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## The future for the small dairy farm: plans, priorities and constraints

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### ABSTRACT

Small dairy farms (<60 ha and/or <180 cows) represent about one third of New Zealand's dairy herds. Declining real returns for milksolids (MS) and inflation are continuing to squeeze their profitability to the extent that, without change, many are likely to exit the industry in the next decade. A mail survey of 1389 farmers was conducted to quantify their plans for the future, the constraints they faced in improving farm income and ways the dairy industry could assist them. A response rate of 41% was achieved. The majority of respondents were over 45 years (74.4%) with the average age being 51 years. Most (85%) were happy with their farm location, but 48% said they were dissatisfied with their farm size. However, few would sell to buy a bigger farm elsewhere (17.8%) or to invest in non-farming activities (24.1%). Only 24% expected their children to continue dairying on the home farm. Few believed their own ability, others' opinions or suitable learning opportunities were limiting their ability to improve farm income. Most believed expenses could be reduced very little (mean = 3.6%). However, MS production could be increased compared to current levels to a greater extent (mean = 15.8%, range 0 to 248%). Factors restricting the improvement of farm income were: the economic and political environment (s=2) (s=median score, where 1=strongly agree and 5=strongly disagree), unfavourable actions of the dairy industry (2), lack of capital (3) and environmental limitations (3). Plans for 2009 included: retired from farming (s=3), (where 1=very unlikely and 5= very likely), on the same farm but no longer dairying (3), no or minor change (2) and have a bigger dairy farm (2). Farmers' priorities for using a 10% higher cash surplus were: debt repayment (s=4; as for previous scale), farm development (4), off-farm investment (3) and improvements to the family home (3). While potential exists to increase production on dairy farms with small herds, the survey indicates a considerable reduction in the number of these will occur over the next decade.

**Keywords:** small dairy farms, herd size, mail survey, farmer age, farm business constraints

### INTRODUCTION

One in three New Zealand dairy farms had fewer than 150 cows in 1997/98 (LIC, 1998). Many of these are located in two of New Zealand's key dairying regions: the Waikato and Taranaki (Allen, 1997). One perspective is that smaller farms should be allowed to continue to exit the industry or amalgamate, as they have done for the past 50 years. This is a 'natural' consequence of the inexorable 'cost-price' squeeze on milk commodities, the introduction of efficiency-enhancing new technology and the application of improved management practice. An alternative view is that these farms are important in sustaining the human capital of farming and rural communities, and that their circumstances provide a picture of those that will be encountered by today's medium sized farm in 5 to 10 years time if the current economic paradigm prevails. Further, an intensively farmed small property is more likely, *ceteris paribus*, to be near to its physical and financial limits than a large farm and therefore to be seeking cost-effective breakthrough technology and systems to enhance profitability (Leslie, 1998).

Thus, the small dairy farm provides a research model for studying the constraints imposed by scale (business viability) in adopting new technology and developing farm management expertise. Part of the research, reported here, was a mail survey of small dairy farmer owners to identify the constraints they faced and their future plans. The definition for a small dairy farm is time- and country-dependent (Parker 1998): a 180 cow herd in New Zealand is 'large' compared to those in many other countries, or relative to 1970 when barely 50% of herds had more than

100 cows. For the purpose of this research a 'small' dairy farm was defined as 'being less than 60 ha and/or supporting fewer than 180 cows'.

### SURVEY METHOD

A four-page questionnaire was designed using information collected at an Exchange Forum for the owners and partners of small dairy farms (Massey *et al.*, 1999). The forum also included representatives from dairy companies, farm consultants and dairy extension agents, rural financiers, Government policy and research organisations. The questionnaire examined whether issues identified at the forum were considered to be important by small dairy farmers on an industry-wide basis. The questionnaire comprised nine sections: farm potential, constraints to change, strategies to encourage small dairy farms, plans for 2009, sources of household income in the 1998/99 financial year, children and their needs, farm location impacts, how a 10% higher cash surplus would be used, and generic background information on farm and herd size, and milksolids (MS) production.

