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FARMERS' PERCEPTUAL, EMOTIONAL AND BEHAVIOURAL RESPONSES TO ENVIRONMENTAL POLICY CHANGES

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ABSTRACT

Environmental policies purposefully encourage environmental protection by redirecting human decision-making and activities. Achieving the right human responses to environmental policy is therefore critically important. This paper discusses the regulatory framework and pastoral farmers' adaptation to a new regulation, consisting of rules, designed to protect the pristine waters of Lake Taupo from land based non-point source nitrogen emissions. The lake is an internationally recognised treasure and New Zealand icon, however, its water quality has been deteriorating over decades because of rising nitrogen levels, 37% of which comes from pastoral farming activities in the catchment. The paper discusses agricultural extension in the context of emotional, perceptual and behavioural change.

Key words: farmer adaptation, policy impact, water quality, farming practices, extension

1. BACKGROUND

Lake Taupo is the largest lake in New Zealand and it is oligotrophic i.e., it has low nutrient and high oxygen levels (Botha, Parminter and Roth, 2006). Approximately 80% of all land in the catchment is owned by Ngati Tuwharetoa and managed by a variety of Maori Trusts and Maori Incorporations on behalf of their approximate 13,000 owners. The remainder of the land consists of single-owned (non-Maori) farming operations (Botha *et al.*, 2006). About 94% of manageable nitrogen entering the lake originates from stock effluent on farmland leaching through soil into groundwater and rivers, and ultimately, into the lake (Environment Waikato, 2005). The remaining 6% of manageable nitrogen originates predominantly from urban wastewaters, such as sewage and septic tank seepage (Lake Taupo Protection Trust, 2007). Monitoring data over the last 30 years suggest that efforts to mitigate leaching were not sufficient to stop lake water quality deterioration (Roth and Botha, 2009; Roth, McGowan and Brown, 2009).

Regional Councils are New Zealand local government bodies responsible for managing environmental issues like water quality. A Waikato Regional Plan (WRP) was developed by the Waikato Regional Council (WRC) under the Resource Management Act 1991, and during 2003, Council released the Protecting Lake Taupo strategy (hereafter referred to as the strategy), which provides guidelines for protecting the lake. To further give effect to the strategy, WRC proposed a variation, called Variation 5, to the proposed WRP in 2005. Variation 5 was disputed and an Environment Court hearing to consider evidence and legal submissions on appeals to it was conducted in 2008. The Court released an interim decision of its findings in 2008 (Before the Environment Court, 2008). It upheld, with very little final change, Variation 5 of the Regional Plan to control land use around Lake Taupo using new non point source discharge rules. This was the first proposed legislation of its type in New Zealand (Yerex, 2008).

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2. METHOD

2.1 Emotions and change

The aim of this research was to investigate, through case studies, how farmers in the Taupo catchment adapted over time to environmental policy changes in terms of their perceptions, emotions and behaviours. The links between human perception and behaviour have been well described in psychology, extension and medical research literature (Lewin 1943; Gibson 1987; Rubin, Amlôt, Page and Wessely, 2009). According to Düvel (1975) perceptions with a negative valence are commonly associated with resistance to change and positive perceptions with acceptance. Therefore, if in our study, farmers had negative perceptions of the changes that they had to go through, they could be expected to resist change. Although the links between perception and behaviour are well understood, the role of emotion in farmer decision-making is less clear."

While there is a prolific body of literature on emotions and behaviour in bio-psychological literature, emotions have been largely ignored in fields like economics (Loewenstein, 2000) and agricultural extension. Johnson (2009) categorised theories of emotion using the contexts within which they were developed, identifying three standard contexts: evolutionary, social and internal. Evolutionary theories attempt to provide an historical analysis of emotions, usually with a special interest in explaining why modern humans have the emotions that they do. Social theories explain emotions as the products of cultures and societies, while the internal approach attempts to provide a description of the emotional process itself. Kiefer (2002: 40) viewed emotions "as emergent from change processes and as playing an important role in adjustment to change." She also described three different ways of looking at emotions, during change, found in the literature. According to Kiefer (2002: 41) there are three groups of literature: the first looks at stress and fear as the main negative reactions to change; the second group looks at the emotional effects of change (layoffs in organisations) on individuals; and the third group focuses on resistance to change expressing irrational emotions. In the context of organisational change, Kotter and Schlesinger (1992, cited in Kiefer 2002: 41) identified four emotional reasons for resistance to change: loss of value as a result of change, lack of understanding of the implications of change and lack of trust in the organisation, different assessments of the situation than those who initiate the change, and fear of not being able to develop the new skills required due to change. Although these emotional reasons for resistance to change are in the context of organisational change, they are relevant to our study because of the similarity between the two contexts: both are about change imposed on individuals who have very little say in it and very limited free choice in their responses.

