ASPECTS OF CHANGE ON SOME NORTH COAST DAIRY FARMS

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ABSTRACT

In a survey conducted in 1969 changing agricultural patterns on some North Coast dairy farms were investigated.

Increasing utilization of introduced pasture species and of fodder crops was apparent, and size of dairy herds on individual farms was also increasing. Half the surveyed farms had recently introduced beef enterprises and a further increase in beef herds was promulgated. Other enterprises playing a major role on dairy farms were maize-growing and pig production.

Over-all, a dynamic situation appears to exist in which many dairy farmers are making positive efforts to adjust to pressures currently affecting them.

INTRODUCTION

In a recent paper, Lovett, Matheson and James (1971) have presented results from a preliminary investigation of the pattern of agriculture in northern New South Wales. Survey work was carried out during August, 1969, in regions defined as the North-west Slopes and North Central Plain; the Northern Tablelands and the North Coast. The survey sample was drawn in such a way as to cover all major farm activities within these areas. Individual properties were chosen at random. Of 32 properties visited in the North Coast Statistical Division, 17 were, or had recently been dairy farms.

A major objective of the survey was to collect information on changes which had taken place during the last five years and changes which were predicted for the coming five year period. From these data it was hoped to gain information on farmer response to the pressure being imposed upon his industry.

The sample of dairy farms is small, but the consistency of the response patterns encountered throughout suggests that the data may be taken as useful indications of farming trends in the area. These data are in some respects complementary to the detailed survey work of Bird (1962) and Standen (1969). However, as these workers were principally concerned with the Far North Coast it is difficult to draw comparisons between their data and those of the present survey.

RESULTS

Background information

Data from the Bureau of Census and Statistics (hereafter referred to as Comm. Stat. 1970) indicate a consistent decline in numbers of dairy cattle in the North Coast Statistical Division, with a concomitant increase in numbers of meat cattle (Fig. 1). The correlation between dairy cattle numbers and meat cattle numbers was highly significant ($r = -0.962$, $P < 0.001$).

In 1967 the dairy herd was 74% of its size in 1957, and the meat cattle herd was 157% of the 1957 figure. This represented a decline of 132,261 in cattle classified as dairy but many of these would be incorporated in the gain of 179,365 cattle in the meat cattle herd.

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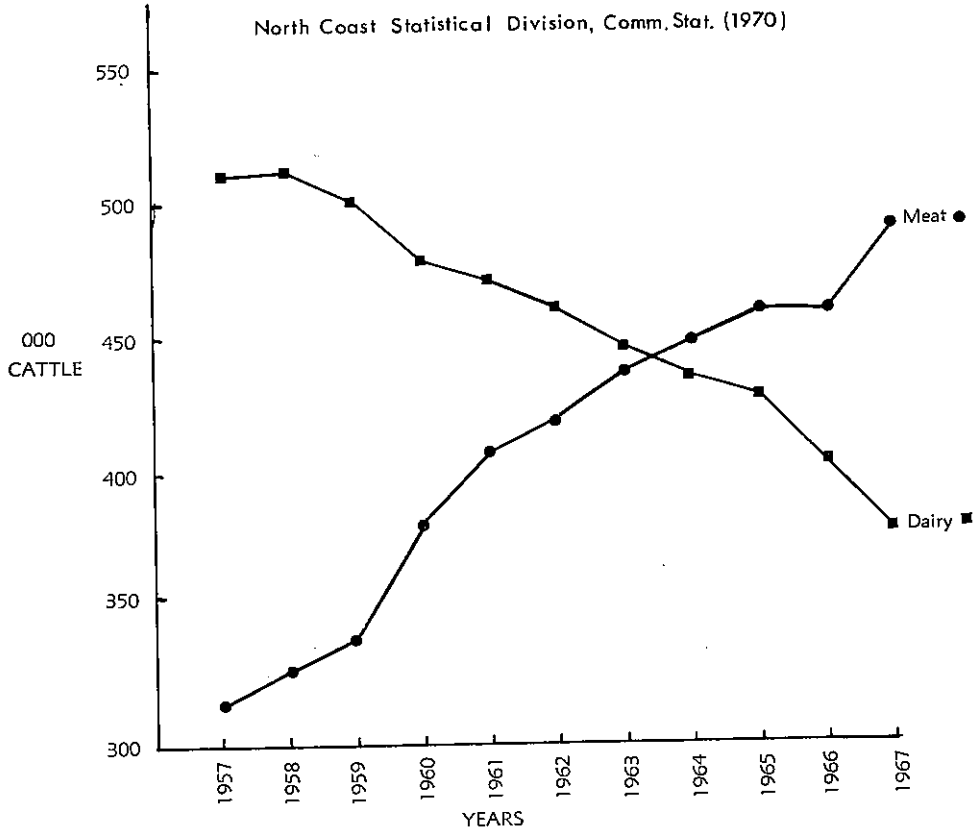
Figure 1. Changes in cattle numbers 1957–1967, North Coast Statistical Division, Comm. Stat. (1970)



