

A pilot study of farmers' views on regulations and incentives for improving water quality in the Waikato

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Executive Summary

The I₃ Response Framework was used to investigate the motivation of dairy and drystock farmers to improve water quality in streams and their response to interventions such as regulations and incentives for riparian fencing and planting.

Statistically reliable scales were developed that measured the motivation of farmers to improve water quality in streams, and also their motivation to comply with regulation and incentives for riparian fencing and planting. These scales were then used to place a small sample of farmers in I₃ Response Framework. The results with regard to farmers' intensity of involvement, attitude strength, intentions and behaviour were all consistent with the propositions of the I₃ Response Framework.

A number of important implications for designing policy interventions arise from the results of this application of the I₃ Response Framework. The moderate to high level of involvement of interviewees with the issue of improving water quality in streams suggests that many farmers will have devoted time and effort to forming opinions about improving water quality, and about the use of rules to mandate fencing and planting of waterways.

Interviewees indicated a lack of confidence that the policy process would provide practical, sound solutions to the problem of improving water quality in streams in the Waikato. This is concerning as it is farmers, like those interviewed here, that will be expected to implement whatever policy intervention is finally settled on by the Council. However, the generally high involvement of interviewees with improving water quality signals a willingness on their part to participate in finding a solution to the policy problem of improving water quality. This, together with their lack of confidence in the policy process, suggests that meaningful engagement of farmers in developing practical and sound solutions will be critical to policy success.

The less involved and knowledgeable interviewees were, the higher they rated the chances of making mistakes in regard to improving water quality, both from a policy perspective and on their farms. The less involved are likely to be less motivated to participate in the policy process, less motivated to implement policy interventions, and less likely to have a favourable view of the policy issue and associated policy interventions. Consequently, the less involved may be an obstacle to policy success, particularly if success depends on their taking action to improve water quality.

Interviewees' attitudes and opinions about interventions such as compulsory fencing or incentives for planting were, generally, formed independently of their attitude and opinions about improving water quality. This implies that efforts to change farmers' attitudes and opinions by promoting the benefits of improving water quality, are unlikely to have a major impact on their attitude and opinions about the merits of any particular intervention, such as compulsory fencing and planting.

Finally, this pilot study has demonstrated that the I₃ Response Framework clearly has merit as a means of predicting the responses of farmers to policy interventions. Consequently, application of the Framework to a broader, representative sample would be worthwhile.

Introduction

Numerous studies have investigated the attitudes and behaviours of farmers in order to improve the design of public interventions intended to change their behaviour. These studies have often provided only limited guidance to policy makers. This is at least partly because these studies have failed properly to account for the intensity of landholders' motivations with regard to the policy objective of interest, and their attitudes towards the different specific interventions that have been proposed for achieving the objective.

For example, while studies have advocated a participatory approach to improving compliance among landholders in pest management, they have failed to identify the precise circumstances under which participatory approaches can be expected to be successful (Gossum et al. 2010; Lourey et al. 2006; Braithwaite 1995). The same may be said in regard to other policy problems such as nutrient emissions.

Most studies of the attitudes and behaviour of farmers implicitly assume a homogeneous level of farmer interest in, concern for, and contemplation of solutions to, the policy objective at hand. That farmers are homogeneous in this regard is unlikely. As a consequence, the identification of effective policy interventions becomes problematic because the differential impacts of interventions on farmers are conflated with their diverse responsiveness to them.

In this paper our objective is to contribute to addressing this conflation by investigating farmers' motivation to improve water quality in streams and their relevant motivation and attitudes towards two different policy interventions: regulation of, and voluntary incentives for riparian fencing and planting. The subject of the investigation is the limiting of nutrient emissions from farms in the Waikato catchment. The investigation is based on a model of compliance behaviour for landholders proposed by Kaine et al. (2010).

The objectives of the investigation were to develop and pilot scales for quantifying farmers' motivation to:

- (i) Improve water quality in streams,
- (ii) Comply with regulation and incentives with respect to riparian fencing and planting,
- (iii) Illustrate the use of the I₃ Response Framework,¹
- (iv) Consider the implications of the Framework for policy interventions to reduce nutrient emissions from farms.

The next section contains a brief description of the model of compliance behaviour proposed by Kaine et al. (2010). This is followed by a description of the methods used to measure farmer motivations and attitudes. Estimates of farmer motivations and attitudes to improving water quality in streams and to regulation and incentives for riparian fencing and planting are reported. These

¹The term "I₃" stands for involvement with the issue and the intervention.

are then interpreted, and the implications for farmer compliance with these interventions are discussed.

Predicting responses to policy interventions

The effectiveness of the design of interventions depends on the motivational state of farmers with respect to the policy objectives of interventions. Poorly designed interventions may not only fail to achieve policy objectives, they may also disrupt agency relationships with farmers and diminish farmers' concern with the policy issue.

