailable in very dry times, with the result that damaging shortages of water were experienced or else reliance was placed on neighbouring properties with perennial supplies from wells.

Most survey farms in the Wingham zone relied on creeks and gullies for stock water. Only twenty-nine per cent. of the farms surveyed in this zone have installed facilities. The area, which is undulating to hilly with a fairly high and reliable rainfall, is well endowed with natural sources of this kind. No farmers in this area reported having experienced shortages of stock water.

Although more than eighty-five per cent. of the farms in the Nahiic area reported use of natural facilities, lower rainfall and a general lack of perennial creeks throughout the area has meant that, compared with survey farmers in the Wingham and Comboyne zones, a higher percentage of Nahiic dairymen have had to instal additional stock water facilities. About seventy-eight per cent. of farmers visited in this area had carried out improvements of this kind. Only one of the fourteen farmers interviewed in the Nahiic area reported experiences of stock water shortage.

(b) Distribution of Stock Water Facilities.

Nine of the sixty-five farms visited (fourteen per cent.) had a constant supply of water to all paddocks. Seven of these were in the Comboyne zone where the supplies were purely natural in character. The majority of farmers had stock water facilities in only a limited number of paddocks and cows were often required to walk comparatively long distances.

TABLE XXI.

Distance from Bails to Nearest Stock Watering Site on Survey Farms Without Watering Facilities Adjacent to Bails.

Survey Zones.	Number of Farms Without Facilities Adjacent to Bails.	Largest Distance Reported.	Shortest Distance Reported.	Average Reported Distance.
	No. of Farms.	Yards.	Yards.	Yards.
Taree	15	1,760	50	175
Wingham... ..	10	400	100	234
Nahiic	10	900	150	267
Comboyne	12	800	50	220
Average ... ..	...	965	88	224

As mentioned previously, installation of drinking facilities in close proximity to the milking yard is one way in which the dairy farmer can ensure that stock have regular access to water. Only eighteen farms (twenty-seven per cent.) had installations of this character. On other farms, the distance from the bails to the nearest watering site varied considerably as indicated in Table XXI.

(c) Improving Stock Water Facilities.

Sixteen farmers were of the opinion that stock water facilities on their farms required improvements. These farmers included eight owner-operators, four share-farmers, and four tenant-farmers. Needed improvements embraced: (a) installation of stock water facilities at the bails (six farms), and/or (b) extension of drinking facilities to more paddocks (ten farms).

The following reasons were advanced for these improvements not being currently implementd:—

- (1) Lack of labour (*two farmers*).
- (2) Unco-operative landlord (*five farmers*).
- (3) Lack of money (*one farmer*).
- (4) Unavailability of materials (*one farmer*).
- (5) No particular reason (*seven farmers*).

It will be noted that these reasons follow a similar pattern to reasons advanced in connection with other needed improvements discussed elsewhere.

The second and third reasons are similar in that they involve questions of finance. In respect of this matter, it would appear that farmers who advance shortages of money as their reason for not improving stock watering facilities are often unaware of the credit facilities available under the Farm Water Supply Act of 1946. Under this Act, farmers confronted with a water supply problem can make application to the Water Conservation and Irrigation Commission for assistance in surveying and establishing the necessary stock water supply.

Production Levels on Survey Farms.

One of the aims of the survey under review was to obtain reliable information on the production from the farms over a period of years, with the view, not only of comparing variations in production between farms, but of analysing the relationships between output on the one hand and farm management practices and certain social and economic conditions on the other hand. It is proposed to examine the latter relationships in a subsequent article, in which the statistical strength of a number of hypothetical relationships will be discussed.

For sixty farms¹⁹ surveyed, statistics representing the quantities of milk and/or cream supplied to factories was obtained from the local butter factories at Taree, Wingham and Comboyne. In addition, figures representing the amounts of whole milk supplied were secured from the Milk Board for farmers who supplied the Board.

The above information was secured for a period of three years, ended 31st March, 1951. This data has been averaged²⁰ to give an average annual figure for the period reviewed. This has been done so as to make some allowance for the wide seasonal variations which have occurred over the three-year period.

¹⁹ For various reasons, the production data obtained from five of the sixty-five farms surveyed was unsatisfactory for the purposes of the survey.

²⁰ Except in one case, when the figures for only the latter twelve months were available. These figures have been revised to compensate for the short period involved.

To achieve comparability between cream and milk suppliers, all statistics of dairy production have been converted to their equivalent in commercial butter using the following conversion factors:—

83.2 lb. of butterfat equals 100 lb. of commercial butter.

21.43 lb. of milk equals 1 lb. of commercial butter.

The latter conversion factor assumes a constant butterfat content of milk of 4.1 per cent. and, therefore, where this factor has been applied, differences between farmers, as regards the butterfat content of milk, have been overlooked. This factor was only used in the case of the Milk Board farmers for that portion of their supplies taken by the Board. In view of the fact that these farmers are required for Milk Board purposes to attain a butterfat content of milk of at least 3.4 per cent., the conversion factor used may have led to an over-estimate of the equivalent commercial butter supplied by Milk Board farmers. However, it is considered that errors of this nature will not have been appreciable for two reasons.

TABLE XXII.
*Average Annual Butter Production on Survey Farms.**

Equivalent Commercial Butter Production (lbs.).	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
0-2,999 ...	2	3.3	1	5.5	1	7.5	...	...	...	...
3,000-5,999 ...	23	38.3	6	33.4	5	38.5	5	38.5	7	43.6
6,000-8,999 ...	23	38.3	10	55.6	5	38.5	4	30.8	4	25.0
9,000-11,999 ...	9	15.0	1	5.5	2	15.5	3	23.1	3	18.8
12,000-14,999 ...	2	3.3	...	...	...	...	1	7.6	1	6.3
15,000-17,999 ...	1	1.8	...	...	...	...	...	...	1	6.3
Totals ...	60	100.0	18	100.0	13	100.0	13	100.0	16	100.0

*Based on an average of the three-year period, ended 31st March, 1951.

^a Percentages of 60 farms surveyed.

^b Percentages of total farms surveyed in the respective zone for which statistics were available

First, because of the diurnal and seasonal variations in butterfat content of milk characteristic of dairy cows, most Milk Board farmers attempt to maintain the average butterfat content of milk higher than 3.4 per cent.

Jersey stock are predominant throughout the year surveyed, so that an assumed average butterfat content of milk of four per cent. is probably reasonable under the circumstances.

(a) Average Annual Commercial Butter Production.

Table XXII summarises the annual equivalent commercial butter production on the sixty farms. An analysis of the information obtained on production levels revealed that:

- (i) The average annual production was about 7,057 lb. of commercial butter.
- (ii) The lowest individual average annual production was 2,674 lb. (on a farm in the Taree zone) and the highest was 16,030 lb. (on a farm in the Comboyne zone).

- (iii) Ten farms (seventeen per cent.) produced more than 10,000 lb. of commercial butter equivalent per year on the average, whilst twenty-five farms (forty-two per cent.) averaged less than 6,000 lb.
- (iv) The survey shows that average annual production was somewhat higher in the Comboyne zone than in other zones and that Taree farmers had, on the average, the lowest output.²¹

The relatively high average in the Nabitac zone is somewhat misleading in that eleven of the thirteen farms surveyed in the area averaged only about 6,500 lb. of commercial butter overall. The other two farms averaged 10,222 lb. and 14,989 lb. respectively. In the latter case, this average was attained on two farms worked as a unit by share-farmer sons of a single landlord.

