VICTORIA WESTBROOKE AND PETER NUTHALL

The extension needs of small dairy farmers

With the constant cost price squeeze, farmers with smaller farms must constantly consider their options to maintain their purchasing power.

Some farmers will sell, others will buy extra land, some will sell and shift onto larger farms, and others will further develop their existing farm. Alternative strategies are also possible. Overall, farms in general are increasing their output. Enlarging the farm in various ways is a major factor in this rising production. With the increasing globalisation of marketing, price volatility also means farms need to have buffers through size economies.

In all these processes, and the associated decisions, extension and consulting personnel (and bankers) can provide assistance. In doing so, it is important they consider the farmers' objectives, their beliefs about the way ahead, and the challenges and problems they believe they face. This article reviews some of these questions for a sample of small North Island dairy farms. The study, carried out on behalf of the Smaller Milk and Supply Herds Association (SMASH) through DairyNZ funding, concentrated on North Island farmers as few relatively small farmers are located in the South Island.

Specifically, due to the concentrations, farms in Northland, Waikato and Taranaki were included in the study which largely involved telephone interviews of over 300 randomly selected farmers. They had to have less than 400 cows to be included. The average herd was 240 cows on 97 ha producing 86,789 kgMS at 355 kg per cow and 971 kg per hectare. Of the farms, 34% did not employ any staff.

An outline of small farmers and their farms, information on their 10-year plans, an analysis of the challenges they believe they face, together with a list of their comments and then data on the information they feel will assist them after considering some efficiency questions, is then given. Finally, conclusions are offered. In considering the material, it is useful to note that small dairy farmers spend $1,940 on advice relative to $4,660 by dairy farmers with two or more people. This compares to $2,810 for all farm types and sizes (from a 2013 survey).

The nature of small dairy farmers

To a large extent farmers' objectives control their actions and also their need for professional help. Very important to the farmers, on average, was seeking 'maximum sustainable cash returns', with a score of 4.46 out of 5 , but at the same time they rated 'reasonable time off and holidays' at 4.23. Clearly a balance is required. On the other hand, they rated the importance of 'passing the farm onto family members' at 2.93, indicating this was low on their priority list. Perhaps they believe their farm is too small for future generations.

Overall, the farmers are surprisingly relaxed over their dairying lives, scoring 'don't sleep at night worrying about decisions' a low 2.06 and, on average, they scored 'investigating new farming methods is exhilarating and challenging' a much higher 3.73. Perhaps this is also reflected in their score of 3.44 on 'don't rest till the job is completed'.

Small farmers undoubtedly have a different outlook relative to their colleagues on larger farms. This may be of necessity, but could also be because their outlooks have kept them as small farmers. Previous surveys of dairy farmers provide some comparisons. Details are presented in **Table 1** for the small farmers relative to dairy farms having two or more people in the 2006 and 2013 surveys. The data covers their age, education, objectives and management styles. The objectives are summaries of correlated items from 20 possibilities, and the management style factors from 25 items, reflecting their personal methods. The locus of control (LOC) is the farmer's belief about how much of their outcomes they can control (100% means all, and so on down to 0%).

The small farmers are younger and some are more educated than those on the larger farmers, which could well be a sharemilker effect.

Table 1: A comparison between small farmers' objectives and management styles relative to those on larger farms. Average factor scores+ for each group with the larger farms coming from survey '06 and survey '13. Mean values of a range of variables and the significance of the differences

Objective/style factor+	Small farms	Survey '06 large farms	t test (**) sign prob (column1/ column2)	Survey '13 large farms	t test sign prob (column1/ column4)
Owner's age*	3.79	3.9	.000	4.1	.000
Owner's education*	3.21	3.0	.050	3.4	.574
Objective balanced	.999	.089	.000	.034	.000
Objective anti-risk	-.193	-.007	.004	-.194	.978
Objective way of life	-.628	-.116	.000	-.157	.000
Objective reluctant farmer	.567	-.099	.000	-.227	.000
Objective community supporter	.174	.401	.007	.212	.588
Objective family supporter	.282	-.030	.001	-.085	.000
Style consult logician	-.255	-.178	.388	-.272	.819
Style correctness seeker	.185	-.062	.001	-.072	.000
Style family and friends consult	.198	-.082	.000	-.087	.000
Style conscientious	.283	.024	.000	-.038	.000
Style thoughtful creator	-.293	-.136	.031	.022	.000
Style benign manager	-.410	-.093	.000	-.076	.000
Locus of control (%)	67.22	67.55	.600	68.17	.008