A sample list of addresses of suppliers who were thought to have fewer than 180 cows was obtained from the New Zealand Dairy Group (NZDG) (n=1520) and Kiwi (n=292) dairy companies, representing the Waikato-South Auckland-Bay of Plenty and lower North Island regions, respectively. The Northland Dairy Company agreed to send the questionnaire directly to their suppliers who met the criteria (n=200), rather than supplying a list of addresses. Questionnaires were mailed out to 698 randomly selected NZDG farmers and all of the Kiwi and Northland farmers

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with a covering letter and an addressed and postage-paid return envelope on 1<sup>st</sup> July. A total of 418 replies were received within 29 days. A second questionnaire was sent as a reminder to Kiwi and Northland non-respondents on 1<sup>st</sup> August. The questionnaire was also sent to a further 199 NZDG suppliers (selected by the same sampling procedure) at this time. At the close-off date for replies (15<sup>th</sup> September) 625 questionnaires had been returned. These were verified and the data encoded to a file for analysis using the SAS, procedures for descriptive statistics (SAS 1993). The response rate adjusted for farms that meet the study criteria was 41%. The respective useable response rate for the companies was 57, 53 and 32% for Northland, Kiwi and NZDG, respectively.

## RESULTS

### Small Farm Characteristics

Overall, respondents averaged 51 years of age and had spent 21 years on the current farm (Table 1). Three quarters of the farmers were older than 45 years of age but a proportion were relatively young and had acquired their farm within the last 5 years. The farms were smaller on average for the NZDG suppliers (44 ha vs. 46 ha overall average), but herd size was smallest for the Northland region (112 cows vs. 118 cow survey average). Milk production reflected cow numbers and averaged 31917 kg MS in 1997/98 (data not shown) and 29467 kg MS in 1998/99, a drought year for all regions. Similar percentages (14.2 and 15.9%) of respondents indicated they had another farm or non-farm business, respectively, but details on these were not obtained. Only 24.2% of the farmers indicated that they expected their children to continue dairying on the home farm.

Overall, respondents earned  $79.1 \pm 27.8\%$  (mean  $\pm$  sd) of their household income from dairying. Other income was derived from: off-farm work ( $9.8 \pm 21.2\%$ ), other farming interests ( $4.5 \pm 13.4\%$ ), other off-farm business investment ( $2.1 \pm 8.6\%$ ), rental properties ( $1.22 \pm 6.6\%$ ), contracting ( $0.9 \pm 5.5\%$ ) and 'other' ( $2.5 \pm 8.6\%$ ). There were large differences between individual farms in the proportions of income earned from various sources, but differences between herd size categories were not significant. Northland farmers received a lower proportion of household income from the dairy farm (74.7 cf. 82.8 and 78.9% for Kiwi and NZDG, respectively) and more from other farming sources (7.6 cf. 3.2 and 3.9% for Kiwi and NZDG, respectively) compared to other dairy company suppliers.

### Barriers to Increasing Dairy Income

Farmers were asked how the issues listed in Table 2 affected them in making changes in order to increase dairy farm income. Farmers agreed that the economic and political environment, and unfavourable actions by the dairy industry were barriers to increasing their income. Their views on capital and environmental constraints were mixed, but there was an indication ( $P < 0.1$ ) that farmers with 121-140 cows saw the latter as less of a constraint than the other herd owners. With respect to age, farmers over 65 years of age ( $P < 0.05$ ) did not rate capital as a limiting factor to increasing their dairy income whereas others scored this as 'neutral' overall. Farmers in the 55-64 age group held mixed

views on whether 'their attitude' was a barrier to increasing dairy income. Older farmers were more likely to see 'lack of suitable learning opportunities' as a constraint than younger farmers, although overall most did not consider this to be a constraint. Regional differences in the rating of the barriers to increasing dairy income occurred in two areas: suppliers of Kiwi were more likely to see environmental constraints to growing their income ( $P < 0.1$ ) than their counterparts in the rest of the North Island. Northland farmers were neutral ( $P < 0.05$ ) whereas the others agreed that the dairy industry had taken actions which were unfavourable to them increasing income.