The survey has shown that dairy production in the Manning River district, as with other areas of the North Coast, is subject to considerable variation from year to year, due to the vagaries of climate. Good seasons are interspersed with adverse seasons, marked by excessive rains and floods, or drought conditions. The impact of these adversities varies considerably from one part of the survey area to another.

Floods and excessive rains experienced during 1950 caused lower-than-average production on most low-lying survey farms, such as those in the lower Manning area (Taree zone) and Wollamba River district (Nabitac zone). Farmers in these areas were handicapped by an inability to produce sufficient fodder crops or the destruction of existing crops, as well as the development of rank and unpalatable growth of *paspalum* in lower-lying areas.

By contrast, during the same period, in the hilly and plateau areas with better soil drainage, most survey farmers were favoured by the heavy rainfalls which caused better-than-average pasture growth and high production. The converse situation often occurs during dry seasons, when lower-river farms have an advantage over the hilly farms.

Analysis of the information supplied by the farmers who supply the Milk Board has demonstrated that most have adapted their farm management in response to price differentials so as to increase winter production. As indicated previously, there is evidence that Board suppliers have been introducing new breed types in order to build up the milk production of their herds.²²

²¹ Statistical analysis has shown that with respect to total butter production differences between the four survey zones were not significant.

²² See p. 196.

TABLE XXIII.
*Production Response of Survey Milk Board Farmers
to the Winter Price.*

Surveyed Zones within the Milk Board Zone.	Total Number of Farms Surveyed in Each Zone.	Number of Milk Board Suppliers.		No. of Milk Board Suppliers who have Increased Winter Production since Joining the Board.		Methods Adopted by those Increasing Winter Production.			
						Controlled Breeding Alone. <i>c</i>		Controlled Breeding together with the Growing of Winter Feed.	
	Number.	No. of Farmers.	Per Cent. <i>a</i>	No. of Farmers.	Per Cent. <i>b</i>	No. of Farmers.	Per Cent. <i>b</i>	No. of Farmers.	Per Cent. <i>b</i>
Taree ...	22	13	59.2	9	69.2	1	11.1	8	88.9
Wingham ...	14	6	42.9	6	100.0	2	33.3	4	66.6
Nabiac ...	13	4	30.8	4	100.0	...	...	4	100.0
Totals ...	49	23	46.9	19	82.6	3	13.0	16	69.6

a Percentage of total farms surveyed in each zone.

b Percentage of total Milk Board suppliers in each zone.

c Control of mating time.

As demonstrated by Table XXIII, eighty-three per cent. of the Milk Board suppliers interviewed have also been increasing winter production in response to price differentials by producing more in the winter months, *i.e.*, by direct control over the mating times of the cows in their herds, and/or by growing more winter feed in the form of crops and pastures. About thirteen per cent. have adopted the former method alone, whilst about seventy per cent. have adopted both methods in association with one another.

The emphasis given to winter production by suppliers and non-suppliers of the Milk Board is shown in Table XXIV. This table demonstrates the comparison between farmers in each group with respect to the proportion of their herds which was being milked during the months of June, July and August, 1950. This table only refers to farmers in the Taree, Wingham and Nabiac zones and does not include the Comboyne zone, which is outside the Milk Board Zone.

TABLE XXIV.
*Proportion of Milking Herd Milked During Winter Months by Survey
Farmers who Were Suppliers or Non-suppliers of the Milk Board.*

Milk Board Suppliers.	Total Number of Farms. <i>a</i>	Proportion of Total Milking Herd being Milked in the Winter of 1950.				
		Less Than 30 Per Cent.	30-39 Per Cent.	40-49 Per Cent.	50-59 Per Cent.	60 Per Cent. or More.
Non-suppliers ...	26	No. of Farms. 7	No. of Farms. 4	No. of Farms. 10	No. of Farms. 5	No. of Farms. 0
Suppliers ...	23	2	1	5	4	11

a In the Taree, Wingham and Nabiac zones. This table excludes the Comboyne zone, since it is not affected by the Milk Board Zone.

Of the twenty-six farmers who did not supply the Milk Board, twenty-one milked less than half of their milking herd in winter. By contrast, fifteen of the Milk Board suppliers milked more than half their herds in the winter months of 1950, including eleven who milked more than three-fifths.

Farmers advanced a number of the reasons for following a markedly seasonal production pattern with emphasis on summer output. These reasons and the number of farmers advancing them are summarised below:—

- (i) Summer production takes the best advantage of the flush seasonal growth of paspalum, so that cows give better results when milked through late spring and summer months (*forty-eight farmers*).
- (ii) The farmer's land, either because of ruggedness or because of its low-lying and cold nature, is not suited to winter dairying (*ten farmers*).
- (iii) A spell from milking during winter months gives the farmer an opportunity to carry out farm improvements neglected during the summer months (*five farmers*).
- (iv) Cows "naturally" give better results if milked during the summer, rather than in the autumn and winter (*three farmers*).
- (v) To expand winter production sufficiently to warrant his becoming a supplier of the Milk Board, the farmer would have to run two herds—one for summer production and one for winter production. His farm is too small to carry two herds (*three farmers*).
- (vi) The farmer finds the production of winter vegetables, such as peas, a more profitable enterprise than winter dairying (*one farmer*).

Of the six reasons mentioned above, all but the second reason are closely related to one another. Most coastal dairy farmers concentrate on summer production, chiefly because they wish to take advantage of the seasonal growth of paspalum. This has been discussed elsewhere. Concentration of milking into the summer months means that many farmers, especially under present conditions of labour shortages, are unable to spend sufficient time during these months on necessary farm maintenance work. Winter months, when work in the dairy is at its lowest ebb, are used by many farmers to carry out farm improvements neglected during the peak milking season. These improvements involve such tasks as fencing, repairs to buildings and machinery and cleaning properties of infestation by bracken fern and lantana. However, that work of this nature generally takes place in winter months, may be the result merely of the maldistribution of the work load, which results from the concentration of the peak milking load into one season. An ironing out of the milking programme may result in a more efficient use of the farm labour force.

Many survey farmers contended that better production responses are achieved from cows which freshen in the spring and summer, than from those which freshen in the autumn. That production per cow and length of lactation are related to the time of calving has been established

by experiments.²³ These tests, however, do not appear to have established anything more than the fact that production is greatest when feed is best.

It is undoubtedly true that many farmers have experienced considerable difficulties in trying to successfully mate their stock "out of season." However, it is equally true that a number of the Milk Board suppliers have been very successful in their attempts in similar directions. The same farmers, with the use of concentrates and winter producing fodder crop, have equalled or excelled, during winter months, the production achieved by many of the summer producers, particularly those who rely mostly on paspalum pasture.

The relative profitability of "winter dairying" and "summer dairying" will be governed by the prices received for milk at various seasons of the year and the relative production costs using concentrates and winter producing pasture in comparison with reliance mainly on paspalum pasture. It is evident that most of the survey farmers concentrated on summer production to obtain the cheapest feed and were content with the comparatively low production level obtained from a stock feeding programme which employed paspalum pasture as the main source of feed. On the other hand, some survey farmers, desirous of higher production, with a less marked seasonal pattern, fed concentrates and grew comparatively large quantities of fodder crops and winter producing pasture. By so doing, they were successful in attaining a greater profit from their farms than the former type of farmer.