The foregoing discussion suggests that emotions play an important role in individuals' responses to imminent change, like that which the farmers in our study experienced. Kiefer (2002: 14) also referred to adapting phase models for understanding emotional reactions to change as "death" and "loss" such as the model of (Kübler-Ross, 1969). We used this model as a point of departure for uncovering farmers' emotional reactions to imminent change. We found the five stages of the grief cycle of Kübler-Ross (1969) a very useful way of revealing and explaining farmers' emotional responses to high-impact imminent change. Kübler-Ross (1969) described the five stages of grief as denial, anger, bargaining, depression and acceptance.

In this study, we used the working definition of emotion by Cole, Martin and Dennis (2004: 319); emotion is a constant, vigilant process which periodically reaches a level of detection (i.e., a feeling) for the person or an observer (e.g., a friend or someone else). We combined emotional, perceptual and behavioural responses to assess farmers' adaptation to new environmental policy.

2.2 Interviews

A random sample of 19 farmers was interviewed in 2005 (Roth, Botha and White, 2005) and again in 2009. Overall, both sets of interviews covered farm properties in the Lake Taupo catchment. Three of those were dairy enterprises and 16 were sheep and beef enterprises. Six of the properties were multiple owned Maori blocks and 13 were non-Maori sole owned farms. Most participants (84%) had more than 30 years farming experience. The same farmers were interviewed both times, except for three of the original six Maori block participants who were, due to staff changes, unavailable in 2009 for interviewing. All the interviews were audio-taped and transcribed. The goals of the research, their input into it, and their rights were explained to all interviewees. Participants signed a research consent form each time they were interviewed. Within a short time after they had been interviewed, participants received a typed copy of the interview. They were allowed to make changes or withdraw information if they so desired. When happy with the content they were asked to sign off the interview. This served as a data verification technique. Data were analysed and a summary of the final report was provided to all participants who requested it.

3. FINDINGS

3.1 Farmers' perceptual responses

Maori regard themselves as the traditional *kaitiaki* (guardians) of the lake. They therefore believe that they have a duty to protect the natural resources around the lake and its waters. All participants in both the 2005 and 2009 studies were concerned about nutrients leaching into the lake. All said that livestock excretions were a major source of nitrogen, because it easily leaches into the groundwater, especially under wet conditions. Effluent ponds on dairy farms, in particular, were perceived as a major source of nitrogen pollution. Participants also acknowledged the use of fertiliser in New Zealand pastoral farming as a potential pollutant. Although a few believed that most fertiliser is trapped in the soil, and as a result does not majorly impact the water quality of the lake, many indicated that fertiliser can enter the lake during storm events. Farmers' perceptual responses to policy change are shown in Table 1.

Table 1. Farmers' perceptual responses to policy change

Perceptions in 2005	
Negative perceptions	
It is not our fault	Rules will limit farm development (M)
Most fertiliser is trapped in the soil	Rules will fail
Farmers are being unfairly targeted	Septic tanks is the actual issue, linked with residential development
Ambivalent perceptions	
Disbelieve research findings about farming's contribution to pollution	The matter will go to the Environment Court
Positive perceptions	
Leaching plays a role in pollution	Animal excretions and effluent ponds are issues
We are the guardians of the lake (M)	Fertiliser is a potential pollutant
Perceptions in 2009	
Negative perceptions	
Farmers are being unfairly targeted	Rules will limit farm development (M)
Financial impacts on farming not sufficiently acknowledged	Rules will fail
High stress levels (So)	Rules are required but not for us (farmers)
There are and will be more huge negative socio-economic impacts like community split (So)	Septic tanks is the issue, linked with residential development
Ambivalent perceptions	
Disbelieve research findings about farming's contribution to pollution	Research is based on theory not farming reality
Computer program (OVERSEER) not accurate	
Positive perceptions	
All the positive perceptions remained unchanged	

Note: perceptions are not property ownership sensitive unless indicated: (M) = Maori; (So) = sole owned property

Participants generally believed that nitrogen enters the lake mainly via groundwater leaching. Research results indicated that, in some samples, the nitrogen was between 80 and 100 years old (Roth *et al.*, 2005). However, farming activities in the catchment have only been ongoing for the last 50 years. Hence, in 2005 participants argued that scientific research results were inconclusive, and that leaching from their properties, in all probability, had not reached the lake yet. They continued to hold the same view during the 2009 interviews. They also indicated that research investigations were based on theory and not on-the-ground farming practices that are, in their view, best suited for different geographical locations around the lake.

Participants acknowledged that rules were required to protect water quality in the lake, but maintained that pastoral farming's contribution of 37% of the total amount of nitrogen (manageable and non-manageable) leached into the lake was relatively small compared to the 63% other human activities, urbanisation and natural erosion contributed to the problem

(Botha *et al.*, 2006). Hence, most participants (92.3%) believed the rules would eventually fail.

