

# **Increasing uptake of environmental practices on sheep and beef farms**

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## Executive Summary

Water quality issues are at the forefront of people's minds at present. The sheep and beef sector is coming under increasing pressure to 'do their bit' to improve water quality on farm. This is not necessarily a straight forward task, and there are a number of barriers preventing widespread action. The sector is also coming under pressure to produce more in an increasingly resource constrained environment.

The aim of this project was to investigate sheep and beef farmer views on barriers to uptake of environmental practices on-farm, seek sheep and beef farmer views on how the industry might improve uptake of environmental practices on-farm to manage the challenges ahead and test these views with environmental activists.

Thirteen sheep and beef farmers in the Waikato (including Taumarunui) and Bay of Plenty Region who were considered to be relatively innovative and involved in the industry were interviewed on a range of questions relating to environmental practices on farm. In addition, four environmentalists were interviewed to test some of the farmer views on them and get their perspective. A trustee from the Grasslands Trust was also interviewed as well as an ecologist from the Land and Water Institute in Australia.

The major impacts sheep and beef farming are having on water quality is through nitrogen leaching and phosphorus, sediment and faecal coliform run-off. There are a number of practices to mitigate these impacts such as riparian fencing and planting, erosion control on steep hill country, avoiding pugging and compaction damage, smart use of fertiliser and sensible management practices with crops, particularly in winter.

The farmers interviewed had undertaken a range of practices on their farms. Their motivations for these practices were generally related to management benefits such as improving animal health and safety, or ease of grazing management. However, they also had an understanding of mitigating their environmental impact. Most of the farmers interviewed wanted to undertake more practices, and the primary barrier to this was unsurprisingly, money. Other barriers for either the farmers interviewed, or their view on the barriers for other farmers were knowledge and understanding, attitude, fear of rules,

the maintenance requirements, and not understanding the benefits in a practical or economic sense.

Farmers generally were well aware of their land use capability and used stock classes and numbers appropriately to manage this. They understood the need for erosion prevention on the hill country and most had undertaken practices to mitigate this impact. Most had fenced some waterways, or were in the process of fencing them and they understood that this was a good thing to do. There was limited understanding around nutrient management, why it was important and what value it had for the farming business, with the exception of Taupo farmers who have regulatory requirements. The independence of the advice coming from fertiliser companies was questioned by all of the farmers. Farmers mostly acknowledged that their farming system impacted on waterways and a limited number talked about greenhouse gas emissions. The environmentalists were focused on water quality, greenhouse gas emissions and biodiversity loss.

There were mixed results for information availability and transfer as well as the time frame for the uptake of environmental practices for the majority of farmers. Many farmers felt the information was all available to undertake environmental practices on their farms, there were challenges with getting independent or trustworthy advice, and practical advice that was relevant to the individuals. The relationship farmers had with regional council staff appeared to have an influence on the quality and quantity of farmer's on-farm environmental practices, and many stressed that a positive relationship was critical to being able to work with council.

A collaborative approach to dealing with water quality issues was suggested by most, with environmentalists accepting that it was the best approach but being wary of the potential pitfalls in terms of resourcing, time to get a result, and the potential for a soft solution that actually requires a more hard-nosed approach.

Farmers favoured a voluntary framework for managing water quality, while environmentalists favoured a regulatory approach. Most of the interviewees acknowledged that to get the majority of farmers to act, some rules would be required.

There were mixed views on what the approach could look like, but a cross-sector, collaborative approach was a common theme.

Based on the information collected in this study, and supported by others, the following recommendations are made:

1. That a collaborative approach is required in addressing these issues, which needs agreement on the problem and agreement on the objectives to coming up with the solution.
2. Information transfer under any sort of approach (voluntary or rules based) needs to be farmer focused, practical, talk about the benefits, be well supported, reward good behaviour, and acknowledge it takes time.
3. The way farmers do business currently is not likely to remain viable when nutrient limits are placed on farmers because the rate of cost increases exceeds the productivity gains and financial returns. Adding value to the products sheep and beef farmers produce is therefore required for businesses to remain viable. Industry leaders should play a role in changing the way we do business to ensure products are receiving the highest value possible in the markets.
4. A Mentor Scheme should be established using farmer 'Environmental Champions' to help other farmers improve practices on-farm. This could be one-on-one or with small groups, and link in to existing groups.
5. A website should be put together as a one-stop shop for environmental practice on-farm that's very practical, easy to understand and shares stories of farmers who have made it work on their farms.
6. Regulations which set minimum and maximum standards will be required to help ensure the outliers take action. Peer pressure from other farmers will also play an important role in ensuring all farmers are conforming.

The challenge of environmental management on sheep and beef farms in New Zealand is one which requires action now. There is a long road ahead and it will require buy-in from all parts of the industry and those with an interest in what happens in the industry. The approach needs to be collaborative, industry-wide and we need to protect our competitive advantage of being clean and green. Most importantly we need farmers to be part of the solution.

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## Foreword

I was motivated to undertake this research for a number of reasons. Firstly, my current role is as Extension Manager for Beef + Lamb New Zealand in the Mid Northern North Island. Therefore, in my daily role I liaise with farmers with the expectation that my role will assist the understanding and technology transfer of methods to increase profitability while also increasing environmental sustainability. Secondly, I strongly believe that the sheep and beef industry need to be looking after the resources their business is built on (land and water) to ensure the long-term financial viability of the industry. Thirdly, I hope future generations are able to swim in our waterways in the same way that I did as a child and still do as an adult. Finally, I want to see a vibrant sheep and beef sector producing a healthy, valued product from land that is well managed while sustaining local communities. Not too much to ask!

## Acknowledgements

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I would like to offer a special thank you to the farmers who showed superb hospitality, gave me open and honest answers and shared a piece of your paradise with me. I was humbled. You are all industry leaders in my opinion.

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## **Introduction**

The sheep and beef industry has been progressively coming under pressure to increase the sustainability of productivity to meet environmental expectations on-farm, particularly with respect to waterway management. The industry is likely to face nutrient limits of some description in the near future (if they haven't already, such as in Taupo). Farmers are also under pressure to produce more or higher value products to contribute to the Government's economic growth agenda and to remain financially viable themselves. In a resource limited environment, there is often a clash of objectives.

The ability and inclination of sheep and beef farmers to make practice changes that are more environmentally focused needs to be examined from the farmers' perspective to ensure a robust path forward for the industry that ensures long-term sustainability environmentally, economically, socially and culturally. The perspective of the growing 'green' political movement is also valuable in developing a path forward for the industry to ensure the objectives of all parties are met where possible.

The aim of this project is to investigate sheep and beef farmer views on barriers to uptake of environmental practices on-farm, seek sheep and beef farmer views on how the industry might improve uptake of environmental practices on-farm to manage the challenges ahead and test these views with environmental activists.

The information gathered to compile this report is not quantitative as the number of farmers interviewed was not sufficient to provide any statistical analysis of the data. The intention is to provide an understanding of some of the motivations and behaviours of the farmers and environmentalists interviewed rather than provide a quantitative analysis.

# **1. Literature review**

## **2.1 Sheep and beef farming in the Waikato/Bay of Plenty**

There are approximately 12,500 commercial (excludes lifestyle blocks) sheep and beef farms in New Zealand approximately 2,100 of these are within the Waikato/Bay of Plenty. Farms in the North Island are classified by Beef + Lamb New Zealand into three classes depending on topography, stocking rates, and stocking policies. The classification is based on a whole farm system rather than classifying areas within a farm (i.e. a farm is either class 3, 4 or 5 even though they might have easy contour areas as well as hard hill country). Class 3 is Hard Hill Country, Class 4 is Hill Country and Class 5 is Intensive Finishing Farms (Beef + Lamb New Zealand, 2012a; Jamieson, 2012).

Dairy support is now reasonably common in sheep and beef farming systems in the region with the Ministry of Agriculture and Forestry (2011) reporting 19% of income coming from dairy grazing.

## **2.2 Water quality issues attributed to sheep and beef farming**

### **2.2.1 Nutrient losses**

Nitrogen and phosphorus originate from animal and human waste, soil, plant material and fertilisers. Nitrogen in the form of dissolved nitrate seeps through the soil to groundwater in a process known as leaching where it then moves into waterways via underground flow. Phosphorus runoff occurs when soils are exposed (in pugged areas, tracks, cultivated ground etc) during wet weather as the phosphorus attaches to soil particles. It is a problem if the dirty runoff reaches waterways. Direct application of fertiliser can also result in phosphorus entering waterways (Waikato Regional Council, 2008).

Nitrogen and phosphorus are of particular concern as they enhance the growth of algae causing water quality to deteriorate. High levels of algae reduce water clarity, make water green in appearance, block up water filters and pumps and can choke small waterways. When the algae die, the bacteria that break down the dead material use a lot of oxygen. This can deprive waterways of oxygen, impacting on flora and fauna in the waterway. High nutrient levels in waterways can also trigger the growth of toxic blue-green algae which are dangerous to humans and animals and have been linked to cattle

deaths in the Waikato. Most nitrogen entering waterways from grazed farmland comes from stock urine (69%) as the nitrogen in urine is more than the plants are able to take up. If water is held long enough in waterlogged soils, seeps or wetlands, bacteria convert nitrogen into a gas which then ends up in the air rather than the water. Although this can improve water quality, one of the gaseous forms of nitrogen is nitrous oxide which is a harmful greenhouse gas (Waikato Regional Council, 2008).

Nutrient losses of nitrogen and phosphorus for sheep and beef farmers in the Waikato have been modelled using OVERSEER® (version 5.4.3) by Judge and Ledgard (2009) using Beef + Lamb New Zealand Economic Service data for the average farms of class 3, 4 and 5 land (2.1 refers). The modelled information showed that as the topography flattens and stocking rates increase, Nitrogen losses increased as shown by the modelled results of 10, 14, and 16kgN/ha/year for class 3, 4, and 5 respectively. The opposite was the case for Phosphorus losses which were found to be higher on steeper land, as soil particles are mobilised with surface runoff or when erosion occurs. Phosphorus losses were 2kgP/ha/year for class 3 and 4 land, and 0.5kgP/ha/year for class 5 land. By comparison the average nitrogen leaching rate for dairy farms in the Waikato was 38kgN/ha/year and for phosphorus, was 0.8kgP/ha/year.

### **2.2.2 Soil compaction and pugging**

Intensive stocking rates and/or hard grazing during wet conditions can result in pugging and compaction damage to soils which then leads to reduced water holding capacity and infiltration by decreasing the air spaces in the soil. This can lead to an increase in overland flow resulting in greater loss of contaminants to surface water such as phosphorus, sediment and faecal microbes (Houlbrooke & Laurenson, 2011).

### **2.2.3 Faecal bacteria**

Animal faeces can carry disease-causing micro-organisms such as bacteria. These can enter waterways when stock are moving through streams or when there is surface runoff from the land into waterways (Waikato Regional Council, 2008).

### **2.2.4 Sediment**

Sediment enters waterways in surface runoff as soil and particles are washed off the land, or when unstable banks slump into waterways. The land cover, soil type and slope

are strong determinants of the amount of sediment runoff. Major slips that occur during high rainfall events contribute large quantities of sediment to waterways. Sediment contributes to the turbidity or murkiness of waterways. High turbidity blocks sunlight which can cause aquatic plants to die, impacting on the waterway ecosystem. It also impairs the vision of fish for hunting and navigation. Accumulated sediment can also cause problems in harbours and estuaries by smothering shellfish and promoting mangrove growth (Waikato Regional Council, 2008).

### **2.3 Environmental practices on sheep and beef farms**

A report prepared by Davies (2012) for Waikato Regional Council provides a summary of the practices relevant to addressing water quality issues. These are outlined below with the relevant references sourced by Davies (2012).

#### **2.3.1 Winter grazing management**

The winter months are generally wet and soils often hold their moisture over this period. Thus, this is generally a high-risk time for potential environmental impacts on waterways. Houlbrooke & Laurenson (2011) suggested one strategy is to relieve stocking pressure by either reducing the stocking rates, or by decreasing the time on the paddock. Break feeding and rotational grazing can relieve stocking pressure, as can shifting stock more regularly and back fencing to reduce treading damage (Beef + Lamb New Zealand, 2011). This can be done by utilising paddocks that are less susceptible to, or with grazing off facilities such as a standoff facility which is not considered very economic or practical for most sheep and beef farmers. Nitrogen losses are greatest from stock urine, therefore reducing stock numbers over winter is the best strategy to reduce nitrogen leaching at a period when leaching rates are high (Betteridge *et al.*, 2009; AgFirst Waikato, 2009).

The use of sacrifice paddocks, a practice used by some farmers, is not recommended because they can result in treading and compaction damage due to high stocking rates (generally) and these impact on the level of phosphorus runoff. Sacrifice paddocks, if used, should not be near waterways and feed should be distributed throughout the paddock to avoid concentrating areas of damage (Waikato Regional Council, 2008).

Where using winter crops, soils should not be left exposed for long periods of time to reduce the risk of runoff, sediment loss, faecal contamination and direct losses of nitrogen (Davies, 2012).

### **2.3.2 Riparian management**

Phosphorus, sediment and faecal bacteria can all be prevented from entering waterways by preventing stock from accessing the waterways and damaging the banks. Wetland areas can reduce nitrate levels so should also have stock excluded. Riparian planting helps stabilise banks and also acts as a filter for soil particles travelling overland in surface runoff (Legg, 2004).

Riparian management is not as effective for reducing nitrogen in waterways as nitrogen generally enters through the ground water (Waikato Regional Council, 2008).

### **2.3.3 Nutrient management**

Nutrient budgets such as OVERSEER® are a model used to understand inputs and outputs and they can be used to predict nitrogen leaching and phosphorus runoff. This information can then be used to determine where nutrient savings can be made (particularly in terms of fertiliser use) as well as understanding inefficiencies in the production system (Davies, 2012).

A Nutrient Management Plan provides an extension of the Nutrient Budget to consider the whole farm system and identify how the losses of nutrients can be reduced.

### **2.3.4 Smart use of fertiliser**

There are a number of strategies farmers can employ to use fertiliser more effectively to ensure a productive response as well as minimise losses of nutrients to waterways.

- Strategic use of nitrogen at the appropriate time of year which means avoiding use in winter when leaching is high and applying nitrogen 4-6 weeks before there is a feed deficit to ensure uptake by the pasture at the appropriate stage of growth (Davies, 2012). Nitrogen application rates of 20-60kg/ha are generally appropriate (Beef + Lamb New Zealand, 2011)

- Avoid applications of soluble phosphate fertiliser during high risk months (May to October) and consider slow release forms of phosphate fertiliser such as Reactive Phosphate Rock (RPR) which is pH dependent (Davies, 2012).
- Olsen P levels should be maintained within recommended ranges of 20-30 for volcanic ash and sedimentary soils and 35-45 for pumice and peat soils for both production and environmental benefits (Ritchie, 2007).

### **2.3.5 Reducing soil and phosphorus loss**

Soil conservation is important economically as this is the medium on which pasture and crops grow to produce food for the animals to convert into meat, fibre and milk. It is important for water quality to reduce phosphorus losses. Controlling erosion and sediment sources particularly in upper catchments by planting or retaining ground cover, stock exclusion and drainage in some cases is recommended. Running lighter, faster growing stock in sensitive areas or excluding altogether (such as steep slopes and near waterways during winter) reduces soil damage and therefore runoff. Using production forestry, retiring areas or planting bush on steep southern slopes with low production value also reduces erosion risk (Davies, 2012).

### **2.3.6 Hot spot management**

Nutrient losses can be increased on areas such as poorly maintained tracks, silage pits, and offal holes. This can be reduced by having good designs and ensuring areas are well maintained (Davies, 2012).

## **2.4 Current rules, regulations and legislation**

Understanding rules and regulations can be a complex process. The following briefly summarises some of the areas where there are restrictions for sheep and beef farmers with respect to on-farm activity in the Waikato/Bay of Plenty Regions.

### **2.4.1 Bay of Plenty Regional Council (formerly Environment Bay of Plenty)**

The Regional Land and Water Plan promotes the sustainable and integrated management of land and water resources within the Bay of Plenty Region. The Plan addresses issues of use, development and protection of land resources, geothermal resources and freshwater resources, including the beds and margins of water bodies.

The Bay of Plenty Regional Council is also implementing Rule 11 to protect lake water quality. Nutrient benchmark for all properties greater than 4,000m<sup>2</sup> will be set in the five lake catchments of Rotorua, Rotoiti, Rotoehu, Okareka and Okaro.

Water metering is also being implemented with all consent holders taking 5L/s or more required to install water meters to monitor their water take.

#### **2.4.2 Waikato Regional Council (formerly Environment Waikato)**

Waikato Regional Council provides a Permitted Activity Guide which outlines the activities on-farm that do not require a resource consent as long as farmers comply with the conditions outlined in the Waikato Regional Plan. The guide provides a comprehensive coverage of topics of relevance to sheep and beef farmers for example stock in water bodies, fertiliser and agrichemical use, bridges, culverts, earthworks and vegetation clearance, dams and damming water, drain construction and clearing to name a few. Where farmers are unable to comply with the conditions of the permitted activities then they must apply for a resource consent (Waikato Regional Council, 2012).

The Waikato Regional Plan applies across the whole region and contains objectives, policies and implementation methods in a number of areas. Water specific issues in the Plan are: matters of significance to Maori, water quality, flows and levels, water takes, efficient use of water, discharges, damming and diverting, wetlands, drilling, non-point source discharges, structures on the beds of rivers and lakes, river and lake bed disturbance, accelerated erosion, discharges onto or into land, contaminated sites (Waikato Regional Council, 2012).