Dairy farming in the Manning River district, as with other coastal areas, is subject to recurrent dry spells in mid-summer so that herds, normally in lactation at these times, often suffer serious declines in production. Under these circumstances, winter production, based on winter producing pastures and fodder crops, as well as purchased concentrates, may be capable of greater stability than summer production based almost entirely on seasonal paspalum growth.

Some farms in the low-lying areas of the Taree district experience cold and damp conditions in many winters and their operators were of the opinion that only a low level of production could be achieved during winter months on their farms. They contended that to expand winter output on their farms they would have to rely heavily on purchased feed which they considered would be an uneconomic proposition. Apart from the problem of obtaining winter feed, some farmers contended that many low-lying areas were not suited to winter production because stock did not react well to climatic conditions in winter months.

(b) Annual Production per Cow.

Despite characteristic differences in production between breeds of cows, the production per cow, within any one breed, varies to a large extent in sympathy with the efficiency of farm management. Production per cow, therefore, provides a valuable index for measuring the efficiency of farm husbandry. McClymont states:

²³ See, for example, M. Cullity, "Influence of Month of Calving on Length of Lactation and Average Yield of Butterfat." *Journal of Agriculture, W.A.*, December, 1949, pp. 313-320.

"The average butter-fat production of New South Wales herds is about 150 lb. (equivalent to about 370 gallons of milk) per head per year. The potential average, that is, the average which could be obtained by good feeding, is probably about 300 lb. (about 700 gallons of milk) per year. That this is possible is shown by the fact that in the metropolitan area, where feeding is better than average, production is about 660 gallons per head. This level might not be economic in butterfat areas, but there is not the slightest doubt that heavier and better feeding with higher average production would mean greater financial returns."²⁴

Production per cow per year, as revealed by the survey, is even lower than the State average quoted above. Equivalent annual commercial butter production per cow on sixty survey farms is summarised in Table XXV.

TABLE XXV.
Annual Production Per Cow on Survey Farms.
(Pounds of Commercial Butter)

Production per Cow (lbs. C.B. Equivalent).	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
50-74	2	3.3	...	...	...	...	2	15.4	...	...
75-99	2	3.3	...	...	2	15.4	...	...	...	...
100-124	6	10.0	1	5.5	...	...	4	30.8	1	6.2
125-149	6	10.0	3	16.7	3	23.0	...	...	...	...
150-174	15	25.0	5	27.8	4	30.8	3	23.1	3	18.8
175-199	14	23.4	5	27.8	2	15.4	3	23.1	4	25.0
200-249	12	20.0	4	22.2	2	15.4	1	7.6	5	31.3
250-299	2	3.3	...	...	...	...	...	...	2	12.4
300-324	1	1.7	...	...	...	...	...	...	1	6.3
Average production of C.B. for each district	lbs. C.B. 170		lbs. C.B. 173		lbs. C.B. 156		lbs. C.B. 141		lbs. C.B. 211	

^a Percentages of 60 survey farms.

^b Percentages of total farms surveyed in the respective zone for which statistics were available.

An examination of Table XXV reveals that:

- (i) The sixty farms averaged yearly about 170 lb. of commercial butter (equivalent) per cow for the three-year period ended 31st March, 1951. Using the conversion factor mentioned previously, this represents an average of 141 lb. of butterfat per cow—significantly below the State average.
- (ii) The modal production level, however, was about 162 lb. of commercial butter (equivalent to 135 lb. of butterfat) per cow.
- (iii) About seven per cent. of the farmers averaged less than 100 lb. of commercial butter per cow, the lowest being 61 lb. per cow.

²⁴ G. L. McClymont, "Feeding for Milk Production," N.S.W. Department of Agriculture publication, Sydney, 1950.

- (iv) The highest producer averaged 302 lb. of commercial butter per cow and far excelled his nearest rival who averaged 283 lb. per cow.
- (v) Lowest average productions per cow were attained by farmers in the Nabitac zone, whilst farmers in the Comboyne zone averaged much higher than those in the other three zones.²⁵

Analysis of the information gained during the course of the survey suggests that variations both in efficiency of farm management between farmers, as well as variation in geographic conditions, underly differences in production per cow. The latter factor is particularly important when comparing the farms in the Comboyne zone with those in the hilly regions of the Nabitac and Wingham zones.

Statistics of production and related factors of farm management for two farms representing the extremes of production per cow levels are summarised below:

Highest average producer: 302 lb. commercial butter per cow (total annual output average 16,030 lb.).

Location: Comboyne zone.

Tenure: Share farmer.

Area of Farm: 200 acres.

Size of Milking Herd: 53 cows.

Type of cows: Jersey grade.

Average quantities of fodder grown: Two acres of turnips and seven acres of maize.

Feed purchased: None.

Pastures: 166 acres of paspalum and clovers (chiefly white), fifteen acres of improved grasses (red and white clover, perennial rye and cocksfoot) sown during last four years.

Treatment of Paspalum Paddocks: Topdressed with superphosphate every three to four years using two bags per acre. This farmer topdresses an average of about seventy-five acres per year. The chief grazing paddocks, embracing seventy-three acres are mown every year. During the summer of 1950, one hundred acres were mowed.

Number and Size of Paddocks: Twelve paddocks about seventeen acres apiece.

Lowest average producer: 61 lb. commercial butter per cow (total average output 4,249 lb.).

Location: Goolongoolook area of the Nabitac zone.

Tenure: Tenant farmer.

Area of Farm: 565 acres.

Size of milking herd: Seventy cows.

²⁵ Statistical analysis has shown that production per cow on survey farms in the Comboyne zone was significantly different from that in the other zones. Differences between the other zones were not significant.

Fig. 8.—A view of portion of the extensive river flats along the Lower Manning River. Note the intensity of property subdivision on the flats in the background.



Fig. 9.—Portion of the flat-to-undulating surface of the Comboyne Plateau with the more hilly areas typical of the southwestern regions, to be seen in the background.

Fig. 10.—A view of the dairy lands in the rugged headwater sections of the Southern Branch of the Camden Haven River. Most of this area is heavily timbered so that the chief grazing areas are to be found in the valley bottoms.



Fig. 11.—A neatly constructed and well kept farm house with a hill top situation which affords a good view, sunny aspect and adequate drainage.