The dairy farms surveyed were randomly sampled in the vicinities of Bellingen (4), Ballina (3), Byron Bay, Kyogle (4), and Murwillumbah (3). Average farm size was 263 ac with a range of 90 ac to 500 ac. The average size of all holdings in the Division in 1967 was 449.9 ac (Comm. Stat. 1970).

Of the farms studied, 15 were owner-occupied, one was leased and one share-farmed. On average the properties had been occupied by their present farmers for 20.6 years. Age distribution of farmers was:—

i) less than 35 years	5
ii) 35 to 55 years	8
iii) more than 55 years	4

Lovett, Matheson and James (1971) have commented on the relatively short term occupation of North Coast properties in general, and this is in accord with the finding of Bird and Marriott (1966) who found that Far North Coast dairy properties were changing hands rapidly. Lovett, Matheson and James (1971) also commented on the relative youth of farmers in the North Coast Statistical Division in comparison with other defined regions of northern New South Wales. Three-quarters of the farmers were below the age of 55, and the dairy farmers in the sample conform to this pattern. It is of interest that Bird (1962) indicated that there was apparently a high incidence of aged farmers on Far North Coast dairy

properties and that this might be a contributing factor to their low incomes. Subsequently, Bird (1966) showed that although substantial differences existed in income levels of dairy farms in Victoria, Queensland and New South Wales these differences were not explicable in terms of differences in mean age and age structure. In this latter paper, Bird (1966) was not able to separate out individual Statistical Regions.

Average rainfall was 64.2 in. on surveyed properties, and was within the range indicated for the area (Comm. Stat. 1970). However, Bird (1962) has commented on the uncertainty of production in the area consequent on variations in rainfall amount and distribution. This variation would seem to be a prime factor in the widespread use of irrigation. On eight of the surveyed properties both crops and pastures were irrigated, but on four others only crops were irrigated because of limited availability of water.

Crops and Pastures

The percentage distribution of cash and fodder crops is shown in Table 1.

TABLE 1

Distribution of cash and fodder crops on survey farms (%)

Cash Crop	Total Acres	% of Total Cash Crops	% of Mean Farm Area
Maize	115	49.4	2.57
Potatoes	52	22.3	1.16
Bananas	26	11.5	0.60
Poplars	26	11.2	0.58
Grain Sorghum	6	2.6	0.13
Beans	2	0.9	0.04
Tomatoes	1.5	0.6	0.03
Pineapples	1.5	0.6	0.03
Peas	1	0.4	0.02
Timber	1	0.4	0.02
Fodder Crop	**Total Acres**	**% of Total Fodder Crops**	**% of Mean Farm Area**
Summer Fodder Crops	64	27.5	1.43
Oats	60	25.8	1.34
Lucerne	50.5	21.7	1.13
Cereal Rye	30	12.9	0.67
Turnips	20	8.6	0.45
Vetch	8	3.4	0.18

Whilst the percentages of crops grown per mean farm area were small it should be noted that crops were not featured on all farms. Thus, 47% of farms grew cash crops and 59%, fodder crops. Of the cash crops, maize and potatoes were outstanding in amount, but the range of crops which were being grown is of considerable interest. Market garden crops were found on properties close to coastal resorts. Oats, lucerne and summer crops such as sorghum hybrids, dominated the fodder crops, again, with a wide choice of less important species being indicated.

