

# Food Futures

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## **The challenge**

Capturing maximum value from the food that people choose to put in their mouths is still a challenge for farmers. For New Zealand it is a fundamental problem along the agri-food innovation chain: the economy still depends upon commodities and pressure is on natural resources to perform better. Although few New Zealanders would argue with the vision of being 'clean and green', many people miss the point that only by being productive and capturing maximum value, will we be able to afford the technologies that enable the 'clean and green' aspects. Of further concern is the apparently diminishing ability to create the rewards that attract the next generation of great people to implement the new technologies on farm and innovate to create even greater environmental and economic benefits in the future. Increasing regulations around primary production have been stimulated by society and are designed to protect animals and environment. Unfortunately for farmers and regulatory bodies, society doesn't always either understand the implications or support the effects. The Nielsen Global Survey of grocery purchase impact (2012) shows that the price of food is top in consumer decision-making all around the world, and when people feel that they are financially stressed, their purchases move to cheaper options. Since the economic downturn, for instance, the consumption of free-range eggs in New Zealand has decreased, despite increasing pressure on egg producers to remove battery cages. Free-range eggs are more expensive to produce than eggs from hens in battery cages and this is reflected in prices. Similarly, the consumption of pork products (particularly in small goods) from overseas has increased, even though the fact that the pork products are cheaper reflects the use of production techniques banned, restricted or being removed in New Zealand (e.g., growth hormones, prophylactic antibiotics, sow stalls and farrowing crates).

## **Environmental impacts**

Environmental concerns, particularly to do with water, rate highly in awareness of New Zealanders, and cows are considered to be the main perpetrators of deterioration. This is despite the report from the Commissioner for the Environment released earlier this year which suggested that overall water quality is high in New Zealand. Furthermore, an entry on The Ministry for the Environment website ([www.mfe.govt.nz](http://www.mfe.govt.nz)) entitled 'How does New Zealand compare?' states that New Zealand's most nutrient-enriched rivers have about half the average nutrient levels of rivers in Europe, North America, and Asia.

Of further interest is that the Lincoln University Public Perception of New Zealand's Environment Survey (Hughey, Kerr and Cullen, 2010) indicated that 80% of those surveyed considered New Zealand's rivers and lakes to be 'adequate to very good', with less than 5% indicating 'very bad'.

Research has shown that there are some bad river areas; sewage treatment plants are still implicated and efforts are being made to ensure improvements. For farmers being restricted in applying fertiliser nutrients because they are in 'sensitive catchments' there are economic implications. Rewarding production per unit of nutrient input or output, along the lines of 'Buying New Zealand lamb to save the planet' (a recent Northern hemisphere headline for articles reporting that New Zealand lamb is produced with less GHG creation than UK lamb), could be more effective in achieving change than stringent implementation of regulations.

Tatua Dairy Company provides the example. Like other dairy companies it fines farmers when their milk exceeds a threshold in somatic cell count. However, it also rewards farmers when they achieve a consistently low count for the season. Tatua now pays out more in rewards than it receives in fines, and is able to market high value products – and return that value to its suppliers. (Tatua topped the payout this year at \$7.50/kg milk solids; Fonterra achieved \$6.40 for fully shared up suppliers.)

In her report on water quality, Dr Jan Wright, Commissioner for the Environment, concluded that New Zealand will have to decide what trade-offs it wants to make in the future.

Technical fixes will cost money, and money is in short supply. Of further consideration is that Dr Wright's report identifies sediment, rather than the nitrogen and phosphorus nutrients *per se*, as the major challenge in New Zealand. Sediment can be linked to deforestation, tillage, recent soils and sand and gravel extraction. The latter is extremely important for infrastructure development.

Equally, agriculture is vital for the export economy, and on-farm mitigation for nutrient loss costs money. Dr Richard McDowell, AgResearch, has calculated that artificial wetlands cost over \$400 per unit of N and P conserved, fencing is somewhere between \$4 and \$55, Effluent ponds are in the range of \$25 per unit of nutrient saved. A feed pad will be over quarter of a million dollars and a herd shelter over half a million to install.

