
IN THIS ISSUE

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Contents

Editorial

It could be worse, and it could be better

Julian Bateson

2

General

Farm management education

Jacqueline Rowath

3

Otago feature

The changing face of the Otago pastoral sector

Gavan Herlihy

6

Land use change in Otago

Fraser McRae

8

The North Otago Irrigation Scheme

Jock Webster

10

Central Otago wine industry

Steve Green

13

IFMA 2011 conference papers

Farm succession on planning in Canada

A workbench approach

Terry Betker

16

What is it worth if you stay on the farm?

John Baker

20

Family business continuance – a global perspective

Mandi McLeod

23

A New Zealand farm irrigation development

Hugh Eaton

26

Adapting New Zealand quality in dairy farming to

Argentinian farms

Luis and Maru Peluffo

31

General

A practitioners' guide to Farmax Dairy Pro

Nicola Waugh and David Miller

33

Sheep farming in Russia today

A bit of a dag?

Stuart Prior

35

Earthquake risk management for agriculture

Tom Wilson

39

What's wrong with the wildings?

Nick Ledgard

41

Profile

The best job in the world

Tafi Manjala

44

Julian Bateson

It could be worse, and it could be better

Are things beginning to look a little more promising these days? The milk payout is a record, with next year also looking good, with billions of extra dollars added to the economy. Wool and lamb prices have improved and the forecast for merino wool is for an increase by up to 60 per cent on the back of high Australian prices.

Log exports have seen prices rising recently to around US\$150 a cubic metre which, although nowhere near highs of the 1990s, is still a lot better than it has been for some time. If you add the benefits of carbon credits, forestry is well worth considering these days. Already this year more than one tree nursery has run out of stocks of radiata pine plants, so any forestry you are planning may need to be delayed until the 2012 planting season.

This may seem to all be reasonably good news but if you are in the kiwifruit industry the scene is not quite as rosy. There are a tough few years ahead as many growers learn to live with and manage the disease Psa. Already over \$17 million dollars has been spent fighting Psa and it is far from over.

At the moment the government is paying a lot to help fight this disease, along with contributions from the kiwifruit industry. It will be interesting to see how this will work in the future when a Government Industry Agreement (GIA) is in force. MAF has said that the introduction of GIAs is not a cost cutting exercise, and of course we believe them, but it does mean that MAF intend to pay less in the future while the relevant industry will be forced to contribute significantly to pest management.

Some of you may be unaware of what GIAs are. The agreements will mean that each primary industry sector will have to sign up to sharing the cost of controlling or eradicating any newly introduced agricultural pests which directly affect their business.

More MAF decisions are being discussed at the time this editorial is being written and there are still some Parliamentary actions required that may or may not proceed

before the election. However, the concern is that the smaller primary industries in particular, such as summerfruit or asparagus growers, will not have the funds to pay the significant costs required towards the control of whatever new pest needs eradicating. I am sure there will be more about GIAs over the next few months and years, and it is probably a lot more worrying for horticulture and forestry than for dairying, sheep or beef.

In this issue

In this issue of *Primary Industry Management* we have a short feature on Otago, five edited papers from the recent IFMA conference and a selection of articles on topics which include sheep farming in Russia and the problem of wilding pines back home here in New Zealand.

The journal starts with the concerns which Jacqueline Rowarth has on the future of farm management education and how Massey University is planning to meet requirements for agribusiness students. The feature on Otago looks at how land use and the pastoral sector have changed there, along with an outline of the North Otago Irrigation Scheme and an introduction to the development of the central Otago wine industry.

In the IFMA conference article section, three of the conference papers concentrate on a very important issue, that of managing farm succession. There are perspectives from Canada, Iowa in the US and New Zealand. With the increasing average age of farmers this is a subject that cannot be ignored. It has been discussed in previous issues of *Primary Industry Management* but these articles cover some new ground and are well worth reading.

Also well worth reading is the final article in the journal – a profile on Tafi Manjala. He is an NZIPIM councillor who has made his home in New Zealand after his early career in Zimbabwe.



Jacqueline Rowarth

Farm management education

'There are two major challenges facing farmers: how to incorporate new technology profitably into the existing business organisation, and how to be sufficiently flexible, mentally and financially, to adjust resource management to meet both changed economic circumstances and widely varying climatic conditions.'

Jack Makeham, Farm Management Economics, 1968

Jean-Baptiste Alphonse Karr, who died in 1890, was a French critic, journalist, and novelist. His epigram *'plus ça change, plus c'est la même chose'* – the more it changes, the more it is the same thing – applies to much of life, including farm management. In 2011 technologies are more advanced than they were in 1968 when Makeham wrote about the challenges for farmers, but the fundamentals of profit, economics and climate still exist.

They could be considered to be even more challenging than 50 years ago because of increasing regulation, media presence when things go wrong, customer expectation and lack of knowledge about what it takes to produce food. But it is still true that 'the essence of farm management processes is dealing with change and dynamics, strategically and tactically'

Knowledge of soils, plants, animals, economics and business is the foundation, and integrating that knowledge with practical experience is the key. Universities are attempting to meet the needs of industry by producing graduates with the right mix of knowledge, skills and attributes, recognising that after three years of tertiary education, the graduates will still be light on experience.

New agribusiness degree

At Massey University the new agribusiness degree has been created after consultation with industry. It includes a practical work component and a capstone subject where students work in small teams with a farmer client, examining potential solutions to an actual problem. In addition, most subjects from the first year set the learning within a practical context and create inter-disciplinary links. What is discussed in soils is picked up in plants, for example, and vice versa.

In a three-year degree it is difficult to do more. Although the four-year option as an honours year is available and encouraged by industry personnel and lecturers alike, the financial disincentive to the student is high. Do they go for a salary package of over \$50,000 including car and phone after three years or another year on the student loan?

Suggestions that the universities should just have a

four-year degree and teach more miss the point about the customer. For universities, the customer is the student, and students have big expectations for rewards in minimum time. In thinking how universities have and can respond to the changing demands on farm management professionals, it is important to understand that the universities are bridging a very different student group into employment from where they were 20 years ago.

The students

In studying members of the Y-generation, born between the late 1970s and the early 1990s, Peter Sheehan, author of *Generation Y – thriving and surviving with generation Y at work* has commented that they are always looking for the fastest and easiest way to do something in order to free up time to do something else. This has major implications for subject choice, at school or in tertiary studies.

For the younger generations, working smarter not harder involves paid employment. Ministry of Education research published in 2007 reported that approximately half of school children in years 10 and above are in paid employment and of these, over half work more than six hours a week. Working smarter not harder also involves picking subjects that they like and enjoy. Future career requirement is of secondary importance. Students look at business degrees which take three years and have 10 to 14 hours of contact a week, and at the agribusiness degree, which has time-consuming laboratory courses which affect the hours available for paid work, and make decisions accordingly.

When value can be shown for extra time spent learning, enrolments follow. Examples are the good salary packages or high kudos in veterinary studies or medicine. It is these enrolments, in conjunction with successful completion, that give funding to the university.

The universities are in the position of juggling what the students will enrol in with what the employers require. This is where there has been a change, the move to fees in 1988, the student loans in 1991 and 'bums on seats' funding in the early 1990s.

Confident and relaxed

The students themselves have also changed. Members of the younger generation know that their parents or the government will look after them if they are not working and have only just encountered the possibility of unemployment during the downturn. They tend to be confident and relaxed, with a high perception of self-worth.

The general affluence of the 1980s and 1990s in developed countries allowed more parents in working and middle classes to give their children what they deemed to be better parenting than they had received from their own parents. They have generally brought their children up with more affection and involvement than previous generations were able to show. The benefit to the parent is that their children have a high degree of affinity and closeness. Over 90 per cent of them cite their parents as their role models and friends.

Misplaced confidence

Of further note is that the children have frequently been treated as equals whose opinions are encouraged, treated seriously and celebrated. This was a deliberate move to give the children the confidence to be able to compete successfully in the global workplace, and is in marked contrast to the 'children should be seen and not heard' attitude of previous generations.

This high level of parenting and building of confidence, in an era of positive tolerance, has resulted in huge confidence and an awareness of self-value. Jean Twenge, a psychology professor at San Diego State University, has recorded a 30 per cent increase in students recording above-average scores in the narcissistic personality inventory since 1982. By 2006 two-thirds of the 16,475 college students evaluated nationwide had above-average scores. At the same time, under-performance linked to what has been described as 'vacuous over-praise', and reflecting heightened expectations, has increased and anxiety has reached record levels. Understanding the generational differences in upbringing helps with managing and encouraging the new generations.

Changing system

Because we want our children to succeed, the school system has changed to ensure that failure is not damnation. At school most students have experienced mastery tests, unit standards and the National Certificate of Educational Achievement. They are accustomed to templates and tick-the-box assessment. They like model answers and doing what is required to pass remembering that once the school day has finished, they are free to earn money.

They have been given leadership opportunities and over half of them now believe that they are leaders. At the same time they have been encouraged to evaluate and challenge other people's ideas and decisions.

Peter Sheahan has pointed out that they were brought up watching television which convinces them to be as loud, contrary and obnoxious as possible and to look after number one because nobody else will. This is despite the fact that

Generation Y is the most parented generation ever. They are looked after to such an extent by parents, chaperones and in after-school programmes that, according to research from Massey University's Human Resource Management Department, members have had very little unplanned free time with detrimental consequences on abilities in creativity and initiative. 'Helicopter' parents have been helping to ensure that the route is obstacle free.

Happy and valued

Another factor for consideration in this generation is that having seen the cost of materialism and consumerism on their parents with broken marriages and an epidemic of stress-related illnesses, they say that they are more interested in life and happiness than money. They are, however, the most materially endowed and entertained generation ever. The result is that they will not stay where they do not feel happy and valued, and this applies as much to education as it does employment. Value is directly related, at least initially, to money. The result is that education and employment have had to recognise that a change in attitude in students and employees has occurred and they need to either change or become extinct themselves.

Major differences in work attitude between traditional and new employees

Traditional employees	New employees
Work ethic – live to work	Work-life balance – work to live
Task focus	Team focus
Commitment	Enjoyment
Authority	Empowerment
Independence	Support
Structure	Flexibility
Tell them	Involve us
Conformity	Creativity
Tradition	Innovation
Regional	Global
Long careers	Many jobs
Learn then earn	Lifelong learning
Loyalty	Variety

The Y-generation is being followed by what will probably be called the Z-generation – Z for zappers although i-gen has also been proposed. Because the significant factors in parenting and schooling which have influenced the attitudes of the Y-generation have not been changed, it is likely that the attitudes to happiness and employment will be similar in the Z-generation. However their world view, and consequently their attitudes towards environmentalism and employment security, will be influenced by climate change and the economic downturn.

Education requirements

As indicated in the introduction, universities have been attempting to keep up to date with industry requirements,

while juggling the needs, wants and desires. They are also attempting to develop the attributes required beyond the knowledge and skills such as innovation, motivation, enquiry and teamwork.

Rob Heebink, Research and Development Executive, Gallagher Group, gave an excellent presentation on basic requirements in education at the Science and Innovation in Education conference in Wellington. His words were aimed at businesses, but the gist is applicable everywhere.

In Heebink's opinion, businesses need graduates who –

- Are well grounded in the basic principles and theory of their respective disciplines
- Are able to apply these principles to solving real-world problems
- Possess good independent critical thinking and sound scientific analysis skills
- Have an appreciation for other technical disciplines and are able to work as part of multi-disciplinary teams to solve complex problems
- Are genuine innovators
- Are self-motivated problem solvers with good problem-solving skills
- Have an inquisitive mind and are self-directed life-long learners
- Have an understanding of basic economics
- Have a good command of the English language
- Have an internal passion for their discipline
- Are personally committed to achieve excellence
- Are able to adapt rapidly to changing circumstances

These skills and attributes are necessary because, again in Heebink's words, all businesses operate in a highly dynamic environment and require a workforce which is able to adapt rapidly to changes and new knowledge as it emerges. Some of the reasons are the pace of technology development, competition, and others are in changes in society itself – demographic, economic, political, regulatory and legal.

Professional development workshop

As an example of a university initiative to meet requirements, Massey Agriculture has instigated a professional development workshop programme. Four or five times a semester, at 4.00 pm on a Friday afternoon, students are invited to listen to an industry presentation. These workshops are not about employment with the company presenting, but rather have the purpose of building up a picture of the agricultural industry in New Zealand by profiling a range of influential people, businesses and organisations.

The workshops give the students the opportunity to hear about the industry's vision for New Zealand, how it is working towards that vision, what attributes are looked for in new graduates, and how careers are developed. Senior students are invited to introduce and thank the speakers, and are the hosts for the speakers, ensuring that with the industry-sponsored refreshments that the speakers have a drink, food and the opportunity to talk.

Attending and being involved in these events has improved the understanding of the industry and the sorts

of questions they might be asked at interview. It has also given the students real ways of building up their professional development portfolio. This means that when they write in their CVs that they are a keen and motivated student who always goes the extra mile, they have something to back up their statement.

This is part of the reason that the workshops are at 4.00 pm on a Friday afternoon. And why they are asked to reply to the invitation to attend the workshop, and let Massey Agriculture know if there is a change in their plans. Reliability is being encouraged, as are professional standards. The hosts wear the Massey Agriculture tie or scarf with pride. Most of the audience wears branded gear, showing that they want to be regarded as young professionals ready to join the industry. The very keen, motivated and reliable are given extra opportunities as well.

Meeting the needs

A three-year degree, even with the extras, will clearly not be enough for the rest of life, particularly when it is building on the changed schooling system with 'tick-the-box' mentality and the parenting approach. The university response, in addition to the refinement of degrees already described, has been to create a Centre of Excellence in Farm Business Management. This is a joint venture between Massey and Lincoln with the support of DairyNZ and the government through the Primary Growth Partnership. Combining the capabilities of both universities, it will coordinate research, education and professional development to meet the needs of the agricultural industry.

The industry has a role to play as well. Lifelong learning is an expectation of the new generations, and professional development is regarded highly. This will mean that employers should ensure that job descriptions include time for professional development through conferences and further study, perhaps through short courses. This will be part of the personalised career development plan that is required, and will also play a crucial role in the retention of staff.

Conclusions

In a project surveying tens of thousands of workers globally, over 70 per cent of respondents want forward thinking in their leaders. This forward thinking must reflect the aspirations of the workers – they want to know how their dreams will come true and their hopes fulfilled. Continuing education and lifelong learning is paramount. Time used to be cited as the most common reason for not getting involved in further study and the new expectation is that the employer makes that time available.

Education for the future will be a continuing process from the foundation of the first degree. New generations of farm managers are developing and want to be rewarded for commitment and ability. There is nothing new in that, but the younger generations are better than older generations at getting what they need, want and desire.

Professor Jacqueline Rowarth is Director, Massey Agriculture, Massey University, Palmerston North

Gavan Herlihy

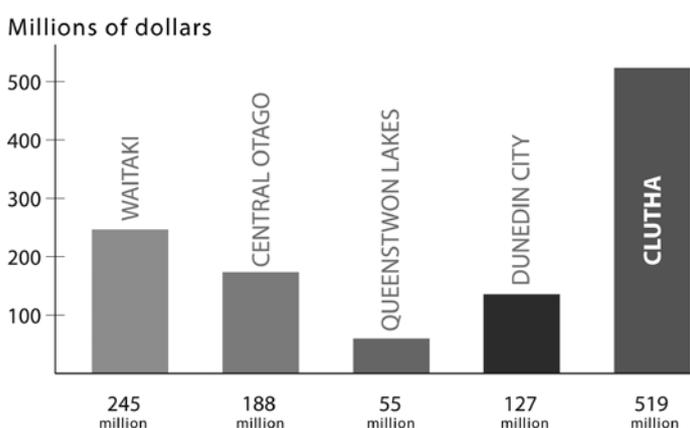
The changing face of the Otago pastoral sector

The generic term ‘the Otago region’ conjures images of the region’s two great inland lakes Wakatipu and Wanaka, surrounded by their majestic high country. Added to these are the iconic images of central Otago’s inland valleys and surrounding hills – the big sky country captured so brilliantly in the paintings of Graeme Sydney.

But in reality, from a pastoral farming perspective, Otago is a very diverse region. North Otago in the nineteenth century was the grain bowl of New Zealand. The wealth that grain created has resulted in a legacy of grand Oamaru stone buildings that still grace that city today.

Today the powerhouse of Otago farming is not north or central Otago, but the south and west regions of the province. As the graph illustrates, almost half of the pastoral gross output in the 2009/10 season in the area commanded by the Otago Regional Council was from the Clutha District Council area. Clutha’s output in dollar terms was double that of Waitaki and more than double that generated in the combined areas of Central Otago and Queenstown Lakes.

Pastoral gross output 2009/10 by district council area



Historically Otago has always been a dominant force in the New Zealand sheep industry. But that is rapidly changing. As the next table shows, sheep numbers have dropped by a third over the last two decades. As with other regions in New Zealand, the big mover has been dairying, with dairy cow numbers rising from an insignificant 34,000 in 1990 to in excess of 220,000. The number of dairy cows now equates to the number of deer in the region.

While the growth in dairying has been significant, especially in the Clutha and Waitaki District Council areas,

Livestock numbers in Otago regional council area

Year	Sheep 1000s	Beef Cattle 1000s	Dairy cows in calf or milk 1000s	Deer 1000s
1990/91	8,310	236	34	60
2000/01	7,234	258	114	190
2009/10	5,564	308	221	221

the economic activity in the wider Otago region is still heavily dependant on the output from its sheep and beef. Last season the gross output from Otago’s sheep and beef properties of \$619 million still surpassed the \$493 million generated by the dairy sector.

In real terms however the next table shows, the output from the sheep and beef sector has been relatively stagnant over the last decade. This has affected the regions dependence on sheep and beef – those areas whose climate or lack of reliable irrigation do not make dairying an option.

Pastoral gross output in real 2009/10 dollars

Year	Sheep and beef farms	Dairy
1990/91	498	40
2000/01	632	285
2009/10	619	493

Reasons for change

The well documented relative returns from dairying compared to sheep and beef has seen a rapid wave of conversions to dairying in those areas able to sustain it, notably in the reliable rainfall areas of south and west Otago. Conversions in other

areas with reliable irrigation have gathered momentum in the last decade.

The steady degradation of much of Otago's mid to low altitude tussock hill country has affected both the productivity and profitability of Otago's sheep and beef sector. The plant hieracium now smothers countless thousands of hectares of Otago's hill country.

Lost foundation

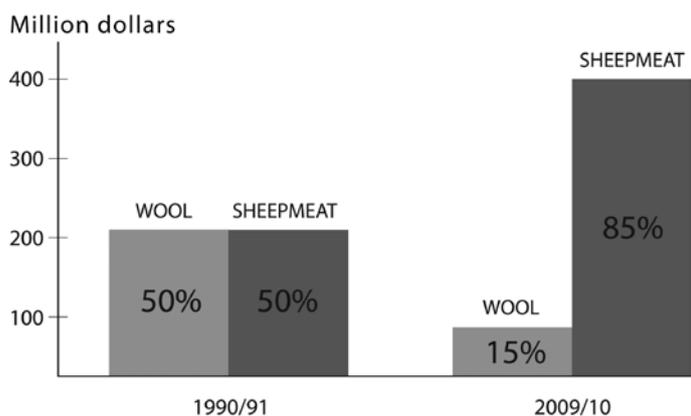
How quickly the pendulum has swung. In the 1970s and 1980s, aided by the Land Development Encouragement Loans scheme, the hill country was the star performer of the Otago pastoral scene. Top dressing to solve a sulphur deficiency, along with oversowing, saw much of Otago's hill country waving with clover. Such country commanded a premium in Otago's real estate market.