There are a large number of residential properties around the lake. Participants in the 2005 study said many of these had the older traditional type of septic tank that did not remove nitrogen from human effluent. Some of these septic tanks were said to be only five meters from the shoreline. Participants in the 2009 study continued to express their concern about development of residential subdivisions around the lake.

While participants in 2005 did not know the detail of the rules (i.e. Variation 5) they expected would be introduced, all of them acknowledged that new rules were necessarily a reality in the 2009 study. However, participants still perceived rules that, in their view, exclusively target farming operations, as unfair. Participants also said the Regional Council did not sufficiently acknowledge the on-farm financial consequences of the rules. As a result, the majority of participants (84.5%) held strong negative feelings towards the Regional Council.

During the 2005 study, participants said that approximately 50% of the Maori farming blocks were still being developed. Although Variation 5 did not exist, participants believed they were going to make substantial financial losses due to their inability to further develop these blocks. As a result, they expected the issue would be referred to the Environment Court, where resolution could span a number of years. This would enable land users to continue farming as they had in the past until the Court decision was made.

Most (92.3%) of the participants farming sole-owned farms indicated that, due to their greater economic vulnerability, their operations were more sensitive to regulatory measures than their Maori counterparts. In addition, most participants in the 2009 study (68.4%) mentioned that the regulation had already impacted themselves and their families. It especially seemed to have negatively impacted participants farming sole owned farms (84.6%), some of whom reported excessive stress levels; abdominal ailments; migraine headaches; sleeping disorders; depression; and increased smoking and drinking. Participants on these farms said that the expected impact of regulation was a constant worry. In contrast, most of the participants farming Maori blocks (66.7%) said the proposed regulation to this point (2009), significantly impacted neither them nor their families. Reasons cited were that they were salaried staff and did not have the same emotional ties to the properties they managed as do owners of sole-owned operations.

3.2 Farmers' emotional responses

Although nitrogen pollution was a real concern to all participants and they agreed that some action was required, the 2005 study revealed they were all in shock and denial as a consequence of Variation 5. They subsequently refused to acknowledge and accept the realities of both the socio-political environment and scientific research findings, because they were experiencing the expected changes as a major disruption and threat to their farming operations, themselves and their families (Table 1). From the 2009 interviews, it was evident that, in general, participants were coming to terms with the proposed regulation at an emotional level (Table 1). This, in particular, was the case for Maori block participants, of which all three of the 2005 participants had accepted that change was inevitable and had moved from stage 1 to stage 5. The three participants who joined in 2009 were in stages 4 and 5. Hence, almost all (83.3%) were exploring different options to ensure the sustainability and viability of their farming operations.

Table 2. Farmers' emotional adaptation in response to policy change

mber of farmers and their emotional responses in 2005 and 2009										
	1 Shock and denial		2 Fear and anger		3 Bargaining		4 Depression		5 Acceptance	
Year	**M**	**So**	**M**	**So**	**M**	**So**	**M**	**So**	**M**	**So**
2005	6	13	0	0	0	0	0	0	0	0
2009	0	0	0	8	0	4	1	1	5	0

Legend: M = Maori properties; So = sole owned properties

During 2009 sole owned property participants continued to experience the proposed regulation as a big disruption to their lives and businesses. Most of them (61.5%) were fearful of the expected impact of regulation and reacted with anger towards it (Table 2). Some (30.8%) were seeking ways to cooperate with the Regional Council by trying to bargain (they were in stage 3) a mutually beneficial outcome, while one participant in this group had moved from stage 1 to stage 4, characterised by depression.

3.3 Farmers' behavioural adaptation

In 2005 farmers adhered to two approaches i.e., wait and see; and swift production input increases well before the new regulation appeared. In 2009 most participants (73.7%) still followed the "wait and see" approach, commonly because of uncertainty regarding minimum nitrogen leaching standards. They also blamed the Regional Council for shifting the goal posts, and high input costs concerned them.

In 2009 the majority (68.4%) of the participant group said that some form of compensation, e.g., a nitrogen trading scheme, would encourage them to change their current farming practices. With little prospect of that happening, the majority of sole-owned property participants (69.2%) felt unmotivated to continue farming in the catchment. All participants indicated a need for skilled, independent farm consultants to help them develop the most appropriate nutrient management plans for their particular farms and to farm accordingly.

Retiring less productive land by fencing, and allowing it to revert back to natural bush and vegetation, was common practice for most farm managers. There are only a small number of dairy farming operations in the catchment, and most have improved their effluent disposal by spreading it via irrigators over larger areas of the farm, thereby getting greater benefit from the nutrients it contained. Many of these environment friendly practices were implemented for reasons other than protecting the environment (i.e., financial efficiency).