Murdoch et al. (2006) and Kaine et al. (2010) drew on social psychology to propose a model of compliance behaviour, termed the I₃ Response Framework. The Framework was intended to be a tool to assist policy makers in selecting strategies to increase compliance based on the motivations and attitudes of landholders. The premise of the model was that landholder compliance with policy interventions might be predicted based on their involvement with the relevant policy issue and their involvement with, and attitude toward, alternative relevant policy interventions.

Involvement

Involvement is a causal or motivating variable with a number of consequences for a person's decision-making behaviour (Derbaix and Vanden Abeele, 1985; Laurent and Kapferer 1985; Mittal and Lee 1989). Involvement stems from the anticipated consequences a stimulus may have for an individual's functional, hedonic and social goals. Involvement has been shown to be associated with extensiveness of decision-making, interest in communications about an activity, commitment to an activity, and social observations about the activity (Mittal and Lee 1989; Rothschild 1984; Laurent and Kapferer 1985). For example, individuals who are highly involved with a stimulus requiring them to make a decision are more likely to search for information from a range of sources, to consciously process information, and to compare various options; while people with low involvement do not (Assael 1998).

Laurent and Kapferer (1985) proposed five causes or antecedents of involvement. These were:

- Functional or interest (personal meaning)
- Hedonic (emotional appeal, ability to provide pleasure and enjoyment)
- Social or sign (ability to express self, status, personality, identity)
- The perceived importance of the negative consequences of making a poor choice (risk consequence)
- The perceived likelihood of making a poor choice (risk probability)

The first, second and third antecedents are sources of involvement and correspond to the three kinds of goals individuals can pursue. The fourth and fifth antecedents combine to define the perceived risk associated with making decisions in regard to the stimulus. Perceived risk is an intensifier, rather than a source, of involvement.

Knowing the combination of antecedents that constitute overall involvement is valuable as differences in antecedents can result in different behaviours. For example, differences in antecedents will result in individuals being responsive to different types of messages about a product or activity (Laurent and Kapferer 1985; Petty and Cacioppo 1981, 1884).

Compliance behaviour

Kaine et al. (2010) hypothesised that an individual's level and antecedents of involvement will critically influence their motivation in regard to awareness of, attitude towards, and decision-making with respect to, an intervention such as a regulation. They proposed compliance behaviour might be predicted by distinguishing between two key dimensions of involvement. These two dimensions are involvement with the policy issue and involvement with the policy intervention.

The policy issue is the policy objective that provides the immediate justification for prescribing or influencing the behaviour of individuals. Improving farm productivity is an example of a policy issue. A policy intervention is a method of influencing the behaviour of individuals in order to address the policy issue. Incentives, rules and taxes are examples of policy interventions.

Involvement with the policy issue represents the level of personal relevance of the policy objective. Issue involvement signals the degree to which the policy objective itself is a source of motivation for the individual, irrespective of any policy intervention (Kaine et al. 2010). This allows for individuals to be motivated to take action in response to an issue even though the associated intervention does not impact on them directly (Kaine et al. 2010). That is, while issue and intervention are context for one another, it is meaningful to distinguish involvement for each when analysing likely responses to interventions and, importantly, means of modifying the responses.

Involvement with the policy intervention represents the level of personal relevance created by, for example, a regulation. Intervention involvement signals the degree to which the intervention is a source of motivation for the individual, irrespective of the issue (Kaine et al. 2010). This allows for individuals to be motivated to take action in response to an intervention even though the issue the intervention addresses is not perceived to be directly relevant to them. Involvement does not itself signal attitude. Attitude may be implicit or may need to be captured in the research process depending on the policy issue. In the case of nutrient management and policy interventions, the policy issue (water quality) is couched in favourable terms: involvement in the issue can be inferred to imply concern with the costs to the farm, the community or the environment of poor water quality. So, involvement bespeaks favourable attitude towards the policy issue of improving water quality.

Involvement with interventions (incentives or regulation), however, may be associated with favourable or unfavourable attitudes. When the involvement

target is of this type, it is necessary to identify attitude in the process of measuring involvement and report them where involvement is substantial.

The two dimensions of issue and intervention involvement can be combined to obtain four main involvement profiles. The relationships between the two dimensions of involvement, the forming of attitudes (favourable or unfavourable), and the consequent behavioural responses of landholders are summarised in figure 1. The horizontal axis in the figure represents a continuum from low to high involvement with the intervention. The vertical axis in the figure represents a continuum from low to high involvement with the policy issue. The resulting quadrants represent types of likely behavioural responses or reactions to policy interventions. The types of behaviours are summarised in the figure. A more detailed description and explanation is available in Kaine et al. (2010).

Given the predictions of behavioural responses for each quadrant, strategies can be suggested to maintain existing behaviour that is already compliant with an intervention or to promote compliance with the intervention. Fundamentally, there are two options for increasing compliance: options that change behaviour by changing involvement; and options that work with the existing level of involvement. These strategies are summarised in Figure 1. Again, a more detailed description and explanation is available in Kaine et al. (2010).