Although farmers know the cost of mitigation, consumers don't.

### **The price of food**

Consumers do know about the cost of food. Global food prices have increased over the past few years, driven by crop failure and production of biofuel crops rather than food crops. However, as a proportion of salary they have generally decreased. The FAO price index reveals that from the 1960s until 2002 food prices decreased in real terms (with a short increase in the 70s due to the oil crisis). Since 2003 there has been a slight increase and some dramatic fluctuations resulting in food riots in various countries. Overall, however, food is still considerably cheaper as a proportion of household income in developed countries than it was, and the range of products in what now constitutes the average food basket has increased to include what used to be considered luxuries – pineapple, hummus, chicken nuggets, frozen berries, dried apricots and exotic breads. Of further note is that the foods are being bought at a greater state of preparation – note grated cheese, soft butter and pre-washed lettuce as well as 'ready meals' saving time for the consumer.

In contrast, food production costs have increased at twice the rate of the consumer price index (Statistics NZ). The result is that farmers' profits are being squeezed. The Ministry for Primary Industry (MPI) models indicate that the coming year will be tough for a large proportion of farmers and there will be little money available for reinvestment in the farm. This has implications for installation of such things as feed pads, herd shelters, and new effluent ponds, as well as fencing and planting. In OECD countries a component of farm subsidies (which average approximately 20% of gross farm receipt) is directed towards environmental technologies on farm. New Zealand's subsidies are directed at border biosecurity.

### **Technology adoption**

The up-side of no subsidies is clear: farmers respond to market forces. They are also rapid adopters of new technologies when the value is apparent.

Greg Muir, CEO of TruTest, is already on record saying that New Zealand farmers are adopting electronic tracing at a much faster rate than farmers elsewhere. In his view the National Animal Identification and Tracing scheme (NAIT) has moved from being 'a compliance cost to a productivity tool 'helping to manage stock better and improve

production and farm returns by understanding animals at an individual level'. The benefits are rapid in dairy businesses with animal weight and milk yield recordable on a daily basis. For sheep and beef farmers, where the emphasis is still mostly on flock and herd performance, new technologies that will allow the cost effective measurement of reproductive performance (dam weight, conception, weaning weights) are still being developed. Similarly, pasture measurement and precision irrigation on hill country is not as advanced as on flat land, but research is underway.

The path to the future lies in rapid uptake of new technologies, but cost effective technologies proven to work in farm systems take considerable funding in research and development. Although farmers are investors in R&D through taxes, rates, levies and co-operative companies in which they are shareholders, the amount of funding actually spent in total in New Zealand is small.

The Pure Advantage report 'Green Growth: opportunities for New Zealand gives 'increased R&D spend' as opportunity one. The recommendation is to achieve the OECD average share of R&D in GDP within 10 years, set the government's vision and policies for green innovation and leverage a significant increase in private sector R&D. Professor Lord Nicholas Stern, London School of Economics, has described the recommendations in the report as 'Incredibly attractive' He believes that green growth transition 'can protect New Zealand's current competitive advantage and globally respected clean green brand, and create new sources of wealth'. Clearly R&D investment should be in areas which will support economic growth while minimising environmental impacts.

The Green Growth report gives three specific recommendations for agriculture (opportunities 13, 14 and 15). Improving the allocation of water to ensure that it goes to the most valuable uses, taking the needs of the environment into account is first. Improvement of water quality and resource efficiency by increasing the efficiency of fertiliser use is also included. The recommended actions focus on investing in infrastructure and designing cooperative programmes and incentives for farming methods that improve efficiencies. Opportunity 14 is to 'develop information technology and communication systems to help farmers economise on inputs'. The recommended action is to build on existing initiatives by bringing together farmers, industry groups and research providers. These groups already exist, and are at least in part responsible for the 'Buy NZ lamb to save the planet' headline. Doing better requires greater incentives to change from Business as Usual – recognising the increasing levels of debt being recorded by the Reserve Bank of New Zealand (RBNZ). In particular the RBNZ notes that the farms most in debt are those that have been investing significantly more than average; purchase, installation and implementation of new technologies requires investment, but when the value is clear, farmers adopt rapidly.

