Innovative and adaptive future farming, particularly as it relates to profitable future use of dryland country in New Zealand – a personal view

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Introduction

First some science and facts to put the dryland area into a NZ farming perspective. The dryland farming regions of New Zealand make up a significant proportion of the east coast stretching from Hawke's Bay in the North Island down to East Otago in the South Island. There are also other pockets of dryland in inland areas of Central Otago, Wanganui and South Canterbury. Dryland farming regions are generally defined as those environments where summer evapotranspiration exceeds summer rainfall in the majority of years (Brown *et al.* 2004).

Records of potential soil moisture deficit (PSMD) around Napier and Ashburton show that significant PSMD developed in these regions by 1 December in 50 to 85% of years with severe deficits in 20 to 55% of years. These deficits increase as summer progresses (Salinger 2004). A total of 2.87M hectares of land received less than 800 mm of annual rainfall or less between the periods of 1950-1980. This area represents 10.7% of the total New Zealand land area (Brown *et al.* 2004).

Climate change over the next few decades will be driven by the underlying trend of global warming, with New Zealand warming by about 0.2°C per decade. As climate warming continues during the 21st century, these areas will become increasingly stressed as potential evapotranspiration rates increase, particularly when the Interdecadal Pacific Oscillation next changes phase and during El Nino events (Salinger 2004).

After the removal of Government subsidies for farmers in the mid-1980s, all dryland farmers have had to make ongoing structural and managerial changes to survive with the variability of rainfall as well as fluctuating agricultural product prices.

Some of these changes have been:

- A significant increase in irrigation with over 600,000 ha now irrigated compared to less than half of this in the mid-1980s.
- A 33% increase in average farm size with the MWI Economic Service Class 6 farms increasing by 117 ha between 1981 and 2003.
- Farmers have made large investments in basic items such as fertiliser, fencing, animal and plant genetics and also in technology such as reproductive scanning and internal parasite management systems to achieve higher productivity.
- Increased investment has resulted in significantly higher production with the Class 6 farmers lifting reproductive performance (mainly lambing percentage), stocking rates and average killing weights of progeny.
- There has been an increased diversity of income sources with a large move away from standardised farming systems of the 1980s where most farms were fine wool based with a mix of both store and finishing lamb operations. Now no two farmers have the same farming policies or "core business" on their farm. The diversification has been built around both the strengths of the farm and the skills and interests of the owner.
- An attitude of flexibility and partnering has been slowly developing where an individual dryland farm is seen as only one part of a supply chain with innovative profit sharing techniques being developed.

So how is dryland farming faring in 2008?

By looking at the balance sheet, most dryland farmers would be very happy with the wealth they have theoretically accumulated over the time they have been farming. Table 1 summarises this return for all rural land in New Zealand compared to other common investments. Capital appreciation only is shown with no allowance made for any cash return or account taken of inflation over that period.

If a farming family had purchased land 20 years ago they would have expected to have made a compounded return of 10.46% p.a up to the end of December 2007 (Table 1). This is significantly ahead of commercial property investments at 3.86%, residential at 7.03% and the NZSE50 at 4.27%. It is important to remember, however, this return takes no account of the cash made from each alternative investment.

Table 1 Simple compound growth (%) of capital indexes for time periods ending in December 2007. Source: R J Preston, Chartered Accountant Christchurch.

	Years ending December 2007				
	25	20	10	5	1
Rural	7.13	10.46	8.04	16.48	21.71
NZSE 50	8.47	4.27	6.88	18.27	10.97
Residential	8.17	7.03	7.96	13.86	10.85
Commercial	7.19	3.86	5.94	11.34	14.15
CPI	4.24	2.60	2.26	2.65	3.18

Figure 1 Comparison of rural indexes for different primary industries over the last 25 years. Source R J Preston, Chartered Accountant, Christchurch, August 2008.

Figure 2 Sheep and beef business returns ($/SU) between 2000 and 2008. Sources: Ibbotson Cooney, Malloch McClean, ANZ National.