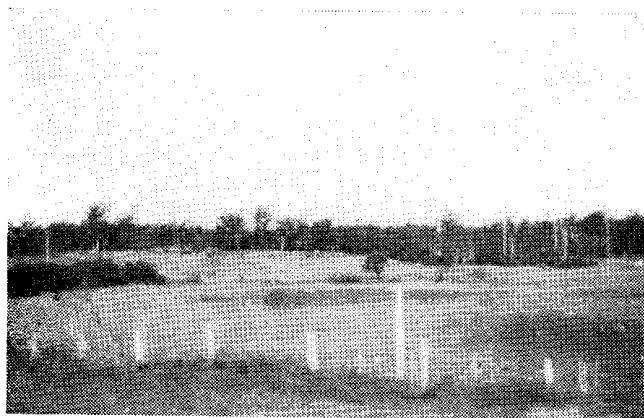
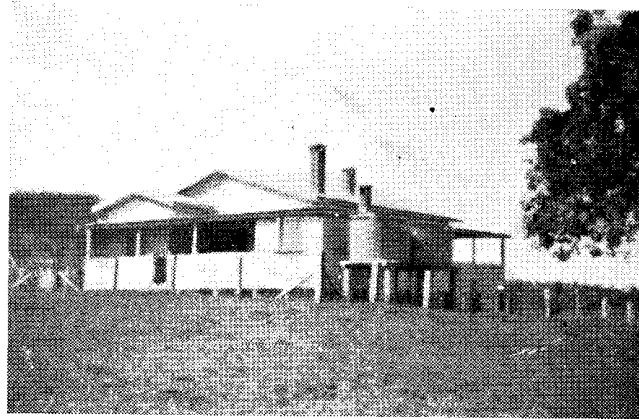
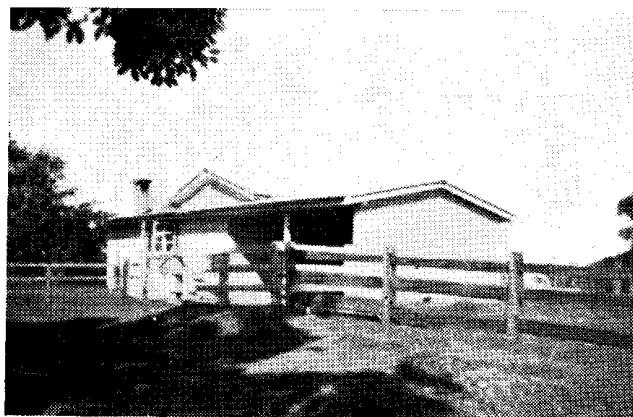


Fig. 12. — Alluvial creek flats sown down to improved pastures which are closely subdivided for rotational grazing.

Fig. 13.—Well kept bails with a sunny aspect and dry situation and a well shaded yard.



Three views of a small but well managed dairy farm in the Moorland district to the north of Taree.

Average quantities of fodder grown: Twelve acres of saccaline, half an acre of barley and one and a half acres of cow cane.

Pastures: 280 acres of hilly timbered country used as winter feed which was at one time pasture but has been overgrown by secondary growth trees and infested with lantana and bracken fern—285 acres of *paspalum* mostly on lower ridge areas.

*Treatment of *paspalum* paddocks:* Farmer does not renovate, mow or topdress his pastures, principally because farm is too rough.

Number and size of paddocks: Eight paddocks of about seventy acres apiece.

Farm Labour.

Analysis of the information gained from farmers interviewed during the survey has demonstrated that a shortage of farm labour is the chief factor limiting operations on many dairy farms. The size of the milking herd and the extent to which farmers are willing to adopt improved farming methods are restricted to a varying degree by the labour force available on farms.

The various types of labour used on the sixty-five farms surveyed, including the farm operator and members of his family, are summarised in Table XXVI. An analysis of the table will indicate that various forms of labour were used on the farms including both full-time labour, seasonal and contract labour.

(a) Full-time Labour.

Operator alone: The majority of farms (sixty-two per cent.) were managed using the labour of only a single operator with no other full-time assistance. Farms of this type were found to be very much more common in the Taree zone than in the other three zones.

Operator plus full-time assistance: Twenty-five farms (about thirty-eight per cent.) were operated using the full-time labour of more than one man. Sixteen farmers (twenty-five per cent.) employed one or more adult sons²⁶ who performed all types of farm work. Six farms (nine per cent.) were operated by partners two of whom employed additional full-time adult assistance—in one case a partner's son, and in the other case a hired worker.

Reliance on full-time assistance was found to be relatively uncommon in the Taree zone, where only twenty-three per cent. of farmers employed full-time labour. By contrast, about half of the farmers interviewed in the Comboyne zone employed the labour of more than one man in the form of a partner or a son.

(b) Part-time Labour.

Permanent family labour: Although many farmers had limited assistance in the major tasks of managing their farms, many relied on the assistance of members of their families for some work. About twenty-eight per cent. of the farmers interviewed were assisted in the dairy by their wives who performed the tasks associated with milking such as operating milking machines or hand milking cows, washing utensils and scrubbing concrete floors. Assistance from wives was more common on one-man operated farms.

²⁶ Over the age of eighteen years.

TABLE XXVI.
Farm Labour on Survey Farms.

Type of Labour.	Survey Area.		Taree Zone.		Wingham Zone.		Nabiac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
1. <i>Full-time labour—</i>										
(a) Single owner operator (O.O.) ...	40	61.5	17	77.5	8	57.2	7	53.8	8	50.0
(b) Owner-operator partners ...	4	6.3	1	4.5	1	7.1	...	...	2	12.4
(c) O.O. + 1 son ...	13	20.0	2	9.0	3	21.5	4	30.8	4	25.0
(d) O.O. + 2 sons ...	2	3.1	...	...	1	7.1	1	7.7	1	6.3
(e) O.O. + 3 sons ...	1	1.5	1	4.5	...	...	...	...	...	...
(f) O.O. partners + 1 partner's son ...	1	1.5	...	...	...	...	1	7.7	...	...
(g) O.O. + 1 hired male ...	2	3.1	1	4.5	...	...	...	...	1	6.3
(h) O.O. + 1 hired junior (under 18 yrs.) ...	1	1.5	...	...	1	7.1	...	...	...	...
(i) O.O. partners + 1 hired man ...	1	1.5	...	...	...	...	...	...	...	...
2. <i>Part-time labour—</i>										
(a) Mechanised contract—										
Hired labour—										
Regular ...	17	26.2	12	54.5	1	7.1	3	21.4	1	6.3
Irregular ...	11	16.9	1	4.5	4	28.6	2	15.4	4	25.0
(c) Seasonal crop pickers ...	3	4.6	2	9.2	...	...	...	...	1	6.3
(d) Bush and fence worker ...	2	3.1	1	4.5	...	...	...	...	1	6.3
(e) Wife in dairy ...	18	27.7	5	22.7	2	14.3	4	30.8	7	43.8
(f) School-age children ...	11	16.9	4	18.2	1	7.1	6	46.2	...	...
(g) Adult daughter ...	1	1.5	...	...	1	7.1	...	...	...	...

^a Percentages of total farms surveyed (65).

^b Percentages of total farms surveyed in the respective zone.

Seventeen per cent. of the farmers interviewed obtained part-time assistance from their school children (mostly in addition to their wives) who performed "odd jobs" associated with operations in the dairy, herding and feeding stock, etc. One farmer was assisted in most of the less strenuous aspects of farm work by his adult daughter.

All farmers using part-time assistance of the above types stated that they regarded it as indispensable to the maintenance of existing production levels.

Temporary non-family labour: Twenty-eight farmers reported that they engaged a local contract worker equipped with rotary hoe and ploughing equipment for breaking up small areas of new ground in preparation for the sowing of fodder crops. On several farms, contractors were used for pasture renovation. In all cases, labour of this kind was employed for only short periods of each year.

Employment of contract labour was found to be almost entirely confined to one-man-operated farms. Of the twenty-eight farms using contract labour, twenty-five were of this type.

The majority of farmers reported difficulties in securing adequate supplies of contract labour at times when it was most needed.