Opportunity 15 (the last of the three recommendations for agriculture) recommends prioritising low carbon agriculture when increasing public R&D expenditure, and continuing to support research into reducing GHG emission from agriculture. 'Buy NZ lamb to save the planet', a headline from the British papers last week, shows that NZ production systems are already considered to be efficient in terms of GHG production. Doing even better, and expanding the headline to 'Buy NZ grown to save the planet', would assist the marketing of 'New Zealand-made: sustainably-produced food'.

### **Recruitment and education**

When the value of the industry supporting sustainably-produced food is recognised, recruitment into the industry will become easier. Latest (20<sup>th</sup> November 2012) figures from the Ministry of Education indicate that there were 22,2820 bachelor degree graduates in 2011; only 288 were in the category 'Agriculture, Environment and Related Studies'. In 2010 there were 223 graduates in this category, of which 100 were in agriculture; the 2011

breakdown has not yet been released. It is important to note, however, that in 2008 there were only 40 graduates in agriculture (of 20,863); the steady increase to 2010 reflects overt statements by the then Minister for Agriculture, the Hon Jim Anderton, that the agriculture industry needed 'the brightest and best', plus the opportunities being created by the dairy boom. Salaries have increased in the agribusiness sector reflecting the shortage of graduates with the necessary background. The New Zealand Herald feature by Simon Collins under the general heading of 'Skills Crisis', supports the statements that have been made over the years. Under the headline 'Tragic skills mismatch shuts rising generation out of jobs' (19<sup>th</sup> November) Simon Collins said that 'Half (52 per cent) of our 130,000 students studying bachelor's degrees last year were enrolled in "society and culture" subjects such as languages, law and social sciences, compared with only 12 per cent in information technology and 4 per cent in engineering.'

Agriculture is too small a sector to mention... yet still supports the economy.

Simon Collins states that education can never be solely about jobs. "It also needs to prepare young people to be citizens and parents, and to help them develop their full potential to contribute to the world in whichever ways they choose. But most young people do want jobs, and clearly we could be doing better to help them. That seems bound to involve tying educational funding increasingly to helping students plan for jobs and actually getting them into jobs or further training after their courses."

Few would disagree – but it is Cal Newport, writer and assistant professor in Computer Science at Georgetown University who has identified at least part of what has gone wrong in present thinking. He has challenged the belief that 'follow your passion' is good advice. In his new book 'So Good They Can't Ignore You: Why Skills Trump Passion in the Quest for Work You Love', he points out that pre-existing passions are rare and have little to do with how most people end up loving their work. Furthermore, he believes that the advice can be dangerous, leading to anxiety and chronic job hopping. His research indicates that passion comes after you put in the hard work to become excellent at something valuable, not before. Hence what you do for a living is much less important than how you do it.

Dr Newport's findings could result in even more confusion in schools in terms of advising what subjects to take, but though all disciplines are important some are more likely to lead to employment than others. Signals are required.

In September the UK Education Secretary stated that league tables are to be scrapped in their current form and a focus on traditional subjects will be required to stop schools promoting 'soft subjects'. Internal assessment is being scrapped and subjects will be wholly end of course exams. New courses in English, maths and science (which will be split into biology, physics and chemistry), foreign languages, history and geography will be introduced in the next few years. A new suite of qualifications will be created for other subjects such as art, religious studies and design and technology. The changes have been welcomed by business leaders who condone rigorous assessment in the school system as part of raising achievement.

### **The future**

For New Zealand, the path should be clear. In order to capture the imagination 'flavour to farm' we need great people right through the value chain who understand the complexities of the Agri-food system upon which the country depends. The government can assist by encouraging participation in science at school and university, sorting out the science funding system so that people can see scientific research as a rewarding career, and ensuring that adoption of technological advances are taken up by industry by setting policies based on scientific research and evidence that enable improved performance while rewarding adopters of best practice. Innovation is the key from farm to fork – great people empowered to do great work for a great industry.