But the removal of subsidies in the mid 1980s silenced the top dressing planes. The introduced exotic higher fertility grasses quickly disappeared, providing an ideal environment for hieracium. The rest is history. We are now paying the price for smothering out the native grasses which were once the ecological foundation of the fragile low rainfall areas that characterise the Otago hill country.

Otago has long been known for its production of quality wool, from ultra fine merino through to coarse crossbred. Otago was one of the few regions where farmers flocked to the selling centre in Dunedin to watch their wool being sold at auction. Wool sale day was a big one for Dunedin retailers.

The demise of the wool industry has significantly affected the Otago region. As the next graph illustrates, in real terms, wool and meat were equal contributors to the sheep sector in Otago two decades ago. Wool's contribution last season had slipped to a mere 15 per cent.

Relative gross of wool and sheep meats in real dollars for Otago



Tenure review of the region's pastoral leases has quietly been eroding the output from the region's high country. Over the last 15 years many thousands of hectares have been added to the conservation estate through the tenure review process. In addition there have been whole farm purchases by the Nature Heritage Fund such as Birchwood Station in north Otago and Michael Peak in central Otago. It has resulted in these properties being totally destocked.

The changing face of ownership

In recent times there have been significant developments in the diversity of the ownership of Otago's pastoral farms. Most purchases have not created a glare of publicity – they have been under the radar.

For example Matt Lang, a Canadian and former husband of Shania Twain, now has three high country properties in the Wanaka and Queenstown area. The majority of the high country stations around Lake Wakatipu now have overseas owners. The sheep and beef sector has seen corporate farmer Greenfields Ltd purchase ten farms in Otago, while Lonestar Holdings, owned by a Nelson based American, now has eight sheep and beef properties in Otago.

On the dairy scene, the Harvard University Alumni Fund now own five of the 11 dairy sheds in the Maniototo region. In addition, the New Zealand Super Fund has recently purchased a dairy farm in west Otago. The face of ownership is quietly but surely changing in Otago.

The future

No one could have accurately predicted the changes that have occurred within the Otago pastoral farming scene in the past 20 years, so it would be folly for anyone to try and predict the changes in the next 20 years. Much will depend on whether the much improved returns currently being enjoyed by the region's sheep and beef farmers are sustained in subsequent seasons.

However a prediction I am prepared to make is the prospect of large tracts of central Otago's pastoral country becoming a wintering pad. This will be the result of environmental and animal welfare implications of wintering outdoors in high rainfall areas on cropping areas prone to excessive pugging coming under closer scrutiny. Animals, be they cows or sheep, winter on top of the ground in central Otago.

The easy pickings for dairy conversions have already been harvested. Further expansion will depend on whether a number of community irrigation proposals come to fruition. In addition, capital is currently a handbrake on the continued wave of conversions. Only history will record if the current very attractive returns available from investment in the dairy sector can overcome the prejudice and reluctance of urban fund managers to invest in the powerhouse of the New Zealand economy. The recent move by the Super Fund to invest in the rural sector could signal such a change.

Gavan Herlihy is a sheep, beef and dairy farmer from the Maniototo in central Otago. A former MP for Otago he has a MAgSc degree from Lincoln and a post graduate Diploma in Business Studies (Dispute Resolution) from Massey University.

Fraser McRae

Land use change in Otago

Land use in Otago is, in general, controlled by the environment. The constraints of soil and climate have already established the local land use norms of horticulture on the fertile, warm valley floors through to extensive merino grazing on low fertility soils on cold mountain tops. These patterns of land use have not changed markedly since the original settlement. However, development in rural technology along with swings in viability between land uses have resulted in local change.

I returned to Otago after a 12 year absence and when asked what had changed, I could reply nothing but everything. The trees have grown as the first generation forests reach maturity, and there are some new land uses. But mostly the changes are far more subtle. There are still lots of pasture and grazing animals, some forests and some horticulture.

The recent changes have not greatly affected the rural landscape, nor changed rural communities and their supporting industries. The changes that I notice are new land uses, changed management of old activities and the addition of new activities alongside existing uses.

In this article I outline changes in land management, use and activities noticed while working throughout Otago. I contrast their effects on landscape and communities, along with economic and environmental effects.

Changing land management

Changing management involves changes to how established uses and activities are undertaken, including planting new varieties and crops in horticulture, grazing pastures with different types of stock and increasing harvesting rates in forestry. Significant management change usually involves intensification and can require capital investment in new equipment. The new equipment is usually additional to existing equipment, or just bigger models of them. Success brings more horsepower and bigger gear.

Changing management is the same land use but more intensive, involving the same staff on the land and in support industries. As a result rural communities remain based around local facilities, such as the school, with social connection through organisations such as sports clubs. There is often still a high level of family ownership of property and direct involvement in daily management. Contracted employment is used to harvest and transport products.

Management change happens to increase incomes while retaining the existing production systems. Subtle change in the observable landscape is understandable as efficiencies are introduced and current knowledge and capital investments are made to work smarter. Ultimately, better cash flow should

mean less stress, and in a good year things are not too bad.

At the basic level little has changed – orchards are orchards, pasture is pasture, and trees are a forest. However, to the keen eye there are no golden delicious on the ground at Ettrick and Earnsclough, green pasture goes higher up the Bengier Range, and stock and logging trucks are more common on the state highways.

Changing land uses

In contrast to changing land management, changing uses introduce new activities among established activities. These changes include horticulture or forestry where stock once grazed and production changing from fat stock to dairy or venison. Interestingly, new irrigation usually pre-empts major land use change, rather than reinforcing established activities. The cost of water demands greater income to service greater costs.

When new people are involved there is a loss of understanding in the variability of seasonal and annual cycles and the variations between extremes of seasons. New land uses are founded on an expectation of certainty and can unwittingly introduce greater risk to the local community and create tension. This can be flood damage, feed shortage from too much or too little rain, dust from gravel extraction annoying residential neighbours, or milk tankers and logging trucks causing problems for car drivers.

Rural landscape

Changing uses require capital investment including new structures and equipment which in turn change the rural landscape. Milking sheds and tanker turn-arounds have replaced shearing sheds and sheep yards throughout Otago, dry land has become irrigated pasture in north Otago and pasture is now forest in the Shag Valley. Redundant structures from earlier activities are either removed or left to decay while most of the new equipment and structures are bigger, adding a few new objects in the otherwise largely pastoral landscape.

Investment in change uses the underlying resources

of land and climate in new ways while often ignoring the existing systems. This major change is understandable as relative profitability between different uses varies, reflecting global markets for different products. Much of New Zealand's rural production has been commodity based. However this is moving towards niche marketing for quality products in an increasingly discerning middle class world. Cut flowers and meat cuts all reflect local value as raw products are prepared for an increasingly image conscious world.

Changing communities

New land uses usually require new knowledge and skills which may be complemented by existing skills. We therefore see rural communities change as the identities defining the established communities are replaced by people bringing in new skills and knowledge. Often there is little common ground on which to build a connection. In addition, with new land uses there is an increasing change to corporate ownership of property with staff employed for a range of work from management through to transport.

Vineyards occupy hay paddocks at Bannockburn and Bendigo, parched pasture is now green in north Otago and Hawea, and forests replace tussock, gorse and broom in the Shag Valley and above Island Block. Dairy herds graze in west and north Otago. The landscape has changed and so have other environmental effects.

Water demand in the inland basins continue to constrain land use and changing from tussock to forestry reduces run-off and water supply in low rainfall areas. Taking water from Otago rivers is increasingly being balanced with the maintenance of ecosystems reliant on water remaining in those same rivers. This will change when permits for taking water cease and all water use will need to recognise minimum flows after 2021.

Adding ancillary activities

Ancillary activities, including home stay, bed and breakfast, snow and adventure tourism on the Cardrona and Pisa Ranges all rely on the established activities for context while supplementing rural incomes. While riding the Rail Trail over New Year I was surprised by the level of farm accommodation and visit activity benefitting from the trail, but calmed by the pastoral landscape that remained dominant.

The use of current knowledge and farm based skills off the farm to generate income are not strictly farm change, but it enables retention of existing land use throughout much of Otago in family farming units. Teaching, nursing, driving and advising all provide income to support home farm enterprises.

Adding uses to established activities involves existing structures with relatively minor investment needed to accommodate visitors to farms whether staying, trail riding or hunting. Like changing land management, adding new activities uses the same staff with the same skills, although with the new activities there is often access to new support industries. These additional activities retain rural communities

as there is often employment created.

Bringing new activities to existing land uses seems to generate new income from the existing structures as it may involve only the diversion of time. Time is often poorly costed and as a result, income from most added activities appears to be quite profitable. This additional activity often includes the wider family with income improving cash flow and leading to less stress but with little visible change from the established land use.

Future changes in land use

If I leave Otago and return after a further 12 years I would still expect to reply nothing but everything to the question what has changed? The forests in Deep Stream, Shag Island Block and Blue Mountains will have grown, with some being harvested, replanted and extended as carbon is sequestered and Emissions Trading Scheme credits join the income column in the farm books.

I imagine there will still be a lot of pasture and grazing animals and there will be new land uses, but mostly the changes will be subtle. If anything there will be an increase in direct production of food either as grain, fruit or vegetables. Production of food and fibre will sit in an environment where contaminants are contained on farm and stock are managed to avoid contamination of waterways. This production will result from low impact practices and should attract niche prices.

Familiar landscape

The rural landscape and structures will remain familiar reflecting the history of land use while launching future activities. Future change in management and land use will reflect increasingly innovative and creative ways to produce food, fuel and fibre along with opportunities for recreation and tourism.

Rural communities and their supporting industries will survive as the effects of peak oil and climate affect how quality food and fibre is produced, harvested and transported to markets. Rural people need other rural people for working and social activities and will continue to interact in an increasingly connected world. Their communities will become more diverse as new people target local productive advantages.

With greater diversity in rural production the supporting communities will be better buffered against fluctuations in individual product prices. Investment decisions founded on sound business plans will reduce activity failures and provide greater certainty to rural communities and their supporting industries. In the future little will really change and orchards will be orchards, pasture will be pasture, and trees will be forests. However, there is likely to be more complex arrangement of those same activities as more of the productive potential of individual soil and climate combinations are used.

continued on page 12 >>

Jock Webster

The North Otago Irrigation Scheme

'It is not the length of life that counts but the width and depth of life' is a quote about life. For land use it is the complete reverse. The length of time that the land can be sustainably used and managed is critical in decisions made as to what land should be used for and how it is managed.

Irrigation has brought about changes to land use with the objective often to create an outcome that is economically viable. Many recent irrigation schemes built or planned for have capital infrastructure costs and running costs which would have previously been regarded as uneconomic and financial madness. This means that land serviced by these irrigation schemes have to be used by farmers who have the ability to produce excellent net profits under a well managed irrigation schedule with high efficiency of water application.

The beginning of the scheme

The North Otago Irrigation Scheme was commissioned in the spring of 2006. The command area of the scheme estimated at 27,000 hectares had very limited irrigation. It was from a small number of deep wells, extraction from the Kakanui river on an unreliable basis and extraction from the Waiareka Creek on an extremely unreliable basis.

The scheme, which has two stages of 10,000 hectares each, began with the sale of 7,500 hectares of irrigation opportunity at a capital cost of \$1,850 a hectare, along with annual running costs of \$666 a hectare. The sales of the remaining 2,500 hectares of stage one shares were sold over the following two years. Some of the locals still persist in saying that it is not possible to farm under that level of increased costs, especially when on-farm irrigation development and expenditure associated with changes in land use are included.

Benefits

The results of a study prepared for the Waitaki Development Board show that the scheme, at a cost of \$56 million, has benefitted the area. Dryland north Otago has a variable rainfall of 325 mm to 950 mm often with cycles of very low rainfall causing severe drought. The soil types range from loess based wind blown silt to very heavy clay loams of extremely high natural fertility.

North Otago farmland was used for extensive sheep and cattle grazing with small pockets of dairy farming, significant areas of mixed cropping and limited horticulture. In the past a major part of these rolling hills were planted in lucerne for grazing, but during the 1990s funding was granted to

further explore direct drilling of drought resistant pasture species such as fescue and cocksfoot.

Neither of these options was completely successful. The combination of north Otago naturally fertile soils and adequate rainfall resulted in either an absolute feast of pasture production or drought, and the resultant parched dry desert was impossible to cope with. It was a case of make some money one year and lose it over the next two years.

Not really possible

The development by the irrigation scheme means that water is pumped under a static lift of 145 metres over the Ngapara hills from the Waitaki River. It gives farmers the opportunity of 100 per cent reliable water at an application rate of 23.5 mm a week. It is not enough to keep up with potential evaporation on severe days but an average sufficient to maintain soil moisture levels. All water is applied from pressured scheme mainlines by pivot and K-line. The rolling hills traversed by pivots creeping up hill and down dale is something our forefathers dreamed of but never thought was possible.

The change in land use has been significant. Dairy farming has become the predominant land use in the area with 70 per cent now under dairy or used as dairy support. This has brought change.

Gone are the trees and shelterbelts to make way for pivots to complete their uninterrupted circles. Gone also are the lucerne and drought resistant pasture species as farmers replace them with the highest producing ryegrasses which have proved themselves under irrigation in other areas and on trial plots. Production has been measured at over 22,000 kg of dry matter per hectare. The resulting milk production is proportionally high with the best farmers producing in excess of 2,000 kg of milk solids per hectare. The effect of relatively deep fertile soils and a moderate climate with irrigation combine to give excellent production results.

Benefits for sheep and beef

Similarly sheep and beef farmers, 20 per cent of the area, pick up the production skills from their dairying neighbours and revolutionise their production. The Lincoln Foundation Sheep and Beef Farmer of the Year won by Colin and Stefan

Mavor in 2008 reflects what can be achieved by irrigating these rolling downlands. They are part of a smaller scheme also drawing water from the Waitaki River pumping it to an adjacent area of north Otago. They produce fat lambs from their own ewe flock and fatten both lambs and beef for specialised markets. This level of specialisation could not be achieved without irrigation.

Both dairy, sheep and beef farmers now regularly re-sow their pastures to ensure they can consistently maintain their production. This is a contrast to pre-irrigation days. Pastures which became thin and weedy during droughts were sown to a break crop following a fallow period to allow moisture build up, and then hopefully a successful re-sowing to new pasture. Now it is merely spray and drill so the length of time the land is out of production is minimal.

Arable farmers have been able to also gain contracts for specialist crop production as yields can be guaranteed on a consistent basis. Hybrid rape production, specialist grass seed production and maize for silage are all new crops to the area. In addition intensive horticultural production is also on the increase although still on a small scale.

Environmental concerns

The fear of many is that irrigation, especially on rolling hills and near waterways, is an environmental time bomb. One of the conditions of the North Otago Irrigation Company water use consent was that farmers would be required to draw up environmental farm plans, maintain these plans and have them available for audit at any time. These plans must allow for and monitor pasture management, soil management, fertiliser application, water application and riparian strip and waterway management.

These environmental farm plans make all farmers aware of the real issues that the wider community has fears of and how they should plan to avoid damaging their own rural environment. Many farmers do a magnificent job of achieving results well above the benchmark, but as in all aspects of life there are still those who let the team down. The Otago Regional Council is becoming much more proactive in ensuring that standards are being met and maintained.

It is often not easy to fence and plant shrubs and trees on riparian strips and re-establish wetlands. However there are some good examples of achievements and success. Given time I am sure that further tree plantings will be made around pivots and even under pivots as the redevelopment of pivot

irrigated farms takes place.

Successful result

One area of significant change is the Waiareka Creek. Before the completion of the irrigation scheme this creek had become a smelly stagnant series of ponds in the Waiareka Valley during dry summers. As part of the scheme the flow has to be maintained at 60 litres a second in the off season and 100 litres a second while the scheme is operating.

This stream is now a clear and attractive creek which will be capable of maintaining a much greater range of fish life. Studies of the environmental habitat in the creek have been made before and after the completion of the scheme. It will be very interesting to see these results continue to improve. Mixing water between the two catchments has certainly been of benefit in this respect.

Economic effect

However the effects of land use change has had a much greater economic effect than many expected. The gross revenue generated from the scheme area has risen from \$21.14 million before irrigation to \$65.08 million in 2010 – an increase of \$43.95 million or over 200 per cent. Farm expenditure has increased by 210 per cent but the extra cash the farm supplies from having the irrigation scheme in place is \$14.91 million a year.

The cost of getting to this stage has been significant with farmers spending over \$62 million in land conversion costs over and above the cost of the scheme. At the same time it has introduced another 76 extra employees within the area who take home a further \$3.37 million in wages.

The comparison to the Lower Waitaki irrigation scheme, now covering 18,000 hectares which was opened in 1972, highlights a number of differences. This scheme began as a predominantly border-dyke scheme which previously was dryland carrying 25,000 sheep. The same area now grazes over 25,000 cows. It is an even more pronounced swing to dairying – currently the most financially viable agriculture production for these soil types.

As dry land the very stony soils looked more like a riverbed during the summer, completely bereft of any trees. The land use change to dairying has seen a significant build up of topsoil and farmers speak of being able to re-drill paddocks without disturbing a single stone. Irrigation has meant the ability to successfully grow trees or shelterbelts changing the vista on the Waitaki plains completely.



Helping others

Now that these farmers have worked through the development of their properties they are at a stage of looking further afield to help others with further irrigation development and the broadening of profitable irrigation farming. And it can be profitable, for it was on these same irrigated plains where Chris Dennison broke the world record wheat yield in 2003 with a wheat yield of 15.1 tonnes per hectare.

Modern day irrigation development methods use artificially lined canals to minimise leakage losses, or totally piped systems which allows the retention of gravity generated pressure. Even the sloping incline of the Canterbury plains creates enough pipe pressure to eliminate pumping completely. In the north Otago irrigation scheme which covers rolling topography there is a pressure reducing valve with an inward pressure of over 2000 kilopascals. However with a 145 metre static lift the energy costs for pumping are significant, with the season average cost being 8.25 cents a cubic metre of water pumped from the river.

Reliability vital

There are over 40,000 hectares of irrigation in north Otago servicing land use options from vineyards and orchards to conventional pastoral farming as well as the supply of water to local industry and the Oamaru town water supply. Therefore reliability of supply is of utmost importance. The Waitaki River has an average flow of 360 cubic metres a second (cumecs), as much as all other east coast South Island rivers north of there put together.

The Waitaki Allocation Board decreed that 90 cumecs should be able to be used for irrigation and industrial abstraction. This would ensure 100 per cent reliability of irrigation and water supply which has historically been the case. As the Waitaki river catchment is snow-fed the highest flows are over the summer – the times of peak abstraction for irrigation. Over January 2011 the river has had consistent flows of over 1000 cumecs with peaks of 1600 cumecs, it is a very big river.