By 2009, most Maori blocks (83.3%) had changed their farming practices. In contrast, the majority of participants on sole-owned properties (61.5%) had made no changes to their farming practices since the 2005 study.

4. DISCUSSION

Non-Maori participants were worried about their communities splitting into two camps, claiming there were clear signs of hostility and community service deterioration in some

areas. At an individual level, participants worried, experienced stress and coped in undesirable ways, like drinking and smoking too much. Participants also feared an exodus of land users and its impacts on the community in 2005 and 2009. In 2009 all participants wanted skilled, independent farm consultants to help them develop the most appropriate nutrient management plans for their particular farms and to assist them to farm accordingly. That is a positive sign and, if the advice is scientific and accepted, it could have the desired outcomes.

Many (61.5%) of the sole-owned participants were still experiencing fear and anger and some (30.8%) were trying to negotiate their way out of the situation in 2009. From a psychological perspective that could explain why most of them (69.2%) remained unmotivated to farm in the catchment. Fear alone is not a sufficient motivator for people to take ownership of a situation and develop a sustained level of commitment over the longer-term. Of equal importance is people's degree of emotional attachment to an existing issue and their sense of responsibility to sufficiently address it (Stobbelaar, Groot, Hall and Pretty, 2009). In our case studies over the period 2005 to 2009, we also found that participants had low feelings of responsibility to address the situation and they had low levels of emotional attachment (Roth *et al.*, 2009) to the issue, because they did not (1) trust the science supporting research findings or new farming practices, (2) see that the proposed changes in farm practices were more effective than what they were already doing, (3) see the impact of those farm practices (i.e., improved environmental outcomes), (4) believe that the risk associated with changing their farm practices was low, and (6) have sufficient peer support towards changing their farm practices.

The intensity and duration of depression are unpredictable and dependent upon coping strategies (the thoughts and behaviours that are used to manage or cope), as well as explanatory styles, that is, how an individual habitually explains the causes of events (Peters and Seligman, quoted by Peterson and Park 2007 p.159). Although farmers were generally very resilient in past tough times (McLeod, quoted by Wallace 2009), some participants in our 2009 study complained about excessive stress levels and a variety of psychosomatic ailments.

Participants' views and understanding of nitrogen entering Lake Taupo had not changed between 2005 and 2009. They were equally concerned about pollution in the lake during both studies, and the time lag between emission and subsequent off-site pollution remained a significant issue for them. They became familiar with the regulations over the three years, yet many still believed they were unfair, because they specifically targeted farmers. Furthermore, participants generally retained the perception that the financial implications of the rules on farmers and their businesses were not adequately acknowledged during policy design. Hence, they t viewed the potential impact of the rules on their businesses as significant and, Maori in particular, felt that their property development would be impaired. This means that all participants have struggled with perceptual adaptation – their thinking has not changed much at all.

In terms of on-farm practice change there is evidence that some farmers have responded positively to policy changes over the period 2005 to 2009. However, most (73.7%) had not made any on-farm practice changes by 2009, as they were unsure of compliance standards. On-farm practice changes before 2005 were mainly for productivity reasons, but on Maori blocks, on-farm changes up to 2009 took both the environment and productivity into

consideration. Only a few (38.5%) of the sole-owned properties had made changes to their farming practices between 2005 and 2009.

Extension, in tandem with other policy instruments like regulations, can be a major tool to influence land users' environmental decision-making processes and behaviours, and is widely relied upon in environmental programs (Botha, Coutts and Roth, 2008). Past experience has shown that extension, in itself, has limited impact to encourage and sustain behaviour change (ibid). This is because getting land users to change their values and goals is often much more difficult than raising awareness (Pannell, Marshall, Barr, Curtis, Vanclay, Lay and Wilkinson, 2005). For any behaviour change to take place, land users, in the first instance, need to be confident that regulation or rules actually target an existing issue (Bewsell, White and MacGowan, 2008; Botha *et al.*, 2006; Botha and Roth, 2006). Secondly, they have to accept personal responsibility for the issue and internalise the proposed policy (Stobbelaar *et al.*, 2009). Thirdly, they have to be convinced that the proposed behaviour changes to comply with policy are consistent with their personal goals (Pannell *et al.*, 2005). Finally, they have to be convinced of the alternative behaviour's greater relative advantage (Cary, Webb and Bar, 2001).

A collaborative partnership that involves the Regional Council, researchers, rural professionals, health professionals and land users themselves will be useful to (1) support and encourage land users in their journey towards commitment, (2) re-establish their farm operations by providing the necessary professional services as required; (3) assess cost-effective technologies and farm practices that will enable land users to develop adequate nutrient plans for their farms; and (4) enhance land users' learning and skills to farm within the limitations of the new rules.

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