Methods

The objective of the study was to demonstrate the benefits that might arise for policy design from quantifying farmer involvement in the policy issue of improving water quality in the Waikato region and their involvement in three interventions: regulations and incentives in regard to fencing and planting waterways.

Since the level of involvement cannot be inferred from observation of actions it must be measured using psychometric scales (Laurent and Kapferer 1985; Zaichkowsky 1985). A survey questionnaire was developed which consisted of a series of psychometric scales designed to measure involvement with the policy issue of improving water quality and involvement with each of the three interventions. In addition, psychometric scales were designed to measure attitudes towards the policy issue and the interventions, and intentions to undertaken actions in relation to riparian fencing and planting. A series of open-ended questions were included to elicit participants' beliefs, attitudes and behaviours in regard to riparian fencing and planting. The responses to the open-ended questions were intended to provide a qualitative validation of the estimates of involvement.

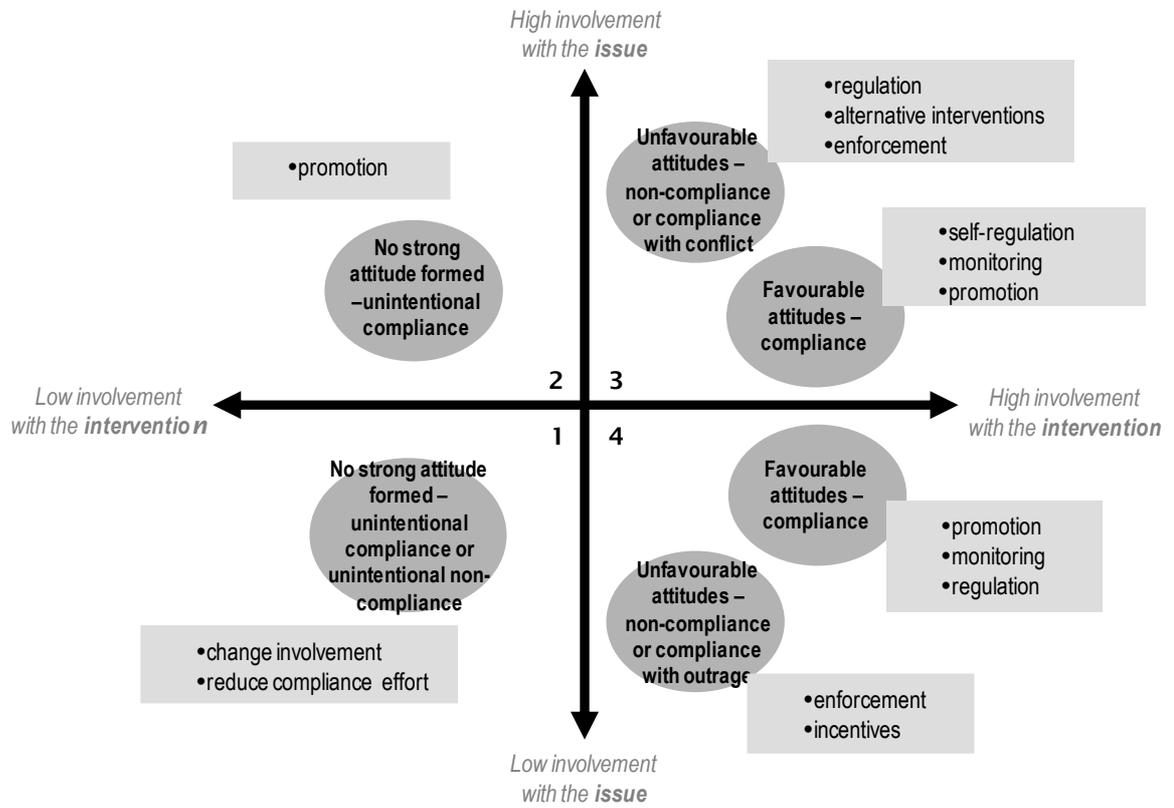


Figure 1 I₃ Response Framework

Source: Adapted from Kaine et al. (2010)

Scales to measure each of the five antecedents of involvement (function, social, hedonic, risk probability and risk consequence) were constructed based on Laurent and Kapferer (1985). Each of the five scales was composed of three items or statements and respondents scored their agreement with each statement in a scale using a five point Likert rating. A score of 1 represented strong disagreement with a statement while a score of 5 represented strong agreement. The wording of the statements in each scale was finalised after piloting with farmers.

The questionnaire was usually administered by personal interview at a location chosen by farmers, usually their property. Three interviews were conducted by telephone. At least two interviewers were present at all interviews, which provided a means for comparing and checking interpretations of responses to the open-ended questions.