The north Otago community itself and the wellbeing of the local economy relies heavily on the regular and consistent supply of water, so the decision to keep 90 cumecs available

for abstraction is critical to the local economy.

The recent decision which has allocated 260 cumecs of water to Meridian's north bank tunnel project and an interim decision allocating over 20 cumecs for the Hunter Downs scheme have met resistance from north Otago irrigators. These decisions have been made without the Waitaki Allocation Plan being updated to ensure that the decision of the commissioners reserving that 90 cumecs for abstraction was written in as law in the Waitaki Allocation Plan. The competing interests threaten the reliability of this abstraction and therefore the economic wellbeing of the local north Otago community and the rural servicing town of Oamaru.

A big challenge

Stage one of the north Otago irrigation scheme was opened in 2006. It was the result of 14 years of consistent perseverance by an enthusiastic group of farmers and non-farmers who could see the benefits that lay ahead for both the farming and non farming community. It was a big challenge and resulted in a large change of land use.

The challenges do not go away. Now it is for the existing irrigation companies on both the north and south banks of the Waitaki to work together to ensure the water consented to irrigate over 100,000 hectares is available on a guaranteed reliable basis.

The current six irrigation companies work together sharing information to improve efficiency of application to better understand environmental issues and have all their farmer shareholders following environmental farm plans. As time passes the land use will change to reflect the best use of the land itself, and the water which is applied to it, to maintain production under conditions acceptable to both the farmers and the wider New Zealand community.

Jock Webster is the managing director of the Mitchell & Webster group which crops over 1200 hectares on the north Otago downlands. He was chairman of the North Otago Irrigation Company from 1992 to 2008. He is currently a director of the Waitaki Irrigation Collective – a company representing the common interests of the six Waitaki related irrigation companies.

>> **Land use change in Otago** continued from page 9

Conclusion

While land use has changed slightly, the production from that land has increased significantly. The investment for that change has come not just from the land but also from urban sources. Private and corporate investors have altered rural land use and their management along with communities as ownership has become more corporate.

This move means not all the financial gains have remained in the rural community as a component is returned to urban investors. Therefore primary production increasingly becomes a fully integrated part of all New Zealander's lives,

and that cannot be a bad thing. Everyone in town should know where their food comes from, and understand the effects of that production.

Fraser McRae is Director Policy and Resource Planning, Otago Regional Council. Originally employed in Otago as a soil conservator, Fraser was involved in tussock grassland management and development. He has since worked in Marlborough and Waikato. In 2005 he returned to Otago and the Otago Regional Council where management of water quantity and quality is his priority.

Steve Green

Central Otago wine industry

The beginnings of wine in central Otago mirrored patterns of European settlement in the region. In 1860 gold miners joined the pastoral farmers, among them were two Frenchmen, Jean Desire Feraud and his partner Bladier who planted grapes and built a small winery near Clyde in 1864. They had some success and won medals for their wines at competitions in New Zealand and Australia before they moved on. Sadly their remarkable pioneering work was not followed up by the predominantly British settlers who instead planted apples, pears and stone fruit and ran sheep in the hills.

In 1895 the New Zealand government brought in Australian based Italian viticulturist Romeo Bragato to identify land for grape growing. Central Otago was one of the first places he visited and he enthusiastically endorsed the region as 'eminently suitable.' Once again the advice was ignored. It was not until the 1970s and early 1980s, around 100 years after Feraud and Bladier, that serious efforts to re-establish winegrowing resumed. A handful of modern pioneers established experimental plots and the first commercial wine was produced in 1987. These new pioneers were widely spread through out the region, yet worked together, sharing experiences and insights.

In those early days the wine world was skeptical about this new area. Some wine writers simply ignored the new region. Others were disparaging, attributing the successful sale of central Otago wine to the high tourist numbers in the region – tourists who would buy wine on the basis of locality rather than quality.

One respected New Zealand wine writer said in 1991 – 'A few hardy pioneers are planting a variety of grapes in central Otago. The region is too cold to produce wines that can rival those in the north. However, they may be able to produce some passable sparkling wines which don't require the fruit ripeness of table wines.'

During the next decade the few wineries that were making wine started to receive national recognition, particularly for Pinot Noir wines. This success generated interest from independent participants prepared to invest money and time in developing vineyards and wineries. This coincided with the release of a soil and climate study researching the potential for growing crops on the land in the vicinity of Lake Dunstan which resulted from the construction of the Clyde Dam.

Accidentally suitable

The Pinot Noir grape found its way to the southern edge of the wine making world by accident. It was one of a dozen



Otago wine facts

	1987	1997	2007	2010
Producing area in hectares	10	135	1454	1540
Tonnes produced	5	230	1699	6196
Listed wine producers	3	14	89	111
Wineries or winemaking facilities	1	6	23	24

Pinot Noir is the predominant wine variety where location and microclimate are an essential part of the allure of the wine. Central Otago appeals on a regional basis but the sub-regions provide further distinction and interest. Central Otago has six recognised sub-regions – Gibbston Valley, Bannockburn, the Cromwell Basin, Wanaka, Bendigo, and the Alexandra Basin. Each of these sub-regions has slightly different climates and soils, providing nuance to the wines.

A good wine

There are a number of main reasons why Pinot Noir makes such good wine in central Otago. In the narrow land mass of the South Island, central Otago is still relatively close to both coastlines. However, the Southern Alps reaching to 3,000 metres above sea level to the west capture most of the rain, leaving inland Otago with a distinctive, semi-continental climate found nowhere else in New Zealand. It is one of the hottest, coldest and driest regions in the country. The seasons are clearly defined, the summers hot, winters cold and autumns long and dry.

The hot summer and autumn days with cool nights with slow ripening allows the development of flavour and complexity in Pinot Noir. Throughout the region it is not unusual for temperatures to drop from 30°C in mid afternoon to 10°C in the evening. Appropriate vineyard site selection is critical and frost management is important. Soils are free draining and low in organic matter but with good minerality. They are formed mainly from schist or mixed schist-greywacke alluvium with some windblown loess, loamy sands and river gravels. Loess is prized in wine growing regions for Pinot Noir and its relatives.

Sustainable management

Other factors such as the geographic isolation from other major wine producing regions and the demands of topography and climate variation led to innovative practices in viticulture, winemaking and wine marketing. This contributed to the focus on quality and the development of a differentiated Pinot Noir brand from individual producers.

The naturally low vigour and rainfall on sites that have not previously been intensively cultivated have allowed trained viticulturists to introduce sustainable management practices from an early stage in the region's history. Low humidity and the resulting low level of disease means pesticides have been rarely used. Organic and biodynamic practices are now being used in a rapidly increasing number of vineyards.

Knowledge and care of central Otago's fragile soils is

an important part of viticulture practice. Grape yields are kept deliberately low although climate and soils also play a role in this. Winemakers demand fruit which is balanced and properly ripe, allowing them to produce wines that reflect the uniqueness of the area.

Highest quality

The wine industry is deliberately not highly mechanised. Climatic restraints and demand for grapes of high quality which are grown on deliberately low yielding vines means that vineyards in central Otago depend on a large number of skilled, trained vineyard workers. The wines produced are expensive, not because there are better practices which can be achieved by machine but because the highest quality wines are best produced by hand.

The wineries are small and modern, using the best techniques and technology, old and new, from around the world. The winemakers are well trained and well travelled. They have tertiary qualifications and have completed vintages in other regions in both hemispheres. They are innovative and outward looking with a healthy respect for the generations of expertise that shapes the world's great wines. Winemakers stay in the area, continuity is a large part of making quality, differentiated wine and knowledge of the vineyards and previous vintages cannot be underestimated.

The world market

Growing and making good wine is only part of the job of being a successful wine making region. Central Otago has been particularly successful in showing its wine on the world stage, and achieving international recognition for the quality of the wines produced.

Two of the most respected wine commentators in the world are Matt Kramer from the USA and Jancis Robinson from the UK. In the *Wine Spectator* Matt Kramer said 'I cannot recall a new wine growing region, let alone one committed to a variety as demanding as Pinot noir, that has vaulted to such a level of accomplishment in so short a time'. Jancis Robinson wrote 'Of the regions I know outside Burgundy, central Otago is the closest to developing its own distinctive style of Pinot Noir.'

Branding the region

The majority of wineries have banded together to establish a marketing company. The brand was central Otago. The story was quality wine. The focus was Pinot Noir. It captured the imagination of the world wine media. There is no top commentator on Pinot Noir who has not been to central Otago to taste wines in their own location and to meet the people behind them. In those years when they are not visiting, those same media people are given the opportunity to taste new vintages when the winemakers take their wines to London, Tokyo, New York or Sydney.

This approach of deliberately branding a region rather than individual wine brands was unique in New Zealand and a key factor in the region's success. Comparison with

the only other internationally recognised New Zealand regional brand, Marlborough Sauvignon Blanc, is useful. Marlborough Sauvignon Blanc was established over at least 20 years, and developed from the success of individual brands – Montana, Hunter's, Cloudy Bay, Wither Hills. Central Otago's recognition came faster and has been all embracing for wine labels, and while some producer brands are now widely recognised they are still seen as particularly central Otago.

Central Otago wines are sold throughout the world. You can drink a central Otago Pinot Noir in Brazil, Dubai, Sweden and the Philippines.

Where to from here

We have seen a lot of changes in the relatively short life of commercial wine production in central Otago. The pioneering five or six wineries in 1987 became 14 within 10 years, and there are now over 100. Change will be even faster, and the industry we currently know will be a very different one 10 years hence.

On the positive side the vines are getting older and the wines will get better as a result. It is difficult to make great wine from young vines – this is an industry where ageing is good. There is better infrastructure and support from outside the industry. Most of the original winegrowers are still around, and their experience and commitment to the region will continue to be invaluable.

However, the tight-knit, supportive team approach is likely to dissipate. More vineyards have been planted, and from 2006 many wineries based outside of central Otago have sourced fruit here then processing and producing central Otago wine in other regions. The largest single producer of central Otago Pinot Noir in 2006 was a Hawke's Bay winery and in the 2010 vintage an estimated 40 per cent of grape production left the region for processing.

Vitality threat

There is a real threat to the medium term viability of the industry arising from the effects of the global financial crisis of 2008 and in particular a period of grape and wine production exceeding demand. Vineyards and wine producers strapped for cash are forced to sell fruit or unlabelled wine at discounted prices to provide for necessary cash flow and this has a knock on effect of undercutting all central Otago producers. It has the possibility of undermining the world class reputation for high quality, high value wine that central Otago has developed.

The ready availability of grapes and easy access to contract wine processing helps this type of activity. There are no restrictions on the use of the central Otago appellation other than that the fruit must be of central Otago origin. Wine made from central Otago grapes can end up being marketed under any label, capitalising on the brand but without the commitment to the region or even to the industry which has been instrumental in building up the value of the brand. Finally, with falling land prices, banks do not have the asset backing they once enjoyed, further tightening the availability of credit to grape growers and wine producers in the region.

However, in the longer term central Otago wine producers can continue to enjoy the reputation that most wine regions in the world would like to have. Those early pioneers set the scene, the next group of producers built on that spirit, with quality wines and their excellent presentation, and the wine makers of central Otago have a will to continually build on and enjoy their place in the sun.

Steve Green is the co-owner of Carrick Winery in Bannockburn, central Otago, which he established in 1994. He is currently Chair of the Wine Institute of New Zealand and the Deputy Chair of New Zealand Winegrowers.



Terry Betker

Farm succession planning in Canada

A workbench approach

There is quite an emphasis placed on the importance of farms having formalised succession plans in place. There is a lot of discussion within the industry trying to understand why more farmers are not actively working on this important issue within their farm businesses. Since the early to mid 1990s there has been a considerable amount of government and industry emphasis on the importance and urgency of succession planning for farms.

Demographic trends suggested an aging farm population and this appears unchanged. A recent Canadian study, co-authored by the George Morris Center and the Royal Bank, reported that more than 120,000 farmers will reach the age of 65 in the next 10 years. More than \$50 billion in farm assets will change hands as those farmers exit the business. Yet an alarming number of farmers still do not have a formal plan in place.

Conferences and workshops with specific succession planning themes are conducted regularly. Print media frequently features articles on succession planning. Farm associations and organisations focus attention on the issue, all without any substantive change in attention to farm succession planning.

You could conclude that the issue from a farm management perspective, being virtually unchanged in the past 10 years, is no more urgent or important. However, farms are increasingly larger and more complex. This, coupled with the reality of rapid change within the industry, points to the need to gain a better understanding as to why more farms are not formalising succession plans. In addition is the need to develop and provide resources that enable and result in more planning.

Succession planning resources

There is no shortage of articles, checklists, discussion and resources on succession planning. There is information about what succession planning is and the dos and don'ts that are part of it. There is information on issues and about common elements such as –

- Family harmony and conflict
- Plan initiation
- Control and fears
- Farming and non-farming children
- Fairness and equitableness
- Tax planning, and
- Wills and other legal documents.

There is, for a significant number of farmers, some confusion between succession planning and estate planning. What is included in the two planning processes, and how they interact, needs to be clearly understood by the farm families who are starting to plan for an intergenerational transfer. Both include important elements that need to be resolved and become part of the overall plan to transition ownership and management to the next generation.

Farmers who do not have a formal plan in place cannot claim that they have not been made aware of the importance of succession planning and the availability of associated resources. On a widespread basis, government and industry have published documents designed to help farm families with their succession planning. There are resources that are made available at no cost and there are those which are fee based.

Succession planning resources, such as conferences and print materials, are still presenting the same issues that were on agendas and in documents over 10 years ago. As noted, farms are changing and there are looming issues and associated challenges in the skills of advisors and the resources that available to them, including their understanding of farm succession planning and how it pertains to the needs of present and future farm businesses.

Important questions

This then collectively begs the questions – Why do more farms not have succession plans in place and just what are the succession issues? Do we need yet another resource on succession planning? Interestingly, this is not just a farm issue. Similar issues and dynamics exist in all small to medium sized family owned and managed businesses.

The answer to the first question is why there is a second question. If succession planning issues were well understood by farmers, there would be more plans in place and with them, the likelihood that additional resources would not be required.

No plans

I had the opportunity to lead numerous succession planning workshops recently for over 200 farmers and farm family members. In virtually every instance, when asked, no family had a succession plan in place.

Typically, Mom and Dad had decided that they needed to get a plan in place. Some were starting by attending the seminar. Some had started by doing some research. Several had talked to their accountant. Some had talked to their lawyer and others had met with an investment advisor. The majority had talked within the family. They had collected a lot of great information and developed a better understanding of the tax, legal and investment issues that needed to be addressed.

But many still did not feel comfortable with where things were. Here lies the problem, and one of the main issues. Even with all the attention on succession planning, farmers generally remain unsure and confused about what succession planning is and more importantly, how to go about it.

The tax and legal issues need to be resolved in a manner most suitable to the family and beneficial to the business. While understandably each of these professional advisors tends to speak to the issues from their personal experience and area of professional expertise, farmers have difficulty in putting the discussions and information in the right order.

Most important element

From a family and farm perspective, succession planning is the single most important element is the transfer of ownership and management. It is not an event or a series of meetings with advisors. It is a process which can be thought of as business continuity planning.

A comprehensive succession plan, especially for larger and more complex farms, should articulate the strategic direction for the business. This helps to align farm management with the intergenerational transition, increasing the likelihood that the farming business remains viable and profitable. This critical piece is often overlooked by families who are working on their succession plans. If the planning does not leave a healthy business plan in place, the succession plan will fail. All businesses are built to be sold even if the sale is inter-generational. The better a business has been built the more profitable it has been, the better positioned it will be to be sold and the greater the likelihood of a successful inter-generational transfer.

Workback for succession planning

As mentioned, farmers are at best not sure what needs to get done and in what particular order when contemplating succession planning. At worst, they become frustrated and avoid the issue altogether. I regularly talk to farmers who realise that they need a succession plan, who are motivated to get a plan in place and who are, at the same time, frustrated in their attempts and questioning what they should be doing.

A large number of the available resources outline

steps within the process of developing a succession plan. What is not so readily available is a step-by-step approach which defines the process in an orderly fashion. One of the challenges in guiding farm families through succession is a lack of understanding, by the farmer, on the amount of work there is in developing a comprehensive plan and how much time it will take. This is even more of an issue for farms as they become larger and much more complex.

The first meeting

An initial meeting is needed required to –

- Involve the family
- Review expectations
- Determine timelines
- Determine who will be involved in the process
- Begin establishing relationships and open lines of communication
- Formally begin the process.

Two of the more important results of the meeting are determining the timelines associated with the succession planning process and determining who will be involved. One of the more common issues with succession planning is the length of time it takes to get the plan completed.

First, most farm families significantly underestimate the amount of time it will take to work through a comprehensive succession planning process. It is possible to meet with lawyers and make the necessary adjustments to wills and other legal documents, and to discuss with accountants appropriate strategies to manage tax issues. But a comprehensive succession planning process requires multiple meetings, and when factoring in all the other farm business management responsibilities, it takes a long time.

The second timing aspect is drift. Lack of accountability, denial, procrastination or more urgent management priorities can all result in succession planning drift. This often causes frustration within families. In some cases this can be to the point where serious conflict arises over the lack of progress, causing problems with the planning process in a negative reinforcing loop. Conflict over the lack of progress results in less attention to the planning process resulting in less progress and more conflict.

Completion date

The succession planning process as outlined in this article uses a workback schedule which is designed to help alleviate the above issues and concerns. The initial meeting should set the farm family a completion date. Once set, the planning process works back to the meeting date. The components of the planning process are identified in detail and in sequence. There are several milestone components, or components that must be completed before moving on to the next planning activity. There is variability in the amount of time required to work through each planning component.

The family is able to visualise what needs to happen, in what order and compare the planning activities against the timeline objectives. The planning process includes a lot of work that the family has to do on their own time. If there is a

Workback schedule example

Action	Sub-action	Responsible people	Start date	Complete date	Milestone event
Involvement		All			Yes
Goals		All			Yes
Values		All			Yes
Financial Performance		All			Yes
Management		All			Yes
Personalities		All			Before organising
Communication		All			Before implementing
Strategic direction		All	27 April	15 June	
	Mission vision				Yes
	SWOT analysis				Yes
	Critical issues				Yes
	KPIs				Yes
	Action Items				Yes
Communication		All		30 June	No
Business plan		All	1 June	15 August	optional
Risk assessment		All	15 July	15 August	No
Communication plan					
	Internal and external	All	15 June	15 July	No
Governance					
	Components	All	15 June	15 July	No
	Organisation structure	All	15 June	15 July	Yes
Preliminary legal review		All	15 June	15 July	Yes
Human resources					
	Job list by management area	All	15 June	15 July	Yes
	Job descriptions	All	15 July	15 August	No
	Performance review process	All	15 July	15 August	
	Roles, responsibilities and authority	All	15 July	15 August	Yes
	Training and skills programme	All	15 July	15 August	No
Estate plan elements					
	Retiring generation needs	Parents	15 August	15 September	Yes
	Fears	Parents	15 August	15 September	No
	Estate distribution	Parents	15 August	15 September	Yes
	Wills, power of attorney, executor	Parents	15 August	15 September	No
	Tax management	Parents	15 August	15 September	No
	Insurance	Parents	15 August	15 September	No
Compensation					
	Ownership, management and labour	All	15 September	1 October	Yes
	Stakeholders and entitlement	All	15 September	1 October	Yes
Deal breaker issues		All	15 September	1 October	Yes
Agreements			15 September	1 October	
	Unanimous shareholder agreement	All	15 September	1 October	Yes
	Business related agreements and contracts	All	15 September	1 October	No
Communication		All		1 October	Yes
Entities structure		All	1 October	15 October	Yes
Accountant review		All	15 October	5 November	Yes
Legal counsel review		All	15 October	5 November	Yes
Plan adjustments		All	15 November	15 December	Yes
Accountant and lawyer sign-off			15 December	15 January	Yes
Communication		All	15 January	31 January	
Plan implementation 31 January					

desire to work through the planning process as expeditiously as possible, the family has to commit to making the effort to get their homework done. If the family realises that the commitment required to meet the workback timelines cannot be met, then adjustment to the timelines can be made. Family members participating in the succession planning process will develop expectations associated with timelines. Setting unrealistic objectives for planning timelines often results in frustration and potentially conflict.