Experience gained during the course of the survey suggests that farmers who now lack assistance on farms, have relied in the past on two sources of labour: (a) family labour, particularly children who have

left school, and (b) to a lesser extent, non-family labour gained from the general pool then available in most districts. For various reasons, sources of farm labour have seriously diminished. Chief among the reasons, advanced by farmers for such shortages is the general drift by many farmers' children and other possible farm labourers to urban occupations.

Despite the fact that advances in farm mechanisation on dairy farms, particularly the introduction of milking machines, have been labour saving, shortages of farm labour must rank high amongst the factors preventing an improvement of farm methods and production levels.

Most of the farmers interviewed were unanimous that, at the level of economic conditions prevailing at the time of the survey, farmers, in general, were unable to pay sufficient wages to attract efficient farm labourers from urban areas, where comparatively higher wages and shorter working hours prevailed. This applied to farmers' children who have left home as well as to other sources of farm labour.

On the basis of the observations made throughout the Manning River district, it is considered that, with existing shortages of farm labour, most farmers, except those operating very small farms, are unable to effectively utilise the whole of their farms. Under such circumstances, some farmers are forced to under-manage their farms as a whole or apply intensive management to a portion of their farms and neglect the remaining portion. Either of these two courses results in a serious decline in the quality of many farming areas. This is reflected, for example, in the development of secondary growth vegetation and infestation of bracken fern and lantana on many hilly farms. Similarly, many acres of rank and unpalatable *paspalum* pastures on river flats have developed through neglect and are largely useless as sources of feed. It is considered that, if farms were smaller in relation to existing labour resources, more efficient management would be possible on a majority of farms.

The more intensive mechanisation of dairy farms would do much to alleviate the adverse repercussions of labour shortages. As mentioned previously, many farmers do not fully appreciate the economic advantages of farm mechanisation. For example, some farmers complained of the costs involved in the purchase and maintenance of a tractor, yet few seemed to be fully conversant with the increased labour productivity which might be expected from the efficient use of a tractor. Machinery costs and shortages could be mitigated by an increase in the number of contractors to carry out the more costly and strenuous farm operations such as cultivation for fodder crops, as well as pasture renovation. Examples of the assistance that can be rendered in this direction have been seen during recent years on the Far-North Coast, where contractors have been employing machines for picking maize, hitherto an expensive and strenuous task, as well as cutting and chaffing the crop, sometimes in the one operation.

Farm Tenure.

It has often been alleged that in the Australian dairy industry an unsatisfactory relationship between landlord and tenant on non-owner operated farms is frequently largely responsible for the low level of efficiency in farm husbandry which characterizes many farms. Such poor production methods are a major cause of low levels of output and result in unnecessary depletion of soil fertility.

One of the aims of the survey was to seek a fuller understanding of the conditions of tenure on dairy farms and the relationship between the operator's tenure status and farm management efficiency. Each of the sixty-five farmers interviewed was asked to supply certain information relating to his tenure status. In the case of non-owner operators, information was sought about the tenancy agreements operating at the time of the survey.

It is proposed to discuss some aspects of the relationships between tenure status and efficiency of farm management in a subsequent article. For the purposes of the present article, several of the more general aspects of farm tenure on surveyed farms are summarized below.

(a) Tenure Status.

The tenure status of farm operators is summarized in Table XXVII. An examination of this table reveals that:

- (i) About sixty per cent. of the farms were operated by "owners," which was more characteristic of the Comboyne and Wingham zones than elsewhere.
- (ii) Farms operated by "tenants" were found to be relatively non-characteristic of the survey area, since they represented only about eleven per cent. of the farms surveyed. Farms of this type were found to be comparatively more common in the Nabitac zone than other areas.
- (iii) Approximately twenty-nine per cent. of the farms were operated by "share farmers," which included some sons of landlords. "Share farming" was considerably more characteristic of the farms in the Taree zone, although it was fairly common in the Nabitac zone.

TABLE XXVII.
Tenure Status of Survey Farm Operators.

Tenure Status.	Survey Area.		Taree Zone.		Wingham Zone.		Nabitac Zone.		Comboyne Zone.	
	No. of Farms.	Per Cent. ^a	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b	No. of Farms.	Per Cent. ^b
Owner ...	39	60.1	10	45.4	11	78.6	6	46.2	12	75.0
Share farmer— ...										
(a) Son of operator ...	6	9.2	2	9.1	2	14.3	1	7.7	1	6.3
(b) Other ...	13	20.0	8	36.4	...	...	2	15.4	3	18.7
Tenant ...	7	10.7	2	9.1	1	7.1	4	30.7	...	...

(a) Percentage of total farms surveyed (65).

(b) Percentages of total farms surveyed in the respective zone.

The classification of tenure status into the abovementioned groups—"owner," "tenant" and "share farmer"—is purely nominal. It does not satisfactorily describe certain characteristic differences between the status in tenure of all farm operators, especially if the relationship between tenure status and farm management practices is to be considered. This can be illustrated by examining briefly some features of tenure status of operators on the farms surveyed.

Owner-operated Farms.

Of the thirty-nine farms included in this group, thirty-six were managed by one or more persons who held the ownership rights in the respective properties. In the remaining three cases, the relationship between ownership and management varied by view of the fact that legal title to the farm was vested in a deceased estate and the actual operator was responsible to a varying degree to the administrator of that estate, in most cases his mother. Divorce of management from ownership, even in these circumstances, could have some significant influence on the actual operation of the farm.

Tenant Farms.

Tenant farmers included those operators who paid a *fixed cash rent* to their respective landlords. Of the sixty-five farms surveyed, seven were operated by tenants as defined. One of the tenant farmers was a son of the landlord, whereas the others were not related to their landlords. The responsibilities assumed by the seven tenants were similar, each contributing all the stock and meeting all running expenses.

In all cases, agreements, mostly verbal, stipulated that the landlord was responsible for the maintenance of capital equipment such as farm buildings and boundary fences. In each case the tenant was responsible for the upkeep of the internal fences.

The annual rental paid by tenants is summarized in Table XXVIII which also indicates, in each case, the location of the farm, period of occupancy by the tenant and the total farm area. On farms which had been rented by the tenant for a long period, it appeared that the annual rental was related to the size of the farm.

It will be noted that most tenants interviewed had occupied the farms for comparatively long periods, indicating a relatively low mobility of tenant-operators. The sample is too small to indicate anything conclusive in this regard. However, with one exception, each of the tenants interviewed stated that he hoped to renew his lease when it expired.

Of the seven tenant-operated farms surveyed, six were owned by local landlords and one by an absentee landlord. Only in two cases did the landlord visit the farm and, in all cases, tenants were given free scope to farm according to their own discretion.

On five farms, the rental had remained unchanged during the period of occupancy by the tenant. However, in two of these cases, tenants had not finished the initial term at the time they were interviewed. On the remaining two tenant farms (one occupied for six years and the other for fifteen years), the annual rental had been varied during the tenant's occupancy and this change had been made during recent years. In one case the rental had remained £210 per annum for fifteen years and had been increased to £240 per annum in January, 1951, when the lease had been renewed for an additional seven years. In the other case, the rental had been £132 per annum for a period of three years from the commencement of occupancy by the tenant interviewed. Thereafter it had been increased to £156 per annum over a twelve months' period and subsequently increased to £204 per annum. After the expiration of the initial lease, the tenant had allowed his lease to lapse into a tenancy at will.