The questionnaire was divided into five sections. The first section contained the questions on involvement with, and attitudes towards, the policy issue of improving water quality in the Waikato region. Involvement with, and attitudes towards, regulation of the fencing and planting of riparian strips was the focus of the second section. Involvement with, and attitudes towards, incentives for fencing riparian strips was the focus of the third section. Involvement with, and attitudes towards, incentives for planting riparian strips was the focus of the fourth section. The final section contained scales to measure intentions and actions in regard to riparian fencing and planting.²

Twenty-one (21) dairy farmers and four drystock farmers (4) from the Waikato region were interviewed in December 2012 and June and July of 2013. Since the objectives for this pilot study were to test methods and models, and not to gather information about farmers themselves for the purpose of creating policy, we wished to avoid creating the impression that Council was intending to change policy in regard to riparian fencing and planting. Consequently, we deliberately selected farmers with a personal link to Council staff to interview as this created an opportunity to explain the purpose of the pilot. Consequently, in most instances the farmers we interviewed were closely related to Council staff.

Farmers were also selected for interviewing on the basis of differences in their location, apparent engagement with water quality and willingness to be interviewed.

Results

The interview selection process may have introduced some bias into the sample. To begin with interviewees reported surprisingly favourable attitudes towards improving water quality and incentives for riparian planting and fencing. For instance, virtually all interviewees agreed or agreed strongly with the statements that 'water quality should be improved' (92%) and 'incentives for fencing

² The questionnaire is available on request from the authors.

waterways would be a good thing' (88%) and 'it would be right to have incentives for planting waterway margins' (88%).

Tellingly, interviewees reported unexpectedly favourable attitudes towards making fencing and planting of riparian strips compulsory. For example, a clear majority of interviewees agreed or strongly agreed with the statement that 'you should have to fence waterways on your farm' (68%). In addition, a relatively high proportion of the sample reported they had fenced their riparian strips. Nearly all the interviewees (83%) reported that they had fenced most or all of the stream, lakes or wetlands on their properties, and a substantial proportion of these farmers (40%) reported that they had also planted some or all of their fenced riparian strips.

Most farmers (80%) reported that they had been motivated to fence to improve stock management or because streams and fences were property boundaries. A substantial minority (42%) also reported that they had been motivated to fence by environmental considerations or a desire to improve water quality. A smaller group (35% of dairy farmers) also reported that the Clean Stream Accord was a factor in their decision to fence streams.

The apparent bias in the sample has a number of implications for the results as follows:

- We expected the involvement of farmers in the sample with the issue of improving water quality and with the interventions may be higher than average. We suspect this was the case.
- We expected the farmers in the sample would be likely to have a relatively favourable attitude to the issue of improving water quality and to the interventions. The results indicate this was the case.
- As a consequence of these biases, the placement of farmers in the I₃ Response framework will be biased towards the upper right quadrant of the Framework.

Consequently, the results of the pilot with respect to the placement of farmers in the Framework and their attitudes towards the interventions, is unlikely to be representative of farmers generally.

Reliability of involvement scales

To predict interviewees' responses to proposals to improve water quality by compulsory fencing and planting of waterways and incentives for fencing and planting their involvement in the policy issue of improving water quality and the three interventions was measured using psychometric scales. A reliability analysis (Carmines and Zeller 1979) was conducted to assess the internal consistency of interviewees' responses to the statements in the involvement scales.

The reliability of the scales that were used to measure involvement is particularly important as the soundness of the findings of this study depends on how well involvement has been measured. Reliability, in this context means

consistency. That is, the extent to which the same ratings would be obtained if the scales were administered repeatedly. Reliability, meaning consistency, is desirable because it means similar results should be obtained if the study were repeated.

Conceptually, the antecedents of involvement are equally relevant to the issue of improving water quality and the three interventions. Given the antecedents are measured using the same scales with minor changes in wording to accommodate different subjects, then the reliability of the scales as measures of the antecedents can be assessed by combining interviewees ratings for each scale across the policy issue and the three interventions. For example, the reliability of the scale measuring the functional antecedent should be assessed using interviewees' ratings for the statements in the functional scale jointly across the issue and the three interventions.

The jointly estimated alpha coefficients (Carmines and Zeller 1979) for the reliability of the scales for functional involvement, social involvement, hedonistic involvement, and risk probability and risk consequence are reported in table 1. Carmines and Zeller (1979) suggest 0.80 as a satisfactory level of reliability for widely used scales.³ Allowing for the small sample in this study, and the conservatism of alpha as a measure of reliability, these results indicate that, on the whole, the involvement scales were reliable.

Reliability of scales across I₃ components

The reliability of the involvement scales was also assessed individually for the policy issue and the three interventions. This was done to determine whether there were any systematic biases in interviewees' responses to the involvement scales. For example, the reliability of all the involvement scales was noticeably lower for one of the interventions. Or, alternatively, the reliability of the scale for one of the involvement antecedents was noticeably lower than the others for the policy issue and all the interventions.