Another benefit of the workback approach is that the schedule can be sent to non-farming children who live a long way away and cannot physically be part of the process. They can see the process that is being followed. Telephone calls can talk specifically about the planning element that is currently being worked through, understanding what is being done and what the next step is.

Without the clarity of the workback schedule it is very difficult for family members who are living apart to know what is going on. One of the causes of conflict are family members not feeling part of the process or feeling like they have not had the opportunity for input. The schedule can be used effectively to avert such problems. The actual planning process can be organised into three phases – readiness assessment, plan development and plan implementation.

Readiness assessment

It is very difficult, if not impossible, to determine if a farm is actually ready for succession or inter-generational transition. Years ago the process of transitioning a farm to the next generation was well understood and relatively straightforward. But as farms have grown in size and complexity the process has become more involved.

It is generally accepted that these trends will continue, which makes it increasingly important that farms work through a readiness assessment before investing the time, money and emotional resources in developing a succession plan. There are farms that are simply not ready. It is far better to come to this realisation early on and easier for ownership and management to make the necessary adjustments before beginning to work through the process. In some instances, readiness assessment can help to divert conflict.

Readiness assessment includes both quantified and qualified assessment. The steps include –

- Setting goals – convergent and divergent goals
- Values – determining how core values are aligned
- Financial performance – determining the farm's financial capacity
- Management – determining strengths and weaknesses
- Personalities – examining personalities and behaviour
- Historical business development – documenting main business development and the management rationale.

The readiness assessment phase concludes with a communication meeting, or a meeting with all family members who have been identified as being part of the planning process to review their readiness. Put simply, it is a go or no go meeting. If the farm is generally ready, then the planning can continue. If not, then ownership and management can take the necessary steps to get it ready before proceeding.

Plan development

Data analysis is as good as the data entered and used. The same can be said for succession planning. The plan is as good as the process that is followed and the detail of activity within the process. The plan development process is quite structured. There is a risk that farm families get bogged down in the planning, resulting in situations where they circumvent steps or discontinue altogether.

The plan development phase is best used when it is represented by an external facilitator. The facilitator must manage participant commitment and involvement against expectations, timelines and desired results. The process must be kept moving, the right time needs to be spent on each step and the facilitator will know when to circle back to issues that need to be discussed and re-clarified.

Conclusion

Not knowing where or how to start working through a succession plan can be a real stumbling block for farmers. Most farmers have not worked through the process before. Farms today are significantly more complex than what they were even 10 years ago, let alone perhaps 20 or 30 years ago when the last transfer may have taken place.

The whole issue is easy to defer. Not much will happen, other than in the event of a family crisis, which in the short term will adversely affect the business if the planning is deferred a couple of weeks. However, as is often the case, it turns into a couple of months and which soon becomes another year.

It is really difficult to measure the cost of deferring planning for succession. But for most farms there is likely to be a cost at some point. The ultimate cost can be a farm that cannot be transitioned to the next generation. But it may even be more basic than that. Farmers like to farm. Generally they would rather not be involved in meetings that can include abstract thought and discussions about feelings and what they think, especially when the meeting might end up with conflict. A detailed process that aligns timelines and expectations and outlines what needs to be done and in what specific order will help farm families manoeuvre through the minefields of succession planning.



John Baker

What is it worth if you stay on the farm?

'I've spent my entire life paying off my uncles, now I will spend the rest of my life paying off my brothers.' This statement was made by a UK farmer. In reply to a question about the estate plan for the farm, the farmer's father replied that he would divide it equally among his three sons, two of whom were not currently on the farm and had not worked on the farm since they were children. Clearly the on farm heir did not feel that an equal division of assets was equitable.

The first consideration for the owner generation is to identify farm business property and personal property. For most business owners this distinction is not difficult as most business owners do not live on their business property. Farmers live in and on their business property making the distinction between the two difficult. After all, the older generation owns it all. While it may be admirable to divide family heirlooms equally among family members so as to provide each heir with a piece of family history, it is not admirable to risk the success of the succession plan by dividing the farm business assets equally.

Start early

Farm business succession planning should not begin upon the death of the owner. It must start when the owners decide they want to move the farm business to the next generation. Given that the majority of the wealth of a farm business resides in the land and as such is a non liquid asset, it is difficult to give farm assets to the successor and equalise the legacy give to non business heirs with liquid assets. If the successor has to liquefy the parents' bequests to the non business heirs, land may need to be sold to generate the need cash.

Another option is to borrow sufficient funds to equalise the bequest. Either of these strategies increase the risk faced by the successor. In the first instance, the sale of land, the farm may no longer have a large enough land base to be profitable. In the second instance the farm may not be able to service the debt or the debt may inhibit the ability of the farm to grow and prosper. If the land is divided among the heirs, the parents are forcing the successor to be in business with individuals, with whom the successor may not want to be in business.

The in-business heir

In a 2006 survey of Iowa farmers who had a farm business successor and who had an estate plan said that the distribution of farm assets meant divide them equally among all heirs without regard to whether or not the heir had worked in the farm family business. The respondents indicated that an equal distribution was the fairest way to divide the assets.

What is not considered in an equal distribution is the value that the successor, the in-business heir, has contributed to the wealth of the business.

When the asset value of farms and farm land experienced low appreciation, the division of assets equally did not present a problem in designing an estate plan that was consistent with passing the farm family business to a successor. The relatively stable asset values and the high profit margins in farming allowed the successor to purchase the assets from the non farming heirs without burdening the farm business with unmanageable debt. The value of farm assets, primarily land, remained stable from the end of World War II until the decade of the 1970s when land values began to rise rapidly. At the same time as the rise in the value of farm business assets such as the land, the profit margins in farming began to decline.

As one Iowa farmer stated, 'No farmer ever bought an acre of land as an investment. We buy it as an income producing asset for the farm business. The non farming heirs think their parents bought it as an investment.' What he meant by this is the increase in land values, in some cases 20 to 30 times its value when the parents came into possession of it, causes the non farming heirs to want their fair share. While the old saw that the expression blood is thicker than water may still be true, it is equally true that blood is not thicker than money. What is not considered by the non farming heirs is the contribution to the parents' wealth that has been made by the on farm heir, the successor.

Succession and successor effect

The contribution to the wealth of the business is made in several forms. One is the succession effect, that being when the owner or operator generation decides to have a successor and begins the process of increasing the income of the farm to support a second generation. That process may include the purchasing additional assets or adding a new enterprise. Either of these will increase the wealth of the business.

A second form of increase in wealth can be attributed to the successor effect. When the successor joins the farm business the business has an excess of labour that must be

employed. In this case the business may add assets or develop new enterprises. In either case, the wealth of the business is increased.

A third form of contribution to the wealth of the business is the wealth which is preserved by the successor providing services to the owner generation as that generation ages. In many families the successor may manage the farm business in place of the parents hiring a farm manager. The successor may also provide other services such as meal preparation, house cleaning, transportation for medical appointments, maintenance on the parent's home and other miscellaneous services. If the parents were required to pay for these services the wealth retained in the business would be decreased.

For those farmers who have a successor and are deciding how to divide assets in their estate plan there are two approaches. One is to do nothing and to divide the assets equally among all heirs. Another approach is to freeze the asset value at the time the successor enters the farm business.

Usually that value of the farm business assets are appraised when the successor enters the business and any increase in the value of the assets after that time is credited to the successor. The justification for the increase in the appreciated value being credited to the successor is that if there were no successor, the assets could have been sold and the proceeds divided equally among the heirs.

Some of the basics

Property ownership The manner in which land and other property is owned will determine how it can be transferred in the future.

Joint tenants with rights of survivorship The deceased owner's share will transfer immediately to the other owner upon the death of the first.

Life estate An interest in real property for the length of your life, but no longer. The deed will say 'to A for life, then to B.' It means that A has full rights to the rents, profits and management of the asset during their life, but upon the death of A the ownership will pass to B.

Life insurance This can provide the liquidity necessary to provide equitable treatment of nonfarm business heirs.

Business entities Business interests may be bought, gifted or earned and may be transferred through an estate plan.

General partnerships All parties participate in the management and are personally liable for the actions of all other partners.

Limited partnerships Similar to a general partnership except that some partners have limited managerial control and therefore have limited liability for the actions of the other partners.

Corporations Corporations can completely separate business liabilities from personal liabilities. The majority shareholders have managerial control and the minority shareholders have little managerial control.

Limited liability companies These include certain

attributes of partnerships and corporations and completely separate business liabilities from personal liabilities

Buy-sell agreements With the occurrence of a specified event, a buy-sell agreement require an owner or the business to buy all or part of the ownership interest of another owner. Such an agreement may be used to provide liquidity for the estate plan and by requiring the successor to purchase the assets or interests from the non business heirs.

First option to buy When used in an estate plan the successor is offered the first option to purchase the assets or interest inherited by the non business heirs. The estate plan may require the option to be exercised immediately on the death of the owner or may specify a later date.

First right of refusal A first right of refusal requires the seller to offer the for sale asset to someone before it can be sold to another.

Trusts A legal entity that holds and manages property for the benefit of a known or discernable beneficiary.

Gifts Gifts made during the lives of the owners may be made to transfer assets to the successor.

Equal distribution of assets The most common form to inheritance and one that potentially creates the most problems for the successor. Land is usually left in undivided common interests to all heirs or the land may be sold and the proceeds divided equally among all heirs.

Unequal bequest of essential business property Short and intermediate assets such as machinery, equipment, livestock facilities, grain storage and tools may need to be passed to the successor in order to keep the farm business profitable. Such distributions are made without respect to equal distribution.

Lease arrangements When the farm owners reach retirement, either planned or due to age and infirmity, a lease of farmland at below market value helps the purchase of the owners' interest in short or intermediate term assets.

Valuing the successor's contribution

Often the increase in net worth of the owners' original farmland is attributable to the increase in value of farmland. Because the successor made no contribution to the increase in wealth it is fair that that the value be divided equally amongst the heirs. However other business assets may have increased in value because of the contribution of the successor and additional farmland may have been purchased because due to the successor or succession effect.

A portion of the increase in value from the purchase of the additional farmland credited to the successor as such purchase would not have been made had there been no successor. It is the owners' responsibility to calculate how much of the value of the additional land should accrue to the successor.

Contract sales

When the owner generation withdraws labour and management from the farm business their need to own physical assets diminishes but there remains the need for an income stream. The owner generation may decide to sell land and other

assets via a contract sale. By using a contract sake the interest as well as the principle is paid directly to the owner generation. The successor has the right to possess and use the land and the senior generation receives a stream of income.

An additional benefit is that the ownership of the land passes to the successor and the senior generation may leave the contract payments to the business heirs. Lastly, in the event of a material change in circumstance, the senior generation may forego a payment during difficult economic time and the successor may be able to make additional payment during propitious times.

Farm management compensation

It is not uncommon for the successor generation to provide business management services and to provide personal care for aging parents. These are services which the parents would have to purchase at fair market value if it were not for the presence of the successor. Depending on the longevity of the older generation the provision of such services can last for years or even decades and the aggregated value can be rather large.

The table below lists some of the services the successor may provide and the annual value based upon local rates can be calculated. Other services may be needed that can be added to the list and appropriate compensation calculated for each. The spreadsheet is not meant to be a formula but is a tool so that a discussion can be held on the value of these services along with when and how they will be compensated.

Successor's contribution	Value per hour	Hours per week	Weeks per year	Yearly Value
Personal care				
Cooking				
Cleaning – washing dishes, vacuuming, dusting, cleaning bathroom				
Laundry				
Bathing, dressing, grooming				
Transportation to for groceries etc.				
Pickup and delivery of pills and other supplies				
Other				
Total personal care				
Farm maintenance				
Farm management				
Personal financial advisor				
Bookkeeping				
Farm labour				
Mechanics				
Lawn mowing and ground keeping				
Other				
Total farm maintenance				
TOTAL				

Hopefully the family will be able to use the plan to generate a number that can be the beginning of discussions on the equitable distribution of the owner's assets.

Summary

Successful farm family business succession plans provide for the transfer of money, management and assets to the succeeding generation and should be implemented over a set period of time beginning when the successor joins the business. Short and intermediate term operating assets should be transferred to the successor during the life of the owning generation. Those assets generate sufficient income to support the successor's family and provide for income for the owner generation during their retirement.

As the ownership of these assets is transferred to the successor, the management of those assets must accompany the transfer so that the successor is responsible for management. With the increase in the contribution of the successor the compensation of the successor should also increase.

The owner generation must distinguish between personal assets that may be divided equally among all heirs regardless of their contribution to the farm family business, and farm business assets. Often the owners decide that the fairest way of dividing their assets, both personal and business is to divide them equally among heirs. Such a division does not account for the contribution of the successor to the wealth accumulated by the owners.

The way farm assets are owned plays an import and sometimes limiting role in how those assets may be transferred. Common ownership of assets allows them to be passed to anyone in an estate plan while joint ownership with rights of survival causes to ownership to pass to the remaining joint owners. The selection of a business entity as a part of an estate plan should be carefully considered. All business entities change ownership and limit management and control. This may not be compatible with other succession planning considerations such as transfer of management and income.

Buy-sell agreements, options and right of first refusal provide the opportunity for the successor to acquire the farm business assets. The funding of these agreements is sometimes difficult and may result in the farm amassing unmanageable debt or require the sale of assets to purchase other assets.

Favourable lease terms allow the successor to use the money generated from the lower lease price to purchase business assets. Contract sales can be similarly used to help the purchase of farm assets.

The successor should be compensated at the fair market value for the services when such services are provided. As an alternative, the owners may wish to provide in their estate plan for a larger portion of the assets to pass to the successor as a form of deferred compensation.

The Greek philosopher Aristotle stated, "The worst form of inequality is to try to make unequal things equal." This is true in mathematics and farm business succession planning.

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Mandi McLeod

Family business continuance – a global perspective

The term succession is usually used in the narrowest sense of asset transfer between generations. Little attention is paid to management succession in the case of a family farm business or succession of board members at a board and governance level. The findings of a farm transfers survey in the US show that financial decisions are most likely to be made by the farm operator without any help from the successor. The data also shows that if successors are going to be solely responsible for a decision, that decision would probably involve livestock management and the selection, recruitment and supervision of employees.

With agriculture contributing approximately 15 per cent of GDP, New Zealand's aging agricultural population is of concern, not only in terms of food production but in agricultural leadership as well. The majority of agricultural leaders are derived from a practical farmer base who have an estimated current average age of 65 years old. These farmers have developed skills with their active involvement in industry organisations such as Federated Farmers and the Dairy Board.

Traditionally, New Zealand has had a relatively self-replacing dairy industry via sharemilking which allowed new entrants the opportunity to build up a herd of cows and develop crucial business skills before buying their first farm. While this has produced a ready market of first farm buyers, most dairy farmers still aim to hand on the family farm to family members.

The sheep and beef industry has a more traditional approach to succession. Family members take over the family farm, or if the property and assets are sold the proceeds divided equally between family members.

Changes to the entry cost of farming relative to income has altered the perception of farming. It is now not seen as an easy option for those who saw themselves as academically challenged or production orientated but a business with increasing regulations and decreasing profit margins requiring a business management focus.

Being sustainable

In 2011 the global face of production agriculture is gaining more than wrinkles as we try to conduct our businesses within the four Ss of agriculture – sustainability, security, succession and subsidies which are all professed to be of paramount importance.

Sustainability is defined as –

- Producing enough high quality food to feed a population

of nine billion

- Using technology not yet invented that will decrease the carbon footprint from agriculture and improve the environment
- Is animal welfare focused
- Has minimal reliance on fossil fuels
- Is a farm business that is capable of being transferred to a succeeding generation.

There is a social reason for ensuring that the quality of the rural environment, including historically significant features, are maintained or enhanced and that consumers have access to locally produced food. Food miles appear to be soon made redundant by an increase in awareness of the total energy cost of consumer-available food, irrespective of where in the world it is produced. This new approach will take into consideration geographically disparate countries who have the ability to use natural resources to produce food at a lower on-farm energy cost than those geographically closer to markets but less energy-efficient production systems.

Increasing demand

In the past 50 years the demand for water has increased three fold and is expected to be the single largest threat to global food production in the next 10 years. By 2050, the 500 million people who live in countries chronically short of water will increase to more than four billion as the global population increase trends towards 9.2 billion. Changes to the climate will result in an increase of 40 to 170 million undernourished people worldwide. Energy, the single most important reason for food price rises in recent years, has had insufficient lack of investment in new oil production to prevent this from becoming even scarcer in the future.

The World Bank projects that by 2030 worldwide demand for food will increase by 50 per cent and for meat by 85 per cent. Availability of credit continues to be a threat to

growth as the uncertainty over property values is enmeshed with equity and affects lending criteria. The reaction of banking institutions to the financial crisis has resulted in the destruction of many relationships between bank managers and clients. The apparently overnight decisions to place some farming enterprises into receivership, alterations to interest rates or in some instances the up-lifting of herds, has possibly irrevocably damaged the respect between the farming community and financial institutions.

The inflexible fiscal attitude taken by many banking institutions adversely affects the viability of many farm businesses. This is seen by the increase in number of New Zealand farm business placed into receivership. Fewer farm businesses results in fewer succession opportunities, a higher concentration of farms owned by fewer and older hands which places sustainability of the business under question.

Food security

Is food security just a red herring? There is currently enough food produced in the world to meet the nutritional requirements of all people. UK research shows that about a third of food purchased by consumers is wasted. Food distribution and the ability of the planet to support an ever increasing population is more of an issue than the amount of food produced. With the increase in water scarcity and the effect of disease in many African countries, the number of adults and the amount of viable land available to produce food is disproportionately affected.

Energy scarcity and climate change will also have significant effects on global food production and distribution. Production is moving to those countries with the natural resources sanctioned for exploitation in the interests of food production. Some of these countries may find themselves in the position of having their resources exploited by countries with food security concerns. With increased competition for productive farm land from international buyers with greater buying power pushing land prices higher, family farm succession may become more dream than reality.