* Age scored on a 1 to 5 scale with 1=20-30 yrs ... 5=60+ yrs, education similarly with 1=secondary ... 4=degree and 5=other

+ A statistical factor score based on the sum of communalities ranging from approximately -3 to + 3. The lower the value, the more akin to the description relative to the higher value. The description is a summary of the contributing variables

** Any significance probability of *less than* around 0.25 can be regarded as important, as it means there is a chance of at least 75% that the difference in the mean is real and not due to sampling chance

The small farmers are younger and some are more educated than those on the larger farmers, which could well be a sharemilker effect. While their LOC is similar, their objectives do vary. Their objectives are less 'balanced' (note that the form of the questionnaire means lower figures reflect conformity to the objective or style), less risk oriented, less 'way of life' oriented, but more directed to family and community life than their colleagues on larger farms.

In terms of management style, small farmers are more inclined to consult and more thoughtfully creative and benign than their colleagues. However they do not talk to their families and friends on professional matters, and are less concerned with doing the right thing and being conscientious relative to their colleagues on larger farms. Overall, there are clear differences, but just how important these are in keeping them as small farmers is not obvious, although likely in some cases.

Also relevant is that the small farmers' equity averages out at 67%, and 35% have non-farm financial interests and 23% a financial interest in at least one other farm. The financial level of these interests is not known. But what is clear is that most small farmers are very familiar with country affairs in that 79% are 'born and bred in a rural area'.

When comparing sharemilkers with owner/operators they are much younger, as you would expect, less are 'born and bred' in the country, and more have increased their herd by at least one-third. The critical production per hectare is also significantly higher, although by just 19kg/ha. This information is a snapshot from 2014/15. Sharemilkers tend to be mobile and have greater opportunities to increase output and improve their longer-term prospects, provided they are efficient.

Having off-farm investments and an interest in other farms is age-related. In part, this will mean time does enable building up sufficient assets to allow these investments. Equity is similar. Ownership type does marginally impact on off-farm investments (closeness to owner/operator), but not interests in other farms. Similarly, a desire to reduce debt impacts slightly on off-farm investing, but not other farm interests.

Farmers who find managing staff more of a challenge than others are less likely to have off-farm investments and interests in other farms. These farmers are likely to be more financially aggressive and capable. Finally, farmers with other farm interests tend to agree that 'they don't rest until the job is done'. Farmers who do not have non-farm investments tend to seek maximum sustainable

cash as an objective relative to their counterparts. Again, these farmers are likely to be determined and very interested in maximising profit within reason.

Farmers' 10-year plans

The farmers were asked to rate a number of possible 10-year plan activities with a view to assessing their intentions and, accordingly, guide where help should be focused. **Table 2** contains a summary of their responses (average score on each possibility from a 1 to 5 rating with 5 meaning a top priority). Assuming their plans might relate to age and their belief in their powers of control, the rating on the plans was compared for the high and low values of these variables.

The farmers are not particularly interested in selling their farm and buying bigger, nor in simply selling the farm. Enlarging the current farm is also not popular, nor is passing the farm to their children. However the farmers are very interested in increasing production on their current farm and presumably either getting in a sharemilker or employing extra labour – all, no doubt, to make their life easier. They are also very keen on reducing debt. Diversification and off-farm investing are not popular. The pattern is clear – the farmers wish to stay on their current farm and increase production through intensification, using help if they can. Of course, this is the average picture and some will be different. Note that age does impact on their ratings in several cases, but the farmers' LOC has less of an effect.

The least important challenge is communicating with the next generation – perhaps this stems from the lack of interest in passing the farm onto their children.

Challenges faced relative to the 10-year plans

Knowledge of the hurdles the farmers believe they will face in increasing production is clearly important from an extension point of view. **Table 3** lists the suggested challenges presented to the farmers together with their rating of them (1 to 5 scale with 5 representing a large challenge).

The biggest challenge is the regulations and issues surrounding environmental factors, which is a common theme. Finding suitable staff is also dominant, as is the profitability of their likely 10-year plans, and the cash returns from the last four years poses a problem. These concerns are all understandable and are no doubt common to all farmers, as is the next most important challenge – managing staff. Also on the same rating is the capital/debt requirement in the plans. The least important challenge is communicating with the next generation – perhaps this stems from the lack of interest in passing the farm onto their children.