In addition, Waikato Regional Council has Variation 5 to protect water quality in Lake Taupo by managing land use and nutrient discharges. This means there is a cap on nutrient leaching for farmers in the Taupo Catchment (Waikato Regional Council, 2012).

The Council also has Variation 6 in place to manage the allocation and use of fresh water over all of the Waikato Region (Waikato Regional Council, 2012).

### **2.4.3 Co-management legislation**

“Recent co-management legislation for the Waikato and Waipā rivers requires the council and river iwi to give effect to the Vision and Strategy for the Waikato River/Te Ture Whaimana o Te Awa o Waikato. The council and river iwi must together find solutions to the increased pressures on the rivers. The iwi partners in this project are Ngāti Maniapoto, Raukawa, Ngāti Tūwharetoa, Te Arawa River Iwi and Waikato-Tainui. The Vision and Strategy focuses on restoring and protecting the health and wellbeing of the river for future generations. It applies to the river itself, and to activities in the catchments affecting the river, including the Waipā River, its main tributary.” (Waikato Regional Council, 2012).

### **2.4.4 National Policy Statement for Freshwater Management**

“The National Policy Statement for Freshwater Management sets out objectives and policies that direct local government to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits. The national policy statement is a first step to improve freshwater management at a national level.” A key purpose of the statement is to set enforceable quality and quantity limits that reflect local and national values (New Zealand Government, 2011).

The statement says that “once limits are set, freshwater resources need to be allocated to users, while providing the ability to transfer entitlements between users so that we maximise the value from water” (New Zealand Government, 2011).

The policy sets a national direction but suggests the management of the resource needs to reflect the catchment-level variation between water bodies and different demands on the resource across regions (New Zealand Government, 2011).

## **2.5 Voluntary frameworks**

Both Regional Councils have initiatives to support farmers in enhancing water quality on-farm. These funds help farmers with some of the costs of fencing and riparian planting, particularly in sensitive areas and are provided on a case-by-case basis.

The dairy industry has had the Clean Streams Accord since 2003 which provides a framework for actions to promote sustainable dairying in New Zealand. It focuses on

reducing the impacts of dairying on the quality of New Zealand streams, rivers, lakes, ground water and wetlands. The targets are around stock exclusion from streams, rivers and lakes; regular crossing points having culverts or bridges; nutrients managed effectively to minimise losses; effluent treated and discharged appropriately; and wetlands protected.

No such framework exists for the sheep and beef sector at this point. Beef + Lamb New Zealand are currently in the process of promoting the revised Land and Environment Planning Toolkit to assist sheep and beef farmers in understanding land and environmental issues on their farms and developing a plan to manage them. The intention is that all sheep and beef farmers will be able to access the toolkit through a free workshop in their local area with expert advice on-hand.

## **2.6 Land use history**

In order to understand current land use and on-farm behaviour, it is important to understand some of the recent New Zealand history with regards to land development. Of particular relevance to this research are the Livestock Incentive Scheme 1976, and the Land Development Encouragement Loans. These schemes are relevant to current farming practices because many of the sheep and beef farmers today, also farmed under these regimes, and were therefore influenced by them.

During the 1960's, Government became increasingly concerned with sheltering the traditional pastoral industries from the reality of the overseas market place. Instead of allowing the market to drive behaviour, a suite of assistance measures and subsidies were put in place (Rayner, 1990). In 1976 the government introduced the Livestock Incentive Scheme (LIS). It was administered by the Rural Bank and offered a combination of low interest loans, and/or reductions of loan principal and tax rebates if certain livestock expansion targets were met (Tyler & Lattimore, 1990). In 1978 the Land Development Encouragement Loan (LDEL) Scheme was introduced. This scheme was also funded through the Rural Bank and included interest free loans and reductions in principal for farmers if certain land development targets were met. The aim was to increase production, particularly on marginal land (Tyler & Lattimore, 1990).

The schemes were colloquially known as the skinny sheep schemes, and there was a sharp increase in sheep numbers recorded following the introduction of the Livestock Incentive Scheme (Reynolds & SriRmaratnam, 1990). Numbers peaked at 70.3 million in 1982 (Statistics New Zealand, 2011). The numbers have been falling ever since, although production per animal has improved substantially. Total sheep numbers have fallen 45% (from 58 million to 32 million) since 1990 with total lamb meat exported only dropping 1% (Beef + Lamb New Zealand, 2012b).

The change in land use was also dramatic with the introduction of the schemes causing a similar impact on vegetation clearance as the wool boom during the Korean War in the 1950's (Taylor *et al.* 1997).

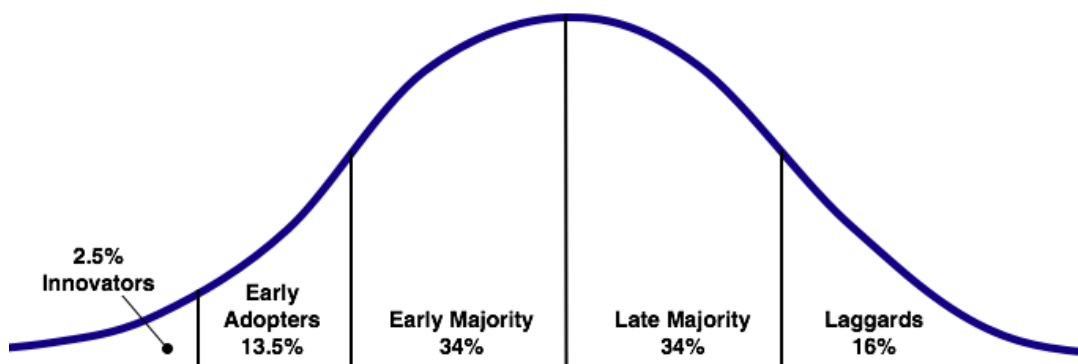
**“Agricultural pressures on the land are driven largely by economics and have fluctuated with export prices and past government subsidies. High market prices caused farmers to convert forest to pasture during the 1950s wool boom, and government subsidies for pastoral farming had the same effect in the 1970s and early 1980s. Since the incentives ended in the mid 1980s, sheep numbers have declined and several thousand hectares of pasture has been converted to exotic pine forests. An even larger area of marginal pasture on steep erodible slopes has been left to regenerate in scrub and native forest.” – State of the Environment Report, 1997 –**

The removal of subsidies in 1985 was one of the defining characteristics of the current farming generation who went from being incentivised to have excessively high stock numbers and a ‘slash and burn’ mentality to maximise production output on-farm, to a whole new-look industry where productivity gains were required to meet growing on-farm costs. This highlights the level of influence Government policy has on farmer behaviour and helps explain some of the behaviour seen in farmers today.

## **2.7 Behaviour change and adoption**

In order to understand what the barriers to uptake of environmental practices are, it is important to have an understanding of how farmers respond to innovations, management practices and government policy.

Adoption of innovations and management changes has been described as a bell shaped curve, initially by Rogers and Shoemaker (1971) and again by Rollins in 1993. The bell shaped curve is widely used amongst extension and technology transfer practitioners to focus activity. Figure 1 shows the bell shaped curve which describes the population. The first 2.5% of the population are the innovators. Innovators are described as venturesome, eager to try new ideas, have more cosmopolitan social relationships, and often communicate with, and belong to, a group of innovators. They have reasonable financial resources, and strong technical understanding. Early adopters make up 13.5% of the population and are generally more localised than innovators, generally have the greatest degree of opinion leadership and often are looked to by other adopters for advice and information and are therefore key people in achieving positive behaviour change. The early majority are 34% of the population and adopt before the average time. They tend to deliberate for some time before adopting an idea and follow the early adopters willingly but will seldom lead. The late majority also make up 34% and tend to be sceptical and cautious in their approach. They do not adopt until most others in their social systems have done so and social norms need to favour the innovation or practice before they are convinced. The final group are the 16% of laggards. These are traditionalists who have a propensity to be guided by the decisions of the past, are very suspicious and allow a long time to elapse before adopting an innovation or practice.



**Figure 1** Adoption curve as described by Rogers and Shoemaker (1971)

Using the bell shaped curve to describe a population and the way people behave suggests targeting innovators and early adopters for new practices and innovations. It also suggests that any barriers they may face will be experienced throughout the population.

There are a range of factors influencing the rate of adoption of innovations or changes to current practices. The characteristics of an innovation such as relative advantage, complexity, ability to trial it and ability to observe it are important (Rogers & Shoemaker, 1971; McManus & Powe, 2007). The characteristics of an individual such as time availability, level of education, approach to risk, what advice and from whom they receive it and their personal and family circumstances have significant influence (Rogers & Shoemaker, 1971). There are also a number of on-farm factors including the type of land, climate, topography, which often determine which type of farming system is run on a piece of land and often determines the level of flexibility in a system.

Often forgotten elements of adoption of new practices are the social factors that influence the rate of adoption. This has been described by Vanclay (2004) who suggests for most farmers, farming is not a vocation, it is a way of life and there is a very strong connection to the land and the environment in which the land is situated. Changes to the farming system are generally carefully considered in the context of an individual farm – what is suitable for one farmer is not necessarily suitable for all farmers. Significant decisions are generally not made by an individual and women have an integral role to play which is often overlooked by outsiders. There are usually very legitimate reasons for non-adoption of practices that may not be obvious to the average bystander as the reasons can be very farm or family specific.

The means of communication are also central to the ability for a farmer to alter their behaviour. Mass media extension, such as field days, monitor farms, and printed media, are good at raising awareness of innovations, but the greatest level of adoption follows one to one interaction between a farmer and an advisor (Rogers and Shoemaker, 1971). The 'advisor' position is often not one person and can include farm consultants, bank managers, neighbours, friends, family, other farmers, sales reps, industry body representatives and more (Rogers and Shoemaker, 1971). In total, farmers are exposed to a wide range of communication types and levels in all aspects of their farming business, and communication is only effective at creating change if the sender has a comprehensive understanding of the context in which the receiver interprets the information. Thus, farmers are more likely to take advice from those who are closer to

their business (i.e. family and friends), than someone more detached such as a Government official (Boxelaar *et al.*, in Journeaux, 2009).

More recent work in Australia describes a framework for understanding farmer behaviour. The Derived Attitudinal Farmer Segments (DAFS) method was developed in conjunction with Dairy Australia who wanted to understand their client base better. The method was identified to better target technology development, extension and communication. The DAFS method has particular strengths in accounting for both individual and situational characteristics of farms and farmers (Waters *et al.*, 2009). The method effectively divides farmers into groups depending on these individual and situational characteristics.

**“Farmers are motivated by a diverse range of drivers and constrained (and enabled) by a range of social, cultural, economic and physical factors. Farmers will therefore react in different ways to external drivers of change and will respond differently to encouragement, incentives and legislation aimed at influencing their farming practice.” (Thomson, 2008 in Waters *et al.*, 2009).**

The attitudinal characteristics that differentiate the segments or groups in the Waters *et al* 2009 study include: the importance of providing for the next generation, the relative emphasis on self-reliance and knowledge, aversion to risk, level of sustainable improvement, business acumen, tradition and perceived financial pressure. They suggest that attributing a title to a segment can result in value-judgements being made. However, to enable targeted dialogue to begin it can be helpful to name the segments or groups identified in the study.

Waters *et al.* (2009) identified six groups of dairy farmers.

1. The ‘Family First’ group were 5.5% and as the name suggests, are driven by their families, are risk averse, lower than average business orientation and lower than average on sustainable improvement and adoption of new practices, they also are difficult to reach, being self-reliant for information.
2. The ‘Winding Down’ group make up 3.6% of the population, are not necessarily motivated towards sustaining or improving their business, are very risk-averse,

difficult to motivate, tend to have a lower level of formal education than the average, below average production, very low adoption rates, and prefer others to try new things first.

These two groups could be compared to the laggards identified in the Rogers and Shoemaker (1971) study.

3. In contrast, a total of 17% of the population were in the 'Love Farming' group; these farmers are positive about the future, motivated for the next generation, willing to improve the business, not under financial pressure to the same extent as the majority, are very responsive to research and development, have higher levels of education, tend not to use consultants and advisors, but do attend discussion groups, and prefer information to be very practical rather than academic. They could be described as the early adopters in the Rogers and Shoemaker study.

The second three groups make up the majority of the population, and all adopt new technologies and practices, just at different rates depending on circumstances.

4. The 'Established and Stable' group (24.9%) are self-reliant, risk-averse, value tradition, not particularly concerned about intergenerational transfer, under financial pressure, relatively low levels of formal education, lower than average adoption of practice changes, tend to have an aversion to other farmers, consultants and discussion groups as information sources. These farmers might be compared to the late majority in the Rogers and Shoemaker study.
5. The 'Open to Change' group make up 21.5% of the population. These farmers enjoy running their business, are motivated to develop sustainable and successful businesses, are prepared to take calculated risks, are not particularly bound by tradition and are less likely to be motivated by intergenerational transfer, they are not under financial pressure, are willing to take on new information, ideas and technologies and use consultants. They are generally younger than the average and have higher levels of formal education. When compared to the Rogers and Shoemaker study this group could be described as a combination of the innovators and early adopters.

6. The final group are 'Growing for the Kids' at 27.4%. These farmers are running a sustainable business, keeping up the tradition and looking to the future of the farm. They are risk aware and moderately financially constrained. They are willing to listen to information and motivated to adopt practices that improve profits, lifestyle and/or ensure intergenerational success. They are older than the average and are more likely to use consultants and advisors. They would be described as the early majority in the Rogers and Shoemaker study.

This study suggests there are a greater percentage of farmers who are more rapid at adopting new technologies and practices than the Rogers and Shoemaker 1971 study suggested. Perhaps this is indicative of a shift in the nature of the farming business in the past 40 years to be more responsive to change.

In a different study investigating the flexibility of farms, Kaine *et al* (2010) described two ways that farms can manage critical inputs like water. One is by substituting other inputs for the critical input. The other is to change the output mix to reduce the dependence on the critical input. The ability to do both of these things is limited by the long production cycles in agriculture, the capital investment reduces flexibility and there are technical constraints imposed by technology. Farmers utilise tactical flexibility to respond to a change in a critical input and this will depend on the capacity of a tactic to match the variability in an input, and the number of tactics available. Farmers will also use strategy to manage variation. Strategy is the group of objectives for the farm system and how these will be pursued in a given environment. The greater the capacity to alter the mix of outputs on-farm without changing the objectives for the system, the greater the strategic flexibility of the system. When farmers are unable to use tactics to sufficiently substitute for variable inputs then the mix of outputs they use needs to change to reduce the reliance on the outputs.

On the basis of the above, Kaine *et al* (2010) illustrate four classifications of farm flexibility.

1. 'Rigid farm systems' are characterised by having low tactical flexibility and low strategic flexibility. These farms have limited tactics available and limited capacity to substitute inputs or change output mixes. Examples include specialist crop enterprises or pasture-based dairy systems.

2. 'Robust farm systems' have high tactical flexibility and low strategic flexibility. There are several tactics available to cope with variability, therefore, a greater ability to substitute inputs than the rigid type. However, they are limited by low strategic flexibility. A cut-and-carry dairy system is a good example.
3. 'Elastic farm systems' have high strategic flexibility but low tactical flexibility. This means they have an ability to alter output mix while maintaining system purpose. They switch between strategies so tend to not be enterprise specific. Investment is constrained because of the variety of outputs so they have a low level of tactical flexibility.
4. 'Plastic farm systems' are high in tactical and strategic flexibility but due to the biological constraints in farming systems, it is difficult to find an example of this type of system in the primary sector.

Sheep and beef farms could generally be described as 'elastic farm systems'. What this means is that the ability to allocate resources efficiently is key to business success in these systems.

**“The more efficient these systems are in choosing which output(s) to produce, given the combination of inputs that are available, the greater their profitability and the greater their capacity as businesses to adapt to variations in input supply.” (Kaine *et al.*, 2010)**

Sheep and beef farmers will be able to respond to small changes in the variability of a critical input by using their tactical flexibility. Where the changes are bigger than this will cope with, they can utilise strategic flexibility to reduce dependence on the critical input (Kaine *et al.*, 2010).

Keeble *et al.* (2012) undertook a case study of co-production to support sustainable irrigation objectives in Victoria, Australia. Co-production is the relationship agencies have with their customer or client (typically the farmer) for natural resource management interventions. They found that the relationship between farmers and government agencies are very important in managing interventions (such as rules and regulations). Their study found that farmers place significant value on having interpersonal relationships with agency staff. This study also found this with a number of farmers,

particularly those who had a good working relationship with regional council staff. They suggested that agency's with the following characteristics (quoted from Keeble *et al.* 2012) are more likely to encourage co-production:

1. Agencies have a 'culture' that supports farmer and community engagement.
2. They work together to support this culture across agencies.
3. They involve farmer representatives early on and are honest about level of influence.
4. They provide farmer access to frontline staff for local intelligence.
5. They establish high-functioning relationships between agency staff.
6. Frontline staff have flexibility.
7. Complementary tools (e.g. planning and incentives) are used to link natural resource objectives (in their case, the Sustainable Irrigation Programme) with productivity outcomes on-farm and over time.

Additionally, they reported that the following is encouraged to avoid a breach of the relationship expectations of farmers:

1. Clear and consistent farmer influence over intervention design and implementation.
2. Maintenance of frontline staff to maintain interrelationships with farmers.
3. If influence is to be reduced by centralisation, or frontline staff numbers reduced, the impact on relational expectations must be considered and managed to avoid breach of the psychological contract.
4. Respect farmers' values: do not lecture them about stewardship.
5. Respect farmers' contributions to co-production: do not politicise committees.