Subsidies are the backbone of European agriculture and appear to be designed to create a level playing field for those in the EU. They could also be viewed as guardian grants to ensure that aesthetically the landscape does not change and that environment and animal welfare practices are acceptable to consumers. It is apparent that some of the basis for subsidies is to ensure that a population of regional food producers is retained to prevent reliance on agricultural imports and the vulnerability that this could bring in the event of another war or similar crisis.

It is true that there are those farmers who are farming subsidies. Equally and more importantly there are those who are frustrated with the rules and regulations and want to get on with the task of producing good quality food in an efficient, sustainable and profitable manner. It is also a sad reality that when one crop is subsidised, other crops are not developed – often at the expense of food production.

The recent push for corn to be grown for ethanol production and the flow-on effects for animal feeds is one

example of how subsidies can have a detrimental effect on other food producing industries. Another possibly more invidious nature of subsidised local agricultural production is the effect on developing countries. For example, sugar subsidies benefit sugar beet producers in Europe to the detriment of sugar cane producers in Africa. Milk subsidies in the US and EU affect the milk price in both New Zealand and Australia.

Ageing is a succession problem

Subsidies can now be seen as disempowering and a disincentive for agricultural production innovation – a potential Armageddon of agriculture? In terms of succession the ageing agricultural population is as big an issue in Australasia as it is in the UK and US. The price of land and non-subsidy farm returns make the challenge for the next generation extremely difficult.

Those farmers who do succeed in taking over the family farm can be frustrated by the regulations that appear to practically force subsistence farming in the name of sustainability and fairness. On the flip side there are non-farming opportunities for increasing incomes through farm shops, barn conversions into office and retail space and subsidy chasing. Despite a large number of young Americans wanting to get into farming, much more of the instant generation are put off by the long hours and low incomes. While some of these issues could be resolved by more of the land and business owning generation making the commitment to having a successor, the question of who will feed the next generation is as problematic as ever.

Success for all

The issues surrounding succession are further compounded by a lack of knowledge and awareness of the processes involved in moving a family farm business beyond the current generation, such that both the family and the business succeeds. For the family business to continue through successive generations, the following are vital –

- Determination by the parents that they are ready for a partner in the business and that the identified successor is committed to farming and what it may take to follow the strategic direction required by the business to grow
- That the successor has the necessary management and business capability or that they are willing to learn and manage a team with the appropriate skills
- Effective and responsible communication to ensure that there are no unmet or unrealistic expectations between family members and staff
- Knowledge that the business is viable or that it can be viable and what it may take to achieve this followed by an acceptance that this is what is desired.
- Using an independent professional facilitator who is skilled in effective, responsible communication and conflict resolution management who can guide the family through identification of issues and develop a business continuance plan that meets the needs, wants and expectations
- Professional approach to the business management aspects

- to ensure that the business is ideally placed to prosper
- Knowledge and understanding of the businesses position globally and taking ownership of this knowledge

What makes a difference between success and failure is for the manager of the business to adopt a culture change from production to management.

Vision needed

Involvement in the development and implementation of family farm succession programmes, has impressed upon me that succession is not the just the domain of lawyers, accountants or financial planners. The family needs to have a vision for the future of the business on which the plan is based.

Families are complex, consisting of individuals linked through a common lineage, sometimes with little more in common than the blood that binds them. It is these individuals that form the heart and soul of a family farm, ensuring its ultimate success or failure. Yet it is these same people that are forgotten in a traditional succession planning model, developed around tax-effective mechanisms for reallocation of assets when the parents decease.

New order business continuance and succession plans need to take into account the three major elements of the family business – the individual family members, the management of the business, and the owners of the assets that are operated by the business. Each plan must be produced based on a vision for the future that allows the family business to be capable of being transferred to successive generations as a viable operation.

For this to happen, each family business needs to understand where their business fits into the global market place and look for opportunities to increase performance. Only when the importance of business management and allocation of resources for production is fully understood, and accepted as the main asset and resource in family businesses, will succession be successful.

Summary

What this distils down to is the onus being put on the producers of food to achieve mission impossible. This is to increase food production but also reduce the carbon footprint irrespective of what this really means and how it is measured. It also involves reducing our reliance on fossil fuel despite having no viable alternatives, reducing our effect on the environment, using less water and of course doing it cheaper. All of which is to be achieved within the context of an ageing farming population and an unsexy image of agriculture as a career choice or business investment opportunity.

There are always going to be tensions between the conflicting views on land use. Protecting the environment versus production agriculture will require debate to ensure that there is an appropriate balance. It seems that the debate between the radicals gets the most press and extreme reactions. The voice of reason is lost in the conversation and will be to the detriment of agriculture and society at large if it does not get louder.

Whinging farmers and farmer lobby groups must become more professional and proactive in their approach. Otherwise they will be reduced to farming in a metaphorical strait-jacket imposed by their antagonists, the food as hobby groups, the extreme animal rights activists and the environmental fundamentalists. Most businesses use professional advisors to help them in their planning. Agricultural businesses should be no different. Professional planners can help farm businesses to shift the emphasis from production to productivity and attain sustainable, viable operations which can be generationally transferred.

Close collaboration needed

Currently supermarkets in the EU and Australasia have a major influence on what food is produced, how it is produced and what price they will pay for it to ensure that they have a ready supply of cheap food. But who is it cheap for? The call for greater co-operation and collaboration between farming businesses and a closer relationship between farmers and consumers is required to redress the power supermarkets have on the economics and the future of food production.

With increasing challenges in viable farm business succession and the threat of farmers becoming an endangered species, the question of who will produce the food must also be addressed. The relative importance of the family farm to international agriculture is in real danger of being underestimated as the drive to push production increases. It is apparent that the affluent world wants an environmentally enhancing food production system. But there is a general lack of understanding as to what this actually is and what implications this may have of the quality, quantity, variety and ultimately the price of food.

There is also little appreciation of what is involved in food production at the farmer end of the equation. How much of the total energy is required to produce consumer-ready food is generated on-farm relative to processing and packaging the food to meet consumer demands?

Viable sustainable business

With all this in mind, it is the continuance of viable and sustainable agricultural businesses that is the biggest issue facing food production. However, despite the complexities surrounding its production the global demand for food cannot be ignored, nor can the fact that most of the world's food is currently produced by family farms. As a global agricultural community, we must recognise these pressures, mitigate or minimise their effects and continue to push for society that appropriately rewards producers for the risks and efforts involved in the production of high quality food within sustainable parameters.

Farmers must also take responsibility for and acceptance of the fact that they are in business. As such they are responsible for the future of the business and the development of business continuance and succession plans. It is only then that farming will be taken seriously as a career and business worthy of respect.

Mandi Mcleod works as a farm business planning specialist for System Insights Ltd

Hugh Eaton

A New Zealand farm irrigation development

Meridian Energy Ltd bought the Francis Farm located near Duntroun in the Waitaki Valley, Otago, in 2003. It was part of Project Aqua a proposed hydroelectric development to take water out of the Waitaki River, down a wide canal and through a series of low level power stations before returning it to the river. The project was eventually abandoned because resource consents were not granted. A total of 25 properties owned by Meridian in the Waitaki and other parts of New Zealand, totalling over 7,000 hectares, were passed to our firm to supervise.

The farm was badly run down but had a planning consent to take irrigation water. I put a proposal to Meridian to develop the farm to a high standard for dairy support to run replacement dairy stock and wintering dry cows. The development cost \$2.55 million and resulted in a highly productive irrigated farm with an enhanced market value, generating a good annual income.

Challenges included managing the project within budget, installing an irrigation system to fit the topography, resource consent issues, environmental concerns and Maori cultural issues. It was carried out under close scrutiny from the local community which had been strongly divided by Project Aqua, the original hydro-electric development.

The opportunity

The farm is 222 hectares of low terrace and river flats with the Waitaki River on one boundary. It had been run in conjunction with a larger hill farm and was in a run down state with no buildings, poor pasture and heavily infested with gorse. Part of the land could be flood irrigated from streams but the water races and levies were mainly derelict. Only about 155 hectares could be farmed effectively. The balance was either wetland or covered in gorse, broom and willow.

The farm has a proportion of good soils with flat contour. The annual rainfall is only 500 mm a year but there are two consents to take water for irrigation totalling 144 litres a second from a pond and streams. At a rate of 0.42 litres per second per hectare or 25mm a week, this volume could irrigate 340 hectares using a modern spray irrigation system, more than the total farm area.

The opportunity was to take 155 hectares and transform it into productive pastoral farmland under efficient irrigation. Having a large corporate farm owner meant capital was

available if it could be justified by a business case. The full development involved installing a new irrigation system. With that came clearing gorse, levelling the old flood irrigation structures, taking out scattered old pine trees, pasture renewal, lane construction, fencing and stock water. We also built a new house, implement shed and cattle yards.

Pasture production could be increased from between one and five tonnes a hectare on the undeveloped unirrigated land to between 10 and 15 tonnes a hectare under spray irrigation, depending on soil type. I presented a formal business case to Meridian and funding was approved in November 2007

The irrigation development

The development involved a drastic change to the landscape and the whole layout of the farm. Designs and quotes were requested with the first choice being centre-pivot irrigators.

The design needed to achieve –

- Efficient use of the available irrigation water in terms of power consumption, distribution, application to the land and retention in the root zone. It needed to apply sufficient water to optimise pasture growth on different soil types.
- Ease of management, needing to be simple to use by a tenant, require little labour and to fit the constraints of the farm geography.
- Acceptable cost with a competitive design and give an acceptable return on capital.

The old flood irrigation achieved none of these. In its favour the neglect of the farm was allowing regeneration of native grasses along stream margins and minimising environmental effect by default. However, herds of dry dairy cows had been grazed in winter on kale crops adjoining unfenced streams resulting in water pollution with dung and mud.

Borderdyke irrigation

The old borderdyke system dammed a stream to raise the water level. This flowed into head races, originally with dams and sills installed for automatic irrigation. Under this system a gate is installed at each dam to water groups of three paddocks. A clock drops the gate to block the water which backs up and flows over the sills till the next gate upstream drops. The water flows over each sill and down a strip between two levies.

Each strip is typically 12 metres apart and can be hundreds of metres long. Modern borderdyke systems have laser levelled sills and strips with high volume headraces. A head race of 230 litres per second might allow 20 to 30 hectares to be irrigated in 24 hours. Laser levelling of sills and border strips, along with higher volume head races, can make this more efficient.

However the system generally applies 75 mm to 100 mm of water in under an hour. The light soils irrigated by border dykes are often free stony alluvial types. The result can be run-off if timing is poor and nutrients will leach into ground water.

Irrigation efficiency

Work at Winchmore Irrigation Research Station in 2002 showed flood irrigation efficiency at between 38 per cent and 90 per cent depending on flow, levelling and length. Landcare Research carried out a soil survey of the farm by showed parallel bands of recent alluvial soils deposited by the Waitaki River –

- Very light stony gravels beside the river with an average profile of available water of only 25 mm
- Young silt soils through the middle with profile of available water of 40 mm
- A strip of heavy silts with a high water table along the south boundary with an average profile of available

water 70 mm.

- A terrace of stony silt soils over compacted gravels with a profile of available water of 130 mm.

The irrigation designs and quotes were audited by Aqualinc. They recommended a plan with four centre pivots. This plan gave 130 hectares of pasture under pivots. The remaining corners totalling 48 hectares were to be watered by manually moved K-line sprinklers. With the remaining 10 hectares of non-irrigated land this made a total of 188 hectares or 85 per cent of the total 222 hectares. The balance consists of river bed, a Waitaki River margin strip to prevent irrigation along with streams and wetlands retired for conservation.

The pivots were audited at 0.5 litres per second per hectare, slightly less than the average summer evapotranspiration of five to six millimetres a day. We were able to use one consent for 110 litres per second averaging 0.58 per second per hectare giving ample water to maintain soil moisture for a dairy support system. The second consent of 34 litres per second could be transferred to another Meridian farm.

Future modifications to the system could include variable rate irrigation equipment on the pivots to automatically adjust the depth of water applied according to soil type. This would justify computerised soil moisture monitoring equipment such as Aquaflex.

The cost

The eventual cost of the development was significantly higher than the original conservative budget figures drafted as early as 2005. However individual components are typical of other developments carried out by our clients.

The project has special features not normally included in a commercial farm development. For example the areas retired for conservation will contribute towards a total of 70 hectares of wetland required for the resource consent for a



Mel Francis Farm Duntroon with 188 hectares of effective pasture area

Item	Total cost	Total cost per hectare	Notes	Typical cost	Typical cost per hectare
Consents	\$30,596	\$163	Environment Canterbury transfer point of take etc	\$10,000	\$53
Clearing and earthworks	\$327,654	\$1,743	Demolish border dykes, remove gorse and trees, clear and level	\$120,000	\$638
Spray irrigation	\$803,983	\$4,277	Four pivots plus K-line. Pumped from a pond 200 metres from Waitaki river	\$800,000	\$4,255
Electricity reticulation	\$233,015	\$1,239	500 metres 3-phase, house supply, shared supply to pivot, pivot cables and installation	\$200,000	\$1,064
Stock water	\$118,822	\$632	Two pumps, ring main and troughs, dairy standard	\$100,000	\$532
Fencing	\$161,448	\$859	24 kilometres of three and four wire stayed and sprung electric fence to suit pivots, 20 hectares of streams and wetlands fenced	\$120,000	\$638
Lanes and feed pad	\$99,973	\$532	2.6 km by 9 m by 300 mm with lanes excavated and compacted, gravel from property, dairy standard without capping.	\$75,000	\$399
House	\$345,790	\$1,839	Benchmark homes, 230 square metres, four bedroom, Oamaru stone, lawns and septic tank	\$345,000	\$1,835
Cattle yards	\$50,794	\$270	Te Pari Cattlemaster SY120, concreted race	\$50,000	\$266
Implement shed	\$36,558	\$194	Four bay, one enclosed with concrete floor 20 metres by 9 metres	\$36,000	\$191
Re-vegetation and shelter	\$25,838	\$135	House garden, whole farm landscape plan	\$5,000	\$27
Pasture improvement	\$152,835	\$813	Full spray, cultivation and sow down	\$152,000	\$809
Lime and fertiliser	\$75,885	\$404	Capital lime and fertiliser, part at peak fertiliser prices	\$75,000	\$399
Project management	\$61,376	\$326	Engineers, surveyors, auditing, supervision and control	\$25,000	\$133
Other	\$28,883	\$154		\$0	\$0
Total	\$2,552,995	\$13,582		\$2,113,000	\$11,239

new hydro electric development on the north bank.

Retiring land at least four metres back from the water's edge required another six or seven kilometres of fence costing \$40,000. For conservation and cultural reasons we decided to move the point of take of the irrigation water up to an existing pond excavated in the river gravels many years ago. This was granted after nearly two year's debate.

Earthworks seemed endless with particular delays in removing willows to allow the passage of the pivot towers. Electricity reticulation required three connection points. Lanes and the stock water reticulation system were built to a high standard and would allow eventual conversion to a dairy farm if appropriate. The lane is metres wide, fenced to eight metres, with at least 300 mm of gravel base. The house is an attractive three bedroom home of an appropriate standard for the present scale and land use.

Economics

The economic return from the development is in two parts – the gain in the market value of the property and the increase in annual cash income. Conservatively the value of the developed farm is \$5.87 million or \$31,000 a hectare for the 188 hectares of effective grazing area. In its rundown condition before development the value at the same date would have been in the order of \$2.2 million or \$12,000 a hectare.

With the current shortage of finance available from banks and the economic downturn, few farms have been selling and there are few comparable sales. In my opinion the irrigation water consents are undervalued in the Waitaki Valley. For example piped water from the Ashburton Lyndhurst scheme is worth up to \$12,000 a litre per second. This farm now has a surplus consent to take 34 litres a second of surface water at no cost and with no annual volume restriction. In mid Canterbury this could be worth over \$400,000 to partially offset the development cost to a more efficient irrigation system. Local farm sales reflect the higher cost and annual charges of the North Otago Irrigation Company piped water but do not add a significant premium for consents like this.

The estimated increase in market value from the development is \$3.67 million compared to an actual cost of \$2.55 million. The capital gain from the development is \$1.1 million.

Income gain

There has also been a significant gain in annual income. Before development the farm was managed in association with a Meridian owned dairy farm, harvesting surplus pasture for silage in summer and grazing dry dairy cows on pasture and kale crops in winter. A total of 700 cows and 160 heifers were grazed for six weeks in winter on 50 hectares of kale and 60 hectares of poor pasture were harvested for silage. The annual return on capital was 1.5 per cent. We designed a dairy

support farming system to be run by an employed manager. At the time of the business case in late 2007 the farm would have returned four per cent of the value at that time.

Under the current ownership we prefer to lease properties rather than employ staff and buy livestock, so the farm is leased. The total rent is \$149,800 including the best land under pivot irrigation at \$900 a hectare each year. The terms of the lease require the tenant to pay all rates, insurance, fees and working expenses. The intention is that the property is returned at the end of the term of the lease in the same condition as at the beginning.

The return on capital has risen by one per cent to 2.5 per cent. Historic farm rents have been in the order of 3.5 per cent to four per cent of market value but have declined in recent years because of static farm profitability and rising farm values.

The gain attributed to the development is approximately 4.6 per cent. If the surplus irrigation consent could be sold for even half the mid Canterbury value, then the marginal return on the capital invested in the development rises to five per cent.

Improvement expected

A typical average cost of farm capital at present is around 6.5 per cent. The cash return is therefore less than the cost of capital. This will be improved by the next rent review and could be improved further by farming rather than leasing the property. The cost of irrigation in the South Island has pushed land use away from sheep and cattle towards more profitable farm systems such as intensive cropping and dairying. Leasing this farm for dairy support is a conscious decision by the owners fitting their wider business plans.

There is a debate about high land values, poor farming returns and the resulting low return on capital. Farmers typically rely on long term capital gain to provide a competitive return on the capital invested in their farming assets.

Project management

I was told at a recent project management seminar that only about 35 per cent of projects in New Zealand are completed on time, to specification and to budget. It made me marginally happier about the cost over-runs on this project.

I quickly learned that my job was principally to annoy people and bully them into doing what I wanted. Rob Verkerk talks about the project management triangle of scope, time and budget. A change in any one will affect the others, for example scope creep will affect the cost and the delivery time.

Plan well

Reporting to the land manager at Meridian made the chain of command simple. I had my project, other people



wanting a say had to go to Meridian. Ngai Tahu and the local community had an interest. The tenant wanted a number of improvements. Contractors continually had bright ideas about ways to spend more money and why they could not finish the job on time.

If the cost of preparing a business case is covered then the manager can go into detail with formal quotes for each stage. A company like Meridian has the resources to take on any appropriate project which can be justified, but it does not like surprises. Any departures from the plan should have written authority in advance.

The house, pivots, cultivation and stock water all had firm quotes. Slippage came in earthworks, electricity reticulation and fencing. These were partly due to changes in the scope but also simple under estimates that would have been corrected by a firm quote from the contractor.

The farm is 200 km from my base so I could be there weekly but not daily. The lessee Richard Metcalf was a great help day by day and had a vested interest in seeing the job done properly.

On this experience I would –

- Define the task and identify the client
- Quantify the cost and get firm quotes covering exchange rate risks
- Get approval from the client for the business case and all variations
- Focus on completing the project on time, to specification and within budget
- Be on site during main phases, daily if necessary.