The farmers' objectives do influence their concerns, as shown by the contrast between farmers with a high interest in cash returns. Similarly, whether or not the farmers are of an anxious disposition impacts on some of the scoring.

Table 2: The relationship of the farmers' prediction of their 10-year changes relative to age, education and their LOC*. Average scores+ and the significance probability of the differences

Change item	Ave score+	Age <45 yrs	Age 45+ yrs	Sign prob**	LOC* <67.5%	LOC* 67.5%+	Sign prob
Sell farm	2.52	2.06	2.84	.000	2.70	2.34	.066
Sell and move to larger farm	1.80	2.07	1.60	.003	1.77	1.89	.429
Enlarge current farm	2.40	2.64	2.22	.018	2.38	2.44	.749
Transfer farm to children	2.33	1.93	2.59	.000	2.40	2.22	.331
Employ worker/sharemilker	3.42	3.39	3.44	.776	3.42	3.42	.984
Largely do work myself	2.79	3.24	2.24	.000	2.87	2.66	.185
Invest in labour saving device(s)	2.80	2.93	2.66	.082	2.83	2.86	.846
Increase production by 10%+	3.60	3.92	3.22	.000	3.48	3.77	.042
Diversify production	2.15	2.25	2.04	.149	2.24	2.01	.124
Invest in additional farm	2.79	3.03	2.51	.001	2.68	2.99	.063
20%+ of income from off-farm	2.29	2.28	2.32	.802	2.26	2.38	.435
Reduce debt to low level	3.77	3.58	4.01	.002	3.78	3.72	.697

+ Scoring 1=very unlikely ... 5=very likely

* The LOC is a measure of a farmer's belief about how many of the outcomes they can potentially control

** A figure of *less than* .25 can be considered important, with more than a 75% chance that the difference is not due to sampling chance

Table 3: The relationship of the farmers' attitudes to the challenges they face over the next 10 years relative to an important objective (priority of cash returns) and concern/worry levels. Average scores+ and the significance probability of the differences

Challenge+	Ave score	Cash return not priority	Cash return is priority	Sign prob*	Do not worry	Worry about plans	Sign prob
Cash over last four years	2.93	2.52	2.98	.017	2.82	3.52	.000
Cash from 10-year plans	3.04	2.62	3.10	.005	2.98	3.33	.024
Capital/debt required by plans	3.11	2.5	3.20	.000	3.08	3.31	.205
Risk in plans	2.74	2.17	2.82	.000	2.70	2.98	.075
Lack of plan knowledge	2.47	2.31	2.50	.256	2.44	2.70	.088
Environmental regulations/issues	3.44	3.21	3.47	.203	3.38	3.81	.022
Lack of suitable technology	2.58	2.37	2.61	.159	2.53	2.84	.049
Poor next generation communication	2.02	1.98	2.02	.800	1.95	2.36	.015
Finding staff	3.21	3.03	3.23	.356	3.13	3.67	.008
Willingness to manage staff	2.76	2.52	2.79	.203	2.71	2.94	.231

+ Scoring 1=not challenging ... 5=very challenging

* Any significance probability of *less than* around 0.25 can be regarded as important, as it means there is a chance of at least 75% that the difference in the mean is real and not due to chance

Farmers' comments on challenges to 10-year plans

Farmers were also asked to provide comments on the issues they felt were impacting on their future plans. **Table 4** contains summaries of the comments and the percentage of the farmers noting each factor was important. Each farmer gave up to three factors. Where more than one answer was provided, the percentage of farmers noting the factor is given in the second and third columns in the table.

Table 4: A list of the comments made by the farmers on the factors that concern them regarding their future plans. Percentage of farmers selecting each comment (precis given) out of those answering

Summary of comments	First comment	Second comment	Third comment
Answered 'No comment'	4.8	0	0
Staffing factors/problems	19.5	23.5	56.3
Limitations due to age	1.8	4.4	0
Environmental/effluent problems	19.2	17.6	18.8
Debt/equity considerations	13.2	19.1	6.3
Problem of generating sufficient cash	12.0	16.2	0
No family to take over farm	1.8	1.5	6.3
Getting out of the industry	2.1	0	0
Low milk solids price and volatility	6.0	8.8	0
Land prices too high and local supply poor	2.7	1.5	0
Children too young now	5.1	4.4	6.3
Droughts and weather	1.5	2.9	6.3
Miscellaneous – risk/stress/indecision	10.2	0	0
Total percentage	100	100	100
Number of farmers answering	333	68	16

Overall, the familiar challenges occur, namely, staffing, environmental/effluent, debt and finance factors, and profitability levels.

