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A Study in Dairy Farming Trends in the Waipa County, 1941-1950

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AS many of you are aware, a single season's management survey covering 850 dairy farms was carried out by Dr. Mitchell. The 850 farms comprised all dairy farms for which full information was available in the 1946-47 season, and from these a randomised sample of 400 farms was selected for further study. Inevitably there has been some sample wastage, the chief causes of which have been lack of data, area changes, and changes in type of farming.

Figure I shows fluctuations both in number of farms and areas involved in land transactions. These are represented as percentages of total farms and total areas respectively. Included as farm transactions are those resulting either in complete ownership changes or only in the loss or gain of sections. The salient feature is the sudden rise in the number of transactions recorded in 1949-50 following the repeal of the Land Sales Act. The area changes provide a similar but less marked trend. Twenty-five per cent. of all sample farms showed complete changes in ownership during the ten years. Of the 75 per cent. remaining in the same families, 10 per cent. record a transfer to or subdivision among other family members.

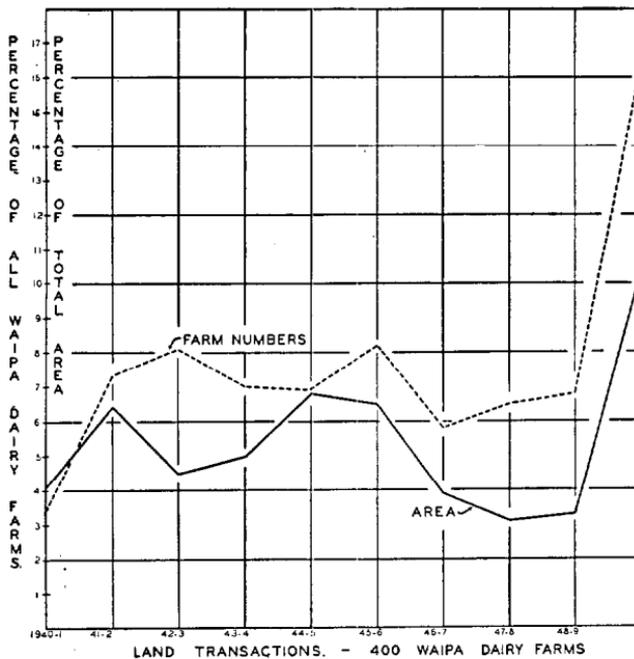


FIGURE I.

In the sample of 400 dairy farms drawn in 1946/47 only two had changed to sheep by 1949/50. Ten farms which were dairying in 1946/47 had been engaged in other types of farming in the period since 1941.

Farm movements so far considered have referred to the original sample. Subsequent trends must have as base a constant area, about which full information is available.

Two hundred and fifty-three farms or 63 per cent. of the total number satisfy these conditions. The area occupied by these is 27,318 acres, or 10 per cent. of the Waipa County.

Farming trends are classified with respect to—

1. Land.
2. Livestock.
3. Plant.
4. Labour.

1. LAND:

(a) For the 253 farms the productive or cultivated area shows a gradual but steady increase over the ten year period so that in 1949-50 an increase of 3 per cent. is shown over that for 1940-41. (b) At no stage has cropping assumed great importance. On the average 37 per cent. of the farmers do some cropping. In 1946-47 this figure rose to a maximum of 48 per cent., since when a decline in numbers has restored the position to that obtaining in 1940-41. In figure II is included the area under crops expressed as a percentage of the cultivated area.