The research described above can be summarised by saying that farmers' behaviour, motivations, attitude to change and likely adoption of practices is highly complex with many variables. The identification of different "groups" of farmers through the social science studies provides useful context to those working with these farmers to try and change behaviour. Those who are building voluntary frameworks, determining policy direction and setting regulations, and advising farmers on best practice need to consider that one-size does not fit all, or even most when it comes to the agricultural sector. Davies (2012) concluded that **"a 'one-size fits all approach' to improving nutrient management on beef and sheep farms is not feasible. Nutrient management on such farms must be tailored to account for site-specific factors."** The challenge

with this is that one-to-one is very resource intensive, therefore, communication of innovations, research, technology and management practices needs to be carefully thought through for maximum impact.

## **2.8 Purpose of the research**

The above research is largely based on overseas agricultural systems and is historical. This project aims to qualify these findings by surveying a sample of farmers in the Waikato and Bay of Plenty Regions to evaluate whether the research findings are still relevant to current farm systems and specifically to the challenges and pressures on sheep and beef farmers in the Waikato and Bay of Plenty Region. It will also investigate the farmers' views on potential solutions.

Previous work has been done by Journeaux (2009) who interviewed a number of industry professionals in New Zealand involved in agricultural extension and a sheep and beef farmer focus group on similar issues. Davies (2012) carried out research by interviewing 32 sheep and beef farmers in the Waikato on their grazing management practices and examined some of the barriers to uptake for these farmers. These two studies will be used as a comparison.

## 2. Methodology

Interview questions were developed to determine the views of sheep and beef farmers on barriers to the uptake of environmental practices, with particular emphasis on water quality. Farmers were first asked to define some terms, and explain what had been done on their farm based on their own definitions of “environmental practices”. Questions were then asked specifically on water quality. These were based on farm management practices that are known to impact water quality (e.g. soil management, riparian planting and stock management). The farmers were also asked for their views on an approach for the industry to manage the challenge of increasing good environmental practices on-farm.

Thirteen farmers were identified on the basis that they were engaged at an industry level (for example, attending field days, leadership positions), had undertaken some level of environmental practice on their farm and were considered by industry leaders as ‘good operators’ of their farming systems. This was loosely defined as striving for best practice, stock in good condition, making a profit, approach to pasture and crop (where applicable) management was sound and on-farm infrastructure was sound. The sample selection was a subjective measure made by the author with recommendations from other industry leaders.

The choice of these farmers was deliberate as our understanding of adult learning suggests that if these farmers experience barriers to uptake of practices, then the vast majority of farmers will experience the same barriers, and more. The idea of ‘if the neighbour is doing it, and it works, then I will do it’ applies here. Because these farmers are generally innovative and willing to try new practices and technologies, they are also likely to have innovative ideas on solving the challenge of increasing uptake of environmental practices on sheep and beef farms.

The farmers selected were from the North Waikato (3), Waitomo (2), Taumarunui (3), Taupo (3), and Western Bay of Plenty (2). These areas are covered by three Regional Councils: Waikato, Bay of Plenty and Horizons Regional Council. Two of the farmers interviewed also had farms in the Whanganui District and questions were answered based on all of their farm properties. The interviewees are listed in Appendix 1.

Semi-structured interviews were carried out at the home of the farmer, or at a location that suited them. Where possible the husband and wife were interviewed. In all cases those interviewed were the decision makers. The interviews ranged from one to three hours depending on the amount of discussion. Following 9 of the 13 interviews, the author was shown around part of the farm to observe (and photograph where applicable) some of the practices that had been undertaken or were being planned. Both the interview, and the discussion that occurred while driving around the farm, were recorded on a digital recorder. The questions asked of farmers are included in Appendix 2.

The farmers were all given an introduction to the project and an explanation of why it was being carried out. They were informed that they would be asked about the motivations for their actions, or inaction. They were also told that although the study was about environmental practices, the author wanted genuine motivations regardless of whether the primary motivation was environmental or not.

Following the completion of the farmer interviews it became clear that the vocal environmentalists had an influence on farmers' inclinations to change practices largely due to receiving media attention. It was determined that their perspective would add value to the study. A new set of questions was developed for the environmentalists. These included the same initial questions around defining terms and some minor adaptations to extract their views on what best practice might look like. The remaining questions centred on the process and approach the industry and Government could take to solve some of the challenges.

Four environmentalists were interviewed either in person (2) or by phone (2). They were selected based on their public profile, particularly in the media and involvement with agriculture and water quality. The interviews were approximately an hour in duration. The questions asked of environmentalists are included in Appendix 3.

An additional two interviews were carried out by phone with a farmer from Millers Flat, and an ecologist from Australia to provide a wider view of the outcomes.

The data from each interview was summarised to ensure that the context of each farming system was clear to the author and to have a clear understanding of the farmer's

decision making process. Analysis was carried out across each group of interviews (farmers and environmentalists) to identify similarities and differences in farming practices and systems and to obtain a comprehensive understanding of what motivated farmers to behave the way they do or did, what drives them, and what limits them from undertaking the practices they want to on their farm.

### **3. Findings and discussion**

#### **4.1 Farm descriptions**

All of the farmers interviewed ran a mixture of sheep and beef, with the average total stock units around 5,500, ranging from 1,750 to 12,600. Sheep ranged from 0% to 85% of stock units with an average around 50%. The effective areas of farms ranged from 63% of total to 99% of total with total farm enterprises ranging from 118ha to 1930ha effective area. The majority of farms were in the Beef + Lamb New Zealand Class 4 classification with 3 of the 13 being Class 3. The ineffective areas included plantation forestry/production trees (*Pinus radiata*, *Cupressus lusitanica*, blackwoods, redwoods, *Eucalyptus fastigata*, Douglas Fir, poplars, *Acacia*, and others), retired bush, scrub, rocks, tracks, wetlands and waterways. Three of the farmers interviewed had bush areas in QEII or Regional Council covenants.

Most of the farms were run as a partnership between husband and wife with most of the interviewees managing lease blocks as well as their own blocks. One of the farmers interviewed owned three properties. Farmers had been actively managing their farms for anywhere between 2 and 37 years.

Rainfall across the farms interviewed ranged from 1200mm per year to 1800mm per year. About half of those interviewed commented that the rainfall had reduced in recent years and the variability had increased.

Topography ranged from a small amount of flat land to steep. The majority of those interviewed had easy-rolling to steep terrain.

#### **4.2 Sustainability definition**

The Oxford English Dictionary defines the term sustainability as 'able to maintain a certain rate or level', and 'able to be upheld or defended'. It further defines sustainable development as 'conserving an ecological balance by avoiding depletion of natural resources'.

Each farmer and environmentalist was asked to define what sustainability meant to them. The word is used a lot by the media, industry, and Government but not as frequently by farmers.

Three of the farmers saw sustainability as being able to hand the land on in better condition than when they started farming it. This was how they defined sustainability as well as something they were striving to achieve through the way they farmed the land.

**“We’re only caretakers here”**

The majority talked about sustainability being the ability to keep doing what they are doing for anywhere from ‘tomorrow’ to 50 years to generations to perpetuity. Comments were made around using the land appropriately for what it can produce, producing food in a way that does not reduce the future production potential of the land, having a family friendly business, making a reasonable standard of living without undue impact on the environment, having a good impact on my life and other people’s lives, and not exhausting reserves or eroding resources.

**“If you took that head-on, it would mean continuing to farm for generations. But if you look at most New Zealand farms, we’re not sustainable, but how are we going to deal with that?”**

Three of the farmers interviewed felt that the word ‘sustainability’ was grossly overused, misunderstood and a term that people pay lip-service to that means nothing. It’s an idealistic term.

**“Any form of food production has an impact on the environment. The best you can hope for is the most benign impact on the environment that you can achieve. Whatever the term is, it encompasses economic and social measures as well as environmental. Farming in a way that absolutely minimises my immediate impacts on the environment while at the same time enabling me to earn a fair and reasonable rate of return on my capital invested and my time and energy spent.”**

The environmentalist's definitions were more academic in nature, with one quoting the Resource Management Act (1991) definition:

*Managing the use, development and protection of natural and physical resources in a way, or at a rate which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while-*

*(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*

*(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystem; and*

*(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment*

There was reference to “sustaining functioning ecosystems” and “increasing trends towards decreasing degradation of ecological diversity”.

**“Sustainability means you have a sufficient stock of natural resources and that you only use the amount in the productivity process that is generated by they system. This is both in the use of system resources and the additional resources that go into the system.” – Barney Foran –**

Guy Salmon had a more detailed definition of sustainability describing it as a multi-dimensional concept that needs to consider environmental, social, economic and cultural elements.

**“What’s important is not implying an endless ability to trade-off between those elements, but rather that each of them has some minimum and maximum thresholds.”**

He also talked about the difference between the economic parameter and the environmental one, suggesting that there are many ways to generate an economic

livelihood, but the natural world has limits and it is quite feasible to do irreversible damage to it.

**“In practice on sheep and beef farms, that means if we can’t meet some of the basic environmental sustainability factors like preventing soil erosion, then we should be thinking about getting our livelihood from something else.”**

Common to almost all of the definitions was the concept of carrying on into the future in a similar manner. Providing resources are not being eroded, this concept is viable, but it is important to continue monitoring the impact of the farming business on all four factors of sustainability – economic, environmental, social and cultural, and be adaptable to new information. For example, during the 1960’s there was a phosphorus problem in Lake Taupo. A catchment wide programme was implemented with unstable hillsides planted, and waterways fenced and planted to catch nutrients. In the late 1990’s, early 2000’s it became clear that nitrogen was causing problems in the lake and a nitrogen cap was put in place. Our understanding of the capacity of the land changes over time. As knowledge increases through science, what was good, long-term, sustainable practice in the 1990’s is not necessarily considered that way now.

The concept of “sustainable development” was originally defined by the Brundtland Commission in 1987. They defined it as:

**“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”**

They went on to say that:

**“The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth.” (Brundtland Commission, 1987)**

If the objective is to achieve “sustainability”, as dictated by society, then it is critical to define it, and to have all parties agree to the meaning of it. O’Riordan (1985) stated that attempting to define sustainability was an ‘exploration into a tangled conceptual jungle, where watchful eyes lurk at every bend’. This doesn’t give a great deal of encouragement to those who are trying to not just define the term, but live by it. As is clear from the definitions provided, sustainability means different things to different people (despite there being some commonalities). Therefore, it becomes very difficult to have an all encompassing term to achieve specific, desired outcomes for the environment and for productive farming systems - particularly because defining it is only the first step. The key question addressed by judges in the Ballance Farm Environment Awards is “Can what is being done now, still be working successfully in 100 years?” This is a good starting point for farmers, it links into the Brundtland Commission definition and should enable a critical assessment of practices being undertaken on-farm.

### **4.3 Environmental practices definition**

The author wrongly assumed that defining ‘environmental practices’ would be relatively easy. Many of those interviewed hadn’t really thought about it before, and found the question quite difficult to answer. It is suggested that this is because the farmers who were interviewed see what they are doing as being intimately connected to the land and therefore the environment and therefore everything they do is an ‘environmental practice’, whether it actually benefits the environment or not.

A range of responses was given around maintaining and protecting the land such as farm management practices that look after the land (e.g. managing land use capabilities, not overloading with nutrients or damaging the soil), caring about the land and those downstream of you, trying to protect the environment, retaining the soil on the hills, keeping the land at equilibrium, being sympathetic to the environment, and working with nature.

#### **“Farming the land in a way that the land can sustain”**

A number of responses defined ‘environmental practices’ as making improvements or enhancements, or minimising impact and reducing environmental footprint on the food produced.

**“I don’t really define ‘environmental practices’, I just adopt practices that I believe help in achieving a long-term environment for my farm that’s going to be beneficial and create an environment that I want to live in.”**

Once again, the term means different things to different people. For some it was about maintaining the status quo, and for others it was about improving and enhancing what’s there. After being asked to define the term, the farmers were then asked to list the environmental practices they had undertaken on their farm. It became clear that all of those interviewed had undertaken practices that had enhanced their environment. The challenge is helping other sheep and beef farmers do the same.

Clay suggests that “There is no single ‘right’ way to practise more sustainable agriculture. Many farmers have found ways to reduce environmental damage, improve production, and increase profitability. How the farmers do this depends tremendously on where they live, what they produce, and where they sell the product.”

#### **4.4 Environmental practices and motivations for undertaking them**

The interview was constructed so that the farmers would define the terms and explain what they had done within these definitions, before being asked about specific activities relating to water quality management. This was to determine if there was alignment between the language used by industry and the language used by farmers, and to determine what farmers saw as environmental practices. In almost all cases, the list initially given by the farmers was incomplete when the more specific questions were asked and/or areas were pointed out during the farm tour. The list of practices compiled from all of the farmer respondents is outlined below in Table 1.

**Table 1** Self-defined environmental practices undertaken by sheep and beef farmers.

<ul style="list-style-type: none"> <li>• Fencing all waterways</li> <li>• Riparian planting</li> <li>• Assessing land use capability and farming accordingly (e.g. sheep only areas, no pregnant stock areas, removed bulls, etc)</li> <li>• Planting erosion prone areas</li> <li>• Biological weed control</li> <li>• Fencing vulnerable soil and water areas</li> <li>• Detention dams</li> <li>• Clearing drains</li> <li>• Fenced off bush</li> <li>• Pest and weed control in retired areas</li> <li>• Soil testing</li> <li>• Planting trees – productive, shelter belts - natives and exotics</li> <li>• Enhancing the existing ponds with planting</li> <li>• Managing contour appropriately with subdivision and stock type</li> <li>• Minimal tillage</li> <li>• Have buffer paddocks</li> <li>• Operating within a nitrogen cap</li> <li>• Leave scrub in the gullies</li> <li>• Reduced stocking rates, particularly cattle</li> <li>• Not creating more tracks and minimum disturbance on existing tracks.</li> <li>• Maintain stock water crossings</li> <li>• Removed breeding cows from the system</li> </ul>	<ul style="list-style-type: none"> <li>• Use sheep and cattle to manage worm burdens and weeds</li> <li>• Reticulated water into every paddock</li> <li>• Soil mapping</li> <li>• Have own nursery</li> <li>• Think about stock management in certain weather conditions (e.g. move stock if its too wet, don't have them in the yards where runoff into stream likely if its raining)</li> <li>• Walk instead of using motorbikes</li> <li>• Silt traps above culverts, cleared every 4-5 years.</li> <li>• Use a nutrient budget</li> <li>• Sustainable harvesting regime in forestry block</li> <li>• Draining swampy areas</li> <li>• Minimal chemical use – herbicides, pesticides, fertilisers, nitrogen, antibiotics etc.</li> <li>• Recycle plastic wrap from silage</li> <li>• Use Reactive Phosphate Rock (RPR) instead of super phosphate</li> <li>• Involvement in research trials</li> <li>• Learn and understand the nitrogen cycle</li> <li>• Grow young animals rapidly</li> <li>• No cultivation and no cropping</li> <li>• Never pug the soil</li> <li>• Never graze below 1500kgDM/ha residual</li> <li>• Spot spray rather than blanket spray weeds.</li> </ul>
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There were a substantial number of different motivations for farmers to undertake these practices. The vast majority of the motivations were not solely to protect the environment, rather to protect the capital investment and to improve the management of the farm. The environmental outcomes were a side benefit.

Motivations which were more environmentally focused included soil and water protection, return the bush to its 'natural glory', caring about the impact on the environment, create a sanctuary to protect native fauna, protect the lake, protect the bush and stream and enhance New Zealand.

**“My children are what motivate me, I am concerned about what sort of world they will inherit in terms of food production and the environment”.**

Other drivers for the practices that were undertaken included animal health and welfare, enhancing the value of the property, because we were regulated to do so, ability to intensify remaining areas after retiring significant areas, desire to improve the farm, want to feel proud of it, look after our home, aesthetic appeal, security of water supply, makes good economic sense as has benefits for production, and wanting to add to the knowledge base for other farmers, the wider community and the next generation.

Farmers were asked what practices they wanted to undertake but have not been and what limited them from undertaking these practices. Most responses were around doing more than what was being done currently, or progressing what had been started. Practices included fencing and retiring bush areas, creating wetlands, planting erosion prone areas, reducing cattle numbers and excluding cattle from waterways. Two farmers spoke of having a vision of a farm park with a lot of planting, walking tracks for visitors, pristine waterways, and a productive farm. One farmer talked about investigating the pros and cons of a herd home, although was very conscious of the public perception of this and was therefore cautious about this idea.

The limits to farmers of undertaking the practices they wanted to carry out were primarily resource based. Money was the biggest limiting factor with time being a close second. Many felt that if they could afford more labour the work would get done so it wasn't so much about the cost of undertaking the practice, but about having the time to implement it. Some found it difficult to identify a financial return from taking action and

were therefore reluctant to undertake them given their current financial position. For example, several felt that fencing waterways came at a cost and there was no demonstrable return. Some wanted to do work on lease blocks that were not run by them and were unable to convince whoever was running it that it was worthwhile. In these instances the work will get done eventually. A small number of farmers felt that it would hinder management or they couldn't see a practical way to implement the practices they wanted to undertake.