On the whole, the scales measuring the different antecedents of involvement exhibited a satisfactory degree of reliability across the issue of improving water quality and the three interventions and there was no evidence to suggest there were systematic biases in the responses of interviewees (see table 1).

The alpha coefficients estimated across the issue and the interventions were around 0.60 or higher for all the scales except for functional involvement with compulsory fencing. These results indicate that, on the whole, the individual reliabilities of the involvement scales for the policy issue and interventions were reasonable. They also suggest there is some scope to refine the statements in the scales.

³ Alpha varies from a minimum of zero (perfectly unreliable) to a maximum of 1 (perfectly reliable).

Table 1 Reliability analysis by I₃ Component

	I ₃ Component				
Antecedent	Issue	Compulsory fencing and planting	Fencing incentives	Planting incentives	Overall reliability
Function	0.69	0.40	0.70	0.76	0.62
Social	0.73	0.83	0.93	0.94	0.87
Hedonic	0.65	0.83	0.86	0.91	0.82
Risk probability	0.57	0.82	0.88	0.69	0.81
Risk consequence	0.59	0.46	0.78	0.42	0.62

Note: The values in the table are Cronbach's alpha for the involvement scales (Carmines and Zeller 1979).

Table 2 Interviewees' antecedent involvement with the policy issue and the three interventions

	I ₃ Component			
Antecedent	Issue	Compulsory fencing and planting	Fencing incentives	Planting incentives
Function	4.37	3.99	3.88	3.96
Social	3.75	3.61	3.39	3.49
Hedonic	3.89	3.77	3.96	4.12
Risk probability	3.55	2.95	2.28	2.32
Risk consequence	3.96	3.21	3.19	3.45

Note: The values in the table are mean scores on each involvement scale

The estimated reliabilities of risk consequence for compulsory fencing and planting and for planting incentives were unsatisfactory. While disappointing, risk consequence was seldom used in subsequent analyses and so did not have a major bearing on the findings of the study.

Overall, the satisfactory reliability of the involvement scales and the apparent absence of any systematic bias in the scales are grounds for confidence in the scales as measures of involvement and confidence in the results of subsequent analyses.

Involvement profiles

An involvement profile is the pattern of interviewee involvement across the five antecedents: function, social, hedonic, risk probability and risk consequence. In a policy context profiles provide an indication of the factors motivating involvement, or not, with a policy intervention and therefore the features individuals may favour in an intervention. Profiles also provide an indication about the kinds of messages about interventions individuals may be most responsive too (Laurent and Kapferer 1985).

In table 2 and figure 2 the mean scores on each involvement antecedent are presented for the policy issue and the three interventions. These involvement profiles indicate the differences in the level and nature of respondents' involvement with policy issue and the three interventions.

Inspection of table 2 and figure 2 reveals:⁴

1. The issue of improving water quality was involving for interviewees. Their functional involvement with the policy issue was significantly higher than their involvement with any of the interventions.
2. Interviewees gave high scores for risk probability with respect to the policy issue. Furthermore, their risk probability scores for the policy issue were significantly higher than their risk probability scores for the interventions. This suggests interviewees believed the likelihood of the government making mistakes in policy decisions about water quality was high, especially compared to the likelihood interviewees of making mistakes on their farm. This implies interviewees might lack confidence in the policy process.
3. Interviewees gave high scores for risk consequence with respect to the policy issue. Furthermore, their risk consequence scores for the policy issue were significantly higher than their risk consequence scores for the interventions. This suggests interviewees believed the consequences of making mistakes in policy decisions about water quality were relatively large, especially compared to the consequences of making mistakes on their farm.

⁴ Statistically significant differences in involvement were identified using paired samples t-test (Cooksey 1997, Tabachnick and Fidell 1989) and treating the policy issue and the three interventions as different treatments for each of the involvement antecedents (See appendix).