TABLE XXVIII.
*Annual Rental, Duration of Tenure and Total
 Farm Acreage of Seven Tenant Farms.*

Location of Farm.	Annual Rental.	Length of Time Present Tenant Has Occupied Farm.	Total Farm Area.
	£	Years.	Acres.
1. Taree Zone	240	3	110
2. Taree Zone	120	20	50
3. Wingham Zone	52	8 ^a	50
4. Nablac Zone	240	15	230
5. Nablac Zone	204	6	223
6. Nablac Zone	109	11	210
7. Nablac Zone	190	22 ^b	383

^a Son of landlord who has lived on the farm all his life and has been working on the farm as a tenant for about five years.

^b This tenant farmer rented two adjacent properties (246 acres and 137 acres) which he worked as a co-ordinated unit. The properties were rented from different landlords and the annual rentals paid were £140 and £50 respectively.

Sharefarms.

Farms were classified as operated by "sharefarmers," if the operator acted under a tenancy agreement which stipulated that the proceeds of farm operations were to be divided with the landlord in fixed proportions agreed upon beforehand. The essential feature of sharefarms, so defined, was that the amount actually paid by the tenant did not take the form of a fixed rent but varied with the variations in the total income derived from farm operations.

Information derived during the course of the survey has emphasised that important differences existed between the nineteen sharefarmers interviewed.

(i) The Sharefarmer's Responsibility.

Sharefarmers had different personal interests in their farm operations. Six of the nineteen sharefarmers were sons of the respective landlords and all expected to inherit the ownership rights in the properties they managed. The remaining thirteen sharefarmers were not related to their respective landlords.

Again, direct financial interests in the property being managed varied greatly as between sharefarmers. Some sharefarmers contributed considerably more to farming operations than is considered to be "normal" to dairy sharefarming agreements. In dairying, the most common sharefarming arrangement is for the landlord to supply, not only the farm and farm household (with basic household amenities) but, in addition, the plant and the stock as well as a proportion of certain running expenses (*e.g.*, seed and fertiliser).

Some important departures from this principle were observed on some sharefarms included in the survey. Table XXIX summarizes the manner in which the various elements of income and expenditure were divided under the agreements in operation on seventeen sharefarms.

Examination of this table reveals that the contribution towards running expenses varied considerably. On two farms, the operator was required to provide all stock as well as the whole of all expenses. In one other case a similar set of conditions prevailed, with the exception that the landlord had agreed to meet half the cost of seeds and fertilizer purchased. In all three cases, the sharefarmers made additional contributions in that they had carried out all improvements to their farm households, including the installation of basic amenities such as domestic water tanks and pipes, kitchen stoves and sinks, baths and laundry accessories.

These cases represented the one extreme in sharefarmer responsibility. At the other extreme, were found the cases where the sharefarmer conformed to the more usual pattern in that the stock and plant and plant maintenance were supplied by the landlord who also contributed a share of certain cash items. Under such circumstances, the sharefarmer was expected to pay the whole of such expenses as petrol and power costs and, in some cases, all the cost of casual labour.

TABLE XXIX.

*The Sharefarmers' Share on Seventeen
Sample Dairy Farms.*

Sharefarmers' Share of Income.			Sharefarmers' Contribution to Expenses.					
Milk/Cream.	Pigs.	Calves.	Lime, Seed, Fertilizer.	Stock Feed.	Dairy Stock Purchased.	Part-time Labour.	Fencing.	Petrol and Power Costs.
9/20	Nil	9/20	*	*	Nil	All	Nil	All
$\frac{1}{2}$		All	All	All	All	All	All	All
$\frac{1}{2}$		Nil	$\frac{1}{2}$	Nil	Nil	All	All	All
$\frac{1}{2}$		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	All	All	All	All
$\frac{1}{2}$		Nil	*	$\frac{1}{2}$	Nil	$\frac{1}{2}$	Nil	All
$\frac{1}{2}$		Nil	*	*	Nil	$\frac{1}{2}$	Nil	All
$\frac{1}{2}$		Nil	*	*	Nil	Nil	Nil	All
$\frac{1}{2}$		Nil	$\frac{1}{2}$	$\frac{1}{2}$	Nil	All	Nil	All
$\frac{1}{2}$		Nil	$\frac{1}{2}$	$\frac{1}{2}$	Nil	All	Nil	All
$\frac{1}{2}$		Nil	$\frac{1}{2}$	$\frac{1}{2}$	Nil	All	Nil	All
11/20	All	All	All	All	All	All	All	All
11/20	All	All	All	All	All	All	All	All
12/20	Nil	Nil	$\frac{1}{2}$	*	Nil	All	Nil	All
$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	Nil	$\frac{1}{2}$ x 2
$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2	$\frac{1}{2}$ x 2

* Indicates a farm where expenses of this kind are not incurred.

x 2 Indicates an agreement under which two brothers work and farm as share-farmers and each has this share, the balance going to their father (or mother) who is the landlord.

A characteristic feature of sharefarming in the Manning River district is that most sharefarmers are given free scope by landlords to farm according to their own ability and judgment. Of the nineteen sharefarms visited, only three were farms in which the landlord participated in the managerial function. Two of these farms were managed by sons of landlords. Hence, few landlords participate in farm management either by giving manual assistance in working the farm or by directing how the farm is to be managed as a going concern. It can be seen therefore that sharefarmers in such circumstances have responsibilities akin to those normally held by tenants paying a fixed rent.

Such variations in the responsibilities of the sharefarming agreements are especially significant in view of the fact that the survey has shown that, overall, there was no constant ratio between the responsibility assumed by the sharefarmer and his share of the profits derived from the joint enterprise.

(ii) *The Sharefarmer's Share.*

As demonstrated by Table XXIX, the manner in which incomes were divided between landlord and sharefarmer varied considerably over the seventeen farms surveyed.

The most usual practice was for the income derived from the sale of milk or cream and pigs to be divided equally, irrespective of the contributions made by the sharefarmer. Where the landlord supplied the dairy stock, some sharefarmers received a fixed amount, or a proportion of the sale price of any stock sold to reward them for the rearing process. Other sharefarmers were not so fortunate. Similarly, even where the sharefarmer supplied all the stock, he did not always receive a portion, let alone all, of the receipts derived from the sale of young stock. However, as indicated, a common practice in the case of the sale of calves, was for the sharefarmer to receive a proportion of the returns identical to his proportionate contribution to the cost of stock purchased.

The smallest share of the income from milk/cream to a single sharefarmer was nine shillings in the pound. Two farms were operated by partner brothers, and the partners each gained an equal share in incomes amounting to one-third in one case, and three-eighths in the other case. The balance went to the respective landlord, in one case the father, and in the other case the mother who was executor of the deceased estate.

To provide some indication of the landlord's share on sharefarms, an attempt has been made to calculate the sharefarmer's "rent." This has been defined as the landlord's share of gross yearly cash income, less his contributions to cash expenses based on an average of the three-year period ended 31st March, 1951. This provides an index roughly comparable with the tenant's fixed cash rent.

The "rents" paid by sixteen sharefarmers are summarized below:

Annual "Rents" paid by Sharefarmers. £							Number of Farmers.
250-299	..	..	..	..	..	..	1
300-399	..	..	..	..	..	..	2
400-499	..	..	..	..	..	..	2
500-599	..	..	..	..	..	..	3
600-699	..	..	..	..	..	..	4
700-799	..	..	..	..	..	..	2
800 and over	..	..	..	..	..	..	2

It will be noted that the "rents" paid by sharefarmers varied considerably. As indicated previously, such variations did not bear a constant ratio with variations in the responsibilities assumed by the sharefarmers.