One of the interesting limitations was fear of Government intervention. In one instance, the farmer felt that the farm would benefit from a lot of planting, but was not keen on rushing into it because of fear that the land would be forcibly retired by Central or Local Government. Another felt that they would be told how their riparian fencing had to be done and that it would be impractical (i.e. that it had to be a 7-wire conventional fence (sheep and cattle proof) when they were willing to put up a 1 or 2 wire electric fence (cattle proof if appropriately maintained)). A third felt that involving Regional Council in their plans may expose their entire operation to scrutiny. They were wary of taking this risk despite feeling they were fully compliant with Council laws. The Regional Councils in question were Horizons and Waikato.

As well as being asked what limits them from doing what they want to, farmers were asked what would help them undertake more environmental practices although this question was asked after the specific questions on water quality management to ensure all aspects had been covered.

The overwhelming limiting factor was not surprisingly, money. More specifically, five of the farmers wanted to be shown the economic benefits of environmental practices and felt this would definitely help them do more. These farmers also mentioned financial incentives could encourage greater uptake of environmental practices. They didn't see this as being a direct financial payment but that what they undertook had some benefit to the business over and above the environmental benefit. They also felt that getting urban buy-in was important. Some also felt that having the pressure taken off them through the media would help and that they would be more accepting of the science if it wasn't always questioned in the media causing confusion.

**“The knowledge economy in NZ is going to be based around agriculture; the track we’re heading down is a real “us and them”. The more we can get people to buy-in to what we’re doing the better we will be environmentally and profitably for agriculture.” – Graeme Saunders –**

Some said there was not a lot else they could do, felt that plans were in place to implement what they needed to, or they had done all they could on their farm to minimise their impact on the environment.

The environmentalists were also asked what limited farmers from undertaking more environmental practices and what would help them undertake more. There was a range of responses. Finances were mentioned as a barrier, although this depended on the practice with some practices not requiring a major cost to implement. Brian Turner stated that **“many farmers, like most of us, often talk about freedom and rights in respect to their land and water use practices, but are less inclined to acknowledge the duties and responsibilities we all have towards nature and the rest of human society. This sometimes results in their short-term material interests being given greatest priority. When this happens moral and ethical considerations go out the window.”** He felt that more farmers need to see protecting the environment as a benefit rather than a cost; he mentioned an agricultural forum where he asked a farmer leader if they considered environmental protection was a cost or a benefit. He said that in his view 90% of farmers would consider it to be a cost.

Eugenie Sage felt that the sheep and beef sector lacked a cooperative approach and a good marketing strategy. She said that farmers were getting a low price for a high quality product which isn’t fair, and it reduces their profit and thereby the amount to invest back into the farm, particularly the environment. She suggested that the consumer needs to have a greater awareness of what they are getting with New Zealand produce. **“We need to promote grass-fed lamb better”**. The author recently returned from Vanuatu where they produce high quality grass-fed beef. On every menu where beef was served it was marketed as ‘premium quality, Vanuatu, grass-fed beef’. It was also comparable in price to a beef steak in a New Zealand restaurant and sold very well to the tourists, although the farmer returns were still poor.

Other limitations mentioned were the lack of education and the lack of understanding of the importance of protecting the environment as well as a fully production focused system as pointed out in the quote below, and reiterated by Guy Salmon.

**“There is a serious lack of understanding in the industry about the value of our indigenous biodiversity and aquatic habitat values, and a lack of acknowledgement of their international significance. Over recent years we have increased understanding around water quality, but have left biodiversity out of the equation.” – Eugenie Sage –**

**“In the sheep and beef sector, they’re much more individualistic and isolated; and there is more sense of entitlement, reflecting what they’ve already done. Some of them pioneered environmental practices with QEII covenants, have a strong sense of place, and see themselves as conservationists. Yet get them in a crowd and they don’t talk about it. So the message can’t get through.” – Guy Salmon –**

To help farmers undertake more environmental practices the environmentalists were suggesting a number of things such as more money, knowledge and understanding. They also suggested farmers needed different moral and ethical values, greater interaction with people holding environmental values, better interaction between Regional Council staff and farmers and more of a one on one focus (although acknowledge that this is very difficult). Further, that the industry as a whole needs better uptake of farm plans rather than rules, help them to redesign their farms so that they are a sustainable unit, practical solutions, and working with them not against them.

The above findings highlight the important role that Regional Councils play in the uptake of environmental practices on-farm. There are many farmers who need to move away from the attitude of seeing Council staff as the ‘bad guy’ and work out how they can utilise council resources to help farmer’s business. Additionally, there are a number of Regional Council staff members who need to work more collaboratively with farmers to achieve change. Given that the farmers who were interviewed were fairly innovative and employed best farm management practice for the most part, they still had a fear of Regional Council. This suggests a major issue for the sector.

Most of the pressure coming on sheep and beef farmers to change their behaviour is very focused on the environmental outcomes. Not just for water quality, but also for climate change, biodiversity etc. The results of this study, and supported by the findings of Keeble *et al.* (2012) suggest that more targeted, focused messaging on the benefits in terms of the whole farming system, rather than just environmental benefits may result in a wider adoption of environmental practices on-farm and avoid some of the 'fear' limitations to practice change.

#### **4.5 “You can’t be green if you’re in the red”**

While sheep and beef farm profit before tax has been very variable over the past 25 years, sheep and beef farm debt per hectare has steadily risen since the year 2000-01. Over the period 2004-05 to 2010-11 it increased by \$2.4 billion, which was more than 30%. In general low profit led to increased overdraft levels for cash to carry-on farm activities that were rolled into term debt. The lowest profit year occurred in 2007-08 when debt was relatively easy to obtain. This ceased in August 2008 when the global debt crisis emerged as a major issue in developed countries. Profitability recovered in 2010-11 with good global prices for both meat and wool. Even so, there is a legacy of debt that built up from refinancing and less so from farm investment. This debt has to be serviced and the ability to service debt is the major focus whereas prior to August 2008 equity borrowing was the trend (Davison, 2012).

Vanclay (2004) proposed a number of social principles relevant to the promotion of natural resource management issues in agriculture. One of which is that it “It is hard to be green when you’re in the red”, suggesting that sustainability requires an economic dimension as well as a physical dimension. It was less invasive and less personal to ask farmers: “do you subscribe to the statement that ‘you can’t be green if you’re in the red?’” rather than asking them about their debt levels. The concept of ‘being green’ is subjective and there is a significant range between individuals in what constitutes ‘green’. However, the question did elicit some interesting responses which provide some insights into attitudes towards environmental practices.

Five out of the 13 farmers interviewed agreed with the statement “you can’t be green if you’re in the red”, meaning, carrying out environmental practices on-farm requires the farm to be making money. However, all of those interviewed had carried out environmental practices on their farms while managing debt which negated this

statement somewhat. One of the environmentalists agreed with the statement because he had seen it first hand in Northland.

For those who agreed with the statement, their reasons included that there was 'no greater tie than poverty', and that environmental practices are easy to forego when the financial situation gets tighter. Those who disagreed said they'd rather be profitable and looking after the environment, than not be looking after the environment. They felt that if you're in the red and you're not looking after the farm and the environment you'll end up deeper in the red. Being in the red might even help because you're not spending as much on inputs. Many suggested that there are a lot of green practices that can be undertaken which cost very little such as altering management practices when soils are saturated.

**“If you’re green, you’re green regardless but if you’re not making a profit on your farm you’re not going to be staying there so you’re not going to be green long-term.” – Sue Yerex –**

**“We’ve been red forever so we can’t subscribe to that! You don’t have to be a millionaire to be a conservationist” – Anne Woodward –**

Most of the farmers interviewed did acknowledge that they are able to invest more into protecting the environment when they are financially comfortable.

**“Debt may mean there are limitations in what you do, but if you’re farming for the long-term you can’t afford to not be looking after your asset.” – Rory Sherlock –**

For Pat Garden, debt was a fundamental game-changer.

**“Debt lurks underneath this whole thing. If you’re up to your eyeballs in debt, you’re going to come out scratching when someone restricts what you can do. You’ll deny that the sun gets up if you have to.”**

Barney Foran suggested that **“soon, many production chains are going to lose their licence to operate and won’t be allowed into the affluent and developed**

**markets, so not being green will mean being out of business, therefore the question is irrelevant”.**

For the environmental practices that had been undertaken on the farms, 8 out of the 13 farmers had some financial assistance for some of what they had done. This varied from full funding support for pest control to up to 50% financial assistance for fencing and riparian planting. Of the farmers who had received the financial support all but one would have done it anyway, but it would have taken much longer to achieve.

One of the major challenges facing most of these farmers is the ongoing maintenance of areas that have been taken out of production (i.e. bush blocks, riparian areas etc). The planted areas require weed and pest control and need to be managed appropriately to accommodate changes in the course of the waterway. Significant damage was reported from deer, goats and possums in particular, which was very disheartening for farmers who had put a lot of effort into their plantings and were quite proud of them, only to have them destroyed by pests. Many made the point that there is no point in planting without pest control investment on an ongoing basis. Fences around retired areas also needed to be maintained and depending on the type of fence could be quite labour intensive (i.e. electric fence requires more maintenance than a conventional fence). One farmer commented that it is comparatively easy to get volunteers to plant trees, but ‘clearing blackberry is not sexy’.

On that basis, the environmentalists were asked what their views were on providing financial assistance to farmers for environmental practices and ongoing maintenance. They all felt that there was some justification for providing some financial assistance initially, but that it was on a case-by-case basis with regards to ongoing maintenance costs. One felt that even with rules dictating that fences must be in place on waterways and to get the poor performers (environmentally) to act, there was no other way than to provide some financial assistance. Once in place they felt it was more likely to be maintained by the farmer who would then see the benefits in terms of management.

**“In terms of the ongoing maintenance support, it depends on how much public good there is. There is a political judgement as to the line between applying the polluter pays principle and the beneficiary pays principle. For example, some small patches of bush on a property that are fenced to**

**protect biodiversity may justify some financial support initially but in terms of ecological value, it is probably minimal. Therefore, the farmer would be expected to maintain the fences and control the pests. However, if the bush block was fairly substantial and the ecological value was larger, fencing it off might impose an important burden on the productive value of the property, and there is more of an argument for public benefit. Thus, there could be justification for the Crown purchasing the bush block, or paying the farmer to maintain it.” – Guy Salmon –**

One of the farmer couples has over 100 hectares of bush on their property. They get no productive value from the bush but do get amenity value from having it there. They have carried out pest control in the block and would like to undertake more of this. They have also fenced it off from the remainder of the property. The river on the boundary of their property with the bush was, up until recently, home to a pair of whio (blue duck). The whio disappeared when the pine forest operation upstream started harvesting and their slash started going into the river. The owners are hoping the whio will return. They maintain the bush the best they can when they can afford to. Despite all of this, they also pay a fairly substantial rates bill on the block.

There are probably many examples like this across the country, and the author would suggest there is a strong case of public good in protecting these areas, although careful consideration should be given to the system as a whole (in the above example, the impacts from upstream affect this significant natural area). It would not cost a great deal to employ a trapper to control the pests, and someone to keep an eye on the general health of the bush. The farmer is already maintaining the fences and will continue to shoot pigs and deer when they are seen. In return, New Zealand would have another habitat for perhaps more whio, and countless other vertebrates and invertebrates that need to be looked after.

The above examples suggest that there is justification for financial assistance in some form. In the cases where farmers received assistance, it was nearly all from Local Government and this is probably the best source of financial assistance to ensure a reasonable level of accountability from the farmer. The approach to assistance needs to be carefully thought through to avoid the money being used inappropriately. An

example could be a rates rebate for protecting significant natural areas which is assessed annually subject to certain conditions on pest and weed control.

For example, in the 2004 floods in the Manawatu, Central Government provided farmers impacted by the floods with a cash payout. One farmer, who was later interviewed by Ecologic, when asked about whether he would spend the money on retiring some land and putting in some erosion prevention replied, 'no'. His view was that we need to train the rivers so they don't cut into the river bank, and he wasn't going to do anything on his farm (i.e. retire land or plant vulnerable areas) until Horizons stopped the river cutting into the bank. Had the payout been conditional on at least some of it being spent on preventative practices, this attitude may not have existed.

#### **4.6 Water quality management on-farm**

Farmers were asked a number of questions relating to specific practices they had or had not implemented that are related to water quality. These were largely based around the Beef + Land New Zealand Land Environment Plan. Their motivations for their actions or inactions were explored.

All of the farmers interviewed had waterways on their properties. These ranged from streams and creeks on most properties, through to rivers, wetlands, swamps, dams and ponds. Management of the waterways varied from none at all to full fencing and planting. The fencing was either fully stock proof or excluded cattle. Most of the farmers interviewed were in the process of putting up more fences or were planning to do so. Most of them understood the need to exclude cattle from waterways but some felt that this was impractical, largely due to the steepness of the waterways. Other forms of management included using a bulldozer to clear creeks and streams of weeds and to keep them free-flowing, putting in culverts and crossings, weed clearance and draining some swampy areas. All but one of the farmers interviewed had done riparian planting or allowed regeneration in riparian areas on their property. The one who hadn't had only been on the property for three years and it was planned but was not a priority yet.

**“Every paddock has a creek or a stream in it and some of it is very steep country. I can't see how I can manage all of the water on the property. It's just not practical.”**

Qualitative work carried out by Davies (2012) on a larger sample (32) of sheep and beef farmers in the Waikato also found that most farmers (29) had waterways on their property and half of those interviewed had fenced nearly all of their waterways. Most of those interviewed had favourable attitudes towards riparian fencing, although a number mentioned issues from weeds and pests, similar to the farmers interviewed in this study.

The issue of riparian fencing is one that seems to cause a lot of anxiety with farmers. Advisors need to be conscious of this and recognise that it is a sensitive issue. Blanket suggestions of stock-proof fencing on all waterways are not likely to be met positively by most hill country farmers. This point was reiterated by Pat Garden. There are a range of solutions to stock exclusion from waterways and a suite of practical options should be offered to farmers on this basis.

#### **4.7 Motivations for improving water quality**

There were a range of motivations for the management that was undertaken including managing nutrient runoff, improving water quality, enhancing the amenity value and aesthetics of the farm, increasing biodiversity, security of water supply and erosion protection. The quote below from Anne Woodward highlights a very strong environmental motivation for the native plants that were planted on their property. For most of the farmers who had fenced off waterways stock safety was a strong motivator and ease of management was both a driver and a benefit. This is highlighted in the quote from Rick Burke below.

**“I was watching a tui yesterday and reminded me that when I was at school, Buller’s Birds used to be on the back of the writing pads, and mine had a huia. All my life I’ve grieved for that huia, I was so close to seeing it and having it with us and I missed out. So close and to get annihilated for such pathetic reasons. I was looking at the tui and thinking I hope it doesn’t suffer the same fate. I was thinking how we’re so ruthless.” – Anne Woodward –**

**“I’m a really keen surfer. One afternoon the surf was pumping and it was a really hot day and I had cattle in the creek. I was trying to get the cattle out with the dogs. They were hot, I was hot and I thought ‘there’s got to be a**

**better way!’ We took a really objective look at the farm, undertook a cost benefit analysis of different areas and saw the riparian areas weren’t making any money. We saw the benefit through subdivision through fencing of the remaining area so that was the motivation.” – Rick Burke –**

All of the farmers were soil testing and this ranged from annual to once every 5 years (1-2 years being the most common). The author assumed this would be used to inform fertiliser decisions and although this was the case for most of the farmers, they were also using it to monitor previous fertiliser applications and check trends in soil nutrients. The fertiliser applied was guided by the soil test results in discussion with the fertiliser sales rep. However, most of the farmers made their own decisions about what fertiliser to apply, and when, based on their own research, knowledge and experience and guidance from independent specialists. This finding was supported by the work of Davies (2012). Farmers felt that fertiliser reps were there primarily to sell product rather than to provide sound advice, although they may have provided good advice.

Farmers were questioned on how they manage the land in terms of soil type and land classes. All of the farmers manage their land according to both soil type and land class but some don’t separate the two attributes as they are strongly linked on their farm. The farmers were cropping and cultivating on the easy country and running their heavier stock classes on these areas. Management of the steeper country included retiring steep areas or planting in productive forestry, removing cattle, reducing cattle stocking rates in winter, using less fertiliser if any and ensuring there is ground cover. Davies (2012) found similar results and noted that interviewees held favourable attitudes towards the management of pasture and avoiding soil damage in winter and were aware of the cost of pugging in terms of pasture condition. There were varying degrees of subdivision across the farms with some farmers fencing off different soil types and different landforms for ease of management. All farmers wanted to retain the topsoil on their land as they recognised this is where the production benefit comes from. Therefore, they treated the land appropriately to maximise this.

Wet soils were managed by farmers in a range of ways. For Taupo farmers who are mostly on pumice soils, there was very little issue with saturated soils as they were free draining. Others had more challenges. Many of the farmers interviewed had taken preventative measures to avoid soil damage when pastures were very wet by ensuring

they had the right stock classes on the appropriate land types (as above) and at appropriate stocking rates. Those who did take action when soils were very wet increased the frequency of animal movements. Two of the farmers interviewed talked about using sacrifice paddocks or using the winter crop paddock as a sacrifice paddock. Most were aware of which paddocks were at the greatest risk of pugging and compaction damage. These findings were also supported by Davies (2012).