**TABLE 1:** Characteristics of sample small dairy farms in New Zealand by dairy company.

Farmer and farm attributes	Parameter	Dairy Company			
		Kiwi	NZDG	Northland	Overall
Farmer's age (years)	No.	155	290	115	560
	Mean	50.79	51.00	51.37	51.02
	Std Dev	9.86	10.11	9.31	9.87
Number of years on current farm	No.	157	289	119	565
	Mean	21	21	21	21
	Std Dev	15.2	15.2	15.2	15.2
Effective area (milking platform) (ha)	No.	154	291	117	562
	Mean	46.1	44.2	50.2	46.0
	Std Dev	13.03	11.05	15.87	12.91
Run-off area (ha)	No.	57	91	59	207
	Mean	26.0	34.0	44.3	34.7
	Std Dev	30.75	82.02	52.44	63.39
Distance to the run-off (km)	No.	56	91	58	205
	Mean	6.56	6.92	7.64	7.03
	Std Dev	8.55	11.07	17.76	12.73
Number of milking cows on 1 July 1999	No.	152	284	118	554
	Mean	120	119	112	118
	Std Dev	28	25	24	26
Milksolids production (to the factory) in 1998/99 (kg)	No.	144	278	114	536
	Mean	31652	30237	24829	29467
	Std Dev	9353	8349	6345	8611
Farmers reporting having another farm (%)	No.	157	286	119	562
	Mean	15.9	14.7	10.9	14.2
	Std Dev	36.7	35.5	31.3	35.0
Farmers reporting having a non-farm business (%)	No.	153	287	120	560
	Mean	11.8	18.5	15.0	15.9
	Std Dev	32.3	38.9	35.9	36.6
Farmers expecting children to continue dairying on home farm (%)	No.	100	220	85	405
	Mean	33.0	21.4	21.2	24.2
	Std Dev	47.3	41.1	41.1	42.9

**TABLE 2:** Barriers to increasing dairy farm income reported by small dairy farmers in New Zealand (percentage of respondents reporting).

List of Barriers	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	P (Chi-sq)	Median
	(1)	(2)	(3)	(4)	(5)		
Lack of capital (n= 544)	18.8	22.8	18.2	26.3	14.0	NS	3
Environmental (n= 540) limitations	11.1	26.5	25.2	27.4	9.8	*	3
Farmer attitude (n= 543)	3.3	14.7	24.5	33.3	24.1	NS	4
Farmer ability to manage change (n= 540)	2.6	9.1	16.3	49.4	22.6	NS	4
What others think of my plans (n= 524)	1.3	2.1	18.5	39.7	38.4	NS	4
Availability of suitable cost-effective 4.3 technology (n= 537)	13.6	27.8	38.7	15.6	NS	4	
Economic and political environment (n= 541)	23.8	37.5	17.2	16.8	4.6	NS	2
Unfavourable actions of the dairy industry (n= 543)	21.9	30.2	26.7	15.5	5.7	NS	2
Lack of suitable learning opportunities (n= 541)	0.7	1.9	17.4	50.5	29.6	NS	4

NS= Not significant, \* = P<0.10, \*\* = P<0.05, \*\*\* = P<0.001

**TABLE 3:** Farmer satisfaction with farm attributes and location (percentage of respondents reporting).

Satisfaction with SDF	Herd Size	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	P (Chi-sq)	Median
		(5)	(4)	(3)	(2)	(1)		
Satisfied with current farm location (n= 547)	0 – 100	41.8	41.0	10.7	4.1	2.5	NS	4
	101 – 120	40.9	45.9	9.4	1.9	1.9		4
	121 – 140	42.1	43.3	10.1	2.3	2.3		4
	141 or more	37.5	45.5	10.2	5.7	1.1		4
	All Respondents	41.0	43.9	10.1	3.1	2.0		4
Satisfied with current farm size (n= 542)	0 – 100	13.1	24.6	20.5	31.1	10.7	NS	3
	101 – 120	12.0	26.0	17.7	31.0	13.3		3
	121 – 140	8.5	22.6	14.1	40.0	15.3		2
	141 or more	7.1	21.2	22.4	37.7	11.8		3
	All Respondents	10.3	23.8	17.9	34.9	13.1		3
Land suitable for small dairy farm expansion is available locally (n= 541)	0 – 100	4.1	18.0	14.8	27.1	36.1	**	2
	101 – 120	5.8	23.2	19.4	24.5	27.1		2
	121 – 140	12.9	29.6	20.7	16.8	20.1		3
	141 or more	9.4	27.1	22.4	23.5	17.7		3
	All Respondents	8.3	24.8	19.2	22.4	25.3		3
Land prices are affordable in SDF location (n= 560)	0 – 100	0.8	14.1	14.1	33.1	38.0	*	2
	101 – 120	1.3	13.9	24.7	38.0	22.2		2
	121 – 140	3.4	17.9	26.3	27.4	25.1		2
	141 or more	3.4	14.8	23.9	29.6	28.4		2
	All Respondents	2.2	15.4	22.7	32.1	27.7		2
Likely to sell current farm to purchase a bigger farm in a less expensive location (n= 543)	0 – 100	4.9	12.3	16.4	23.8	42.6	NS	2
	101 – 120	5.7	8.9	15.9	35.7	33.8		2
	121 – 140	8.4	11.8	18.0	31.5	30.3		2
	141 or more	9.3	12.8	22.1	30.2	25.6		2
	All Respondents	7.0	11.2	17.7	30.8	33.3		2
Likely to sell current farm to invest in non-farming activities (n= 542)	0 – 100	9.2	20.0	29.2	17.5	24.2	NS	3
	101 – 120	7.0	13.3	31.0	24.7	24.1		3
	121 – 140	6.2	18.6	23.2	27.7	24.3		2
	141 or more	8.1	17.2	27.6	25.3	21.8		3
	All Respondents	7.4	17.2	27.5	24.2	23.8		3