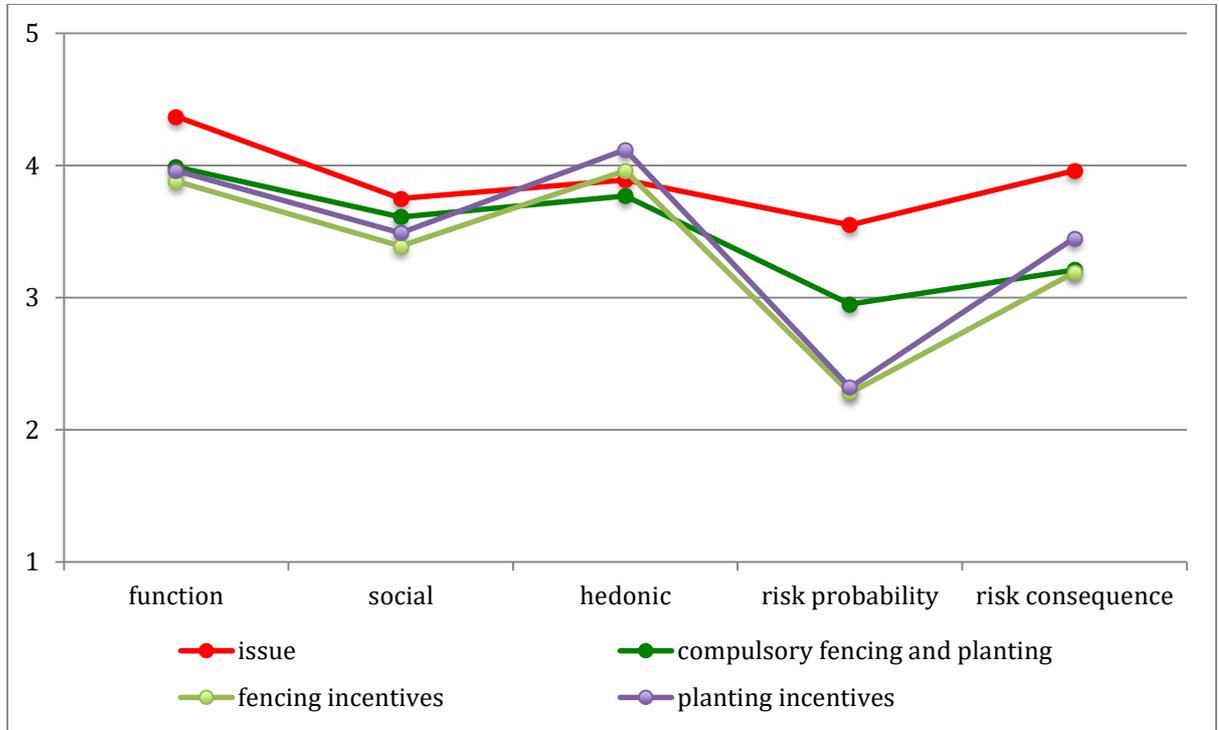


Figure 2 Involvement profiles for the policy issue and the three interventions

Table 3: Correlations between antecedents of involvement for policy issue and interventions

(a) Improving water quality

	Function	Social	Hedonic	Risk probability	Risk consequence
Function	-				
Social	0.34	-			
Hedonic	0.59	0.12	-		
Risk probability	-0.44	-0.03	-0.68	-	
Risk consequence	0.29	0.17	0.39	-0.24	-

Notes: Correlations in **bold** were statistically significant.

(b) Compulsory fencing and planting

	Function	Social	Hedonic	Risk probability	Risk consequence
Function	-				
Social	0.70	-			
Hedonic	0.90	0.67	-		
Risk probability	-0.52	-0.39	-0.61	-	
Risk consequence	-0.36	-0.18	-0.38	0.82	-

Notes: Correlations in **bold** were statistically significant.

Table 3: Correlations between antecedents of involvement for policy issue and interventions (continued)

(c) Incentives for fencing

	Function	Social	Hedonic	Risk probability	Risk consequence
Function	-				
Social	0.26	-			
Hedonic	0.86	0.34	-		
Risk probability	0.00	-0.58	-0.09	-	
Risk consequence	0.72	0.08	0.65	0.45	-

Notes: Correlations in **bold** were statistically significant.

(d) Incentives for planting

	Function	Social	Hedonic	Risk probability	Risk consequence
Function	-				
Social	0.60	-			
Hedonic	0.89	0.49	-		
Risk probability	-0.51	-0.32	-0.38	-	
Risk consequence	0.36	0.48	0.44	0.06	-

Notes: Correlations in **bold** were statistically significant.

4. Interviewees' social involvement with the issue of improving water quality was significantly higher than their social involvement with incentives for fencing. This suggests interviewees believed that their position on the issue of reducing water quality was more revealing of self-identity than their position on incentives.
5. There were no significant differences in the level of hedonic involvement interviewees had with the policy issue and the interventions. This implies interviewees expect that they would experience high emotional rewards from contributing to improving water quality, and from fencing and planting waterways.
6. Interviewees risk probability scores for compulsory fencing and planting were significantly higher than their risk probability scores for incentives for fencing or planting. While interviewees believed the likelihood that they would make mistakes in implementing the interventions was moderate to low this result suggests interviewees saw greater potential to make mistakes with compulsory fencing and planting compared to incentives for planting and for fencing.

Correlations between antecedents of involvement within I₃ components

Generally speaking the correlations between the various antecedents of involvement should be limited as each antecedent measures a theoretically different construct (except in regard to risk consequence as argued previously). However, there were some consistently strong correlations among some antecedents within each I₃ component (see table 3).

First, interviewees' scores on functional involvement and hedonic involvement were significantly correlated for each I₃ component (see table 3). This suggests that there was a strong association between the importance of water quality to interviewees and their emotional engagement with water quality.