Pasture sown to introduced species was a feature of 59% of surveyed holdings. Percentage distribution of sown pasture is shown in Table 2.

Tropical legumes and grasses had been adopted on four farms, one in the Bellingen area, one near Ballina and two in the Kyogle area. Amnemus weevil was a problem on one of the latter. The combination of perennial ryegrass and white

TABLE 2

Distribution of introduced pasture species on survey farms (%)

Pasture Species	Total Acres	% of Total Introduced Pasture Species	% of Mean Farm Area
Perennial ryegrass with white clover	306	58.1	6.84
Tropical grasses* and legumes	141	26.8	3.15
Perennial ryegrass	58	11.0	1.30
Subterranean clover	8	1.5	0.18
Vetch	8	1.5	0.18
Lotus major	5	0.9	0.11
Perennial ryegrass with vetch	1	0.2	0.02

*Includes *Setaria* sp., *Glycine* sp., Siratro, *Desmodium* spp., green panic

clover was dominant among the introduced pasture species followed by tropical grasses and legumes. A range of less widely grown legumes was encountered, e.g. *Lotus major*. Also of interest was the treatment of perennial ryegrass as a monoculture grass crop with added nitrogen. Walker and McMaster (1970) make the point that pasture improvement on the coastal fringe of New South Wales has been concentrated on areas of fertile soil e.g. adjacent to rivers. The introduction of pasture and crop species on the survey farms indicated that, at least initially, such development was indeed concentrated on easily workable, fertile and irrigable creek lands. However, intensification was not confined to the most favoured portions of farms since on ten properties substantial amounts of fertilizers were being applied to kikuyu grass and paspalum swards on rough country. On seven of these properties, nitrogen as well as phosphate was being applied. Half of these properties were undertaking this improvement in association with species introduction programmes as outlined above.

In Table 3, land use is summarised in average terms. It will be seen that 55.3% of the area of these properties was under a relatively intensive agronomic management system. A complete comparison with all rural holdings was not possible, but such comparable data as are available (Table 3) indicate that the average dairy farm surveyed was considerably more intensive in terms of utilisation of cash crops and fodder crops than rural holdings in general.

TABLE 3

Land use on survey farms and all North Coast rural holdings as percentage of farm area
(Mean farm size = 263.4 ac)

	Survey Farms %	All Holdings %
Cash crops	5.2	3.1
Fodder crops	5.2	
Sown pasture	11.8	13.0
Fertilized pasture	30.4	84.0
Balance	47.4	

Fertilizer Use

All farms used some fertilizer, and all had some fertilizer component other than phosphate. The main fertilizer types are summarised in Table 4.
Lovett, Matheson and James (1971) indicated a much greater use of compound fertilizers on the North Coast than elsewhere in northern N.S.W. On the dairy properties 20-11-0 was the most extensively used compound fertilizer.

TABLE 4
Types of fertilizer used on survey farms

	No. of Farms Using Fertilizer	Used on Pastures	Used on Crops
Superphosphate	6	6	3
20-11-0	6	1	5
Mo-superphosphate	4	2	3
Sulphate of Ammonia	5	0	5
Muriate of potash	4	0	4
Urea	2	0	2
19-12-0	2	1	1

(Nitram, 12-1-0, 28-28-0, 14-34-15, 0-11-30, 5-17-5, 18-18-0, 11-34-11, 18-1-0 and "blood and bone" were used on one farm each, predominantly on crops).