Erosion was of concern for most of the farmers interviewed and where it wasn't, they had already put management practices in place to manage the high risk areas. The types of erosion varied depending on the topography and soil type of the farm in question but all erosion types were reported. Farmers were asked to estimate the area of erosion risk on their farms and this ranged from very low to 100%. As mentioned above most farmers had thought about their stocking policies so that the land that could cope had the higher stocking rates and heavier stock types, while the steeper land that was more at risk of erosion had lower stocking rates and lighter stock types in most cases. Most of the farmers had used poplar poles for erosion control and many were allowing scrub to regenerate in the gullies. Some had drained springs or swamps (on Regional Council advice) to prevent slipping and slumping. Only one farmer mentioned water quality as a specific driver of erosion control.

Farmers were asked if they had a Nutrient Management Plan or Nutrient Budget and if they knew what their nitrogen leaching rates were. Other than the three farmers interviewed in Taupo (who are regulated to have a Nitrogen Management Plan and a Nutrient Budget) in general, knowledge in this area was poor. The farmers were aware of the terms and most had used them in some shape or form using their fertiliser representative. However, they did not understand the value of using them for their business. Most had an awareness that they would need to have a stronger understanding of this in the future. There was some confusion around the purpose of each and how the information that they produced could be put into practice.

**“I’m too busy thinking about other things; it hasn’t been brought to my attention that I should spend time with it. When I think about it, probably makes a lot of sense. It could save me money.” – Graeme Saunders –**

**“I don’t have faith in the calibre of the nutrient budget so haven’t pursued going down that track with the other farms.” – Kirsten Bryant –**

**“To get farmers to take up nutrient budgets, plaster the media that there’s financial savings to be made, then within 2 years there should be uptake. There’s no reason why nutrient budgets shouldn’t be a condition of supply. One advantage of consent to farm is that there is some control over what farmers are doing. BUT, farmers see this approach as an open door to bring in all the other things that aren’t going to be of value so there’s huge suspicion.” – Graeme Saunders –**

Similarly, Davies (2012) found that several of the farmers interviewed were aware that their fertiliser representatives gave recommendations based on nutrient budgets, but most did not mention having one. None of the farmers she interviewed had a Nutrient Management Plan.

The environmentalists were asked to describe what they thought best practice water quality management would look like on a sheep and beef farm. These are outlined in the quotes below.

**“Many say that best practice is what they can’t afford to do. By best practice one means fencing off waterways and streams, leaving tussock and other natives in the gullies, and so on. But in a lot of cases, where do they get the capital to do it and the profit to maintain it? One understands they have a predicament and I sympathise - but none of us can avoid the fact that in the long run some farming practices have been, and still are, wrong, and we have to accept that. The science is there to back up the conscious decisions to change that have to be made. There have to be no-no’s in farming as in everything else.” – Brian Turner –**

**“In terms of stream margins, light grazing by sheep is OK for weed management if it’s done under the right conditions without damaging riparian plantings. Cattle should be excluded. Waterways should have planted riparian buffers. Farmers should have a strong understanding of soil fertility and how to manage it, topography and climate, and**

**understand how water moves on their property. If irrigated, precision irrigation should be used. They should also have a low level of debt and be thinking about cash flow in terms of the cost of inputs rather than increasing stocking rates to crank up production for cash flow.” – Eugenie Sage –**

Both Guy Salmon and Mark Bellingham talked about retiring more vulnerable, steep land and planting it. Guy Salmon talked about a more fundamental strategic approach being required for the industry and New Zealand as a whole with regards to land use.

It is clear that the farmers interviewed had undertaken a number of practices on-farm to reduce their impact on water quality. Whether the motivation was to improve water quality or not is irrelevant from the environment’s perspective. Management and animal health and safety were strong motivators and should be considered when developing messages for farmers around environmental best practice. The environmentalists acknowledged that best practice comes at a cost and were reasonably inline with what farmers were saying in terms of the practices that should be undertaken on-farm.



### **CASE STUDY: Rick Burke, Katikati**

Rick has been managing his farm since 1984 and as well as being a top farmer in terms of production, he's a top farmer environmentally as well.

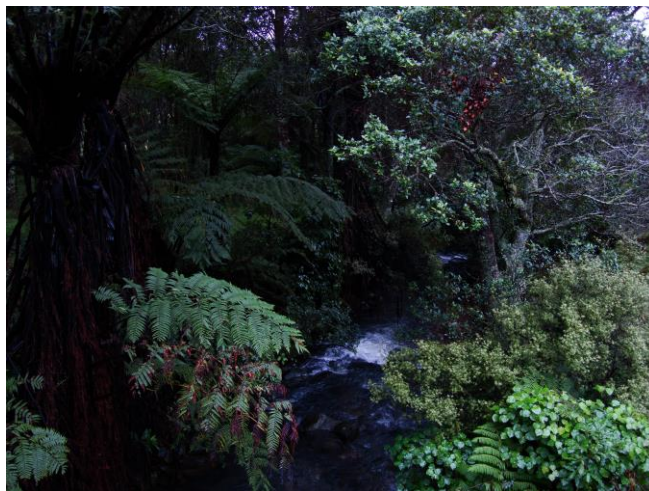
Over the past 10 years, Rick has taken 70 hectares out of productive use and planted it with native bush and production forestry. He has subdivided the remaining land to enable a much more targeted and efficient approach to farming it without reducing stocking numbers.

“When we first came onto the property we took a really objective look at all of the production areas and ran a cost benefit analysis. The riparian areas didn't stack up for livestock production so it made sense to fence them off and plant them with natives, and production trees where possible.”

Rick used flaxes and grasses close to the stream, then taller native species further back, depending on the topography of the margins. The grasses and flaxes are able to handle a beating from the water if it floods and they provide good habitat for the birds and insects.

Rick feels the size of the margin is important. Both the needs of the waterway and the need to keep a workable farm are important, so in some areas the margin is very wide (30m) and other areas it's quite narrow (3m).

It wasn't all smooth sailing - the river changes a lot when it's not being grazed and they lost plants early on. Rick explains that there is a settling stage for the river when it is not being grazed right up to the edge which actually erodes more until it settles. They found ponga were susceptible to this due to their weight, but they learned from it and suggest other farmers get specialist advice so they can understand what will happen as they retire areas. They also have challenges with deer coming down from the Kaimai Ranges, and although they provide some additional meat for the family they do a lot of damage to the bush and stream bank.



“The benefits are huge. We are now getting better production, increased fertility, better rotational grazing systems, and not wasting fertiliser. Plus, we have a beautiful corridor of bush on the property which enhances our capital value and makes farming here that much nicer. We also know we’re looking after the harbour and not pumping sediment into it.

“Don’t underestimate the value it adds to your farm in terms of the vista and the capital value. It adds a significant amount. For us, it’s the satisfaction that you get with driving past it every day. It’s really cool.”

Rick attributes the success of what they’ve achieved on the property to a really strong relationship with Bay of Plenty Regional Council. The Council offered financial support for the fencing and planting and they undertake weed and pest control in the fenced off areas. The Council also offered a further incentive; that for every 0.6ha of good quality native wetland established and maintained, they would offer a title. So, Rick has now subdivided off 12 lifestyle blocks which has created a little community and enabled him to purchase some of the neighbouring blocks. Rick says that “often there is a conflict between ‘intensification’ and ‘conservation’, but in this case the two have married together perfectly.” He acknowledges that not every Regional Council is in a financial position to offer this kind of support.



In Rick’s case, the riparian planting took about 4 years to establish to a point where it didn’t require ongoing maintenance, but now it looks after itself apart from the pests. It was really clear to him that it was needed because the Kaimai Catchment is very sensitive and there is a relatively short distance to the sea. He knows what he does on his farm can influence the fishing industry and is conscious of that.

Rick suggests that Government and Councils shouldn’t take a blanket approach to setting up rules and implementing incentive based schemes. One-size will not fit all and it depends on the issues in each catchment and for each farm. He suggests if councils are assisting with fencing costs, they should take into account the type of land the fence is going on. Obviously, flat land will always be cheaper and easier to put a fence on than steep hill country.

Rick is proud of what he has done on his farm and of the fact he has done it in a way that has benefited his production system.

#### **4.8 Main environmental impacts on the environment**

Following the specific questions around water quality management, farmers were asked more broad questions about their farm and some of their views on the potential solutions to increasing the uptake of environmental practices on sheep and beef farms.

Farmers were asked what they would consider to be the main environmental impacts their farming system was having on the environment.

Interestingly, some of the farmers had not thought about this, despite the work they had done on their farm to mitigate their impact. This suggests it was done as an integral part of their role as a 'farmer' as opposed to being a conscious decision about mitigating their impact.

Given that the interview was largely focused on water quality, the results were possibly biased towards water quality impacts. However, other environmental impacts were talked about. Farmers also mentioned impacts they used to have but had made management changes to reduce or eliminate them. The following list outlines the impacts mentioned by the farmers of their farming practices.

- Soil pugging and compaction
- Runoff of nutrients, faecal coliforms and sediment
- Nutrient leaching
- Greenhouse gas emissions – only four farmers mentioned this and only two acknowledged greenhouse gas emissions from livestock as a problem. The other two talked about fossil fuel emissions of CO<sub>2</sub>.
- Loss of soil organic matter
- Lake water quality
- Chemical contamination of waterways
- Topsoil loss
- Feeding more humans to overpopulate the world
- Visual impact

**“I’ve never ever thought about the environmental impact of my farming. I’m not trying to have an environmental impact. I’m just trying to farm. It**

**gets back to my desire to leave the land in a better condition than when I started. Enhancement is my focus. So that's my environmental impact – trying to do the right thing. I've never thought about it because I'm doing a lot to enhance the environment.”**

Journeaux (2009) asked the same question in his survey of farmers and found the predominant response was around impacts on water quality, particularly sediment from erosion and pugging and nutrients such as phosphate and nitrogen. Some considered loss of habitat and biodiversity an issue. Climate change was not mentioned.

The environmentalists were also asked the question about the impacts of sheep and beef farming on the environment and mentioned similar impacts. Additional impacts included: farmers not understanding cumulative impacts in waterways; feeling that 'my little bit isn't having an impact' from farmers doesn't solve the problem; taking too much water is an issue, particularly in the South Island. They noted that there are farmers who are farming the land beyond its land use capability and that fertiliser use is becoming more common on sheep and beef properties. They also all mentioned impacts on biodiversity and the contribution of agriculture to climate change.

**“Sheep and beef farmers have grown up with a set of property right conceptions that's inconsistent with the way the natural world is organised. So things like thinking they have the right to dump thousands of tonnes of sediment onto properties downstream is built into the farming model and it shouldn't be.**

**Often the downstream properties are much more productive than the hill country ones. For the hill country farms to inundate the farms downstream doesn't really stack up.” – Guy Salmon –**

**“The whole New Zealand attitude to biodiversity needs to change, its not just farmers.” – Eugenie Sage –**

It will not be possible for the industry to improve environmental practices on-farm if there is not an acceptance of the issues. In addition, pressure from the 'green' movement will not cease if farmers do not acknowledge that there is an impact of

farming on the environment. Having said that, the environmentalists need to acknowledge that there is an impact of food production on the environment and help the farmers to reduce their impact to an acceptable level by working with them to find solutions.

#### **4.9 Advice and information transfer**

The approach to the environment by farmers appeared to differ across the different parts of the region, although this cannot be quantified due to the small numbers sampled. So the following statements are based purely on observation.

##### **4.9.1 Relationship with Regional Councils and other sources of information**

Farmers appeared to have undertaken more environmental practices and were more aware of their impact where they had a good relationship with the Regional Council. This was very clear in the Western Bay of Plenty with both farmers who were interviewed mentioning the positive relationship as a driver for what had been achieved. Generally, where farmers had received financial assistance from a Regional Council the relationship was reasonably good. Most of the farmers interviewed mentioned challenges with Regional Councils. In particular they noted that council staff who had some understanding of farming systems were generally much easier to deal with. Conversely, a number of challenges had arisen where the relationship was not positive.

For farmers in the Lake Taupo Catchment, the relationship had been mixed throughout the process of Regional Plan Variation 5<sup>1</sup> being put in place. They all have a strong working relationship with Regional Council; some are better than others. They all mentioned that the personnel are critical.

**“We have a good relationship with the current staff. We have worked at the relationship because there was nothing to be gained by having a bad relationship. There has been a huge amount of staff turnover throughout the process (of Variation 5). Some of the staff were awful and hopeless but they’ve all gone and there’s a really good team now. Farmers have to learn**

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<sup>1</sup> Regional Plan Variation 5 (RPV5) came into law in 2012 and means nitrogen discharges below the root zone of agricultural pasture are capped for every farmer in the catchment. The level of discharge is determined by Overseer®.

**to work with these organisations. Rather than seeing them as a battle ground, they can add to our farming business.” – Mike Barton –**

There were a number of other sources of advice from which farmers had sought information. These include: environmental consultants provided by Regional Council, Landcare Research, other farmers, rural press, field days specific to environmental practices, fertiliser rep, farm and forestry consultants, family, neighbours, monitor farms, discussion groups, Department of Conservation, Taumarunui Sustainable Land Management Group (farmer group), and like-minded people.

#### **4.9.2 Weaknesses with existing information**

Farmers were asked what they thought were the weaknesses in getting information on environmental practices on-farm to farmers. Some felt that the information was readily available. The problem is that farmers are not taking it up sufficiently and they felt that was a bigger challenge than just producing the information. They felt that farmers don't want to know. They think it's a cost and they see it as being driven by the "greenies" or that they "don't want to take the lid off Pandora's Box". This was also the experience of Barney Foran in both New Zealand and Australia. Suggestions to get around this were to showcase best practice more with good, well respected farmers; to highlight the management benefits of caring for the environment; to setup discussion groups on environmental best practice as an integrated component of the farm system. The key is working with farmers, alongside them, rather than telling them what to do.

**“The information is all there; attitude is the problem. Change the attitude through education, but if they're not open to education then you're back to square one. Legislation can change attitude but then it becomes a war.” – Philip Woodward –**

**“If farmers don't see a need for environmental practices in the first place then there's a real problem. First thing is to show them there's a need. Then provide a practical solution to solving it.” – Rory Sherlock**

Others felt that more capability needed to be built into the industry, that there weren't enough people with the skills and experience to pass on to the next generation and to educate those in the industry. One farmer commented that there were a lot of young

people coming in the 'environment' space, but that farmers generally don't trust young people to advise them on these sorts of issues as they're not seen as having enough real-world experience. This has implications for Universities and tertiary qualifications in the environment and ecology area as well as the agricultural qualifications. Regional Councils need to employ people with a mixture of agricultural science, farm experience and knowledge of environmental systems and the principles of ecology to be able to effectively work with farmers.

One suggestion was for more "one-to-one: advice which is a view supported by Journeaux (2009).

**"How environmental practices are implemented is different on every farm, the 'what' or the issue is probably the same or similar. Therefore, help with implementation is critical and needs to be one on one so that it is property specific. We need people to be able to work with farmers to implement plans and not just audit farmers. On-farm implementation of farm plans is creating a bottleneck in the process because it's under-resourced and they're too complex." – Robert Carter –**

The environmentalists were also asked their views on getting information to farmers on environmental practices. Similar to some of the farmer comments, Brian Turner stated that **"the challenge is how to encourage and persuade without antagonising greatly. You need to engage in frank and open conversation about what's going on and the impacts of what's happening and then address what can be done. The problem is this approach is very time consuming. You need to take people with you and inspire which is very difficult to do."** He felt central Government for the most part pays lip service to the environment which sends a clear wrong message throughout the farming sector.

Barney Foran used an interesting example to respond to the question.

**"Farmers don't see how bad their system is compared to a whole lot of other production systems. For example, if a property developer sought to bulldoze 1,000 hectares of bush and forest to put down houses (or in an agricultural example, put down grass and legumes) there would be a huge**

**uproar. They benchmark against themselves, they don't benchmark against the standards that are applied in many other parts of the economy”**

Other comments included that it was challenging to get independent advice and that a lot of the advice farmers get is from reps selling product. A more fundamental challenge was raised by Guy Salmon; that Beef + Lamb New Zealand do not have information on who all their levy payers are. So how can the organisation expect to get information out to all farmers? This is because they are reliant on meat companies to report who has supplied them. This is currently being worked on but remains an on-going challenge for the organisation. Mark Bellingham suggested a number of challenges in the process of getting information out to farmers, in particular that Federated Farmers seem to have difficulty getting information out through the provinces (a point reiterated by other environmentalists as well as some farmers). Often there is a disconnect between regions or between staff and the elected representatives which adds to the confusion for farmers. He felt that Regional Councils were very variable in their ability and inclination to get information out but that they were the only ones in the right space to do the information transfer. He suggested industry bodies should work closer together. Like many farmers he advocated for a collaborative approach to solving the problem and using the good news stories.

#### **4.9.3 Timeframe for widespread adoption**

The likely timeframe for widespread adoption of environmental practices was also discussed. The question was deliberately vague to get an understanding of how important the farmers felt the issue was, acknowledging that different practices will have different timeframes for implementation and some are ongoing.

The majority of farmers interviewed took a planned approach to the work they had done or were planning to do and were 'chipping away' where resources allowed. Many also suggested that focus should be on the sensitive areas first. Responses to the question ranged from "yesterday", to a generation. Some acknowledged that some farmers would be able to act quickly and it would take more time for others (e.g. 4 years for a top farmer and 10 years for an average farmer), suggesting planning could be done on this basis. Some felt that most good practice could be established within 5 years, with one farmer saying he had fenced and planted a creek within 6 weeks.