It is not possible to compare accurately the above "rents" with the cash rents paid by tenants for two reasons:

The responsibilities of landlord and sharefarmer varied considerably with respect to expenses incurred in replacing capital items on farms, and in running costs. On the other hand, all tenant farmers supplied stock and met all running expenses.

The survey did not include an analysis of landlord and farm operator equity.

Despite these limitations, it was evident during the course of the survey that most sharefarmers paid higher "rents" than did tenants on farms returning comparable levels of income. This was particularly evident when a sharefarmer's financial interests in the property were similar to those of a tenant farmer, namely, when the sharefarmer owned all the stock, plant and machinery and paid for all running expenses. Two examples can be cited from the farms surveyed:

- (a) One sharefarmer, with the abovementioned equity in capital and responsibilities with respect to expenses, paid a "rent" of £363 per annum, and the gross annual cash income from the property was £661. A tenant on a farm returning £639 paid a rent of £120.
- (b) Similarly, a sharefarmer with "tenant" responsibilities on a farm returning a gross annual cash income of £986 paid a "rent" of £460. A tenant on a farm returning £1,017 gross income paid a cash rent of £204.

TABLE XXX.

Duration of Tenancy Agreements on Twenty-six Non-Owner Operated Dairy Farms.

Length of Agreements.	Number of Farms.
<i>Tenant Farm Agreements—</i>	
No fixed period (tenancies at will) by a non-relative of landlord ...	2
3 years	2
5 years	2
7 years	1
No fixed period on a farm where a son of the owner is the tenant ...	1
<i>Sharefarm Agreements—</i>	
No fixed period (tenancies at will) by non-relative of landlord ...	9
3 years	2
5 years	1
No fixed term (tenancies at will) by son of landlord... ..	6

Duration of Farm Tenancies.

Tenancies vary considerably in their duration. The duration of tenancy agreements on the twenty-six non-owner operated farms, which were current at the time of the survey, are listed in Table XXX. Examination of this table indicates that most of the tenancy agreements were for no fixed period and would thus be classed as tenancies at will. Of the eighteen farmers with agreements in this category, seven were sons of landlords and operated the properties, presumably, on the assumption of continued occupancy. The remaining eleven were subject to short notice to quit. Some of the farmers whose agreements were for

no fixed period began their present tenures on a fixed term basis, but allowed such agreements to lapse without renewal. Most sharefarmers, however, from the outset of current tenancies, had been operating under a tenancy at will, some for long periods of time. In one case, the sharefarmer had occupied the farm for twenty years, none of which time had been covered by a fixed period of tenure.

Landlord and Tenant Relationships.

Few tenant and sharefarmers realized the necessity of embodying agreements of tenure in writing with detailed and explicit statements of the obligations of both parties to the agreement. Of the twenty-six non-owner operators interviewed, only eight (three tenant farmers and five sharefarmers) reported that they had written agreements covering the terms of their tenures. The balance of sharefarmers and tenants reported only verbal agreements.

None of the agreements (verbal or written) were reported to be comprehensive, but covered only a limited number of topics such as the period of tenure and certain broad financial matters, such as the tenant's rent or method of income division in joint landlord-sharefarmer enterprises. Any reference to farm husbandry practices was found to be particularly limited and amorphous in character, merely stipulating, for example, that "the tenant must maintain the property in the condition prevailing at the commencement of (his) tenure" or the "tenant must cultivate and manage the property according to the principles of good husbandry."

Although only explicitly stated by a few tenants and sharefarmers, it was apparent during the course of the survey that an unsatisfactory landlord-tenant relationship was a fundamental reason why many viewed with disfavour the adoption of certain approved practices such as renovation of pastures, pasture topdressing, fodder conservation and the sowing of improved pasture plants.

(i) *Compensation.*

Lack of adequate compensation for money and energies expended on improvements was advanced by some tenants and sharefarmers as their chief reason for not following improved practices of various kinds.

The survey has demonstrated that few tenant and sharefarmers understand fully their rights under the existing Agricultural Holdings Act. Lack of knowledge of the provisions of this Act, it is claimed, is a major reason why tenant farmers and sharefarmers permit a landlord's lack of co-operation to prevent them from implementing needed improvements.²⁷

(ii) *Duration of Tenancy Agreements.*

Although conversant with their rights under the Act in respect of compensation for certain improvements implemented by them, a number of the farmers interviewed were adamant that the legal duration of tenure prescribed by the Act was too short to make worthwhile some desired improvements.

²⁷ A. W. S. Moodie and J. R. Butler, "Farm Tenancy in New South Wales," N.S.W. Department of Agriculture publication, Sydney, 1945, p. 3.

These farmers contended that, particularly under adverse seasonal conditions, a tenant may reap no benefit by way of an increased output from such improvements as sown improved pasture, within the short period of two or three years. Tenancies of this duration were considered to be a severe handicap to a tenant who wished to improve his farming methods in order to receive, not merely financial compensation at the termination of his tenancy agreement, *but an enhanced production from the farm*. It is evident that problems of this nature are worthy of closer analysis, if the most satisfactory legal basis for landlord-tenant relationship on farms is to be reached.

(b) Tenure Experience and Age of Farm Operators.

Tenure Experience.

The concept of the "agricultural ladder" has been employed by a number of research workers in the United States to analyse changes in the tenure status of farm workers. Timmons and Barlowe have employed this technique in a study on "Farm Ownership in the Midwest."²⁸ Using a similar approach, it is possible to describe briefly the changes which have occurred in the tenure status of farm operators interviewed during the course of this survey of the Lower North Coast.

"The concept of the agricultural ladder . . . is that one gains experience and accumulates the necessary funds to purchase a farm and the working capital to operate it by advancing from an unpaid family laborer or hired hand to tenant, mortgaged owner and finally full owner.

Basically, the ladder concept has involved four fundamental steps or rungs. These rungs are often characterized by the letters P-H-R-O: 'P' for a period (usually counted after the age of 14) when the individual is on the home farm doing unpaid family labor for his parents; 'H' for hired hand; 'R' for renter (sometimes designated 'T' for tenant); and 'O' for owner. Other rungs to the ladder have often been recognized and used in descriptions of the functioning of the ladder. For instance, the tenant group is sometimes broken down into different types of tenants. An 'N' classification is sometimes used to cover periods of nonfarm employment, an 'MO' group is used at times to designate the mortgaged owners, a 'PO' group may be used to indicate part ownership, and an 'L' group frequently is used to designate time spent as landlord.

The concept of a ladder with a number of separate rungs rising from the P and H rungs to the O and L rungs suggests a definite gradation of tenure status groups and implies that each successive group has higher tenure status than the preceding one. This concept is highly artificial and cannot be accepted without numerous reservations."²⁹

²⁸ Iowa Agricultural Experiment Station Research Bulletin 361, June, 1949.

²⁹ Timmons and Barlowe: Op. cit., p. 892.