Weed Problems

Recurrent weed problems were recognised by 14 farmers. Most found these to be consequent on the clearing and cultivation of land. The most common weeds were summer grasses, lantana, crofton weed and fireweed. Only five farmers regularly attempted control with success. In the case of lantana, mechanical control was effective, and herbicides were applied to the remaining species.

Livestock

Of the 12 farms currently in dairy production 75% had Jersey cows. Two of the remaining farms had Guernseys and the other, Friesians. Average size of the milking herd was 67.3 cows, with 32.3 replacements being carried. This total size of 99.6 animals per dairy herd represents a considerable increase over the 78.5 animal herd of 1965/6 (Comm. Stat. 1970). The current survey results also show an increase over the figures of 57 milkers and 87 total cattle on owner-operated Far North Coast dairy farms in 1959-60 (Bird 1962).

Average herd size on beef producing properties was 52.3 head. This compares with 279.2 head per "pure" beef property recorded in 1965-6 (Comm. Stat. 1970). The breeds varied from properties which used Channel Island breeds crossed to a beef bull, to those with well established Hereford breeding stock. Vealers were the predominant output from the surveyed beef properties. Only one sold substantial numbers of store cattle and only one produced fat cattle.

The major breed encountered in pig enterprises was Large White (87.5% of pig farms had this breed) but Landrace, Berkshire and Saddlebacks were also represented. The Landrace was favoured for crossing with Large Whites. Average numbers of sows per herd was 13.4.

Labour

The average full-time labour force was 1.47 men per farm. Only one farm had no full-time family commitment. Part-time family labour, principally farmer's wives helping in the dairy, was 0.59 per property. Additional full-time and part-time hired labour each contributed only 0.06 men per property. However, 59% of properties used casual labour for operations such as relief milking, fruit and other cash crop harvesting, and fencing. Bull-dozing and harvesting operations were performed under contract on 47% of properties, and 18% of farmers undertook contract operations themselves.

On the basis of full-time family labour, one man tended 46 cows on the dairy properties. However, only two properties were encountered where dairying was the sole enterprise, i.e. this labour was not solely committed to the dairy herd.

Machinery

All properties used at least one tractor, and 37.5% had more than one tractor. Bull-dozers were owned by 12.5% of properties, and were principally used in land clearance work and dam construction. Cultivation equipment was owned by 87.5% of properties but only 12.5% had machinery for harvesting cash crops. There was evidence of a co-operative approach to the utilisation of such equipment, e.g. in maize harvesting. Only three farms had fodder crop harvesting machinery and irrigation equipment was owned by 31.2%.

Crop storage was makeshift, only one grain shed and two silos being encountered. Several properties were, however, considering silo installations as an adjunct to their maize-growing enterprises.

Capital investment

The means of farmer estimates of capital invested in properties are presented in Table 5.

TABLE 5

Capital investments on survey farms

Land Value	Value Per Ac	Machinery	Livestock	Other (Roads, Fences etc.)	Total
$38,121	$132	$3,599	$8,490	$2,230	$52,440

The significance of these data is doubtful, but it is of interest that in three cases, where livestock and cropping enterprises co-existed, farm machinery was valued at a higher figure than were the livestock. On average, however, livestock represented the largest single investment.

Changes implemented in the five years 1965-69

The data obtained on change indicated a dynamic situation in North Coast dairy farms. Only two properties were encountered where dairy cattle were the sole enterprise. Conversely, in the five year period prior to surveying, eight farms (47%) had introduced beef enterprises; there were three combined beef and dairy enterprises and six combined dairy and pig enterprises. The latter predominated in the northern part of the survey area.

The impact of introduced pasture species has been considerable, tropical species were being used on 24% of the properties and introduced species in general on 41% of properties. Crop introductions, largely of maize, were important, as was the increased standard of management indicated by the introduction of subdivisions to small paddock systems on 24% of the surveyed properties.

Changes promulgated for the five years 1970-74

Either the introduction of beef or an increase in size of existing beef enterprises was foreshadowed on 29% of properties. The introduction of cash crops was planned on 35% of properties, and 29% intended to introduce pasture species, including tropical grasses and legumes. Increase in fodder crops was envisaged, as was increased size of pig enterprises.