Second, interviewees' scores on functional involvement were also significantly and negatively correlated with their assessment of risk probability for three of the four I₃ components; namely, the policy issue, compulsory fencing and incentives for planting. This suggests that there is a strong inverse association between the importance of water quality to interviewees and their perception of the potential to make mistakes in regard to improving water quality. In other words, interviewees with high (low) functional involvement in water quality and the interventions tended to have a low (high) assessment of the risk of making mistakes in improving water quality.

One explanation for this result is that those with high functional involvement with water quality may be more informed about it and so are more confident about government making good decisions in regard to water quality, and riparian fencing and planting. In contrast, those with low functional involvement in water quality may be less informed about it and so are less confident about government making good decisions in regard to water quality, and riparian fencing and planting.

Overall, the pattern of correlations among the antecedents of involvement appeared reasonable and reinforces confidence in the scales as measures of involvement, and confidence in the results of subsequent analyses.

Correlations between antecedents of involvement across I₃ components

There were also interesting patterns in the way in which each of the antecedents of involvement were correlated across the policy issue and the interventions (see table 4).

First, interviewees' scores on functional involvement were not significantly correlated except for incentives for fencing and incentives for planting. This suggests that the importance to interviewees' of matters in relation water quality depend largely on the matter under consideration. This suggests that functional involvement depends on the specifics of the matter under consideration, rather than a person's worldview. The same also appears to be the case with hedonic involvement.

Second, a similar result appears to apply in the case of risk probability. Interviewees' scores on risk probability were not significantly correlated with the exception of compulsory fencing and incentives for fencing. This suggests that interviewees' assessment of risk probability in relation to improving water quality depends largely on context. In this case interviewees judged the risks entailed in fencing as being similar irrespective of the policy intervention. In contrast, they judged the risks associated with riparian fencing and planting as being dissimilar.

Third, interviewees' scores on social involvement with the policy issue and the three interventions were all significantly, positively correlated. This suggests, perhaps, that interviewees' views on how revealing their opinions about water quality are of their self-identity may depend on their worldview rather than circumstances.

Fourth, interviewees' scores on risk consequence were significantly, positively correlated for the three interventions. This suggests that interviewees' opinions on the consequences of their decisions in relation to the interventions were similar, irrespective of the intervention. However, their opinions on the consequences of making poor policy decisions were largely dissimilar to the consequences of their own decisions in relation to the interventions. This seems sensible given the different nature of these two kinds of decisions.

Overall, the pattern across the policy issue and interventions of correlations among the antecedents of involvement appears reasonable and reinforces confidence in the scales as measures of involvement, and therefore confidence in the results of subsequent analyses.

Table 4: Correlations across the policy issue and interventions for each antecedent of involvement

(a) Functional involvement

	Water quality	Compulsory fencing and planting	Fencing incentives	Planting incentives
Water quality	-			
Compulsory fencing and planting	0.24	-		
Fencing incentives	0.07	0.01	-	
Planting incentives	0.26	0.19	0.60	-

Notes: Correlations in **bold** were statistically significant.

(b) Social involvement

	Water quality	Compulsory fencing and planting	Fencing incentives	Planting incentives
Water quality	-			
Compulsory fencing and planting	0.57	-		
Fencing incentives	0.76	0.70	-	
Planting incentives	0.74	0.78	0.70	-

Notes: Correlations in **bold** were statistically significant.

(c) Hedonic involvement

	Water quality	Compulsory fencing and planting	Fencing incentives	Planting incentives
Water quality	-			
Compulsory fencing and planting	0.23	-		
Fencing incentives	0.18	0.20	-	
Planting incentives	-0.07	0.12	0.68	-

Notes: Correlations in **bold** were statistically significant.

(d) Risk probability

	Water quality	Compulsory fencing and planting	Fencing incentives	Planting incentives
Water quality	-			
Compulsory fencing	0.33	-		
Fencing incentives	0.17	0.59	-	
Planting incentives	0.25	0.17	0.10	-

Notes: Correlations in **bold** were statistically significant.

(e) Risk consequence

	Water quality	Compulsory fencing and planting	Fencing incentives	Planting incentives
Water quality	-			
Compulsory fencing and planting	0.21	-		
Fencing incentives	0.53	0.53	-	
Planting incentives	0.27	0.45	0.59	-

Notes: Correlations in **bold** were statistically significant.

I₃ Placement

Measuring the level of involvement

To place interviewees in the appropriate quadrant of the I₃ Response Framework a measure of involvement level or intensity is required that aggregates the antecedents of involvement for each dimension of the Framework. The argument advanced earlier was that perceptions of the uncertainty entailed in making a decision intensify the involvement arising from the three source antecedents (functional, social and hedonic). This argument has two implications.

The first implication is that the level of involvement should be the product of the three sources of involvement and risk probability. The second implication is that risk consequence should be an indicator of level of involvement and should be correlated with the three sources of involvement (functional, social and hedonic). Regression analysis revealed that, as theorised, interviewees' assessments of risk consequence were largely a linear combination of functional, social and hedonic involvement, and risk probability.