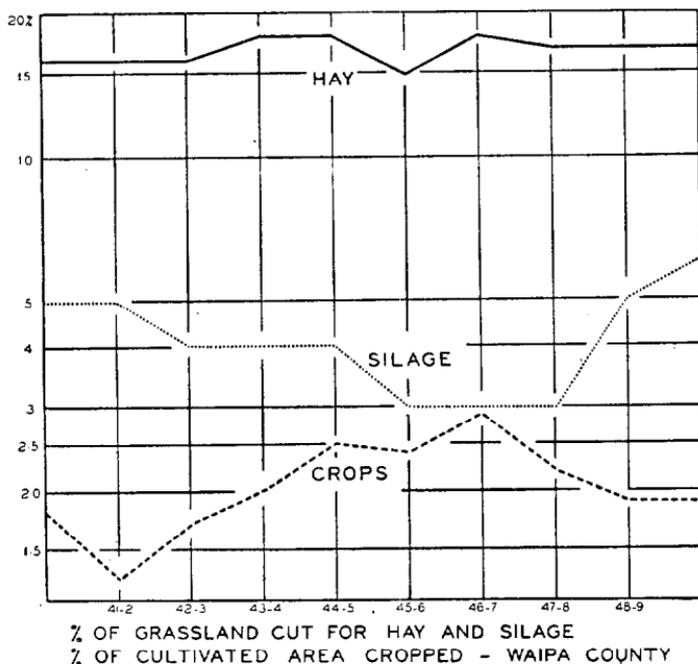


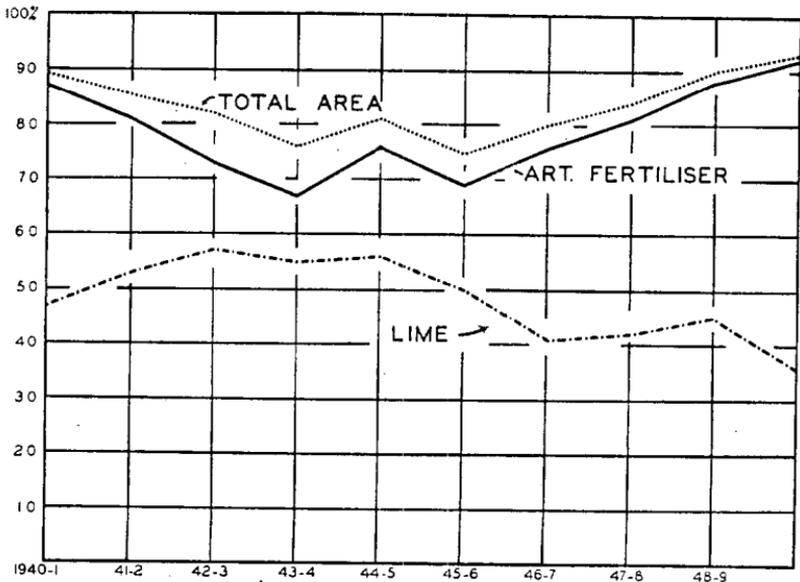
FIGURE II.

(c) **Hay and Silage:** In every year over 90 per cent. of dairy farmers have made hay. Area saved for hay reached a maximum in 1944-45 when 18 per cent. of the total area in grass was cut. The area cut shows seasonal fluctuations but no perceptible trend. The amount of silage made each year has shown much greater variability. In 1940-41 the area cut for silage represented 5 per cent. of the total grassland, but by 1945-46 it had fallen to 3 per cent., at which level it remained for three years before rising suddenly to a record of 6 per cent. of the total area in grass in 1949-50.

(d) **Topdressing:** Fertilizer rationing commenced in 1941-42, this season's ration being computed as 40 per cent. of the farmers' average annual usage in the base years 1939-40 and 1940-41. Twenty-eight per cent. of the base ration was available for the next three years, but this period of scarcity was followed by a gradual increase in supply until in 1947-48 67 per cent. of the base ration was obtainable. Rationing caused an immediate decrease in the area topdressed with artificial fertilizers alone. In comparison the practice of liming, either alone or in conjunction with superphosphate, gained in favour and by 1944-45 the area topdressed with lime and superphosphate was more than double that sown with artificial fertilizers alone.

The increase in 1944-45 of 1 cwt. of superphosphate per cow in milk was reflected in a marked rise in the area topdressed with lime and superphosphate. Subsequently, with increases in fertilizer supplies, the practice of sowing artificial fertilizer alone has regained favour at the expense of the mixed topdressing system, and in fact since 1947-48 the area topdressed with artificial fertilizer alone has exceeded the comparable area for 1940-41.

Figure III shows the total area topdressed and its components, the areas limed, and sown with artificial fertilizer.



AREA TOPDRESSED AS A % OF THE TOTAL GRASSLAND
253 WAIPA DAIRY FARMS.

FIGURE III.

Unfortunately no figures are available showing trends in the rate of application. The best estimate that can be obtained is merely an index. This is derived from the total output of lime and fertilizer works supplying the county, and the area topdressed and limed in corresponding years.

Table I shows trends in both liming and topdressing rates. Deliveries from fertilizer works and rates of application for 1940-41 are both taken as base 100.

TABLE I.

Season	Topdressing with Artificial Fertilizer			Liming		
	Average area Topdressed (1 yr. lag) Acres *	Index of fertilizer works' deliveries	Index of rate of application	Average area limed Acres	Index of lime deliveries	Index of rate of application
1940-41	77	100	100	50	100	100
1941-42	70	54	59	55	111	101
1942-43	64	50	60	53	128	121
1943-44	72	54	58	54	110	102
1944-45	66	63	73	48	174	181
1945-46	72	77	85	39	155	199
1946-47	78	96	92	40	145	182
1947-48	85	102	92	44	130	148
1948-49	89	112	100	35	128	183

* There is in each year a difference of five months between the time at which annual returns for farms and works are made. As most topdressing on dairy farms is done in the autumn, in any season returns submitted will refer to the acreage topdressed the previous autumn. It is necessary, therefore, to lag the area topdressed one year behind the deliveries from fertilizer works for the same season.