DISCUSSION

North Coast dairy farms comprised 46.1% of all rural holdings in that region in 1965-6 (Comm. Stat. 1970). The data collected in the survey indicate a considerable degree of change in farming pattern on these properties. Lovett, Matheson and James (1971) have indicated that good management, as evidenced, for example, by fertilizer input and irrigation practises was characteristic of North Coast properties in general, and this is borne out by the dairy farms examined in this paper.

Dairy farms used more full-time and part-time family labour but less hired labour than the average of all North Coast properties. Dairy farmers were ready to make changes in their farming patterns, although a substantial proportion of them were no longer young. This gives cause for optimism regarding the future of the region in general terms. Farmers currently in dairying did not envisage going out of the enterprise and data on herd size indicate that a possible reason for this is an increasing number of milkers per farm, while the total dairy cow population of the North Coast is declining. Standen (pers. comm.) suggests that this may be a statistical phenomenon caused by the rapid decline in small herds. Alternatively, it may be that larger and potentially more viable units are evolving and this could gain impetus from the newly formed Dairy Industry Authority.

The swing to beef is pronounced (47% of properties) and the co-existence of dairy and beef enterprises with beef bulls being used on some of the dairy stock seems likely to expand. It is of interest that only one farmer indicated that the majority of his beef cattle were sold as stores. The tendency to retain beef cattle is related to a farming system which is apparently gaining in popularity, i.e. the integration of cropping with dairy and beef production. Increased output from sown pastures appears to have released some land for cropping, maize being the major crop encountered.

The North Coast is the only Statistical Division of New South Wales to have shown a consistent and substantial increase in area of maize sown for grain in recent years (Table 6). The survey results indicate that the crop is widely distributed in the Division.

TABLE 6
Trends in maize production in the North Coast Statistical Division, data from Comm. Stat. (1970)

	Average for Five Seasons Ended 1964-65	1965-66	1966-67
Acres	17,333	17,501	21,173
Bushels of grain	807,709	703,233	1,083,813
Bushels/ac	46.6	41.7	51.2

Maize was stored on the farm as a grain feed source and in some cases was being sold to neighbouring properties. A former dairy farmer maintained that his combination of beef cattle with maize, where the latter was partly used as a cash crop in the above manner, yielded returns equivalent to his dairy enterprise.

In the context of cropping, it is interesting to note that there was a low incidence of harvesting machinery probably due to the relatively small size of holdings. Contract harvesting was common, but some co-operative ventures in machinery had been launched. The scope for this type of development, which is widespread in countries of small property size, e.g. Denmark and the Netherlands, would seem considerable.

The combination of dairy cattle and pigs, often with maize, is a further indication of logical diversification on farms of restricted size. This type of development was found particularly in the Ballina and Kyogle areas.

As in the case of maize, there has been a substantial increase in the North Coast pig population in the last few years. New piggery developments, for up to 50 sows, were encountered during the survey. The only other pig development is associated with the grain industry. Notwithstanding recent increases, North Coast pig numbers have yet to regain the high values of the immediate post-war years (Table 7).

TABLE 7

The pig population of the North Coast and Western Slopes Statistical Divisions, Comm. Stat. (1970)

	1945	1963	1964	1965	1966	1967
North Coast	198,793	115,128	115,298	135,560	142,313	158,389
Western Slopes	117,678	131,568	128,690	141,703	155,915	165,009
New South Wales	523,917	391,999	391,300	448,661	479,768	513,575

A comparison of the range of pasture and fodder crop species now in use with those reported by Bird (1962) is indicative of the rapid developments in the availability of such material in the last decade. The present survey results indicate that farmers have been willing to adopt this new plant material and Swain (pers. comm.) suggests that the Feed Year Assistance Scheme may well have contributed to the adoption of new seed, and fertilizer, practises. Introduced pasture species were, in fact, a feature of 41% of farms. Ryegrass and white clover were popular, with tropical grasses and legumes being adopted on 24% of farms. The use of the latter species demands a high level of management (Swain, Bird and Drane 1970; Swain *et al.* 1971) and this seems implicit in the degree of recent sub-divisions carried out on the surveyed dairy farms. Colman (1970) has indicated the likely benefits accruing from the use of nitrogen fertilizer on kikuyu grass, and the evidence of adoption of this practice is a further indication of upgrading of management levels.