### Farm location and other attributes

Most respondents (85%), and particularly those over 65 years of age, were happy with their current farm's location, but 48% were dissatisfied with its size (Table 3). Owners of herds with 120 cows or less disagreed ( $P < 0.05$ ) that land suitable for expanding their farm was located nearby, and those with smaller farms were also more likely to disagree that this land was affordable. Some 18% of the farmers were likely to sell the current farm in order to purchase a larger farm in a district where land was less expensive. Farmers overall were neutral, except for the owners of 121-140 cow herds, on whether they were likely to sell their farm in order to invest in non-farming activities.

### Farm potential

Farmers assessed the potential of their current farm to produce more milk and carry more cows, and their capacity to reduce farm working expenses without compromising long-term MS production (Table 4). One third indicated they could increase MS output by 20% or more (mean increase = 15.8% overall, 30.8% for those over 20%): this potential was similar across herd size categories. A reasonable proportion of this increase would be through increasing herd size, but 38% indicated no room to increase cow numbers and therefore were constrained to raising per cow productivity. Most respondents (63%) indicated 5% or less flexibility to reduce costs. Northland farmers believed milksolids could be increased to a greater extent than either NZDG or Kiwi suppliers (mean=22.0% cf. 15.2% and 13.6% for Kiwi and NZDG, respectively). However, the possible increase in cow numbers for all three groups were similar (mean=11.3, 9.5 and 12.4 cows for Kiwi, NZDG and Northland, respectively).

**TABLE 4:** Perception of developmental potential on small dairy farms (percentage of respondents reporting).

Production attributes	Perceived change	Herd Size (cows)				Overall	P (Chi-sq)
		0 - 100	101 - 120	121 - 140	141 +		
Extent to which current milksolids production levels could be increased (n=511)	Less than 10%	25.2	27.3	25.0	25.6	25.8	NS
	10 - 20%	39.3	40.9	43.3	41.9	41.5	
	20% or more	35.5	31.8	31.7	32.6	32.7	
	Overall	20.9	30.1	32.1	16.8		
Extent to which number of cows could be increased (n= 501)	None	34.2	33.8	42.6	41.3	37.9	NS
	Less than 10 cows	14.4	10.1	5.6	8.8	9.4	
	10 - 19 cows	27.9	31.8	30.9	26.3	29.7	
	20 or more cows	23.4	24.3	21.0	23.8	23.0	
Extent to which current farm working expenses could be reduced without decreasing long-term MS production (n= 494)	Less than 5%	63.1	66.7	64.6	54.2	63.2	**
	5 -10%	11.7	20.4	13.7	26.5	17.4	
	10% or more	25.2	12.9	21.7	19.3	19.4	
	Overall	20.9	29.8	32.6	16.8		

### Plans for 2009

Overall 57% of the farmers indicated that in 10 years time they were unlikely to be farming in circumstances similar to their current situation (Table 5), including 52%, 75% and 57% of those over 65 years, 55-64 years and 45-54 years of age, respectively. Almost half of those with fewer than 100 cows said they were 'very unlikely' to be in their present farming situation. Except for those on farms with 141 or more cows, most were unlikely to have: a larger farm, a manager or sharemilker on the farm or passed the farm onto a family member. Some 38% indicated that they were 'likely -very likely' to be retired from dairy farming. Farmers with 121 or more cows said they were less likely ( $P < 0.05$ ) to have retired from farming.