**“It’s a bit like putting a plan together for the work that needs to be done on the farm. There’s the necessary stuff and there’s the nice to do. Take the worst areas first and the ones you can achieve. If I was advising farmers on what to do, I’d emphasise by saying to a farmer, ‘have you got any areas that you have a problem with? Are any of those a real problem? What do you need to do to sort those out?’ It’s just like your pastures or anything; planning is really important, but has to be prioritised and to fit in within the budget.” – Rory Sherlock –**

Fencing waterways came up often with this question, with the practicality issue coming out fairly frequently. However, they all acknowledged that there are many sheep and beef farmers who have no excuse not to be excluding at least cattle from their waterways. The author was given examples of properties where they felt putting a fence in would do more damage than putting in a reticulated water supply and riparian planting to keep stock away from the waterway.

Several farmers talked about how “hundreds of years” of wrong-doing had to be undone and that it would not be fixed overnight.

**“It will take 30 years. It’s taken a hundred years to cause these problems; it’ll take a third of that to get it back. As our generation dies out the younger ones will be much more responsible. We’re the last of the slash and burn types. Not much more land developed out of native bush because we’re passed that. What we’re struggling with now will become easier as pressure increases and it just becomes a part of what we have to do.” – Robert Carter –**

Journeaux (2009) found similar results with the industry professionals suggesting 1-3 years was acceptable but most thought that 5-10 years was more realistic. He found that farmers felt that it was very much dependent on what was being undertaken and how much change to the existing farming system was required. Practices that had a relatively low impact on the system such as pole planting on steep slopes 2-3 years, but practices that disrupted the system like retiring large areas were more likely to take 12-15 years to get widespread adoption.

For the environmentalists the timeframes for widespread adoption of environmental practices depended on the practice but it was suggested that we can't wait a generation. Guy Salmon suggested it's hard to know where to start with some of these problems.

**“We can't wait a generation, much of the damage that's been done has been in recent years with increased demands of water, increased nutrient use, particularly on hill country and increased stocking rates to try and keep up with costs.” – Eugenie Sage –**

**“Those that move (with the times environmentally) will survive and those that don't move will go out of business.” – Guy Salmon –**

#### **4.9.4 Other challenges to achieve widespread adoption**

A number of farmers mentioned the “rural-urban” and “rural-green” divide as a major challenge. They felt that the “greenies” and “townies” didn't understand what farmers do or that they had made some very positive changes to benefit the environment. They felt threatened by campaigns such as ‘dirty dairying’. On this basis, the environmentalists were asked if they thought their messaging was appropriate.

Eugenie Sage, Guy Salmon and Mark Bellingham all agreed that the Dirty Dairying campaign was necessary to achieve change in the dairy sector and feel that it was because of that, that the dairy industry is taking positive action to managing water quality. It was also the catalyst for establishing the Land and Water Forum (LAWF) which was seen as a positive by all of the environmentalists.

**“Before ‘Dirty Dairying’ there was contempt from the dairy farmers and Fonterra. Money was more important and it was only by mobilising the wider public that we got change.” – Eugenie Sage –**

The general comments from the environmentalists surveyed were that as a nation we've moved towards a more collaborative approach rather than the big campaign approach, but that there is still a need for campaigns where practice is poor or change is not made in a sufficient timeframe.

**“Once there’s acknowledgement from the farmers that the wider community has a say in how they farm, then at that point you can sit down and talk.” – Guy Salmon –**

There was a feeling that some fairly substantial steps need to be taken by the sheep and beef industry to avoid such a campaign, and that farmers need to accept that there are limits to production so that the environment is protected. More importantly, Government and industry leaders need to understand this point and help the industry farm profitably within these limits.

Work undertaken by Journeaux (2009) found that most environmental best management practices are complex, provide little obvious relative economic advantage to the farmer, and outcomes are difficult to monitor and observe. Most extension activities, including environmental programmes, are also very much based around mass media approaches rather than intensive one to one interactions. Environmental factors, because of the way they are communicated to farmers, are often seen as add-ons to normal farm management, as opposed to being integral to the farming system, and are seldom presented in a whole farm system approach which is how farmers operate. However, there are a number of environmental best management practices that have productive benefit (e.g. using nutrients efficiently or preventing soil erosion) that many farmers already undertake and more would be likely to if it wasn’t presented as an ‘us and them’ or in the context of rules, regulations and compliance. Farmers mostly see environmental factors as a compliance cost as opposed to providing any market advantage. While ideally market incentives would drive adoption, the reality is that the current main driving force is domestic societal pressure and regulation.

**“The market would be the best mechanism of the lot to shift farmer behaviour. Currently, our markets are very focused on safe food and animal welfare, not water quality. The time will come, but we need to act now.” – Pat Garden –**

The results of this section suggest there is a long way to go to ensure farmers are receiving timely information in a format that will encourage them to adopt environmental practices. Farmers need to accept that there are going to be limits as outlined by the National Policy Statement on Water and begin factoring this into their business

decisions to ensure they can remain profitable. Some practices will take a long time to adopt but farmers should focus on the practices that address the most sensitive areas first and start 'chipping away at the low hanging fruit' (i.e. address issues that are relatively easy to resource first). The industry needs to help farmers achieve this by promoting the benefits, including economic benefits, and providing practical solutions. The time to act is now. Evidence-based policy needs to be written in a manner that allows this to occur, targeting the high risk areas first and progressively covering more over time.

#### **4.10 Collaboration**

Collaboration was suggested by virtually everyone who was interviewed as a way to get buy-in from people. Some suggested that it could take longer to use a collaborative approach than the current system, although Guy Salmon countered that by saying that writing plans takes a long time at the moment, particularly with Environment Court proceedings etc. and suggested that collaboration could speed that process up. More importantly he noted that results are more likely as there is generally much more buy-in from the people affected.

Mark Bellingham suggested the game's moved on from "scrapping". "It's a matter of trying to work out sensible ways of implementing a whole lot of these fresh water quality issues".

**"Consider what a retired principal judge of the Planning Tribunal, Arnold Turner, (no relation of mine), said in 1993. I quote: 'It is necessary for every community to have a common ethic governing its relationship with the natural world. If the community does not have a common environmental ethic, its debates about the environment will be reduced to a Darwinian struggle of special-interest groups, where power, not morality, rules.'" – Brian Turner –**

A local example of a collaborative process that worked was given in the North Waikato where they have made substantial gains in reducing possum numbers. The locals were having major problems with possums destroying trees that were planted. They approached the Waikato Regional Council for support and a rating system was determined based on Capital Value of the properties rather than farm area. The funds were then used to poison and trap possums and numbers dropped dramatically from 33

possums per 100 traps to 1 possum per 100 traps. The scheme has now been extended over 150,000ha from Port Waikato down to Raglan.

**“One of the big rewards from the possum control programme was that within 6 months we saw a huge change in the bush, all the tawa trees suddenly had leaves on them again; it was amazing.” – Rory Sherlock –**

Alastair Reeves suggested the same sort of approach could be used to deal with erosion and then biodiversity could be improved by planting natives. He says this was a good example of a Regional Council looking at the big picture and making a difference.

**“Can’t do it all tomorrow, just have to put in place small plans and chip away at them, if everyone does it, the gains will be huge.” – Alastair Reeves –**

A collaborative approach was also suggested by Journeaux (2009) who states that **“the social component of environmental issues is crucial, as adoption is very much a social process. The traditional top down/linear approach to extension has significant limitations, and social factors must be taken into account in designing and carrying out extension programmes. The use of participatory or collaborative approaches with farmers will enhance farmer understanding and acceptance of the issues in question, and result in a greater rate of adoption of best management practices.”**

The collaborative approach to managing water quality has its merits, but it does have some limitations in terms of resource requirements. Barney Foran also pointed out that collaboration cannot always be on a consensus basis either; he suggests it needs to be led by the evidence and at some point the hard decisions have to be made. It is probably the best we have and is the most likely approach to achieve success.

#### **4.11 How to get more farmers actively engaged**

The farmers interviewed are generally engaged with the sector and are considered as leaders. Therefore, they had value to add in terms of getting the majority of farmers onboard with improving environmental practices on-farm. Some had thought about this

question previously and others found it quite difficult to answer as they didn't feel there was any easy solution.

There was a mixture of suggestions from farmers with some talking about there being an attitude change required before we could think about what next. If there is no attitude change, then there is a role for regulations and penalties. Other comments were similar to what has been discussed above in terms of promoting management and economic benefits, helping farmers understand that it's not about stopping them making money, but about protecting their asset. Receiving a premium for product was also mentioned, although there was not much optimism about this actually occurring.

Kirsten Bryant suggested that farmers often feel guilty about what they're doing because of pressure from media and the urban community. She felt that actually making deliberate, considered decisions rather than just going on gut feel or what you've always done would go a long way to reducing impact in many situations.

**“Think about ‘if I do this, what will the impact be?’ Or ‘how can I do this a better way to reduce the impact to the environment?’ Might come to the same decision but at least it will be a considered decision.” – Kirsten Bryant –**

An understanding of the nutrient cycle and waste coming out of the system is required, suggested Sue Yerex who felt very few people understand the nutrient cycle or want to understand it. She suggests more of a focus on the outputs (waste) from the farming system is required to help farmers understand their impact on the environment. There is financial benefit in reducing the waste also.

Most felt that rules would be required to get the majority to act, although they felt disappointed with this. Journeaux (2009) found that both farmers and professionals felt that market pressure was minimal or non-existent and this finding was reiterated by this research.

Getting more farmers engaged will require a huge effort from the industry. Some of the potential solutions have been talked about or are addressed below. Acknowledgement of the problems and a practical approach to solving them are critical to getting actively

engaged farmers and greater uptake of environmental practices on sheep and beef farms.

#### **4.12 Balance between regulations and voluntary approach**

Most of the farmers preferred a voluntary approach to increasing uptake of environmental practices on sheep and beef farms and particularly improving water quality. However, they acknowledged that a solely voluntary approach would be insufficient to get change from the majority of farmers.

Councils need to identify significant waterways requiring protection. These should be targeted first and Councils should work with farmers on “how do we do this together?” Collaboration is a good way to start, particularly if there is good cross-sector representation and a wide range of expertise. There are examples of this with Environment Canterbury using “Zone Committees” and Waikato Regional Council’s “Catchment Liaison Committees”. The committees are made up of representatives from the communities with Council representation and are expected to work collaboratively to develop water management implementation programmes for the region they represent.

If farmers understand that there is a consequence of inaction under a voluntary approach they may be more willing to act. Education of farmers and of the next generation is also critical.

**“Our generation are much greener than the previous generation, and our kids will be greener than us.” – Graeme Saunders –**

A peer driven process would be far more effective than the ‘big stick’ of Government. Mark Bellingham suggests that “efforts need to go into championing farmers to do well at looking after the environment”. He also suggests that “Central Government need to do a lot better at offering rewards for good behaviour”.

There is a good example of this in the dairy industry with companies such as Tatua paying premiums for low somatic cell counts in milk. Tatua pay an extra 7 cents per kilogram of milk solids for a cell count under 100,000. They also rank suppliers by their cell count and publish a list of the top 10 performers for low somatic cell count in their monthly magazine. The associated peer recognition from this has been suggested as

the 'greatest driver' for behaviour change. Their Supplier Services Manager, Paul van Boheemen says "if we did nothing we'd lose any marketing advantage we had by saying we had the best quality milk in the country." As a result, their average cell count is 25 per cent below the national average, and they can achieve higher yields from making caseinate. In addition they get the marketing value (Poland, 2012).

There was general agreement among the surveyed respondents that where there are sensitive and vulnerable areas, rules and regulations are going to be the best approach a view also supported by Journeaux (2009). However, it should still not be a one-size fits all approach and consideration needs to be given to some of the natural challenges such as extreme events that can lead to damage despite best practice being implemented.

**"Where you can get a collaborative approach, people adopt a sensible attitude to things. It allows science to define the boundaries. Doesn't have to be stopped through lack of science, but identify those areas and put the resources in to find the answers that are needed there. Not necessarily wish list stuff initially. Then everyone can have the confidence that you're going the right way without putting any parties at risk. I'd be very supportive of that type of approach and could have faith in the outcome."**  
**– Rory Sherlock –**

Farmers felt that industry bodies have an education role in helping farmers understand the issues and helping them achieve best practice. They acknowledged that the reach of the industry bodies is not always as widespread as they would like as not all farmers are engaged with them.

**"Need to agree on what the problem is which then means you can work out the solutions together."** – Sue Yerex –

There was a range of views as to who should lead the process, with most farmers suggesting that Central Government need to set the fundamental rules for Local Government to implement at a catchment level. Those in positions of leadership in the sheep and beef sector also need to play their part in taking responsibility and helping as many farmers as possible.

**“The current approach with regards to policy sets land users against conservation issues. The approach should be, ‘you reckon you’re so good at looking after you’re land, show us!’ At the end of the day, the only thing that might work is a great big sharp stick, and that would be sad.” – Pat Garden –**

A largely voluntary approach was suggested by Ross Richards based on the Horizons Whole-Farm Plan which has received positive feedback and is used by Ross and Ruth on their property.

**“80% voluntary/incentives based and 20% rules. Rules would be minimum standards. The voluntary system would be based on the Horizons Whole-Farm Plan. Apart from the ridiculous cost of getting the plans done, it seems to be a workable system – everything that’s in our plan was suggested by me in the first place. It’s a system whereby the rest of the community can contribute to my reduced property rights. Council rules now make it impossible for me to clear the bush, so I’m encumbered with the cost of maintaining that land for the rest of the community. So through rates that fund the Farm Plan, the rest of the community is contributing to that maintenance.” – Ross Richards –**

Alastair Reeves also felt a voluntary approach was achievable by using Quality Assurance systems. Kirsten Bryant supported a similar approach.

**“Rules are destructive. They get people’s heckles up. I’m quality assured, if it says on the package of food that I’ve produced that its x, y and z, and that’s what’s making someone eat it, then I need to be x, y and z. However, the current Quality Assurance Scheme doesn’t have anything to do with the environment. The Fonterra move regarding the fencing of waterways as a condition of supply is a really good one and it will make people do it. This sort of approach needs to be well supported by the Regional Councils. It could be lead by Central Government and focused around 100% Pure. That’s a brand that’s NZ Inc. Companies can come under it and**

**say we're part of 100% Pure – industry, then that gets supported by Regional Government to implement it.” – Alastair Reeves –**

The environmentalists also talked about a combined approach and collaborative models. However, they were more cautious about this and most suggested that minimum standards and a consistent approach across New Zealand were essential as a foundation for any voluntary frameworks. They were also not confident that voluntary frameworks were going to achieve sufficient action.

Eugenie Sage pointed out that the collaborative approach taken with the Land and Water Forum is great. It has all the necessary ‘players’ around the table and working together, understanding each other’s position. One problem, she suggests, is that there is no similar collaboration at a political level, so recommendations from the process can be cherry picked by Government for political reasons. One significant gap in the Forum report was the lack of agreed standards for water quality. The report focused on improving processes but without agreeing on actual limits. She also highlights a challenge in resourcing collaborative processes at a catchment level for not-for-profit organisations and Non-Governmental Organisations in particular.

Guy Salmon pointed out that the Land and Water Forum is suggesting limits on sediment and nutrient discharges and faecal coliforms that are set and are binding. The methods of achieving these are more flexible in nature in that they are determined at the community level. Then if those methods don’t work to achieve the limits established, more regulation would be applied. This is an escalatory approach. This is recommended because farmers will see for themselves if it is not working and accept that more regulation is required.

**“One of the big questions from the LAWF about the National Water Quality Framework (that Central Government is preparing) is will it be as strong as it needs to be? If it’s not, the whole LAWF collapses and the deal is off.” – Guy Salmon –**

The question of the best approach to get the majority of farmers to increase the uptake of environmental practices on sheep and beef farms elicited a different response from almost every interviewee. It became clear that this is a question for the leadership of the

sector and they need to get buy-in from the sector as well as agreement from other interested parties. The first step is to agree on what the problem is and then agree on what the objective is to fix the problem. This will help shape the solution.

Collaboration is going to have a role in coming up with a viable approach and it will be of critical importance that farmers are brought along with the process rather than having it imposed on them at the final hour. This will ensure a greater level of buy-in. Farmers are then involved in developing the solution and action should occur.

Careful consideration needs to be given to penalty-based or polluter-pays schemes. A system where farmers can pay for the right to pollute does not solve the problem. For example, it is possible to get liability insurance to cover a breach of the Resource Management Act 1991 which will cover all fines and legal costs. The premiums for this may be high but for some farmers this will be no barrier.

Bill Durodie, a Professor of Peace and Conflict Management at Royal Roads University, Canada, points out that polluter pays doesn't benefit anyone (Durodie, 2002).

**“At a time when governments all over the world are concerned about the erosion of social bonds surely the 'polluter pays' principle is simply a formula for more social fragmentation? If applied more widely, what would stop me from arguing (as I do not have any children) that I should not have to pay taxes for education, or even get involved when I see a child in trouble down my street. Maybe the parent should pay? In fact the environment (like children) is a collective good, and we should restore a broader sense of social responsibility rather than individual blame for the management of such issues. Some things in life are best left out of the market mechanisms that dominate all else.” – Bill Durodie –**

## A challenge to the industry – Mike Barton, Taupo



Mike lives on the North Western side of Lake Taupo where he and his wife, Sharon own a 142 hectare beef finishing property. Their business plan is to grass finish 300 prime cattle per year in a way that does not harm the iconic Lake Taupo. Landcare Research has established a permanent deep drainage lysimeter facility on the farm. Mike's qualifications include a Masters of Business Administration degree with a research project on "The Implications of a Nitrogen Cap on Farm Businesses in the Taupo Catchment".