Environmental issues

The farm development had to allow for the environmental sensitivity of the site and the sensitivities of the owners. The company has a strong interest in environmental issues but even its renewable energy projects involving hydro and wind power can attract criticism.

The Francis farm has a boundary with the Waitaki River which is a large braided river with flows ranging from below 100 cubic metres a second up to floods of over 1,500 cubic metres a second. The farm has free draining alluvial soils and is cut by spring fed streams and wetlands. The environmental issues are –

- Run-off carrying soil, dung and urine into streams and the river
- Leaching of nutrients into groundwater
- Depletion of the streams by pumping irrigation water
- Destruction of native vegetation regenerating in wetland areas.

Fencing wetlands

We commissioned an environmental survey and a detailed re-vegetation plan from Boffa Miskell. The estimated cost of full re-vegetation and maintenance of the wetlands was \$977,000. This is unreasonable for a farmer and unlikely to be approved by Meridian but we have adopted the principles.

All wetlands have been fenced at least four metres back from the water's edge to provide a filter for run off and

exclude grazing stock. Low native shrubs will be planted to protect the heads of the streams. Fence lines will be planted to provide shelter for livestock, biodiversity and linking vegetation corridors. Parts of the Waitaki River bank have been fenced over 100 metres back from the bank to provide a marginal buffer zone. Environment Canterbury has planted poplar poles in this zone for erosion control.

The farm was developed to be run as a dairy support farm not a milking dairy farm. Nutrient loading should be less and there is no dairy shed effluent. However we will need to be aware of possible nutrient losses and soil damage from grazing large mobs of dairy cattle on kale crops in winter.

The irrigation system was designed and audited to apply only the required rate and volume of water that the soil can absorb without runoff or leaching. The irrigation consent for 110 litres a second could be taken from either of two streams, one flowing within a hundred metres of the site. The previous owner and a neighbour had shared the take for flood irrigation. By pumping the full consent continuously there was a risk of depleting the stream, competing with the neighbours and reducing its viability. We now have approval to move this consent to a landlocked pond. The trade-off is that we may need to develop an adjoining gallery to get the flow we need.

Cultural issues

Immediately across the road is a limestone cliff with an overhang at the base used for hundreds of years by Waitaha and Ngai Tahu people for shelter. The overhang has a series of drawings and is linked to rock art sites throughout south Canterbury and north Otago. Local Maori still have a strong interest in maintaining water quality to preserve sources of traditional food such as eels and whitebait.

This Maori cultural link has been a real incentive to preserve the streams and to restore as much native vegetation as possible along waterways. My plans to dig a trench to bury a power cable would have needed consultation with Ngai Tahu and the Historic Places Trust and an archaeologist present at all times. Instead I arranged to share an existing line with a neighbour well away from the site.

Conclusions

The commercial components of the development were typical of South Island irrigation costs. The development was a success financially in terms of a possible capital gain of \$1.1 million. It is generating a return on the marginal capital of 4.6 per cent to five per cent depending on the value of the water released by efficiency gains. The return could be improved by farming rather than leasing the property.

Other gains have been in using less water to irrigate more land and minimising loss of nutrients by leaching. The streams and wetlands have been retired and will be gradually restored with native grasses and shrubs.

Hugh Eaton is a Registered Farm Management Consultant for Macfarlane Rural Business Ltd, Ashburton

Luis and Maru Peluffo

Adapting New Zealand quality in dairy farming to Argentinian farms

I began reading From Grass to Milk by C P McMeekan in 1966 and followed this with the different editions of Milk Production from Pasture by Colin Holmes. My first visit to New Zealand was in 1992, guided by dairy farmer Jock Campbell, and this visit convinced me that here was the quality of living we dreamed of for ourselves and our staff.

We have been working with the help of many friends including Professor Colin Holmes, Barbara and Louis Kuriger, Nicola Shadbolt, Shane Maxwell, Kevin McDonald, Ross Wrenn and other farmers and consultants. As a team we feel we could now manage a dairy farm somewhere in New Zealand.

Farming in Argentina

Much more difficult has been adapting that same way of farming in Argentina. Unfortunately Argentina is placed 109 out of 180 countries in the international corruption rankings. This means that in Argentina there is a lack of faith in almost everything. As a matter of interest New Zealand is currently number one as the least corrupt country in the world.

Farm cooperatives are one example which generally fail in Argentina. Typically they are managed by a good contract manager along with a not very well prepared and unpaid farmers' council. As a result they either go bankrupt or are managed for the benefit of the manager's personal aspirations and a small number of their associates.

A further problem is money, or the lack of its availability. Loans from banks are not available for anyone who really knows how to farm. To get any kind of a loan you need at least twice the equity of the amount of money being borrowed, which is naturally very limiting.

It is in this social and political environment that we have tried to adopt the New Zealand dairy system, but in a country where ryegrass and white clover will not survive unless you irrigate well. However over 10 years we have successfully gone from four dairy farms with 2,400 cows in milk to 10 dairy farms with 6,500 cows, most of them managed by sharemilkers.

How it was done

How did we achieve this growth? First we upgraded our sheds to the same standard we saw in New Zealand. This allowed us to be able to milk comfortably in under two-and-a-half hours in the morning and two hours in the afternoon. We then upgraded the living facilities for sharemilkers and staff to the standard we would like for ourselves, with television and

internet included. Then we changed our milking schedules from a very early 3.00 am start to a more respectable 6.00 am and kept to this. At the end of the season we can go to once a day milking for the last two months.

We have been using New Zealand genetics since 1986 so that we have herds which could benefit from the seasonal changes. We began with summer and autumn calving as on our farms it is only possible to produce milk from pasture in the second half of the cow production cycle, spring time. Most of our farms are now summer and autumn calving, although some of them are autumn and winter calving to allow a second opportunity for the cows to be in calf.

Instead of the typical milk routine that our advisers thrive on – wash teats, dry teats, take first skirts, put cups on, milking, take cups off and teat dip – we changed to just putting the cups on, milking, taking the cups off and the teat dip. That means that we can now milk 850 cows in a 44 bail shed in under two and a half hours using just four people.

Pleasant work

We use a portable milk bar and 50 by 50 metre pens for every 20 heifer calves as in New Zealand, or in individual cages for 60 days. This is much less work and is much more pleasant to see than the usual method used in Argentina of each calf being tied to a stick with two buckets.

Male calves are given away when they are born. Heifers are bred at 13 to 15 months old and calve at two years old. This means there are only three herds on the farm – heifer calves, heifers in AI or pregnant, and cows in milk. It is profitable to milk the cows 305 days and our staff then have the opportunity for a good rest and holidays at the end of the season when only 15 to 20 per cent of the cows are in milk.

With these methods we find that the right people to

manage the farms are mainly young couples who are vets or have degrees in agricultural science and are just out of university with a strong feeling for living on a farm and dairying. They are offered a year training as milkers and then offered a sharemilker contract with the freedom to manage the farm, with the possibility of buying cows with their savings. They receive a monthly salary and a small share of the milk cheque less feed costs other than grass. We divide the net profit evenly with them at the end of the season.

The farms have one worker for every 100 cows, so an 850 cow farm normally has about eight staff including sharemilkers, with a trainee helping in the first four to six months of the season. Normally in Argentina the average dairy farm has a worker for every 50 cows. Our system allows us to pay double the normal wages and so we have no trouble keeping staff. Last, but not least, we practice and try to teach all the team, that everyone around us deserves to be well treated as no-one is better than anyone else.

Land value, costs and production

The family farm is in the best part of the West Buenos Aires and North La Pampa Province where most of the new big dairies have been built. The area has an average rainfall of 700 to 850 mm, with between 40 and 60 frosts a year and summer temperatures averaging 20°C to 21°C.

Soils are sandy and free draining with low water retention and with up to three per cent organic matter in the first 20 cm and most of them with an Olsen P of 25. Pastures can produce five to seven tonnes of usable dry matter a year when we grow fescue, white clover and lucerne which may last three to five years. Oats and rye are the winter annuals, with maize and sorghum for summer use and silage. The value of land without dairy conversion is around US\$6,000 a hectare

We have also been farming two rented properties since 2004, at Pergamino, which have some of the best land and climate in the country. Rain averages 980 mm although in 2006 we had 683 mm and in 2008 only 590 mm. Median summer temperatures are 22°C to 23°C and there are between 20 and 25 frosts a year. Pastures produce between six and nine tonnes of usable dry matter per hectare each year. The value of land without dairy conversion is US\$15,000 a hectare.

Our feeding system

We feed the cows only grass when –

- It is growing more than 30 kg of dry matter a day
- Cows can manage to eat over three per cent of their body weight every day

In the average year this situation may last for about 50 days a year, in spring and autumn. We usually have a summer drought but we also have a dry winter. What is crucial is that in many years in September and October we do not get enough rain so we have a short spring. The magic day,

when grass grows more than the needs of the cows in our west Buenos Aires farms stocked with 21 cows per hectare, is usually not before November.

Many times a year we face the situation that if we wait until grass has enough volume for the cows to harvest over three per cent of body weight a day, the quality has already fallen. So it is not possible to produce more than a kilogram of milk solids a day without supplements. In addition, summer temperatures may be so hot at up to 40°C that cows will not graze for more than four or five hours and concentrates are needed to meet the requirements of the cows, even if a lot of grass is available.

This may explain why top farmers in Argentina's best areas seldom produce more than 500 kg of live weight of meat per hectare each year, or 270 kg milk solids per hectare per year, on grass alone. We need feed from outside the farm to increase production. Many New Zealand consultants and farmers have come to help us how to manage grass the New Zealand way but we still have these problems.

In autumn we supplement with grain and by-products for the first five to six months and produce mostly on grass for the remainder of the year. Taking out part of the farm area for summer crops of maize, soya and sunflower, we expect to harvest nearly all the grass we can produce in a normal season. This gives us between 5,500 and 7,500 kg of dry matter per hectare and we achieve a stocking rate of about 2.2 cows per hectare to produce between 750 and 800 kg of milk solids per hectare.

No followers

We expected that our management system would be copied by other farmers. However after about 100 visits from discussion groups or individual farmers over the past 10 years, no one else seems to have followed our way of working. This could be because most farms would need to invest in better sheds and better houses, but with uncertain profits as the farm may have to stop dairying and go back to crops if they failed to manage the changes. In addition, farm advisers may expect less work and therefore less income for them if they recommend changes in dairying.

At the moment Argentine dairy production is still in trouble. However we have not only survived as dairy farmers, but using the New Zealand style dairy system we have also grown, with a fair return for everyone involved. We think there are opportunities in Argentina for joint ventures in dairy farming with New Zealanders. We are always willing to learn more about how to produce and harvest grass and can progress significantly if we can get more people involved in encouraging research.

Luis and Maru Peluffo are Argentinian dairy farmers



A practitioners' guide to Farmax Dairy Pro

Farmax Dairy Pro is a whole farm modelling decision support software which is designed to model both the physical and financial aspects of a dairy farm business. It also enables scenarios to be run looking forward and comparisons made based on changes to the physical and financial aspects of the business.

Farmax Pro sheep, beef and deer, which originated from Stockpol developed by AgResearch in 1988, has been available and readily used by farmers and consultants around the country for the past seven or eight years. Over the past three years, Farmax Dairy Pro has been developed using a similar interface and process. It is simple and easy to use, and enables accurate comparisons based on differences in physical aspects and profitability. This enables users to make decisions based on accurate modelling as opposed to gut feel or simple spreadsheet analysis.

What is it used for?

Farmax Dairy Pro can be used to analyse current farm systems and explore different options. These options can then be compared and a decision made to maximise the profitability of the farm system. It can also be run alongside other software such as Overseer nutrient budgets to quantify the environmental implications of different scenarios.

The DairyNZ farm systems review project included a consultant survey. This survey was designed to understand, among other things, the process that consultants and farmers were going through to analyse current farm systems and decide on any changes to these systems. Results from this survey suggested that there was very little in-depth analysis occurring and minimal sophisticated tools being used in the decision making process.

It was more probable that analysis was carried out in a simple spreadsheet based system and that farmers make decisions based on experience, gut feel and what other farmers were doing. One of the main reasons for this lack of analysis is due to the absence of simple, user-friendly analysis programmes available for use. Farmax Dairy Pro is a software programme to investigate all options and compare them based on physical and financial differences. This enables an informed decision to be made to best suit the individual farm.

It has also been used alongside Overseer nutrient budgets to investigate environmental effects. This process can then be used to select the most environmentally friendly and profitable system for that particular farm. In addition a monitoring version has been released called Farmtools Dairy

which enables users to set up a management plan for the property for the season.

As the season progresses information can be updated and comparisons can be made between the actual and the plan. Scenarios can then be run to look at and choose the best option based on the events that have occurred. This is a powerful tool as it enables decisions throughout the season to be based on profitability and to set the farm up for next season.

The farm systems review relied heavily on the use of Farmax Dairy Pro to look at common questions in the main dairy regions of New Zealand. These questions included –

- Was it more profitable to grow winter crops on farm or purchase and graze cows in the South Island?
- Is it more profitable to grow maize silage on farm or purchase it in the Waikato?
- Does the rule of thumb to not spend more than five per cent of payout on supplements still ring true?

Advantages over other models

There are many advantages of Farmax Dairy Pro. They include its simple interface which masks complex calculations, its ability to accurately model farm systems taking into account their subtle differences and the wide range of reports.

This model has a very easy to use and interface but with calculations embedded behind the interface which enable it to account for small differences between individual farms. For example, the model incorporates the effect of genetic merit, cow size, heat stress, pasture substitution, body condition score and physical intake of the cow when determining milk production and body condition score change.

Feed intake limitations in the programme are driven by the neutral detergent fibre of the diet, size of cow, cow genetic merit and stage of lactation. If the diet is too high in neutral detergent fibre for the size of cow, her genetic merit and stage of lactation the programme will automatically reduce the intake of pasture until feasible. In addition, if average pasture cover becomes too high the programme will reduce the pasture quality. It can also account for pastures with high levels of kikuyu where the pasture quality profile is adapted to model these pastures.

Farmax Dairy Pro can also be set up on a two season basis. This means that the flow-on physical and financial effect of differences at the end of the season in body condition or pasture cover on the following season can be easily quantified. This is particularly useful if using the monitoring version as it enables the user to quantify and compare the profitability costs and benefits of decisions made on next season's production and profit.

The programme has the ability to add in crops and feeds additional to those already in the programme. In addition, feed quality and yields can be adapted to recorded information for individual farms. There is a range of graphic reports which can be used to cater for most requirements.

What are the benefits?

Using Farmax Dairy Pro to model a farm system provides a snapshot of how the farm is performing. Some of the benefits include clearly comparing differences, providing confidence in decision-making and is a good reporting tool.

It provides the user with confidence and enables decisions to be made based on robust modelling of the farm using the specific characteristics of the farm business as opposed to a rough calculations, rules of thumb and gut feel. The model manages the complex interactions well. For example, if the pasture cover is too high during the spring and early summer, the programme will adjust the pasture quality in the mid to late summer period. This will automatically lead to a drop in milk production and condition score over the affected period.

The model also allows the user to easily consider options based on the best and worst case in terms of pasture growth and payout, ensuring that the risks are realised. It allows for in depth analysis of the farm system currently employed and the opportunities to increase profitability of the farm business can easily be investigated. These changes could be simple fine tuning to the current system or could involve a significant change depending on the system involved and the goals of the farmer.

The graphical reports are useful, particularly for absentee owners, or large scale properties with multiple owners. Farmax has recently released a monitoring version called Farmtools Dairy which involves monthly monitoring and can be used for tactical decision making throughout the season. It also provides monthly reports which compare progress in terms of production, pasture cover, body condition and profitability which can give an excellent picture of how the farm is running compared to the initial plan.

Using Farmax Dairy Pro

The model has been designed so there is a straightforward system in place for inputting information and setting up a farm in the model. Usually the set-up is based on historical information from the most recent year. This ensures that the modelling of the farm and farm system is accurate and also ensures pasture growth is specific to that farm.

Some of the information required in setting up these models includes –

- Historic monthly milk production
- Cow numbers including sales, purchases, deaths and movements on and off the milking platform
- Supplements fed and the months these are fed
- Pasture cover levels at main times of the year.

What we have learned

As with any computer modelling software, there are always some constraints. This is because modelling always has some underlying assumptions. Areas within Farmax Dairy Pro which need to be considered include the management ability of the farm operator, the effect on reproductive performance and the reporting ability of the programme.

We also learned that the programme may over-simplify the management required to achieve high production per cow. When cow numbers were reduced and grain based feeds introduced the 'per cow' was able to reach 100 per cent of body weight reasonably easily. However in practice there would be problems around the cows not eating to a low enough residual and therefore affecting pasture quality and milk production through the summer and autumn months.

Farmax Dairy Pro also does not take into account the effect that body condition has on the reproductive performance of the herd. It takes into account the direct loss of milk production from any changes in body condition but does not alter the six week in-calf rate and consequent effect on lactation length.

In some of the case studies used, the pasture quality needed slightly modifying as the rainfall throughout the summer period was higher than average for the region. Therefore the pasture quality in this area was typically higher compared to the average for the region through that period. This may be necessary in other areas of high summer rainfall or areas in the North Island that are irrigated.

Conclusions

Farmax Dairy Pro is a robust piece of software which is used to model farm systems accurately and can take into account subtle differences between farms. The comparison between different scenarios is clear and multiple reports can be extracted with the results of the analysis available for simple comparison.

As with any software there are some constraints, the main one being the assumption around the ability of the farm management to implement any of the chosen options. The user needs to keep this in mind.

However setting up a model is simple and accurate if the process of setting up cow numbers followed by feeding until milk production equates to that of historical production and pasture covers to match historical information. It is a versatile programme which provides in-depth analysis and allows for informed decision making specific to individual farms and their systems.

Stuart Prior

Sheep farming in Russia today

A bit of a dag?

My nineteenth century ancestors in the north of England may have had an acquaintance with sheep farming as well as dairying. My exposure to the products of the animals on whose back New Zealand lived for so many decades was prosaic rather than genetic. It came in the Dalgety woolstore in Dunedin in the early 1970s.

As a callow student wheeling dobbins of greasy wool to the kings of the store, the pressers, and watching the classers do their work. I learned all I needed to know about sheep and incidentally, about trade unionism of the ‘pay your dues or you are down the road’ kind. I learned a new vocabulary and new economic concepts. As we pulled apart bales of wool from the dry Otago high country, the term a bit of a dag developed new meaning, especially when farmers were being paid for their clip by weight.

Since the New Zealand economic revolution of the mid-1980s when we went cold turkey on subsidies, I have watched from afar as the sheep to people ratio in New Zealand has fallen. Productivity has also increased dramatically. But for various reasons, including the disappearance of Russia as a market for about a third of our wool clip, our sheep are being swept off the countryside and lower hills by the milky tide of omnipotent dairying. Maybe we can look forward to the day when we have to visit a zoo to see a sheep.