The incidence of fodder cropping, using temperate cereals in winter and summer fodder crops such as sorghum hybrids, is increasing in the area. Lucerne is gaining in popularity and, as is the case with maize, can be found as a feed reserve and as a cash crop. Conservation of these fodder crops is not widespread, only one forage harvester being encountered together with a small amount of hay-making machinery. However, here again the increasing use of these crops and the growing awareness of their potential suggests that the time is opportune for investigations into their economic viability.

CONCLUSION

The geographic locations visited, the range of property size encountered, and the age distribution of property owners indicate that, although small, this random sample of North Coast dairy farms can be taken as a useful indicator of trends in farming practice in the region. These trends were consistent, i.e. increase in range and size of livestock enterprises; adoption of cropping and integration of cropping with livestock; adoption of introduced pasture species; sub-division, use of fertilizers and irrigation.

Although lack of capital may be limiting the growth of new farming systems their rate of adoption is encouraging. Some measures e.g. the increase in pig

numbers, may prove to be only temporary palliatives, but the willingness of farmers to try new enterprise combinations gives grounds for optimism. The immediate need would seem to be sound economic appraisals of the alternative strategies which appear to be biologically valid in the region. Only when these are available can the inherent enthusiasm of the agricultural community be channelled towards the most viable farming systems.

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REFERENCES

BIRD, J. G. (1962)—The dairy industry on the Far North Coast of New South Wales. *Review of Marketing and Agricultural Economics,* **30**: 3-60.

BIRD, J. G. (1966)—Cohort analysis of the dairy farm work force. *The Australian Journal of Agricultural Economics,* **10**: 196-202.

BIRD, J. G., and MARRIOTT, B. W. (1966)—A regional case study of dairy industry adjustment. *Review of Marketing and Agricultural Economics,* **34**: 202-11.

COLMAN, R. L. (1970)—Future use of nitrogen fertilizers on pastures and crops in sub-tropical New South Wales. *Journal of the Australian Institute of Agricultural Science,* **36**: 224-32.

COMMONWEALTH STATISTICIAN (1970)—Official Year Book of New South Wales, No. 60, 1969. Bureau of Census and Statistics, 1970.

LOVETT, J. V., MATHESON, E. M., and JAMES, P. G. (1971)—The pattern of agriculture in northern New South Wales—a Preliminary investigation. *Journal of the Australian Institute of Agricultural Science,* **37**: 15-24.

STANDEN, B. J.(1969)—Changes in land use in the Richmond-Tweed region of New South Wales, 1958 to 1967. Miscellaneous Bulletin No. 7, Division of Marketing and Agricultural Economics, New South Wales Department of Agriculture.

SWAIN, F. G. BIRD, J. G., and DRANE, F. H. (1970)—Case studies of feed year development in the red soils area, Far North Coast, New South Wales. Miscellaneous Bulletin No. 11, Division of Marketing and Agricultural Economics, New South Wales Department of Agriculture.

SWAIN, F. G., MEARS, P. T., DRANE, F. H., MURTAGH, G. J., BIRD, J. G., COLMAN, R. L., and YABSLEY, G. M. (1970)—Commercial evaluation of a new farming system. Proceedings of the XI International Grassland Congress, Surfers Paradise, Australia, pp. 925-9.

WALKER, M. H., and McMASTER, G. S. (1970)—Distribution of sown pastures in New South Wales. *Agricultural Gazette of New South Wales,* **81**: 142-5.

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