Mike was Chairman from 2006 -2009 of Taupo Lake Care (TLC), the group representing farmers in the process of developing the Lake Water Quality legislation (Variation 5) with Waikato Regional Council (Environment Waikato), Taupo District Council, the Ministry for the Environment, Tuwharetoa and all affected stake holders. He is currently a trustee of the Lake Taupo Protection Trust. The Trust is charged with removing 20% of the leached nitrogen from the catchment by 2018 by changing farmland to lower leaching land uses at a budgeted cost of \$81million.

Mike is increasingly being approached to speak at events for farmers around the country to talk about the realities of farming within a nutrient cap. The following outlines some of Mike's views on the challenge facing sheep and beef farmers in the next five years.

The industry is facing a combination of a failing business model and failed leadership.

**Failed business model** – essentially real returns for farming since 1984 have dropped substantially. We farmers are self-delusional; we don't interrogate our farming business model in a detailed, objective way. The Red Meat Sector Strategy is saying the top 20% of farmers is where everyone should be, but the top 20% are in the area of diminishing returns and have a huge exposure to risk, both climate and market. The whole thing can come unstuck very easily. To rely on just improving farmer performance as a means of improving profitability is an incredibly naïve and unfortunate way of examining the farming business model. The reality is that the return on investment is appalling. Why would you borrow at 6 or 7% when the returns are around 2% (between -0.4% and 2.4% in the last five years).

Because the farming business model is under such stress, and farmers are financially squeezed, to ask them to engage in environmental practices which have a cost, either in terms of implementation, or in terms of possible lost production is really difficult. They see it as another imposition on an already failing business model. That's the first reason why farmers won't take it up - they're just trying to balance the books, pay the mortgage, pay for the kids to go to boarding school, or take the wife on the holiday they haven't had for 30 years. So improving environmental practice is so far down the scale of reality for most farmers. It just can't happen. They might want to do it, but can't.

**Leadership** – Anyone who gets into a position of leadership in the farming industry is unlikely to talk honestly because they're worried they might scare off their voting constituents. One of the major impediments to uptake is the lack of honest dialogue around what our current farming business models are. The leadership in general tells people what they want to hear, not what they need to hear.

So for whatever reasons, we have farming leadership whose approach to dealing with environmental issues has been to push back. At the very best, they turn around and say 'look what the urban people are doing. We'll do something when they fix theirs'. This is just another form of denial. Farming leadership has made farmers terrified of the issue because they don't want to take the lid off the box.

Instead of looking at Regional Authorities as possible independent verifiers of the good environmental practices, then getting them to put their name to a brand appellation that could extract value, we just fight with them.

We've got consumers telling us we've got issues with dirty dairying, etc. Nike` got in trouble a while ago because of labour issues and they changed. They didn't turn around and carry on. They changed. Most urban people believe that farmers are appalling stewards of the environment. Yet I haven't met an urban person who doesn't eat our food. So there's a huge disconnect. Why can't the farming leadership see it?

A failed farming business model, leadership that is unwilling to 'front foot the issue' and a huge disconnect with the urban consumer are the real reasons there won't be any change.

Farmers are bone-weary from trying to make a profit.

I'm capped at my 2004 production level. Between 2004 and 2012 my costs have gone up 45%. I can't increase the amount of meat I produce on this farm other than through stock performance. I can't increase stocking rate. I have no way to increase production to meet rising costs and make a profit. It is so obvious that the business model has reached the end of its life. That's why adoption of environmental practices won't occur.

All the other issues, scrapping with Councils, disputing the science, they're the symptoms of the disease. The disease is the business model is failed, and leadership is lacking in this area.

What we'll do is argue around the edges of the issue, argue for more subsidies for fencing, etc whereas we need to be getting brand value, associated with good practice, that gets a premium back to farmers (i.e. the so called "value chain argument") such that the farming business model is rejigged and the fundamental issue of appalling returns is dealt with by environmental practices.

The farm business model of increasing intensity in the face of rising costs because of static commodity prices is challenged now anyway. We're at the face of that challenge right now, be it through environmental issues or through climate. It's just a biological system that is at its limit. It doesn't matter which is coming, its there. Let's be real about that and start having a conversation with farmers, with processors and with consumers about what that really means.

Put another way - as a nation we cannot have conversations about protecting waterways without having a parallel set of conversations about changing the agricultural business model.

#### 4.13 Economic growth

**“Whether we and our politicians know it or not, Nature is party to all our deals and decisions, and she has more votes, a longer memory, and a sterner sense of justice than we do.” – Wendell Berry (American farmer and author) –**

The Government is currently progressing their Economic Growth Agenda which includes a target of lifting exports from 30% of GDP to 40% by 2025 and they are proposing that part of this will come from the agricultural sector (by doubling the value in the next decade and increasing productivity at 2.1% per year) (Ministry of Business Innovation & Employment, 2012). This is despite the pastoral production contribution to exports as a percentage of GDP remaining static for at least the past 20 years at around 8-11% (Jamieson, 2012; Reserve Bank of New Zealand, 2012).

**“Again and again we’re told that more dams and big irrigation schemes are necessary if we are to ‘progress’ and ‘survive’. We’re told about ‘win-win situations’ and that environmental effects will be ‘less than minor’. About ‘balanced development’ and ‘wise use’ when in reality what we get, more often than not, is imbalance and misuse.” – Brian Turner –**

Throughout the process of conducting the interviews it became clear that in the face of limits on production, set through nutrients, climate or otherwise, the requirement of farmers to continually increase productivity and/or production to remain viable, and pressure from Government to ‘grow’, the industry faces a massive challenge.

**“Along the way there’s going to be a lot of tension and a lot of anguish by farmers facing limits. There is no question that some people will be directly affected and their businesses will be compromised. The Government needs to recognise that and be responsive to it. But at the same time, people need to accept that they can’t take out debt under the pretence they can continue to grow and grow.” – Pat Garden –**

This isn’t just an issue for the agricultural sector, it’s a global issue.

**“As the economy expands, so do the resource implications associated with it. These impacts are already unsustainable. In the last quarter of a century the global economy has doubled, while an estimated 60% of the world’s ecosystems have been degraded. Global carbon emissions have risen by 40% since 1990. Significant scarcity in key resources – such as oil – may be less than a decade away.” (Jackson, 2009).**

Environmentalists were asked what their views were on growing the economy and protecting the environment at the same time. This question evolved as the project developed and therefore the farmers were not asked their views on it. Thus, the responses below are solely from the environmentalists. It would be interesting to investigate the responses of farmers to this challenge. The following quotes and statements reflect the views of the environmentalists who were interviewed.

- 1. “Politicians and some business leaders tell us that if we want more economic growth, we’ll have to accept there’ll be more environmental damage. Farmers talk about wanting to hand their land on to future generations in a better shape than when they came onto their properties, but many indicators show that irreversible environmental damage is continuing. We are ramping up what the land can produce, not being smart about what it can sustainably handle.**

**What’s wrong with aiming for a steady-state economy? Infinite growth in a finite world isn’t possible. The future is going to be local economies, self-sufficiency and supporting local businesses. The globalisation model is collapsing. I doubt that, currently, any more than 20% of New Zealanders accept that this is a reality. In this regard we need to redefine and agree on what we mean when we say growth. And drop GDP - it is a myth measure. It doesn’t take account of and factor in what some term Externalities - ecological, heritage and recreational values for instance. Something called a GPI - genuine progress indicator would be a far truer and fairer measure.” – Brian Turner –**

- 2. “Economic activity should be about meeting everybody’s needs, not everyone’s wants. It should be about reducing inequality and spreading**

**the benefits and wealth around to those who need it; and safeguarding the environment on which the economy depends. Its thinking about things in the long-term, ensuring what we do now is not at the expense of nature and future generations.” – Eugenie Sage –**

- 3. “It’s true that economic growth has diminishing marginal returns, but I’m a bit critical of people who say we shouldn’t aspire to it. For an individual you can say, ‘I’m wealthy and secure and I don’t really need more income’. There are lots of environmentalists who have a nice piece of land in Golden Bay or the Coromandel in that category. But there’s a public interest in getting economic growth because there’s a lot of people that need it. There’s an equity problem in the way it’s spread about. The problem is not that we shouldn’t have economic growth; the problem is we don’t distribute it well.**

**It’s a valid thing to aspire to, but the growth that we think we’re generating from agricultural pursuits in NZ is not real growth. It consists in large part of undertaking activities which wouldn’t be undertaken if you couldn’t shift the externalities onto the community or the environment. ” – Guy Salmon –**

- 4. “It is possible (to achieve economic growth) but we’re going to have to identify that there are some productive systems that we’re going to have to abandon to protect the environment.” – Mark Bellingham –**
- 5. “Economic growth is what’s killing the biosphere; the expectation that we can glean more and more productivity out of it which seems to be happening for less and less money. Economic growth is one of the globe threatening activities. It is necessary for developing countries to get everyone’s per capita income up to a certain level to give them the basics they need for human endeavour. In the developed world economic growth means ripping the guts out of the rest of the world for means of personal satisfaction. Therefore it needs to be brought under control.” – Barney Foran –**

6. **“The focus shouldn’t be on growing, it should be on efficiency. Taking a look at what you’re doing and saying ‘how can I hold this thing together by looking for efficiencies?’.” – Pat Garden –**

#### **4.13.1 Possible solutions**

If producing more is not going to be an option, an alternative is increasing value. Therefore, the environmentalists were also asked if farmers should receive a premium for product where good environmental practice is used to produce them. They all thought that farmers should receive a premium, but like the farmers, they were not confident that it would happen without some fairly substantial shifts in the global economy. Guy Salmon had seen some market research work done in the late 1990s in Europe, US and Japan which found that consumer preference improved with labelling referring to environmental practice, but it didn’t include a premium except in special cases.

Environmentalists suggested that it was important for farmers to receive a premium so that they could look after the land and not be farming on a ‘knife-edge’, but have a buffer to manage climatic and market pressures. Mark Bellingham suggested using tracking technology with performance indicators such as soil and water quality as well as talking about the land story and how they’re managing biodiversity. He suggested the best incentives will come through marketing. Mike Barton supported this suggestion by talking about ‘emissions’ labelling (emissions being all losses from the system, nitrogen, phosphorus and greenhouse gases).

What is clear is that talking about economic growth without considering its impact on the environment is futile. It may improve the lives of some of the current citizens but at some point there will be a cost that is paid by future generations if we are not smart about our actions. In a similar vein to dealing with water quality in a catchment, growth of a sector cannot be achieved simply by a Government directive. It requires buy-in and practical solutions. Farmers need to be involved in this discussion and ensure that the resources they use, the land, the water, the air, are part of the equation, or accept the consequences.

#### 4.14 Other issues

There were a number of other issues raised throughout the interview process. As has been mentioned, the rural-urban divide was raised by most farmers. This was not mentioned by the environmentalists. Several farmers suggested some form of linking-programme between rural and urban communities where urbanites could come onto the farm, help with some planting or similar and have a rural experience. There were a lot of comments about how the gap is getting bigger and fewer and fewer people seem to have any connection to the land. Farmers were very concerned about this.

The author attended the Blue Duck Station Open Day in August. The Station is a great example of conservation and farming working well together. As well as having a productive farm, the Steele's have also protected a substantial area of bush and have an extensive trapping and monitoring programme. Most of the work is done by volunteers, known as 'eco-warriors' and they have diversified their business with a café, accommodation, horse trekking, bush safaris and hunting trips, kayaking, mountain biking and tramping. They run a 'sponsor a trap' programme. You can sponsor a trap for \$100 for a year. The trap gets your name engraved on it and you can check your trap's progress and latest kills using their Google Earth application. This approach was an innovative way to protect the whio (blue duck) on the property and also turn it into a viable business. Most of the volunteers are from overseas, but there are New Zealand volunteers also and most of them are from urban communities. Here we see conservation and agriculture working together to bridge the rural-urban divide.

There was some discussion around other parts of the sector that have an influence on farmer behaviour. As expected, banks were mentioned, particularly where they are financing farmers who are not performing. However, most commented that this was pre-recession behaviour from banks and that most were much stricter now. Farmers were concerned that fertiliser representatives would have more of a compliance role in implementing Nutrient Management Plans. Given some of the farmer issues around the nature of fertiliser representatives having sales as their primary objective, there are potential problems ahead for the industry. Some farmers also felt that the real estate industry needed to be promoting the amenity value more and felt that this would influence more farmers to protect waterways and plant more trees.

The influence of women on farmer attitude towards environmental practices was also observed. Once again, there was not the sufficient data to support this in a quantitative manner but it is worth mentioning. In all the cases where both husband and wife were interviewed it was clear that the wife had a strong influence over the husband's attitude towards the environment. It was not always the over-riding attitude, nor was it always the most dominant with respect to 'being green', but there was certainly an influence. Others talked about trying to get their neighbours to change and suggested: 'the trick is to convince the wife they should do it and then it will happen'.

#### **4.15 Potential risk with moving the problem**

There is always a risk that in fixing one problem you create another, or just move the problem somewhere else. There are a number of potential areas where this could occur when improving water quality on-farm. For example, dairy farmers will often graze their dairy cows off-farm for winter to protect their soils from pugging damage. But, the dairy cows have to go somewhere – it could be to a run-off block or to a sheep and beef property. If the cows are not managed appropriately at the place where they're moved to, then pugging damage can occur and the result is that the problem has simply moved from one property to another. A number of farmers talked about reducing cattle numbers on the hill country to reduce soil damage. Often, the cattle on the hill country are breeding stock and this is a relatively economically efficient way to produce meat (in the calf). If all the cattle are removed from the hill country then this raises two issues. Firstly, pasture quality management on hill country has traditionally been done relatively effectively by the breeding cow. If the breeding cow is removed from the system, how is the pasture on the hill country managed without excessive cost (e.g. a current alternative is using chemicals applied by helicopter)? Secondly, these breeding cows have traditionally been a source of finishing stock (i.e. the calves are grown out for meat), where will the finishing stock come from if breeding cows are removed? A significant proportion of calves are coming from the dairy industry already. Is this a potential problem?

There are no easy answers to these challenges. It is important to consider strategies such as grazing off, or destocking over-winter in the context of the whole system. Farmers who graze their cattle off on another property for the winter should have an understanding of the way their stock are managed and the impact they may be having on that property. In terms of overall land use, it is perhaps a bigger industry issue. The

whole system needs to be considered in terms of what various land classes can produce and how that production can occur sustainably.

## 4. Recommendations

There is no silver bullet to improving water quality across New Zealand, or to increasing uptake of environmental practices on sheep and beef farms. The issue is biological in nature, and therefore complex. It also requires individuals to change their behaviour; an issue which has challenged generations of advisors. On top of that, there is a significant range of personnel involved in the issue – consumers, New Zealand citizens, both urban and rural, central and local government, industry professionals and advisors, and of course farmers. Any solutions are going to require a collective approach, and the fundamental part of this will be firstly, agreeing what the problem is, and secondly, agreeing on the objectives to solve the problem.

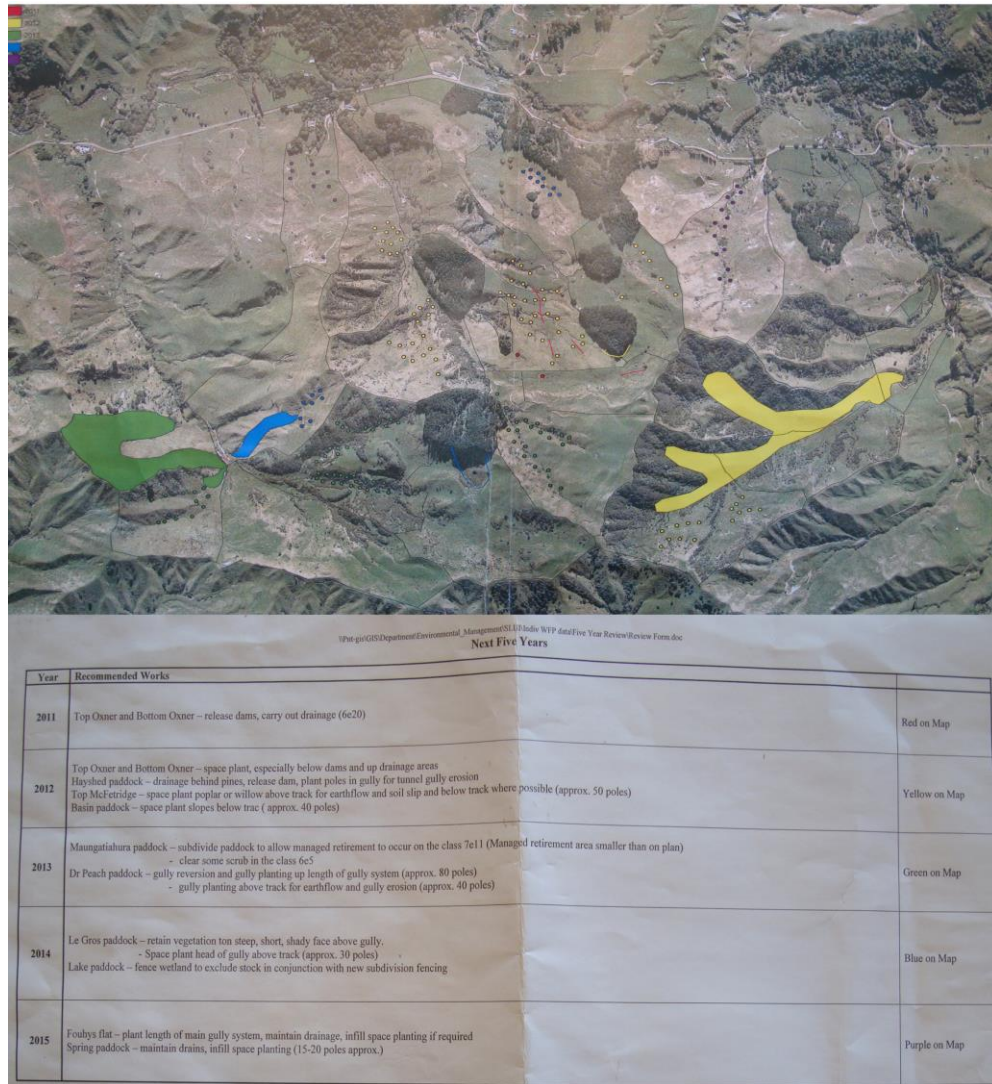
### 5.1 Information transfer

Generally, good practice in terms of waterway management can be condensed into 3 key areas: riparian protection, erosion control and nutrient management.