Information requested to assist in the farmers' plans

The farmers were also asked to note the additional topics they would like information on and their preferred methods of delivery. **Table 5** contains this information for both the farmers' primary comment and their second one where they had an additional suggestion. It is clear that overall succession, effluent management and financial management factors dominate in their interests. As might be expected, the farmers are keen to learn about 'skill development'.

Table 5: Farmers' comments on the topics or tools they would like provided. Percentage of farmers making each listed comment (precis given) out of those answering

Summary of comment information on ...	Primary comment % of farmers	Secondary comment % of farmers
Succession	10.7	4.6
Animal nutrition	3.3	0
Effluent disposal	7.8	14.9
Pasture management	3.7	3.4
Stock replacement	1.2	2.3
Labour management	8.6	14.9
Financial management	14.0	13.8
Technology/robotics	3.7	6.9
General information	3.7	0
Herd homes/housing	9.9	2.3
Networks and discussion groups	9.1	8.0
Off-farm investments	2.1	1.1
Ownership systems	3.7	2.3
Farmer organisations	4.9	1.1
Skill development	9.1	4.6
Mental health/depression	1.2	1.1
No suggestion/no idea	3.3	0
Total percentage	100	100
Number of farmers answering	243	87

When it comes to the method of information delivery farmers preferred, they were generally eclectic in their choices. On a 1 to 5 scale they rated 'expert speakers' 4.14, 'one-day workshops' 4.02, 'farmer case studies' 3.91, 'discussion groups' 3.58, 'booklets' 3.40, the 'worldwide web' 3.17 and, finally, 2.88 for 'computer-based "what if" scenario simulations'. The younger farmers did, however, give higher ratings on the last two than the average. The feature of this data is that most extension methods other than computer systems were found to be more useful to the farmers.

Efficiency and expansion

Farming efficiency is reflected in a number of variables. The one available from the survey was production per hectare, which was used as the dependent variable in a statistical regression equation. This relationship provided further pointers to where extension should be directed.

The results suggest that risk and community/family support objectives both have an important impact on efficiency. As would be expected, the farmer's LOC is important in reflecting the need to work with them on creating realism over what they can control. While it seems being rurally born and bred is a disadvantage, this is no longer a factor. Perhaps such people are somewhat complacent and this could be a target for extension work.

To assess whether farmers who increased production were inherently different from the others, and therefore providing targets for extension/advisory work, those who had increased their herd by at least one-third were compared to the others. **Table 6** shows the results, where age is clearly a factor, with older farmers being more likely to have increased their herd size by at least one-third. This is to be expected simply because they have had more time. Equity is also a factor, as would be expected, but whether these farmers have saved more, are more efficient at earning debt repayment money, or are simply older is not clear. Also, their average education level is less, because with each decade students tend to stay longer in formal education. Perhaps it is a combination of all three factors.

But what is clear and relevant is that the 'increasers' have a different style, being more conscientious and keen on doing things correctly, as well as being more benign in their outlook compared to those not increasing their herds. They also have a more balanced objective set and a slightly higher LOC. Accordingly, these factors are targets for assistance if indeed a farmer wishes to increase production. However even if not expanding their herd, all farmers want to improve their productive efficiency, so again changing these factors may help.

One clear conclusion is that a significant number of the farmers are not concerned about handing on their farms to the next generation or in expanding production or diversifying.

Table 6: A comparison between farms who have increased their herds by at least one-third. Mean values of a range of variables and the significance of the differences

Variable	Herd increase by one-third – mean values	Herd not increased – mean values	Sign (t test) probability***
Age*	3.3	2.7	.000
Born and bred**	1.15	1.24	.076
Education*	3.1	3.4	.046
Equity %	71.4	64.9	.055
Style + consultative	-.333	-.221	.215
Style + correctness seeker	.322	.125	.009
Style + family/friends consult	.233	.183	.143
Style + conscientious	.216	.313	.049
Style + thoughtful creator	-.292	-.293	.987
Style + benign manager	-.472	-.382	.148
Objective + balanced	1.07	.970	.181
Objective + anti-risk	-.15	-.21	.297
Objective + way of life	-.66	-.61	.476
Objective + reluctant farmer	.62	.54	.398
Objective + community supporter	.17	.18	.873
Objective + family supporter	.23	.31	.392
Locus of control %	67.8	66.9	.089