### Priorities for additional cash

Farmers' priorities for using a hypothetical 10% increase in their cash surplus are summarised in Table 6. The highest priorities, irrespective of herd size category, were debt repayment and further farm development. The views on off-farm investment and purchase of additional land did vary between herd size groupings. For example, farmers with the larger herds indicated they were more likely to expand their land holding than those with fewer cows. A further 60 farmers specified "other", half of which related to leisure activities (e.g. holiday, travel, boat). The farmers were more likely to spend money on farm if they expected their children to continue on farm.

**TABLE 5:** Likely status of present small dairy farmers in 2009 (10 years from now) (percentage of respondents reporting).

What farmers will do	Herd Size	Very Likely (5)	Likely (4)	Neutral (3)	Unlikely (2)	Very Unlikely (1)	P (Chi-sq)	Median
Dairy farming much as now (n=552)	0 – 100	11.9	12.7	7.6	18.6	49.2	NS	2
	101 – 120	15.3	21.0	12.1	17.2	34.4		2
	121 – 140	14.8	19.9	8.5	22.7	34.1		2
	141 or more	9.2	25.3	10.3	20.7	34.5		2
	<i>All Respondents</i>	13.4	19.5	9.7	19.9	37.6		2
Have a bigger dairy farm (n=529)	0 – 100	5.1	11.0	13.6	17.0	53.4	***	1
	101 – 120	8.3	17.3	12.2	18.0	44.2		2
	121 – 140	17.1	21.2	11.8	21.8	28.2		2
	141 or more	11.8	28.2	18.8	16.5	24.7		3
	<i>All Respondents</i>	11.0	18.9	13.4	18.7	38.0		2
Have a manager or sharemilker on the farm (n=524)	0 – 100	1.7	3.5	10.3	12.1	72.4	***	1
	101 – 120	9.7	12.3	11.6	13.6	52.9		1
	121 – 140	10.6	21.2	13.5	14.1	40.6		2
	141 or more	19.3	16.9	16.9	13.3	33.7		3
	<i>All Respondents</i>	9.7	13.9	12.8	13.8	50.2		1
On the same farm but no longer dairying (n=535)	0 – 100	11.9	33.9	17.0	13.6	23.7	**	3
	101 – 120	12.8	19.9	16.0	19.2	32.1		2
	121 – 140	10.2	26.1	17.1	22.2	24.4		3
	141 or more	3.5	18.8	11.7	29.4	36.5		2
	<i>All Respondents</i>	10.3	24.9	15.9	20.6	28.4		3
On a different farm and no longer dairying (n=525)	0 – 100	0.9	3.5	15.5	24.1	56.1	*	1
	101 – 120	3.9	4.5	13.6	25.2	52.9		1
	121 – 140	2.4	5.3	8.8	30.6	52.9		1
	141 or more	0.0	11.9	17.9	26.2	44.1		2
	<i>All Respondents</i>	2.1	5.7	13.1	26.9	52.2		1
Have passed the farm to a family member (n=530)	0 – 100	4.4	9.6	11.3	23.5	51.3	NS	1
	101 – 120	8.3	13.4	12.1	19.1	47.1		2
	121 – 140	5.2	12.7	15.0	22.0	45.1		2
	141 or more	7.1	9.4	15.3	15.3	52.9		1
	<i>All Respondents</i>	6.2	11.7	13.4	20.4	48.3		2
Have a business or employment other than farming (n=517)	0 – 100	13.9	13.9	18.3	14.8	39.1	NS	2
	101 – 120	13.8	11.8	18.4	21.1	34.9		2
	121 – 140	10.2	16.3	15.1	22.9	35.5		2
	141 or more	6.0	11.9	27.4	21.4	33.3		2
	<i>All Respondents</i>	11.4	13.7	18.8	20.3	35.8		2
Retired from farming (n=535)	0 – 100	20.7	21.6	16.4	20.7	20.7	**	3
	101 – 120	23.8	16.9	17.5	21.9	20.0		3
	121 – 140	9.8	25.4	16.2	23.7	24.9		3
	141 or more	16.3	19.8	10.5	18.6	34.9		2
	<i>All Respondents</i>	17.4	21.1	15.7	21.7	24.1		3