Those providing advice or implementing rules on managing these areas should ensure the following:

1. Farmers understand the problem
2. Farmers understand the benefits and costs of responding **for their system**
3. The solution is practical and achievable
4. Farmers are given the appropriate support to undertake the changes
5. Farmers are rewarded for good practice
6. Acknowledge that it takes time. Start with awareness, work towards behaviour change.

An example is the Horizons Whole-Farm Plan. A land management officer comes onto the farm and works with the farmer to identify areas of concern. Between them they work out a 5 year plan. This is recorded on an A3, colour aerial photograph of the farm with action areas for each year colour-coded. The specific tasks for each area in each year are outlined in a simple table on the back. This is shown in Figure 2. The recommendations are done on paddock name or number and the farmer can put it on the wall in the office or the shed and it is very clear what they need to do. The Council staff member checks in with them regularly to review the plan and to offer support and advice and to keep them on-track.



**Figure 2** Example of the A3 page provided by Horizons Regional Council outlining 5 years of practices to be undertaken on this particular farm.

## 5.2 Industry structure and leadership

In the face of resource limits and rising costs to the farming business, a change is going to be required to ensure farms remain economically, environmentally and socially viable. It is up to industry leaders to acknowledge this, and to engage specialists, other sectors and farmers to change the way we do business. Industry leaders should consider being far more emphatic on the issue of environmental stewardship. Thus it is important for farmers to vote for leaders who will tell them what they need to know, not what they want to hear.

Collaboration needs to be part of this equation and most importantly, bringing the consumer along with the industry will be critical.

### **5.3 Mentor scheme**

This project involved interviewing 13 farmers from across the Waikato and Bay of Plenty, all of whom have undertaken practices on-farm which have enhanced the environment. It was relatively easy to identify these farmers, which suggests there are a lot more out there. Evidence also suggests one-to-one engagement works best, and farmers learn a lot from other farmers. On that basis, I am proposing setting up a mentoring scheme with 'Environmental Champions' helping other farmers improve uptake of environmental practices. This could be one to one or involve small discussion groups and could be supported by regional councils and Beef + Lamb New Zealand. It would not be resource intensive, but would enable farmers to learn from other farmers and work with them to achieve their objectives.

### **5.4 Safe, Lean, Clean & Green Product – the how to guide**

Many farmers talked about plenty of information being available but it wasn't all in one place in an easy to use format. Therefore a website should be established that incorporates information on a range of tools and advice on improving environmental practice on-farm. The website would have stories of farmers who had done good things on-farm, such as the case study in this report on Rick Burke with photos, practical advice on how to implement practices and where to source resources (e.g. eco-sourcing trees). It would also outline the costs and benefits of undertaking the practices. Additionally, the website will include the key contact details for people who can help to implement these practices.

It could be produced with the relevant industry players and people could link to the website from their own organisations (e.g. Beef + Lamb New Zealand, Landcare Research, Regional Councils) and use a frame on the website so that it had the look and feel of the original page you access it from (e.g. if you access it from Beef + Lamb New Zealand, it would look like a Beef + Lamb New Zealand page). Topics on the page could include: erosion control, nutrient management, riparian planting, stock exclusion, market information and other relevant subject areas.

### **5.5 The outliers**

The above recommendations, if implemented should go some way to helping the majority of farmers improve their on-farm environmental practices. There is still likely to

be a small percentage of the population of farmers who are not willing to change and who will not respond to the approaches outlined. Most of those interviewed agreed that regulations would be the only thing that would make all farmers act and that these regulations should set minimum and maximum standards for water quality. For these regulations to be effective, they require adequate monitoring, reporting, verification and compliance to ensure that the outliers are being identified. Once identified, then the right people can be put around them to achieve the desired outcomes. Penalties may be required to ensure this happens. Peer pressure from other farmers is also likely to cause these farmers to change their behaviour. If other farmers are identifying them and publicly condemning their behaviour it will improve public attitude towards farmers in general and provide incentive for all farmers to comply with the rules.

## 5. Further work

Due to time constraints, this project was necessarily narrow in scope. The following points suggest areas for further work that became apparent throughout the interviews and subsequent analysis.

- This work was necessarily a qualitative analysis of the issues. Davies (2012) conducted similar, work in the Waikato for sheep and beef farmers and surveyed a larger number of farmers (32). However, there would be value in expanding this analysis into other regions which will be facing different issues and undertaking a qualitative survey to determine what practices are actually being undertaken on a wider scale.
- In order to remain focused, this project interviewed those farmers who had undertaken environmental practices, and were generally accepting of the need to do so, regardless of their motivations. Further work should be undertaken across the spectrum of individuals in the sheep and beef industry, particularly with those farmers who are not prepared to undertake any environmental practices on-farm. These farmers need to be asked what the impact on them would be if a cap was in place, and what the real reason for their lack of action is. Is it denial of a problem or that they can't see a way out of it?
- The question of economic growth in a resource limited environment has been well documented outside of New Zealand. In this study, only the environmentalists were interviewed about it. There may be merit in exploring this issue further with farmers and the wider public.
- Sheep and beef farmers are very much at the awareness stage of the behaviour change continuum. Meaning, there is a lot more information and understanding required before actual behaviour change will occur. There are many farmers who are unaware of the changes that are coming in terms of resource limits, specifically, nutrients. The industry needs to make a concerted effort to start bringing this issue to the forefront of farmers' minds with a broad extension campaign that runs across industry organisations (Beef + Lamb New Zealand, central and local government, Crown Research Institutes, fertiliser companies, banks, rural supply companies etc).
- A lot of work needs to go into a regulatory approach to ensure the problem is addressed and the right incentives are created, while perverse incentives are minimised.

## 6. Conclusion

There are many good farmers out there doing good things. These farmers could facilitate further environmental enhancements by helping their neighbours do the same and speak up when other farmers aren't doing the right thing. This would go a long way to showing the public that as an industry we acknowledge the need to maintain water quality. A good starting point for farmers wanting to improve the environmental performance of their farm is to engage with their local regional council staff, they have a lot of helpful knowledge and resources. Having said this, regional councils could get value from being more open with farmers and understanding their situation.

There are a number of advisors working to help farmers increase the uptake of environmental practices on their farms. It is important that those providing advice understand the farming system and the farmers' perspectives. By doing this, the advice can be tailored to meet the needs of the farmer. A 20 page research report probably isn't going to result in behaviour change, but a piece of practical advice relevant to the farming enterprise might.

Changing performance starts with awareness; behaviour change comes at the end of the process and it takes time. As much as certain things need to be implemented instantly, we need to accept that this won't always be possible without help and support.

The industry needs strong leaders who can help farmers understand why they need to act, and how they can act. It is not going to be an easy road; there will be costs - financial and social, and these shouldn't be ignored. Think about the long-term, what is good for our sector and our land long-term? What are we passing on to future generations? Taking the politics out of the mix and just addressing the issues will help facilitate change.

Pressure is building for the sheep and beef sector to "do their bit". Many dairy farmers are frustrated that the focus has been on them and are calling for action from sheep and beef farmers. The urban community is also increasingly aware of the contribution farming systems other than dairy make to the degradation of water quality. The evidence is there which says that sheep and beef farmers are having an impact on our

waterways. There is variation between catchments and therefore the on-farm solutions to mitigate the impact need to be delivered at a catchment level.

As an industry, we have an opportunity to take a proactive approach to dealing with this challenge. A proactive approach could involve all the major stakeholders including farmers, local government, central government, farm advisors, bankers, vets, sales representatives, environmental groups, recreational water users getting together to find solutions for individual farming businesses. There are examples of this around the country at a catchment level and the Land and Water Forum achieved this on a national level. If solutions are focused on the benefits to the farming business of taking action, then behaviour change is far more likely to occur. It is important for farms to remain financially viable, if that is what motivates them to change, then the solutions need to be focused on the financial outcomes of action.

Increasing environmental practices on sheep and beef farms will ultimately come down to sheep and beef farmers understanding what is needed, realising the benefit to their business, finding the right way to implement change on their farm and helping others achieve the same thing. In other words, the solution is all about people.

**“Agriculture has long been thought of as a technical issue involving the application of science and the transference of science outputs via a top-down process of technology transfer. It is not. Agriculture is farming, and farming is people.” – Vanclay, (2004) –**

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# Appendix 1: Interviewees

## Farmers

Alastair and Ann Reeves, Waimai Valley  
Alex and Anne Richardson, Taupo  
Anthony and Dani Darke, Aria  
Graeme and Karen Saunders, Wharepapa South  
Kirsten Bryant, Taumarunui/Wanganui  
Mike and Sharon Barton, Taupo  
Philip and Anne Woodward, Waikaretu  
Rick Burke, Katikati  
Rick and Rose Powdrell, Te Puke  
Robert and Suzanne Carter, Taumarunui  
Rory Sherlock, Ngaruawahia  
Ross and Ruth Richards, Taumarunui  
Sue Yerex and James Truebridge, Taupo/Parapara

Pat Garden, Millers Flat, Trustee, New Zealand Grassland Trust

## Environmentalists

Eugenie Sage, Green Party MP  
Guy Salmon, Executive Director, Ecologic  
Mark Bellingham, North Island Conservation Manager, Royal Forest & Bird Society of New Zealand  
Brian Turner, Poet, Essayist, Biographer and Editor

## Other

Barney Foran, Adjunct Research Fellow, Institute for Land, Water and Society at Charles Sturt University, Albury-Wodonga, Australia.

## Appendix 2: Interview Questions for farmers

### Introductory questions:

Farm area, stock classes and numbers, annual rainfall, topography, how long been on the property, ownership structure, debt levels/structure?

### Lead-in questions

1. What does sustainability mean to you?
2. How would you define environmental practices?
3. What 'environmental practices' have you undertaken in the past or currently? Why – what was your motivation?
4. Did you have any financial support in implementing these practices? If yes, would you have done what you've done without it?
5. What practices would you like to implement on your farm?
6. What limits you from doing this?

### *Water quality management on your farm*

7. Do you have waterways on your property, including wetlands? (No / Yes – if yes please describe these (e.g. rivers, streams, creeks, wetlands, stock-water dams)
8. How are they managed and why?
9. Have you done any riparian planting?
10. If so, what and why, if not, why not??
11. Do you measure soil nutrients (e.g. N, P, K, S, Mg levels)?
12. If so, what do you measure, how often and why?
13. What practices do you undertake/changes do you make when you see the results?
14. If nothing, why not?
15. Do you know what you're leaching/losing
16. Do you have a nutrient management plan and/or a nutrient budget?
17. Do you alter your stocking policies when soils are very wet?
18. If so, why? If not, why not?
19. Do you treat different soil types differently? How?

20. If so, why? If not, why not?
21. Do you treat different landforms (e.g. hill country, flats, gullies, terraces, etc) differently? How?
22. If so, why? If not, why not?
23. If so, do you use it? If not, why not?
24. Are you concerned about erosion on your farm? (erosion types include wind, slip, slump, earthflow, gully, tunnel gully, stream bank and silt deposition associated with flooding)
25. Which types of erosion exist on your farm? What is the area of erosion risk (ha)?
26. Are you doing anything about it?
27. If so, what and why? If not, why not?

### **General questions**

#### *Your farm*

28. What would you consider are the main environmental impacts your farming system is having on the environment?
29. Have you sought or received any advice on anything we have talked about so far or are you considering getting advice? From whom?
30. What would help you undertake more environmental practices on your farm?

#### *Other farmers*

31. What would you consider to be the main driving forces requiring farmers to improve the environmental impact of their farming systems?
32. What and where do you think the major weaknesses are in the process of getting information on environmental management systems to farmers?
33. What do you think is a realistic time frame for the majority of farmers to adopt environmental practices?

#### *Approach*

34. What balance do you think there should be between a rules approach (from Central and/or Local Government) and a voluntary framework?
35. Do you think any regulatory approach should be led by Central Government or Local Government? Or by an industry body?

*Do you have any other comments to add?*

## Appendix 3: Interview Questions for environmentalists

### General questions

1. What does sustainability mean to you?
2. How would you define the term “environmental practices” on-farm? (What does it mean to you?)
3. a) Do you subscribe to the statement ‘you can’t be green if you’re in the red’?  
b) If so why, if not, why not?

### Sheep and beef farms

4. What would you consider are the main environmental impacts sheep and beef farmers are having on the environment?
5. For a sheep and beef farm, what would best practice water quality management look like to you?

*(after this question is answered, inform interviewee that questions have been asked of farmers around riparian planting and fencing of waterways, stocking policies on wet soils, erosion control, managing soil type and contour and nutrient management)*

6. What do you think limits sheep and beef farmers from undertaking more environmental practices?
7. What do you think would help them undertake more environmental practices?
8. What would you consider to be the main driving forces for farmers to improve the environmental impact of their farming systems?

### Information transfer

9. What and where do you think the major weaknesses are in the process of getting information on environmental management systems to farmers?
10. Which individuals or organisations are best placed to provide information to farmers on environmental management systems?
11. What do you think is a realistic time frame for the majority of farmers to adopt environmental practices?

### Process

12. What does economic growth mean to you?
13. What are your views on growing the economy and protecting the environment at the same time?
14. Is the Government’s economic growth agenda achievable while still protecting waterways? Specifically the target of lifting exports from 30% of GDP to 40% by 2025.

15. a) Do you think farmers should receive a premium on products where good environmental practice is used to produce them? In NZ and globally (i.e. moving out of the commodity space).

b) If so, why? If not, why not?

16. a) What do you think about the conflict between food production and protecting the environment in the face of a rapidly-rising global population?

b) How should New Zealand farmers respond to this?

One farmer stated “the position we (the farming industry) are in is a combination of a failing business model and failed leadership. Essentially real returns for farming have dropped substantially since 1984 (subsidy removal). Farmers are self-delusional; we don’t interrogate our farming business model in a detailed, objective way. To rely on just improving farmer performance as a means of improving profitability is an incredibly naïve and unfortunate way of examining the farming business model. Anyone that gets into a position of leadership in the farming industry is afraid to talk honestly because they’re afraid they might scare off their voting constituent. So because the farming business model is under such stress, and farmers are financially squeezed, to ask them to engage in environmental practices which have a cost, either in terms of implementation or in terms of possible lost production is really difficult. They see it as another imposition on an already failing business model. That’s the first reason why farmers won’t take it up, they’re just trying to balance the books, pay the mortgage, pay for the kids to go to boarding school, etc. Improving environmental practice is so far down the scale of reality for most farmers, it just can’t happen. They might want to do it, but can’t.”

17. a) What are your views on this?

b) Do you have any ideas for the industry to address this?

Many of the farmers who I have interviewed were motivated to action primarily by other factors (other than environmental) to implement environmental practices on their farms – e.g. management benefits, animal health and safety, able to manage productive areas more effectively, aesthetics, etc.

18. a) Given the above, are the messages that are being sent to farmers and the language that’s being used (‘dirty dairying’ for example) the most appropriate to get action from the majority?

b) Is there a different way to sell the story?

Most of the farmers interviewed had or are still having challenges with ongoing maintenance of retired and riparian areas. Some received financial support for the initial fencing and/or planting but not for the ongoing maintenance of fences, pest and weed control which can come at a substantial cost. It’s relatively easy to find volunteers to plant trees, but not so easy to get them to clear blackberry or mend fences.

19. a) What is your view on providing subsidies for environmental services both initially and on an ongoing basis?

- b) Who should fund them and how do you think they should be implemented?
- 20. The Land and Water Forum and the process it is operating under are getting cross-sector support and positive feedback.
  - a) What are your views on the process and do you think it is the best process to achieve change at a catchment level?
  - b) How long can we wait to allow this process to happen?
- 21. What else could we do to get farmers to change their behaviour?
- 22. Primary Industries Minister, David Carter, recently said that we need to improve environmental practices on-farm and increase productivity, and science will provide the solutions. What are your views on this?

### **Approach**

- 23. What balance do you think there should be between a rules approach (from Central and/or Local Government) and a voluntary framework to improve water quality in New Zealand? Why?
- 24. Do you think any regulatory approach should be led by Central Government or Local Government? Or by industry?
- 25. Under a legislative/regulatory approach, who should bear the cost of monitoring/reporting/verification for compliance?
- 26. a) Who should set minimum standards for water quality?
  - b) How should the decision be made?
- 27. Do you have any views on what either a voluntary or regulatory approach should look like?

### **Vision**

- 28. If you were asked to portray a vision or goal to New Zealand sheep and beef farmers around managing water quality nationally, what would it be?

*Any other comments to add on anything we've discussed?*