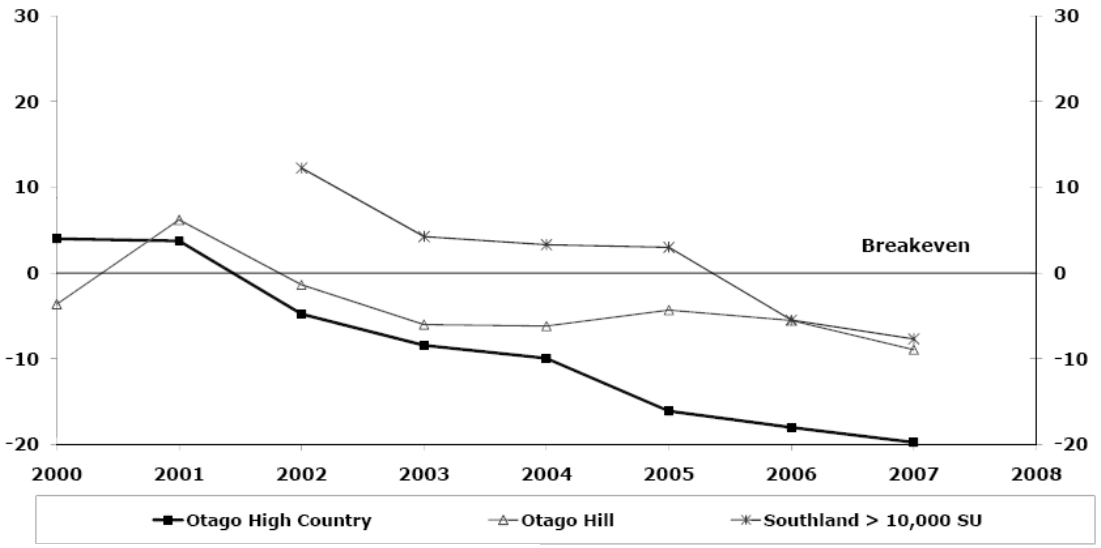

Figure 1 shows the rural index broken into different farm types. Grazing land has had the biggest increase in value over the 25 year period, ahead of dairy. Dryland farms would be represented within the grazing rural index.

A quick look at the yearly Profit and Loss accounts for a typical dryland farm would however, be a very depressing read. This is graphically shown in Figure 2. The average profitability trend of Otago hill and high country and large Southland sheep farms with greater than 10,000 stock units is shown in net business returns per stock unit from 2000 to 2007. The two Otago farm land classes have made losses in the past 6 years. Most dryland farmers are currently only just surviving financially with expenses continuing to increase and any previous commodity price lifts being factored into the land prices.

This is no different from what has always been the case with farming but the stakes are now getting far higher. Given the level of debt (due to increased land values) that most new entrants to farming are carrying,

they no longer have the financial buffers in place to survive the severe moisture deficits which occur in these regions for 20-55% of all years. Significant expenditure items are now fixed rather than variable so consistency in returns and prices is essential between years.

The underlying lack of profitability in dryland farms over recent years is exacerbated by a number of external drivers impacting on these farms to a greater degree than they ever did in the past. Although most of these outside influences affect all types of farming, dryland farming with its variability in incomes is more vulnerable to any factors that reduce profit.

Some of those factors that impact on profit margins now or have the potential to do so in the future are:

1. The ongoing requirement to prove to consumers and the wider community that our agricultural systems are environmentally sustainable. The concept of getting "permission to operate" from the community and consumers is several steps on from getting a resource consent to operate as we have to today. This is potentially in direct conflict with the intensification processes that have maintained our international competitiveness as a low cost milk, meat and fibre producer.
2. The shortage of non-renewable resources such as fuel and fertiliser that are both significantly more expensive than they have been historically. Fertiliser will be too expensive to be routinely applied to the whole farm.
3. The drive from consumers for farmers to be aligned into efficient supply chains right from the farm to the consumer. This is being done to provide "traceability" systems to give consumers confidence to eat our products but also should drive cost out of the supply chain by reducing waste. Who owns these supply chains will be a source of constant tension between farmers and retailers.
4. The ongoing impact of global warming that will continue to give even greater variability in climate both between and within seasons than we have been used to over recent decades.
5. The capital intensive nature of farming businesses today both within the farm and in marketing structures off farm. Successful farms of the future will need innovative capital raising structures to remain in control of the future. If family farms cannot raise the necessary funds to finance their development then corporate style businesses will grow at their expense.
6. The need to provide consumers with choice is going to force us to have to deal with the issue of co-existence of different production systems, both across farms and even within farms, where products are produced for different markets. Dryland farms should theoretically be able to supply all markets ranging from organic and low input right through to branded products utilising genetically modified inputs. To get to this level of market maturity there will first need to be significant negotiations taking place within farming communities to get agreement on the type of farming practices allowed to take place in each region. Once agreements are reached a significant investment in systems to underpin and prove each farming system will be required.
7. The maintenance of our clean biosecurity status is essential to the survival of the agricultural industry within New Zealand. With the volume of trade and tourism into New Zealand the threat of a breach of our biosecurity can never be underestimated.
8. Ongoing political influence both at a regional and a district level. Regardless of your political views, there is no doubt that the impact of any regulations or taxes for NZ farmers, that are significantly different from those applied to farmers in other competing exporting agricultural nations such as Australia, South America and Ireland, will have a significant effect on our survival as a farming nation. A current example of where this is happening is the emission trading taxes on ruminant animals to be introduced in 2013 which is well before the research community has come up with solutions.
9. Competition from other agricultural exporting nations. New Zealand is no longer the cheapest converters of grass to product. Those that have visited farms in Australia, South America, USA and Eastern Europe will know of the significant increase in our competitors' level of expertise (often assisted by Kiwis) and these countries are starting to appreciate the opportunity they have for pastoral agriculture to be a large contributor to their economy.

This has not been written to depress dryland farmers but to instead recognise some of the drivers that will impact on their businesses more in the years ahead than they do today.