The fall in the area topdressed is associated with a fall in the rate of application. Thus in the second year of rationing 83 per cent. of the area topdressed in 1940-41 received only half the fertilizer distributed in the base period, but by 1948-49 when area topdressed and fertilizer output were at their maxima the sowing rate was again approximately that for 1940-41. In complete contrast liming trends show an increased rate of application associated with a reduction in the area limed.

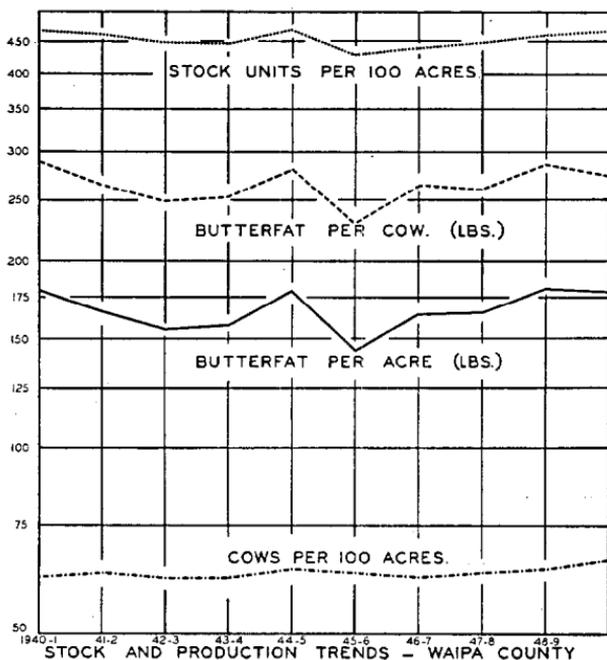


FIGURE IV.

2. TRENDS IN STOCK NUMBERS AND PRODUCTION:

(a) Total milking cows have shown a steady increase, the regularity of which was broken only by the severe drought of 1945-46 and the prolonged effect of the drought on the following season. This increase in cow numbers is not sufficiently dramatic to influence the group average until the last three years. Over the whole period there is an 8 per cent. increase in number of cows in milk. The number of dairy animals carried has decreased, due probably to the use of penicillin and strain 19 vaccine.

(b) **Carrying Capacity:** This can be expressed either in terms of stock units or cows in milk per 100 acres. The stock unit method allows for currently non-productive cattle as well as beef and sheep stock when these are run on the dairy farm. Some allowance is also made for variations in per cow production.

Table II shows trends in carrying capacity, production per cow and production per acre.

TABLE II.

Season	Carrying Capacity		Butterfat Production (at the pail)	
	Cows per 100 Acres	Stock Units per Acre	Per Cow lb.	Per Acre lb.
1940-41	62	4.7	289	180
1941-42	63	4.6	265	166
1942-43	62	4.5	249	155
1943-44	62	4.5	253	157
1944-45	64	4.7	281	179
1945-46	63	4.3	229	144
1946-47	62	4.4	265	164
1947-48	63	4.5	260	165
1948-49	64	4.6	285	181
1949-50	66	4.7	275	179

Cows per 100 acres show a 6 per cent. increase for the ten years; a change in carrying capacity not reflected by stock units. The difference is due in part to the higher proportion of replacement stock run in the earlier years and also to the influence of per cow production, affected as it is by seasonal variation. Both these factors influence the number of stock units but have no effect on cows per 100 acres.

The average production per cow, comparing the first and last years, reveals a fall of 14lb. of butterfat. As these seasons are not strictly comparable climatically a truer comparison is made between the first, fifth and ninth years. This reveals no significant change in per cow production. Climate is the dominant factor affecting per cow and per acre production, and it appears that, in spite of previous experience, in good and average seasons farmers do not save sufficient feed surpluses to provide for the inevitable periods of scarcity. Thus production per acre provides a similar trend to that for per cow production, and either of these a satisfactory measure of between-season climatic differences.

3. MACHINERY:

The only data providing any satisfactory measure of change are those referring to tractor numbers. Unfortunately during the war information for three seasons was not collected. In 1940-41 one in every six farmers possessed a tractor, but by 1949-50 this ratio had narrowed remarkably to two out of every three. The most spectacular changes occurred in the latter three years when the tractor force increased by 59 per cent.

4. LABOUR:

Coincident with the sudden rise in mechanization was a decline in the farm labour force. Especially was this true for those connected with shed work. Detailed collection of labour statistics began in 1946-47 and the figures available cover four seasons only.

Table III shows detailed labour statistics.

TABLE III.