**TABLE 6:** Likely use of additional cash surplus by small dairy farmers (% respondents).

Use of Higher Cash Surplus	Very Likely (5)	Likely (4)	Neutral (3)	Unlikely (2)	Very Unlikely (1)	P (Chi-sq)	Median
Debt repayment (n= 525)	33.7	34.9	2.1	12.2	17.1	NS	4
Farm development (n=519)	12.9	45.9	6.2	24.1	11.0	NS	4
Off-farm investment (n=518)	12.4	28.2	10.6	23.6	25.3	*	3
Purchase of farm equipment or farm machinery (n= 521)	2.9	19.4	9.8	35.5	32.4	NS	2
Purchase of additional land (n= 523)	7.1	19.3	15.9	27.0	30.8	**	2
Children's education (n=458)	6.6	21.2	11.8	18.3	42.1	NS	2
Improvements to family home (n= 517)	7.0	34.2	10.6	27.5	20.7	NS	3

## DISCUSSION

The average age of small dairy farmers in this survey (51 years) contrasts with industry cross-sectional averages of 39 years reported by Parker *et al.* (1992) and 46 years by Rauniyar & Parker (1999). This confirms the commonly held view that the owners of small dairy farms are older than the industry average. Nevertheless, as Litchwark (1999) found also, a proportion of small dairy farmers in this study were relatively young and had only recently (within the past 5 years) acquired their property. The survey average farm area of 46 ha is 65% of the 1997/8 national effective area of 87 ha (LIC 1998). Production of around 30,000 kg MS compares favourably with the levels reported by Allen (1997) and Leslie (1998) for farms smaller than 60 ha (32,000 kg MS). The average herd size of 118 cows for this survey is similar to the 109 cows reported by Allen (1998) for herds on <50 ha farms.

Non-dairying income accounted for around 20% of the small dairy farm's revenue. Rhodes & Journeaux (1995) reported that dairy farms earned an average of 37.1% of their household income from off-farm work. Rauniyar & Parker (1997) from a 1995 national survey reported 39% of dairy farm households had at least one member employed off-farm and that annual earnings from this source averaged \$28652 ( $\pm$  24279). Off-farm income is important to the viability of many small dairy farmers, as shown by the financial analyses of Allen (1997) and Leslie (1998), but the proportion earning revenue from this source does not appear to be more than for the overall dairy farming population. This may reflect the older average age and low indebtedness (Allen 1998) of the owners of small dairy farms.

Three barriers to raising small dairy farms income stand out: lack of capital, the economic and political environment, and unfavourable actions by the dairy industry. Farmers have little direct influence over the last two factors, but could raise capital by leveraging their equity (reported to be 83% by Allen (1998)). The inability of the existing farm to cashflow debt is likely to be the main limitation to using this option for farm business growth (as implied by the strong indication to use extra cash to retire debt). One solution to this is to sell the farm and relocate capital into a larger enterprise. About one fifth of the survey farmers indicated a willingness to do this. A second option to enhance small dairy farm viability is to improve productivity by increasing MS output and 'lowering' average costs per kg MS. One third of the respondents estimated MS output could be improved by more than 20%, and one fifth indicated flexibility to decrease costs by at least 10%. Considerable potential therefore remains on many small dairy farms to improve business performance. The farmers generally did not perceive their ability to manage change, withstand peer pressure or access learning opportunities as barriers to realising this potential. Their motivation to take up opportunities, however, appears to be inversely associated with age, with those older than 55 years in particular, being less likely to change their farm location, size or practice than the other respondents. This behaviour is consistent with the exit phase of the farm business life cycle (Boehlje & Eidman 1984). However, change is likely to occur over the next decade amongst these

older farmers in terms of retirement (ca. 25% of the respondents), diversification into another business or employment (ca. 25%) and discontinuing dairying on the present farm (ca. 35%).

The survey findings confirm the view reached by others through trend and financial analyses (Allen 1997, Parker 1998) that the number of herds with fewer than 150 cows will sharply decline over the next decade. Nevertheless, the survey also indicates worthwhile potential to intensify production and lower costs on small dairy farms and, as noted also by Massey *et al.* (1999), extension strategies to help these farmers achieve this should be explored.

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