* Age scored on a 1 to 5 scale with 1=20-30 yrs ... 5=60+ yrs, education similarly with 1=secondary ... 4=degree and 5=other

** 1=born and bred in country, 2=not born and bred in country

** Any significance probability of *less than* around 0.25 can be regarded as important, as it means there is a chance of at least 75% that the difference in the mean is real and not due to chance

+ A statistical factor score based on sum of communalities ranging from approximately -3 to +3. The lower the value, the more akin to the description relative to the higher value. The description is a summary of the contributing variables

Conclusions

Despite the economic imperatives, one clear conclusion is that a significant number of the farmers are not concerned about handing on their farms to the next generation or in expanding production or diversifying. It appears many are happy to accept their small operation and see out their farming days as best they can, with paying off any debt as a priority if surplus funds are available. This strategy provides the maximum capital for inevitable retirement.

Farmers who have increased their herd by at least one-third since starting tend to be more efficient, and they also happen to be newer to farming. The farmers have relatively high equity and are very keen to be debt-free. But what is interesting, and probably expected, is that efficiency seems to decline as equity rises. Perhaps the farmer becomes more comfortable with their position as the net assets rise above what is regarded as a critical position.

It is also clear that about one-third of the farmers have off-farm financial interests, although the size of these investments is not known. The off-farm investors are not bothered with managing staff, are relatively determined, and are also interested in maximising profit. This again is to be expected, but at least the data confirms this.

Overall, the farmers rate both maximum sustainable cash returns and leisure time quite highly as objectives, even though one can compete with the other. Also, given the reluctance to pass the farm to family, perhaps the small nature of their farms makes them believe their offspring would be better off in another occupation. However this conclusion does not apply to all the farmers, with some rating setting up their children on the farm highly.

The lack of expansion plans comes out in the farmers noting that selling their current farm, and perhaps purchasing a larger one, is not high on their agenda with respect to their 10-year plans. Nor is the possibility of adding to their current farm area by buying locally. However the farmers note they would like to employ labour (who would not like to hand over some of the chores?), but they doubt whether they would invest in labour-saving technology. Perhaps they do not have the throughput to justify the expense – or at least this is their perception of the situation.

Despite these negative reactions, the farmers still believe they will increase output by at least 10% within 10 years. This is where they would, on average, want to concentrate their efforts, being 'lukewarm' over diversification, purchasing another farm or investing off-farm. As noted, their 10-year plan is heavily concentrated on reducing debt. This would provide stability, a buffer and, of course, retirement income when the time comes.

When it comes to the challenges to their 10-year plans, the main concerns are questions relating to environmental regulations and requirements and finding suitable labour, which has been a major problem generally for many years. As expected, the other major question in the farmers' minds is the availability of cash and finance in its various guises.

For the preferred extension methods, the farmers rated most methods listed in the questionnaire relatively highly, except for computer-based systems. When asked for further comments no new methods were suggested. However the concerns over environmental, debt and financial matters, and also succession questions, were reinforced.

Given the data available from earlier surveys it was possible to compare the objectives and management styles of the farmers relative to large dairy farms, which showed quite large and significant differences. Similarly, age also has an impact, particularly on the objectives as the various stages in the typical life-cycle evolve.

The data was also used to examine the farmers' efficiency using the only efficiency variable available – production per hectare. This showed that the farmers' LOC, as well as their objectives, impacted on efficiency, i.e. their belief in what they control and their specific goals. Also, when analysing the farmers who had increased production by at least one-third, this rise was explained by the farmers' LOC and their level of anxiety. Effectively, LOC, objectives and personality were influential in more ways than one.

All the analysis makes it clear the farmers can be grouped using two basic attitudes. One group are largely content with their current situation, and another are keen on expansion to improve their finances and cover themselves for future cost price squeezes.

The conclusions, which are reinforced by earlier studies (Parker et al. (2000) and Westbrooke (2013)), lead the way to extension groups developing systems to assist the small farmers. Examples include providing workshops on environmental planning, mentoring groups to assist succession, and on retirement planning. In addition, financial management would be of interest to the 'expanders'. Both groups need to be catered for in the interests of national efficiency.

VICTORIA WESTBROOKE is Lecturer in Agricultural Management and Agribusiness and PETER NUTHALL is honorary Associate Professor at Lincoln University. Email: peter.nuthall@lincoln.ac.nz