Russian potential

That is where Russia comes in. It is a country which bought much of our wool and a large proportion of our sheep meat in the 1970s and 1980s and was potentially a wool and mutton superpower. Then it dropped off our radar in the 1990s when political change led to the collapse of the Soviet agriculture sector and the disappearance of perhaps as much as 60 per cent of the country’s farm animals eaten in the post-subsidy era. So at a time when sheep farmers in New Zealand are seen as an endangered species and there is a northern hemisphere country with cheap land in abundance, a grass based agricultural system opportunity, a demand for sheep meat with a sheep and wool-based textile industry to be rebuilt, there would seem to be potential for an involvement.

Potential but is there opportunity? Burned into our DNA is the memory of unpaid bills for wool and dairy products in the 1990s. Lurid tales of oligarchs and mafia, Russian brides, long-legged female tennis players, and bears with vodka are today’s stock media diet where Russia is

concerned. Who is interested in the fact that Russians love their sheep meat, love the barbecued chops and would prefer sheep meat to pork in their sausages?

The good news is that there is significant opportunity available to New Zealand as a result of the current free trade negotiations under way with Russia, Kazakhstan and Belarus. To take advantage of this opportunity requires recognition of opportunity, leadership and a combination of the business and political management, market and collectivist or socialist principles at which New Zealand farmers are masters. What we need to do is to apply our New Zealand skills in managing the politics and economics of farming to the Russian farming opportunity. In other words, we need to look at Russia as a typical, bog-standard, political economy.

Keeping Soviet soldiers warm

Historically our sheep links go back to the nineteenth century when Tsarist buyers acquired merino sheep from New Zealand and Australia to help to build their own fine wool industry. After the World War II, some industry links developed, exemplified by the work of Godfrey Bowen in teaching Russian shearers his fast-clip methods.

My entry into the world of sheep grand politics came during my first assignment to the New Zealand Embassy in Moscow in 1978. Large wool purchases had begun at the time of the Korean War, and continued through to the end of the Soviet empire. At that time of the Cold War, New Zealand wool was helping to keep the Red Army warm by contributing its wool to manufacture into quality greatcoats and blanketry. About a third of our clip regularly disappeared to the ‘evil empire’, which paid cash on the nail. For all his anti-Soviet rhetoric, Prime Minister Muldoon never forgot that trade was New Zealand’s lifeblood. So we protested Soviet Cold War activities, lambasted the Red Army, and helped keep Soviet soldiers warm and fed with basted lamb.

The large Soviet purchases of sheep meat in the 1970s – at a time when we were desperate for new markets in the aftermath of Britain’s entry into the European Community

and the collapse of world commodity markets as a result of the first series of oil shocks were a blessing and a worry.

Investigations

Were these purchases not only feeding the Soviet army, but were they also a deliberate attempt to subvert New Zealand by making us dependent on the Soviet market? Our Embassy was charged with investigating whether the crafty Soviets were up to something.

The reason for the purchases was pragmatic. The Soviets bought sheep meat for hard currency because it was the cheapest red meat they could find at the time. And some of it did end up in stores to feed the Red Army, but we could breathe easily.

However it was curious – the USSR had the potential to be a global sheep power with a flock of about 140 million sheep and goats, but the purchases from New Zealand and other sheep and wool producers could not be explained only by southern hemisphere counter-seasonality of production. Indications were that something systemic might be amiss in Soviet sheepland.

Three big flaws

Soviet sheep farming suffered from the three major flaws which eventually led to the collapse of the Soviet farming industry in the 1990s – central direction by bureaucrats, the lack of ownership and the lack of a market economy. The first flaw led to many economically irrational decisions. Lack of ownership meant that workers knocked off at 5 pm on weekdays and Fridays and returned mid-morning on Mondays, which created problems for animal after-care services. In addition, because inputs and outputs were collectively owned, a help-yourself philosophy developed. Finally, the lack of a market meant that producers had no idea where their products were going to, or where inputs such as New Zealand wool were coming from.

Throwing money at the problem was the Soviet way. Money went in vastly increasing subsidies in the later Soviet period as well as debt write-offs. These short-term fixes acted to subtract value from farming and stifle innovation, as New Zealand found to its cost. Money was also turned to importing cheap food from abroad. That created a new class of renters and beneficiaries, those profiting from rents on imported food. When the wheels fell off the Soviet system there was the mother of all grab-it-and-run garage sales and privatisations and chaos. The agriculture sector was among the worst hit.

A turn-round is possible but it will be a hard slog. Russian experts have told me that there is scope for bringing Russian lands into greater production. Russia has four million hectares of land which is currently unused. They also tell me that the future of Russian agriculture will be based on animals which do well on pastoral feeds.

Russia cannot afford the US or European type of intensive, industrialised agriculture with heavy expenditure on chemicals, growth hormones, medicines and grain. Russia has a real chance to be an organic producer on a nationwide

scale. It will be too expensive to feed grain and human food to animals such as pigs in future.

Ideal animal

Is there a future for sheep in Russia? Russian scientific experts with whom I have talked are adamant that there is. They see sheep as an ideal animal for Russian conditions, not least because they can be used for supporting rural communities, with small flocks providing work and income in regions where work is hard to come by.

There seems to be cautious confirmation of this optimism. A degree of stability has been returning. Sheep numbers in Russia, about a third of what they were in Soviet times, are reported to be on the rise. They are being farmed in traditional areas, hilly country to the south, such as Dagestan, Kalmykia, Buryatia, Astrakhan, Chita and Gorno-Altai. The increase in numbers is coming from peasant-owned smallholdings, not from commercial farming businesses.

Sheep are essentially a cottage industry. Russian experts say that animals are generally of poor quality. There is no breeding and selection work as the state system of breeding collapsed with the USSR. As a result animals are suitable neither for meat nor wool production. The industry, such as it is, is running on the old basis of small farms and small slaughterhouses.

It is also reported that such is the state of sheep industry collapse that there is no equipment being produced for sheep farmers in Russia, including shearing equipment. Such equipment used to be produced at a factory in Barnaul, but this has long closed. There is no tagging equipment being manufactured in Russia, nor any other equipment specifically for sheep-farming.

Enthusiastic Russians

So what can be done? First, there is a political battle to be fought. Sheep are seen as losers. There is a small number of Russian enthusiasts who believe in sheep and are prepared to try to regenerate the sector. The enthusiasts form two groups. One group sees sheep meat as part of a general meat trade for supermarkets and restaurants, the other group focuses on what might be described as the ethnic basis of sheep meat consumerism.

Into the second group come political leaders from the south of Russia, regional governors and regional leaders, in the Southern Federal District, the Caucasus, where unemployment is a major issue and agriculture, including sheep farming, as significant job creation potential. The sheep enthusiasts understand that if sheep farming is to develop to produce and market good quality sheep meat and wool profitably, it needs to move to fundamental new principles. This will include the use of Australian and New Zealand breeding stock and sheep farming expertise, as well as the training and development of an entire new group of Russian sheep farmers, with the new knowledge and skills needed for a modern sheep farming industry.

New Zealand's outstanding record over the past two

decades of increasing sheep productivity and product quality positions us uniquely to contribute to the redevelopment of Russia's sheep industry. Where might the Russian sheep resurgence begin? Russian specialists have identified Kalmykia as the only potentially profitable centre for sheep farming in Russia. The principal reason is that for 95 per cent of the year sheep can be fed on pasture, which means very little expense on winter feed. When snow falls in this part of Russia, it falls in a thin layer and does not lie as it does in sheep farming areas elsewhere in Russia.

Kalmykia also has land suitable for sheep and is very cheap at the moment. Land is available for long-term lease subject to the consent of the political authorities. What types of animals might work best? An expert who spent eight years in Kalmykia reports that a particularly successful sheep in Russian conditions is a crossbred Merino/Poll Dorset, which is highly productive and whose products are in demand. Merinos are another successful breed. The expert had experience of some New Zealand breeds such as Finnish landrace and Texel which had been tried in Russia, but said that they had not performed in Russian conditions.

Market matters

Meat

With respect to the products of sheep farming, there are two sheep meat markets operating in Russia

- Sheep meat sold to ethnic groups for whom it is a traditional meat, Russia has a Muslim population of about 20 million
- Sheep meat sold to the restaurant and supermarket trade.

The former market looks for traditionally fatter sheep and the market demand in Moscow is said to be around 2,500 sheep a day. The latter sales are in the form of frozen meat and vacuum-packed meat. Demand in Moscow for this category is approximately 20 containers or 300 to 400 tonnes a month. With respect to lamb, Moscow and St Petersburg are the only markets. All other Russian markets take commodity sheep meat.

Domestic production is seasonal. Russian fresh sheep meat is seasonally available between August and November and the highest prices on the market are recorded in April.

Wool

What about wool? There are opportunities but we need to connect with Russia differently if we are to identify niches and to take advantage of them. Russian experts say that there are opportunities for Russia and New Zealand cooperation in textiles and clothing, with wool as Russia's first interest.

The collapse of wool production in Russia, and the textiles industry around it, was a painful result of the collapse on the Soviet system. New Zealand should consider serious, long-term investment in supplying wool and fabrics to Russia. In the area of finished products the going would be a great deal harder, given the intense competition in this market segment from nearby European suppliers such as Italy and the UK.

The Soviet system focused on the production of fine wools. New Zealand cross-bred wools were a high quality raw material. As we now know, many factories of the former USSR were equipped with machines designed to work with New Zealand wools. A few of these factories have survived and are obtaining small quantities of New Zealand cross-bred wools via European middlemen.

It remains to be seen whether dual purpose sheep would work better economically in today's Russia, than specialised meat or wool animals. There is an immediate market for good quality, low cost meat. Rebuilding Russian domestic wool production would have to be a long-term project focused on rebuilding basic infrastructure and management as well as production. One small example of the challenges is there is no system for grading wool. A significant export potential for wool to China is not being realised because wool cannot be graded.

Local wool market participants are sure that New Zealand has an opportunity to sell big volumes of wool to Russia in future. It is suggested that New Zealand consider opening warehouses for wool in Russia from which local producers could source the raw materials they needed. The warehouses could operate on different models, including

A large flock of sheep is grazing alongside a road. Out of a cloud of dust emerges a flash new BMW. A fashionable young man dressed in a Brioni suit, with an Yves St Laurent tie and Wap sunglasses leans out the car window and says to the shepherd:

'Hey, friend, will you give me one of your ewes if I tell you the exact number in your flock?'

'Why not?' the shepherd replies.

The young chap takes out a portable IBM computer connects it to his mobile, links into a NASA site, then connects to the GPS system, scans the field with the flock in it, processes the resulting data with an Excel spreadsheet, prints the results out on a mini-printer, looks at the results and says with assurance 1,586.

The shepherd replies 'That's right, take one you like'.

The young man takes a long time over his choice and then takes one of the animals and puts it into his car boot.

Unexpectedly the shepherd says to him 'If I guess what you do, will you give me back what you have just taken?'

'No problem', the young man replies.

'There's no doubt about it, you are a consultant.'

'How did you guess?'

'No mystery. You appear here when nobody asked you to come, you ask for payment for an answer which I already know and for a question which I have not asked, and you haven't the slightest clue about my business.

Now – give me back my dog!'

receiving goods on consignment. Taking into account the low levels of profitability of the textiles sector today, and the very high interest rates being sought by the banks, Russian users would find it affordable to buy from such warehouses. This would avoid the payment of cash in advance and waiting perhaps two months for products to arrive in Russia.

Barriers to New Zealand?

It is up to us. If New Zealand is serious about taking agricultural knowledge and expertise off-shore to build businesses close to centres of northern hemisphere consumption, Russia is the place to look for sheep farming. Getting to know the people and the industry or what is left of it is critical. Top level political contacts and personal relations are the key to successful business in Russia.

We have a lot to offer. We also have to accept that we have a lot to learn. The Caucasus mountain region of Russia has one of the world's oldest traditions of animal husbandry. Going back over 2,000 years, sheep, goats as well as dairy and beef animals have been raised in the region. There is a lot of inherited knowledge and wisdom, as well as genetic material, which could help New Zealand become a global sheep power.

We need to focus not on the theory, but on the practice of cooperation and successful, profitable sheep business. The anecdote on the previous page which I have translated from a Russian publication gives us a good reminder that Russian sheep farmers were not born yesterday.

Conclusions

There is an historic and strategic opportunity to get involved in the process of rebuilding Russia's sheep industry. Russia

offers New Zealand an opportunity to rebuild volume markets for wool and sheep meat. There is a large and unmet demand for sheep meat in Russia. There is also a huge and unmet demand for exports of sheep meat from Russia to neighbouring markets, including Turkey and the Middle East.

The USSR used to take a third of the New Zealand wool clip – today it takes very little, and most of this is bought via middlemen. The Russian government aims to encourage the private sector to rebuild production capacity for clothing – crossbred and merino wools are essential requirements.

New Zealand can help Russia to reactivate its textiles and clothing industry. Private Russian producers have indicated a longer-term potential for New Zealand to supply tens of thousands of tonnes of wool. The Russian authorities have said that they would welcome New Zealand involvement in long-term supply to Russian manufacturers and users of raw materials which Russian cannot itself produce. Mutual dependence, or interdependence, is involved. New Zealand should consider possibilities for having product in stock in Russia whence it can be supplied to Russian users;

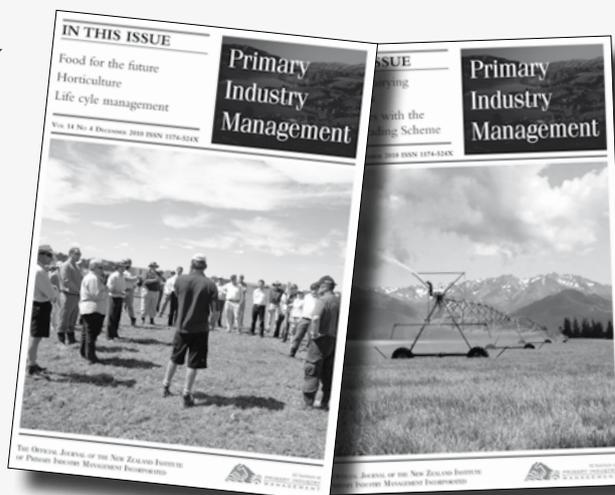
The New Zealand and Russian governments can help by working at official level to support the necessary linkages. Russian consumers need no persuading of the value of sheep meat, wool and leather and sheepskins. They are not brand-driven, as in the US, but they are ready to buy into brand New Zealand.

Stuart Prior was the New Zealand Ambassador to Russia from 2003 to 2006

In upcoming issues of Primary Industry Management

In the September 2011 issue we hope to feature Hawke's Bay along with another feature on governance. In December we hope to have a feature on what is happening in agriculture on the West Coast and perhaps a look at some of the effects of increasing foreign ownership of New Zealand farms. Looking ahead to March 2012 the feature will be on the Bay of Plenty and perhaps a bit of a technology update.

We are always looking for more articles and keen to have contributions from NZIPIM members. If you would like to contribute on any of the subjects mentioned above, please get in touch with the editor, the details as usual are on the contents page.



Earthquake risk management for agriculture

Reflections following 22 February

The February earthquake can only be described as a king hit on Christchurch city. Fortunately, there was comparatively little in the way of a rural or agricultural effect on the land or the buildings. Although there was some liquefaction in similar places around Halswell, as during the September 2010 earthquake, it was nowhere near as bad.

Unknown fault lines

One of the biggest lessons that can be taken from the February event is realising that many of the damaging earthquakes in New Zealand and around the world occur on unknown fault lines – those which have not been previously identified. Although disconcerting, it is well known in geological science that there are many unidentified fault lines throughout the country and they are extremely hard to detect.

Usual methods of identification – looking for rock offsets, terraces of an old fault scarp, rivers that have been diverted – do not work in many instances if the fault line has not ruptured recently and the landscape has been re-worked by a river or glacier. Alternatively it may be that faults do not reach the surface, such as during the February earthquake, where there was no surface rupture despite significant ground shaking. Unfortunately traditional fruit growing areas such as Hawke's Bay, central Otago and Marlborough are very likely to have unidentified fault lines running through them.

One way to pick up these unidentified fault lines is with geophysics. This involves looking into the earth using a variety of geophysical techniques, such as seismic refraction surveys. While these can identify fault structures at depth, it can be difficult to get adequate resolution and they are very expensive to undertake. It is like using an X-ray from the 1960s to look inside a human body. The image may give you a fairly good idea about what is happening, but will not be as exact as a modern MRI scan. In addition, given the scale of a survey looking for unidentified fault lines can be like searching for a needle in a haystack.

New Zealand in a highly geoactive zone

The other take-home message is that this country is an extremely geoactive place, and the sad reality is that with the Christchurch earthquake we see that being played out. The New Zealand land mass is essentially like broken or fractured glass. The rock which makes up this country has

been through a series of significant tectonic compression and extension events over the last 200 million years and probably beyond.

The Earth's crust throughout the breadth and length of New Zealand is therefore relatively broken due to all of this deformation and movement – geologists like to refer to it as being tortured. Because the land has been stretched, compressed and twisted over millions of years, it is full of cracks. With the country sitting at the boundary of two major tectonic plates, this is not surprising.

So while ring of fire countries like Japan and New Zealand are in very tectonically active areas, which have had regular geological activity such as earthquake and volcanic eruptions over the last 150 to 200 million years, the Australian continent for example has not moved around that much. It is a very old land mass, having some of the oldest rocks on earth. While Australia does experience some earthquakes, they are not of the same magnitude or frequency as we experience here in New Zealand.

Implications for building in New Zealand

The next message is that New Zealand is a challenging place to build cities. One way to counter this is to have appropriate building codes that can withstand the extreme forces of an earthquake, including liquefaction. It is always going to be a trade-off between the level of safety and what is economically feasible. However, engineers in the field have taken heart that buildings less than 10 years old generally performed very well in Christchurch as they all withstood the February quake.

Another way to counter this is to build in sensible areas, such as not directly on fault lines and highly liquefiable ground. This also extends to avoiding frequently flooded areas and hills susceptible to landslides. However, in New Zealand almost everywhere is susceptible to some kind of hazard. It is important therefore that households and

businesses make the appropriate preparations.

As with wind zones, New Zealand has been geographically assessed into different earthquake zones. Christchurch was judged to be in a relatively high seismic area, but the level of seismic hazard for Canterbury had been assessed to be a lower than what transpired, a 6.3 quake. This is because there had been few active faults observed close to Christchurch.

As well as this, Christchurch city received most of the energy from the fault rupture release. The fault which ruptured was orientated towards Christchurch running from Halswell out to Taylors Mistake. The fault dips upwards from the south east. It appears to have ruptured from down to up, meaning the energy was focused in towards Christchurch. Because of the city's very high building code standards, residential and commercial buildings, as well as silos and packing houses in surrounding rural areas, all performed very well even though the design criteria were exceeded.

Agricultural land rehabilitation

Remediation of land damaged by fault rupture and liquefaction was a significant concern for affected farmers and land-owners after the September quake. A multi-disciplinary team of researchers linked to the Rural Recovery Group, responsible for recovery of rural areas following this earthquake, used a variety of techniques to assess land damage and evaluate the effectiveness of rehabilitation techniques.

It was found that land damage caused by strike slip fault rupture could generally be repaired by heavy rollers. In areas of severe surface deformation and fracturing, deep cultivation followed by rolling was necessary to close surface fractures and flatten fault micro-topography to restore the land to a useable condition for agricultural purposes.