TABLE XXXI.
*Patterns of Working Experiences and Tenure
 Status Reported by Survey Farm Operators.*

A. Thirty-nine Owner-Operators.

Tenure Experience Groups.	Tenure Experience Sub-groups. ^a	Number of Cases.	Proportion of Owner-operators.
			Per Cent.
1. <i>Basic agricultural ladder experience but no previous farm ownership—</i>	PHTO	1	2.6
(a) Without non-farm experience ...	PSO, PTO	7	17.9
(b) With non-farm experience ...	HIO	1	2.6
	PNSO, PNTD	2	5.1
	HNSO	1	2.6
2. <i>Previous experience as an operator (not as an owner) with no other farm experience...</i>	NTO	2	5.1
3. <i>Farm experience but not as operator—</i>			
(a) Without non-farm experience ...	HO, PO, PHO	12	30.7
(b) With non-farm experience ...	HNO (NHO) · PNO, PHNO.	6	15.4
4. <i>Previous experience as an owner-operator</i>	HONO	1	2.6
5. <i>No previous farming experience ...</i>	NO	6	15.4
All owner operators ...	.....	39	100.0

B. Twenty-six Share and Tenant Operators.

Tenure Experience Groups.	Tenure Experience Sub-groups. ^a	Number of Cases.	Proportion of Total Non-owner Operators.
			Per Cent.
1. <i>Previous experience as a farm operator not as owner—</i>			
(a) Without non-farm experience ...	PHST, HST, HS ...	2	7.7
(b) With non-farm experience ...	NTS, NST	3	11.5
2. <i>With farm experience but not as operator—</i>			
(a) Without non-farm experience ...	PS, HS, PHS	10	38.5
(b) With non-farm experience ...	NHT, HNS, PNT, PHNS.	6	23.1
3. <i>Previous experience as owner-operator ...</i>	POS	1	3.8
4. <i>No previous farming experience ...</i>	NS	4	15.4
All cases of tenants or share-farmers	.....	26	100.0

(a) Each code letter represents a period of farm tenure or non-farm tenure spent by the farm operator since he left school: P—on his father's farm for "keep"; H—as a hired farm worker on his father's or another farmer's farm; S—operating as a sharefarmer; T—as a tenant farm operator paying a fixed cash rent; N—in urban occupations; O—as an owner operator. The last symbol in all groupings represents the status in tenure at the time of interview.

Movement from one stage of the ladder to another may not always indicate that an operator has improved his status, since he may be financially, or otherwise, worse off by making the move. Similarly, the progress from stage to stage may not be constantly in one direction; some operators may have progressed and then retrogressed in terms of the agricultural ladder.³⁰

For the purposes of this article, the P, H, T, N and O symbols, as described above, have been employed. In addition, the symbol "S" has been used to designate a share operator as distinct from "T" which represents a tenant operator.

³⁰ Timmons and Barlowe: *Op. cit.*, p. 893.

Table XXXI summarizes the working experience of the sixty-five farmers interviewed. Owner-operators are analysed separately from non-owner operators (share and tenant farmers). It should be noted that the tenure status of farmers at the time they were interviewed is shown, in all cases, by the last symbol in any combination of symbols.

Analysis of the information on previous working and tenure experience has demonstrated that farmers have had a wide variety of experience, which can be summarized as follows:

- (1) Twelve of the owner-operators (thirty per cent.) had "basic agricultural ladder experience." That is to say, they started their working experience as unpaid assistants on their parents' farm or as hired workers, and then "climbed" to the status of a sharefarmer or tenant farmer.
- (2) Twenty-four of the owner-operators (sixty-two per cent.) had no previous experience as a farm operator. This group included six owners who had no previous experience on the land prior to gaining ownership of their properties and eighteen owners who had non-operator experience.
- (3) Of the twenty-six non-owner operators, five (nineteen per cent.) had previous farm operating experience; sixteen (sixty-two per cent.) had farm experience but not as operators; four (fifteen per cent.) had no previous experience working on farms.
- (4) All but ten of the sixty-five farmers interviewed had been reared on farms which in most cases were local dairy farms. Fifty-three farmers (eighty-two per cent.) had worked as labourers on farms after they had left school for "keep" or wages and, in most cases, they had spent all, or part, of their time on their parents' farm.
- (5) Only ten of the sixty-five farmers (fifteen per cent.) had not lived all or most of their lives on farms in the survey district. Of these ten, two had come from overseas, two from metropolitan centres, two from farms in other parts of the State, and four from local townships.

Age of Farm Operators.

The concept of an agricultural ladder obviously envisages the passage of time as the farmer progresses from one rung of the ladder to another. If it is to be assumed that this movement has followed the theoretical pattern P-H-S-T-O, an analysis of age distributions should reveal a significant difference between the various tenure groupings of farm operators with respect to age. Table XXXII summarizes the distribution of farm tenure groups by age of all survey farm operators.

Analysis shows that the difference between the mean ages of the three tenure groups was not significant. Two reasons can be advanced to explain this:

- (a) A group of sharefarmers and tenant farmers have remained on the same tenure status for a considerable period and, in their cases, progress to owner operator status is by no means inevitable. Shortage of money was the chief factor preventing farmers from acquiring their own farms.

- (b) Analysis of the manner in which owners acquired ownership of farms shows that many did not pass through a transition period as share or tenant-farmers. As indicated by Table XXXI, twenty-four of the thirty-nine owner operators interviewed (sixty-two per cent.) had no previous experience operating farms. Some spent periods in non-farm occupations. Six acquired the ownership of farms without any previous experience on farms. Transition to ownership in these instances, particularly the former, often took place at an early age.

TABLE XXXII.

Farm Tenure Groups and Age of Survey Farm Operators.

Tenure Group.	Cases Reporting.	Average Age.	Number of Farmers in Each Age Group.						
			Under 25.	25-34.	35-44.	45-54.	55-64.	65-74.	75 and over.
Share Farmers ...	19	41	1	6	5	6	...	...	1
Tenant Farmers ...	7	47	...	1	3	1	2	...	...
Owner Operators ...	39	50	1	5	6	10	12	5	...
Totals ...	65	...	2	12	14	17	14	5	1

TABLE XXXIII.

How Owner-Operators Acquired their Farms.

Method by which owner-operators acquired their properties.	Number of farmers.
1. Inherited—	
Outright	5
With incumbrances	13
Property held as an estate	3
2. Purchased	16
3. Own Selection	2

How Owners Acquired Their Farms.

Analysis of the methods by which farmers acquired ownership rights in their properties can be of significance, since it may throw some light on the important sociological problems of property inheritance and mobility of rural populations.

Table XXXIII summarizes the manner in which the thirty-nine owner-operators acquired their farms. This table reveals that:

- (a) Twenty-one owner-operators (fifty-four per cent.) inherited their properties. The ownership rights of three properties were vested in an estate. Five farmers inherited outright their ownership, whilst thirteen acquired full unencumbered ownership by paying off mortgages on the property or by purchasing other personal interests in the property.
- (b) Eighteen owners (forty-six per cent.) did not inherit their properties but acquired them by straight-out purchase or by selecting a lease ("homesteading").

Analysis shows that owners without farm operator experience benefited to a greater extent from inheritance than those who reported this type of experience. These included those owners who went directly from "P" and "H" tenure status to ownership.

The analysis of tenure experience of the sixty-five farms surveyed has emphasised:

- (a) Family assistance was very important in helping many farmers to acquire property ownership.
 - (b) Most of the farmers have lived the bulk of their lives on the dairy farms they were operating at the time of the survey or on dairy farms in the same district.
-