The future of dryland farming

When we look out into the future it is pretty clear that the era of cheap food is well and truly over. Food demand is being driven upwards by increased population, increased affluence, changing eating habits and competition between food and energy for land use. The outlook for our main agricultural commodity prices is that they will be significantly higher in real terms than they have been over the past 10 years but the volatility around the mean is expected to be high. Even though we have numerous competitors on the horizon internationally, from my own personal experience I know it will take at least a generation before they understand how to capitalise on the

opportunity they have to compete head on with NZ farmers. We are just entering a very positive, albeit volatile, period for NZ farmers.

Combined with higher demand for food, New Zealand farmers are well positioned to move quickly to own or control supply chains with the aim of getting as close to the end customer as possible and forming a long term partnership to reduce price volatility. Branding and developing a story around this brand will be critical to extracting more value for the product from the customer. It would be my view that it would be easier to develop a "story" around a rolling dryland farm in Marlborough than it would around an intensively irrigated dairy farm on the Canterbury plains. Dryland farmers need to capitalise on their advantage and build and understand their own brand. Controlling a supply channel and owning a brand will keep us away from the low priced commodity production end of the food chain where we used to be but where, with our high cost structures, we can no longer afford to operate at.

Some of the other trends and opportunities I believe we will see in dryland farming over the next century are:

1. I expect the trend of increased land consolidation with bigger farming units will continue and probably speed up. The larger farms will become more self contained from breeding right through to finishing so they can meet their contractual specifications to the supply chain they are aligned to. Bigger properties will mean that more innovative ownership structures are operating with leasing, share farming and equity ownership all being more common in dryland farming units. These large land holding entities will own land in different regions and even across several countries to minimise risk. The security around being a producer for a successful supply line will give investors the confidence to expand.
2. What about the traditional family farming unit that is the basis of most dryland farming operations now? At the same time that we have a large corporate type model in farming, there will be another model probably around the family farming unit of niche producers and marketers. There is a hungry world out there demanding a range of products, some which we know nothing about today. Anything will be possible, from producing and marketing free range chickens, to producing high value oil crops, to running animals that produce certain antibodies in their blood and the product you sell is not meat and fibre but blood. Farmers around grape growing regions will be able to relate to this where a vineyard industry developed overnight and an economic unit was not 300 ha but 30 ha. We will move well beyond thinking that we are producers of commodities and instead be using our land and climate to cultivate a huge range of new innovations most of which we have not even thought about.
3. Survival and growth of both models (corporate and family farm) will be dependant on the dryland farmer's ability to innovate. Underpinning that innovation will be the need for an increased investment in R&D for this class of land. A lot of problems need solving such as:
    i. Requirement for drought resistant plants that can perform at their biological optimum with lower fertiliser inputs, particularly legumes!
    ii. Technology to reduce the methane emissions from ruminant animals.
    iii. Opportunities for new, high value crops that perform in our traditional dryland.
    iv. Automation technology to save the cost and the labour requirements of repetitive jobs (shearing, fencing, spraying etc).

    And these are only the ones we know about now.
4. Successful farmers will need strong support teams around them which combine a range of skills. Once such teams are established, tapping into their expertise, enthusiasm and networks can have dramatic results. True synergy, where the output is greater than the sum of the individual parts, will be a critical factor of successful future farming systems.
5. The requirement for a new way of thinking and a new set of skill sets within farming will mean training is even more critical for the industry than in the past. The key new skill mixes will include global supply chain understanding, a partnering and J.V mentality, governance training and very sophisticated interpersonal skills.

Conclusion

Early on in my farm consulting career, I learnt that you could not judge the financial success of a farm by looking over the fence. You had to look at the financial accounts and the results were, more often than not, completely different from what you expected. As we go forward the successful future farming models will be less about the look of the farm or its locality and strengths and weaknesses of individual properties. It will be more about the attributes of the management and governance of the farming business and the ability to innovate.

Continued variability in annual rainfall and environmental pressures will drive the development of future farming systems to ensure farmer survival. Where rainfall is plentiful, the lag time for change can be greater as the system is more secure. All farmers, whether in high rainfall or fully irrigated, will have to evolve and follow in the path of dryland farmers in reshaping their business for the future. The initial changes, as in the

past, will be driven by survival but new opportunities will continue to open up for the smart business operator focused on the customers and their point of difference in the supply chain.

The challenges of dryland farming are as great as they have ever been but probably the opportunities are also bigger than they have ever been. Do not believe anyone who tells you that dryland farming will not survive in the future. I am sure John Lee of Snow Farm in Cadrona Valley did not believe those people that told him that rabbits and *Hieracium* would reduce his viability in the future. The message is that we have to face the challenges and adapt to survive. The future dryland farm will be completely different from what it has been in the past but a farmer, like any other business, just needs to keep adjusting the way they utilise their resources of land, labour and capital to adapt to the changing external environment.

Good luck, it will continue to be an exciting ride.

REFERENCES

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