Land liquefaction

Liquefaction damage to land consisted of blistered topography by liquefied sediment injecting between topsoil and subsoil and liquefied sediment ejection at the surface. Both surfaces were often unsuitable for continuing agricultural operations. Several passes by a rotary hoe and power harrow smoothed blisters and returned paddocks to a suitable state.

Land severely affected by sediment ejection required scraping or grading of the sediment to under five centimetres and cultivation of the material into the topsoil. Both treatments resulted in destruction of the current pasture or crop. Land less severely affected could be treated by spreading which conserved the existing pasture. Future work will track the recovery of remediated and un-remediated land.

What can be done on farms?

There are several ways to risk manage for earthquakes. Check in buildings to see that all large objects are adequately secured, and that shelves are stacked and braced so their contents will not act as projectiles. Thousands of tonnes of foodstuffs were lost in Christchurch warehouses from poorly secured shelving. Carrying out these tasks need not be expensive,

and will help prevent crush injuries and other harm from flying objects.

Outside check that large containers such as silos and vats are firmly secured. In the September earthquake some grain silos were ruptured or severely weakened in regions close to the fault line where the shaking was strongest. In some cases there was localised liquefaction of the ground causing the foundations to collapse.

On a farm, damage to buildings and equipment will depend on the level of shaking, the quality of construction and how well equipment is restrained to resist movement during shaking. Loss of transport would have a significant effect at different times of the year, such as during the harvest. Workers may not be able access farms due to transportation network disruption. Transport trucks may not be able to get produce off farm to the processing plant, or away from that plant.

Communications are vital for business and for personal well-being and coping, so expect this to possibly fail. Do you have back-up generators? Power may be down – and for some time. Sewage could also be affected. However, in the recent Canterbury earthquakes most farms had these services restored within days and up to about a month.

Indirect effects

Indirect effects may occur, such as transient workers avoiding the area due to the disaster, accommodation may have been damaged, or workers have to look after children due to schools being closed. This has been a big issue in Christchurch since September, with many people choosing to leave the area for a while and many school closures.

Some people are starting to return, and most of the affected schools have now re-opened. One other effect has been the damage to Jade Stadium which has resulted in the city not being able to host the Rugby World Cup later this year. Further indirect effects may include the loss of contracts because of export orders not being met.

Preparation

Ask yourself what you need to do to prepare for a major earthquake – perhaps seismic strengthening and proper design of critical facilities, such as processing plants. Ensure that critical input providers such as electricity, transport and water network companies have secure, resilient supplies. Plan to manage on your own for days or weeks following a large earthquake.

Farmers and fruit growers in particular are constantly using risk management principles to manage frost, drought and disease. Think about earthquakes as one of these risks, but as part of your day-to-day risk management decisions. Many of the actions you take for earthquake preparedness will increase your ability to deal with other disruptions or disasters, such as having a diesel generator in case of a power cut. A large secure water supply will also mitigate drought conditions. Finally, get your buildings up to the current earthquake code.

Nick Ledgard

What's wrong with the wildings?

What is wrong with wilding trees? This would be the most frequent question I am asked. The people looking for an answer are increasingly aware that many forests either planted or wildings can be registered with the Emissions Trading Scheme and gain carbon credits which can be sold for handsome sums.

They may have seen, and been attracted by the Douglas fir wildings back-dropping Queenstown, the larch framing superb views of Mt Cook on the road to the Hermitage, and surrounding Naseby township the mainly Corsican pine, larch and Douglas fir. They may also have seen tourists buying place mats and calendars of high country scenes which often feature wilding trees.

Despite such 'what is wrong' questions, I think most



Douglas fir spreading up Bowen Peak – 1985 and 2003

people are familiar with why there is concern about wilding spread. Wildings are often found growing in places where they were not planted, and where they can disrupt visual landscapes, submerge grazing and conservation values, and add costs to changing land uses. Even though I am a keen tree person, and have a 50-year joint venture right to manage a 380 hectare block of wilding trees near Lake Coleridge, I do not endorse wilding spread.

One could equate its worth to that of a wild deer herd compared to farmed deer behind fences. The conifer species most often seen spreading is contorta or lodgepole pine *Pinus contorta*. It occupies around 60 to 70 per cent of the national area affected by wilding trees. This species may be valuable in its native North American home range, but it has yet to attract a ready market in New Zealand. So when considering the commercial worth of wildings for timber and fibre, please be aware that in most cases they are the wrong species, on the wrong site, widely scattered, of poor form and often far from markets.

Carbon storage

Today, when considering the commercial worth of wildings, the immediate thought of many is about carbon storage and gaining credits via the ETS. Yes, this is possible, and quite a few wilding forests have been registered with the ETS, with some receiving a cheque for the carbon stored in them.

One property is using this money to control spread outside the registered area. I have no problems with this at all. However, I do object to those who are cashing in on wildings and have little concern about being a seed source for subsequent spread beyond their boundaries.

Most high country land owners wanting to establish a new commercial plantation would need a resource consent which would have wilding control conditions attached. Similarly, the same conditions should apply to land where the owner is making a commercial profit from a wilding forest.

Why the problem?

Why is wilding spread such an issue in the eastern hills and high country of the South Island? It is mainly because we are in a great environment for growing woody species. Almost 30 years ago, Kevin O'Connor, the then Professor of Range Management at Lincoln College wrote 'The success of woody revegetation cultures forces land users to choose between forests and improved pasture.... making that choice will be the principal landscape planning issue in the tussock grasslands and mountainland for the next 20 years.' In other words, most land which is not improved for grazing will inevitably revert to woody species. And of those, the exotic conifers grow particularly well.

Back in the early 1980s, I undertook a survey of introduced trees starting in Molesworth and ending up in Queenstown. We found some stands of conifers, such as Douglas fir, which were world records in terms of volume for their age. Such species not only grow well, they also reproduce well – often both earlier and more profusely than they do in their home country. This leads to high 'rains' of seed, which can be readily blown into land which is both lightly vegetated and lightly grazed. And therefore we have the wilding spread issue, where trees are turning up on land where they are not wanted.

Dark green tide?

The risk of wilding spread is an issue which we have to address, but it can be overstated. I have seen maps of the high country which are largely coloured red, the red indicating land that is at risk to wilding spread, insinuating that it will all go under a dark green tide if we do not watch out. Let us be honest, the red colour could just as easily indicate susceptibility to *Hieracium* and rabbits, or even wild sheep. More importantly, even though that land is susceptible to wilding invasion, there is no such thing as immaculate conception for trees, and it will not be invaded unless there is a seed source. Over the vast majority of the high country, there are no seed sources of spread-susceptible species.

That brings me to another misconception which is that all pines spread. This is akin to saying that all sheep are Perendales and therefore not easy to contain within your average fence. In reality, the propensity to spread varies significantly between species, and virtually nobody today is planting the most spread-prone species, such as contorta pine, Scots pine, Corsican pine and larch.

These are the species which feature in well-known spread sites such as Molesworth, the Amuri Range, Craigieburn, around Lake Pukaki and at Mid Dome. Even these species vary in their ability to spread depending on their location. For example, Corsican pine, the most common spreading species around Hanmer, is hardly producing a cone a little further north at Tardale on Molesworth station, due to the altitude of around 900 metres. In addition, spread will not occur where there is a good, closed canopy vegetation cover or where there is improved pasture and grazing. On the Canterbury plains, there are shelterbelts containing every

species of spread-prone conifer, but no wildings are seen due to the intensity of land use.

Closing the stable door

The above words about misconceptions do not suggest that we can be casual about the risk of wilding spread. Indeed not, as it is past inaction which has led to the currently well-known large areas of unwanted spread, where it could be said that we are trying to close the stable door after the horse has bolted.

Probably the best example in Otago is around Queenstown, where conifers are an integral part of the area's iconic scenery. Nobody would like to see all the trees removed, but on the other hand there are many sites that most people would rather see remaining tree-less. The slopes opposite the town over the lake beneath Cecil and Walter Peaks are one such example. Their subtle, glacially carved and pastel-coloured contours, often highlighted by late afternoon sun, would be rapidly submerged by a cover of dark green conifers.

Work in progress

I wonder how many people realise the work that has gone into maintaining that treeless vista. Although they do not arrive frequently, seeds of Corsican and Scots pine are being blown over the lake, with the species mix indicating an origin in the Closeburn area. If the resulting scattered outlier trees were not removed before the age of serious cone production, then an eventual forest cover would be inevitable. Similarly, above the town, a tree line is being maintained below Ben Lomond which contours around at the natural limit of our native mountain beech. Douglas fir wildings can grow well above this level, so if it were not for such management, the slopes would be tree covered to the ridgeline, which would lose its attractive mixtures of tussock, scree and bare rock.

Further down the slope, the Douglas fir is challenging the remnant pockets of mountain beech forest. Although, it will not establish under an intact beech canopy, the fir will compete readily with beech regeneration once a gap appears.



The tree line under Ben Lomond is being maintained by removal of Douglas fir wildings



Measuring relative growth of Douglas fir and mountain beech

Recent studies have shown that in these low light conditions, Douglas fir is consistently faster growing than beech.

Fortunately, Queenstown is awake to the threat of wilding spread. A wilding control strategy has been in place for almost 10 years, and in 2009 a Wakatipu Wilding Control Group was formed to promote the strategy's implementation. The group has strong support from not just the Queenstown Lakes District Council and the Department of Conservation, but also from the local community. Such strength is important, because just as introduced conifers will always be part of the Queenstown landscape, so also will be the need to prevent them from spreading to areas where they are not wanted.

Winning or losing?

Are we winning this war with wildings? This is another frequently asked question, often posed by people who have been aware of wildings at a certain site for many years, and have observed them steadily becoming taller and more dense. This is true, but what they may not have observed is the much larger surrounding areas where scattered trees have been removed.

Once wildings are removed, they cannot be seen, and anyone unfamiliar with that land would be unaware that there had ever been a potential problem in the first place. That is the case over large areas of the South Island – the slopes opposite Queenstown and further east on The Remarkables are good examples. It is fortunate that, unlike some other weeds such



Radiata pine, a species not hard to control, spreading to the east of Alexandra

as gorse and broom, wildings can be quite readily eradicated. They are very predictable, in that we know the direction of spread by wind, the sites where they can and cannot establish, and the age at which they will produce seed.

They are also very obvious well before coning age with plenty of time to remove them, and the seed bank in the soil does not last more than a few years. It is for these reasons that the Department of Conservation places wilding control in the eastern South Island as one of the most cost-effective uses for their conservation dollar. As a result there are many areas where removal has been successful and reinvasion will not be frequent. Good examples around Otago are the Kakanui mountains, and the Hawkdun, St Bathans and Lammerlaw-Lammermoor Ranges. In these cases we are certainly winning.

A stitch in time

I run a lecture course for the School of Forestry at Canterbury university, with the title 'Trees in the New Zealand landscape'. It acknowledges all the prospects and problems associated with trees, under the umbrella motto of 'the wise use of the right tree in the right place'. Today, we know enough about trees and wilding spread to be making the right informed decisions, and therefore new wilding spread need not be a major issue in the future.

However, just as the occasional sheep will always get through a fence on to the neighbour's place, there will be the odd wilding which will crop up where it is not wanted. These must be removed as soon as possible, certainly before they mature to an age where they can produce cones and seed. Today this is becoming par for the course, whereas so often in the past, outlier wilding trees were allowed to persist and cone. A few minutes of removal time for a single tree had become many hours or days of multi-tree control. In wilding control, the catch phrase should always be 'a stitch in time saves nine'.

Introduced trees will always be with us, and with them comes the risk of unwanted wilding spread. Fortunately, we are now well aware of this risk, and we must remain so – especially in areas such as Otago, where the landscape is dominated by large expanses of low stature, lightly vegetated and lightly grazed land.

Tafi Manjala

The best job in the world

From farming in Zimbabwe to the shock of his first South Island winter. With his passion for extension and role as Northland regional leader for DairyNZ his role as NZIPIM councillor Tafadzwa (Tafi) Manjala talks about his experiences so far.



Zimbabwe beginnings

I was born in Zimbabwe and spent my early childhood on a commercial farm where my father and grandparents worked. I guess there was that element that when you are growing up, whatever your father or mother does sounds like it is the best job in the world, so the agricultural bug bit me at a very early age. What appealed was seeing how crops grow, watching the whole production cycle and how everything seemed like one big factory, and the number of people that were involved on that farm – that and the animals.

However, it was after high school before I seriously considered a career in agriculture. This prompted a three year period of study for a Diploma in Agriculture. It was the best training I have ever done because theory was matched with the practical on a daily basis, along with a year's working experience on farm in the second year.

I went to manage a smallholder farmer project growing maize, paprika and sorghum for a year before embarking on a degree in agriculture at the University of Zimbabwe in Harare, where I majored in crop science. While at university I was project advisor for an absentee-owned 270 hectare farm employing over 200 staff. We farmed cotton, tobacco, paprika, maize and poultry. I was in an exceptionally lucky position to be able to do this.

Every weekend and every holiday I was on the farm and this enabled me to have an influence and keep up to date.

Farm structure in Zimbabwe

In Zimbabwe, farms had a different structure from most farms here. The management team included an assistant farm manager, four section supervisors, the farm owner and myself, so in terms of delegation I had some contact with the staff but not a lot on a day to day basis. My contact was with the management team – where the discussion happened in terms of planning – and the supervisors had the responsibility for the staff. It is a fairly typical set up for farms in Zimbabwe.

It probably also comes back to why I really appreciate that diploma training, because it had such a practical focus. I was itching to get my hands on to a project and apply some of those things. I did not actually struggle that much juggling

university and the farm because quite a number of the things that we were doing in our course I had done in my diploma. And besides, I was at that age when you feel bullet proof and you can do anything – you can conquer the world.

Even so, some times were better than others. I have seen first hand how political decisions can destroy an agricultural economy. Eventually, in 2001 due to unrest in the agricultural sector, the farm was taken over by the war veterans and it was time to move. This was a native's farm which was taken over and it is a story that has never been reported, that the locals also lost farms.

I re-created myself as a scientific officer providing extension support to communal farmers. In mid 2002 my boss, an Australian scientist, recommended that I consider opportunities abroad to further my career and suggested emigrating to New Zealand. I thought Australia sounded like a good place, but he felt the New Zealand agricultural sector had better agricultural career opportunities.

Arriving in New Zealand

I came to New Zealand in July 2002. I will not forget the day I arrived. It was 22 July, and I got such a shock from the cold as I walked out of Christchurch airport. Probably it was the wrong time of the year to come here because of the weather change from tropical to temperate.

To be honest, I felt like quitting just about every day from day one. Temuka was just too cold, my hands were freezing every morning, there were early morning starts and no social life and everything just felt too hard. I thought I would just do three months and then go back, because I still had my old job back there.

But then I thought about what was actually happening to Zimbabwe from a longer term agricultural perspective. Things were disintegrating by the day, with the farm acquisitions or settlements and people getting kicked off their farms. Some people were getting beaten and some people lost their lives. Was agriculture going to remain the mainstay of the economy?

The answer in the third month was a resounding stay, so I decided I needed to focus, knuckle down and get as good I could at what I was doing. That is what made the difference.

I started enjoying the work, probably because of the focus. If you have a focus on what you are doing you really have a good chance of being successful.

New Zealand was lonely because I had left my wife and five month old son behind. However that was probably the wisest thing to do because I was moving into the unknown. My wife and son eventually arrived nine months later.

Learning to be a consultant

I have always had a passion for extension, but now I had to learn what I was intending to extend so I started working on a 620 cow operation as a farm assistant in Canterbury. I progressed to herd manager and finally to assistant farm manager with Dairy Holdings, milking 700 cows for two seasons before moving to join Dexcel at the start of the 2004 season.

I have been based in Northland since then, starting as a consulting officer for three-and-a-half years then regional manager for 18 months. Now I am the Northland regional leader with three field staff and 1,100 dairy farms to cover.

Northland farmers are resilient. They have had a fair mix of droughts and floods and they have come through. Climate is a really big challenge, but I think the biggest gains in Northland will probably come from three main things. The first is good financial management, especially control of farm working costs. The second is improving reproduction performance, because we have about a 17 per cent empty rate. Third is to improve pasture grown and pasture eaten.

One opportunity for the seed industry is to breed pasture species suitable for Northland. Nationally farmers have been talking about pastures lacking persistence and we are talking about adaptability to Northland as part of that. Once we have achieved that as an industry we can make big gains.

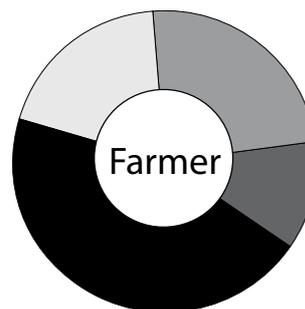
I have always loved extension. I enjoy seeing the transformation of people where initially they have doubts then move to adopt a small component and then finally the whole practice. Complete adoption takes time, so in extension you can only see those transformations if you stick around long enough. I presented a paper at the Australasian Pacific Extension Network Conference in 2009 titled 'An extension officer's perspective on practice change. In the paper I discussed the four steps vital to achieve changes in farming practice.

The diagram shows the four step process. The process starts from the 12 o'clock position and progresses clockwise. The farmer is central to this process as they are responsible for the practice change. When change has occurred the process restarts, focussing on a different need. The process repeats faster through each cycle as learning from experience and success are repeated.

Change agents can achieve on-farm change quickly by establishing relationships with farmers and following these four steps. Once change is achieved change agents must use leading farmers as a platform for wider practice change in the community, because farmers learn best from other farmers.

Extension agents will also achieve more change on-

Four steps to achieve practice change



■ Purpose solutions ■ Follow progress ■ ID needs ■ Create tension/appetite

farm if they allow time to follow up and support farmers making changes. This requires time and resourcing, but is critical to move from good to great extension practice.

Rural professionals, including private consultants, have earned the respect of farmers from their success working with clients and the time they have been in the role. We should all individually use this knowledge and move the industry forward faster by training our successors. Sometimes these successors are too overwhelmed to ask you for support – offer it for the good of the industry you are in. The NZIPIM offers a platform for the experienced to share their knowledge and for regular upskilling, so we stay up to date.

Increasing NZIPIM reach

I joined the NZIPIM in 2005 and since 2010 I have been the councillor for Northland. At the time I joined I did not know very much about NZIPIM, other than it was good for my personal development. It has been fruitful, especially since I have been involved on the Council and involved in trying to revamp our Northland branch by helping organise events that are relevant to rural professionals, and recruiting for more members.

That is probably the key way in which we can increase our reach. There are a lot of rural professionals giving farmers advice, such as private farm consultants, fertiliser reps, bankers, seed suppliers and others

The NZIPIM is currently working on accreditation of farm management consultants. The concept of accredited member status will help lift professional standards and consistency to a level that is highly valued by farming clients and this could encourage more membership. Farmers are more likely to use someone who is professionally recognised by a professional body. However, from an institute point of view we have to be clear about what we are providing and be able to clearly outline the benefits of being a member.

I feel I have come a long way since my first New Zealand winter in 2002 and I have seen many developments and opportunities created during this time. The NZIPIM as a professional body provides an excellent platform for all of us working in the industry.

This is the best job because of the opportunities for personal growth from farmers and rural professionals.