Season	21 yrs. and over		15-21 yrs.		Total Persons	Total Labour Units
	Men	Women	Boys	Girls		
1946-47	327	41	76	15	459	432
1947-48	371	57	76	13	517	493
1948-49	372	55	69	15	511	477
1949-50	362	15	58	5	440	431

In 1947-48 the average number of cows handled per worker was 31. By 1949-50 it had risen to 37, and over the same period bails per milker increased from 2.0 to 2.6, an increase of 30 per cent. As a result the number of cows per bail decreased by one and some reduction in milking time should have been effected. If in 1949-50 workers are in the shed no longer than they were in 1947-48 their efficiency in terms of cows milked per labour unit per hour has been increased by 20 per cent. Doubling up and improved shed methods have increased efficiency, but in the 1950-51 season only 48 per cent. of the dairy farmers had installed doubled-up plants. It appears that, although a certain increase in efficiency has been obtained, a depleted shed force is working longer hours than was required three years ago. This has placed limitations on work in the field which has shown little expansion despite the large increase in tractor numbers. It appears that tractors have been used mainly in lightening the existing work rather than in the extension of farm work. Their value as time savers where there is a limited labour force is considerable, but unfortunately dairy farms require considerable manual labour. In the future more time may have to be spent in the shed and reliance placed on contractors for seasonal work. Other alternatives may be found in an increase in shed efficiency, a reduction in the less essential field work or a depletion of cow numbers. Any changes in milking cow numbers would, however, be effected by the ruling price for butterfat.

SUMMARY.

Trends for the group of 253 farms have not proved spectacular. Influenced by war conditions, area topdressed and rates of application have shown variations which probably would not have occurred under other circumstances. Just how important fertilizer is to dairy farming in the Waipa County is difficult to determine. That the deficiencies in supply during war years had little if any effect is shown from returns for 1944-45 when, with a favourable season, production per acre returned to the 1940-41 level.

Indirectly the fertilizer shortage may have had some effect on the sudden increase in area cropped during the war years. Extra fertilizer supplies were made available for cropping and re-grassing programmes. The greatest stimulus to cropping, however, was given by a subsidy of £5 per acre, instituted in September, 1944, with the object of providing extra food for wintering increased pig numbers. This subsidy was continued until 1947, and following its removal a sudden drop of 24 per cent. in the acreage under crops occurred.

With reference to livestock, production per cow and per acre have remained fairly stable. There has been no change in carrying capacity when expressed as stock units. Carrying capacity in terms of cows in

milk per 100 acres has increased due to non-productive young and dry stock, rendered surplus by improved farm methods and services, being replaced by milking cows. In accord with this the area cut for silage rose and the weight of silage increased from 6 cwt. to 8.5 cwt. per cow. Little change is shown in the area cut for hay, though yields have increased, maintaining a ration of 11 cwt. per cow.

Labour is being drawn away from the farms by economic conditions mainly beyond the farmers' control. Countering this has been the large increase in the tractor force, but it is doubtful whether this extra power has been fully exploited.

Perhaps the most disturbing feature of this study is the absence of any marked upward trends. Not all dairy farmers fully utilize the food surpluses they have available in the spring months. Wool and mutton prices have increased rapidly in recent years, but in spite of this few dairy farmers have changed to sheep stock. Sheep numbers reached a maximum for this group of farms in 1943-44, after which they declined, and though the trend appears again to be upward, income from sheep stock forms but a fractional part of total returns on these dairy farms.

One hundred and eighty-one pounds of butterfat per acre represents the best average that this group of farms has obtained despite the fact that the Waipa County is one of the best dairying districts in New Zealand. One may well ask whether 181 lb. of butterfat is the best that this land can produce with the labour force available. Perhaps the answer lies in the farmer's attitude towards his farm as a productive unit. This may be a very important factor when it is remembered that 75 per cent. of the original 400 farms have remained as one-family farms throughout the ten years.

Discussion

Dr. MITCHELL: Production is back to pre-war levels but the average does conceal marked upward and downward trends on individual farms.

Mr. HUTTON: Some farms are up 70 lb. per acre while others are down 70 lb.

Mr. SEARS: What are the factors beyond the farmer's control, that have caused the labour shortage?

Mr. HUTTON: Probably the higher wages with overtime rates of pay in the towns.

Mr. SEARS: Is that really beyond the farmer's control?

Mr. KNOWLES: Important factors are the hours and conditions of work.

Mr. WOODCOCK: Many factors contribute to trends in production. In one trial where topdressing ceased the effect was not felt for 3-4 years. The increase in silage conserved might be due to the return of fertilizer and labour saving devices such as the buck rate. On some farms where there are share-milkers now instead of owners one might expect a drop in production.

Dr. MITCHELL: Share-milkers are not worse than owners, if anything they are a little better. In 1946-47 about 10% of the farms in the sample were run by share-milkers.