Consequently, the intensity of involvement of interviewees was calculated as the average of the ratings for the three source antecedents, multiplied by the ratings for risk probability, which is a measure of the likelihood of making a mistake. The calculation is summarised in the following expression:

$$TI = ((F + S + H)/3) * (1.0 + Rp)$$

Where TI denotes intensity of involvement, SI denotes mean source involvement; F, S and H denote scores on the functional, social and hedonic scales respectively; and Rp denotes scores on the risk probability scale.

This expression has a minimum of 2 and maximum of 30. Scores equivalent to the mid-point of this range were interpreted as representing moderate involvement. Hence, interviewees with scores above 15 were deemed to have moderate-to-high involvement while those with scores below 15 were deemed to have low-to-moderate involvement.

Involvement with water quality and interventions

The placement of interviewees in I₃ space is graphed in figures 3, 4 and 5 for:

- Involvement in the issue and compulsory fencing and planting of waterways,
- Involvement in the issue and incentives for fencing of waterways, and
- Involvement in the issue and incentives for planting waterways, respectively.

Interviewees' level involvement with the issue of improving water quality was significantly higher than their level involvement with compulsory fencing and planting, and incentives for fencing and planting (See table 5). Their level involvement with compulsory fencing and planting was significantly different from their level involvement with incentives for fencing and incentives for

Table 5: Tests of differences in scores on issue and intervention involvement

Involvement with: (1)	Involvement with: (2)	Mean difference (1) - (2)	Paired t-test
Water quality	Compulsory fencing and planting	3.49	4.64, p=0.00
	Fencing incentives	5.91	8.22, p=0.00
	Planting incentives	5.44	7.30, p=0.00
Compulsory fencing and planting	Fencing incentives	3.11	3.26, p=0.01
	Planting incentives	1.96	2.52, p=0.02
Fencing incentives	Planting incentives	-0.44	-0.56, p=0.58

Notes: For example, participants' involvement with improving water quality was 3.49 units higher on average than their involvement with compulsory fencing and planting

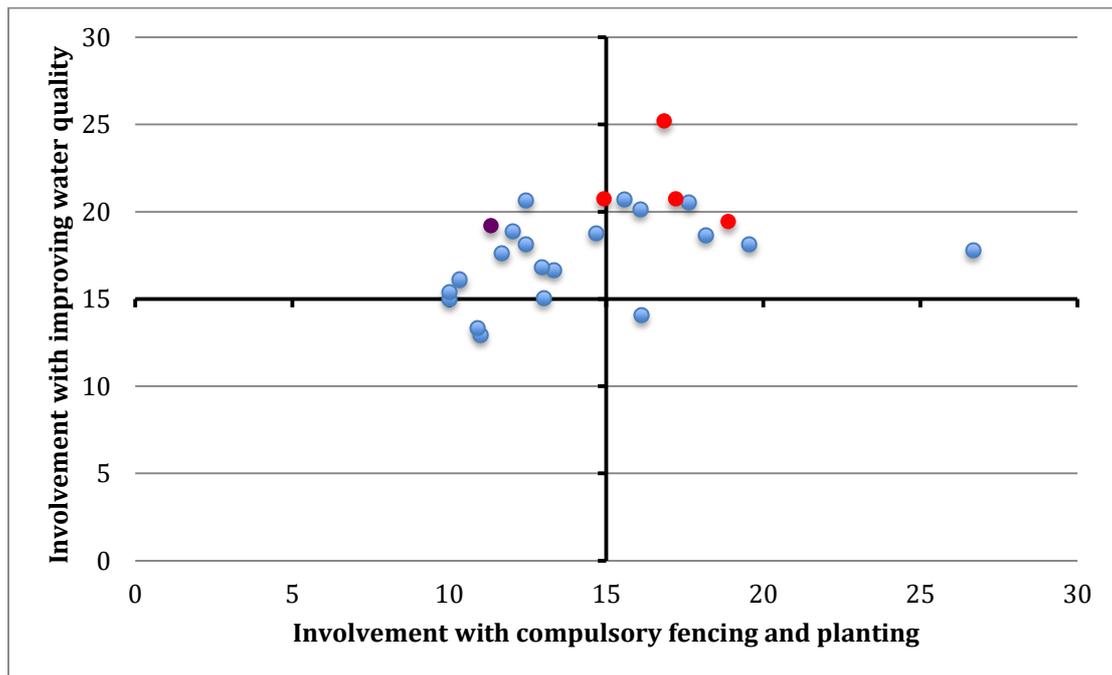


Figure 3 Interviewees' involvement with improving water quality and compulsory fencing and planting of waterways

Notes: Blue dots indicate dairy farmers
 Red dots indicate drystock farmers
 Purple dot dairy farmer with unfavourable attitude to compulsory fencing and planting

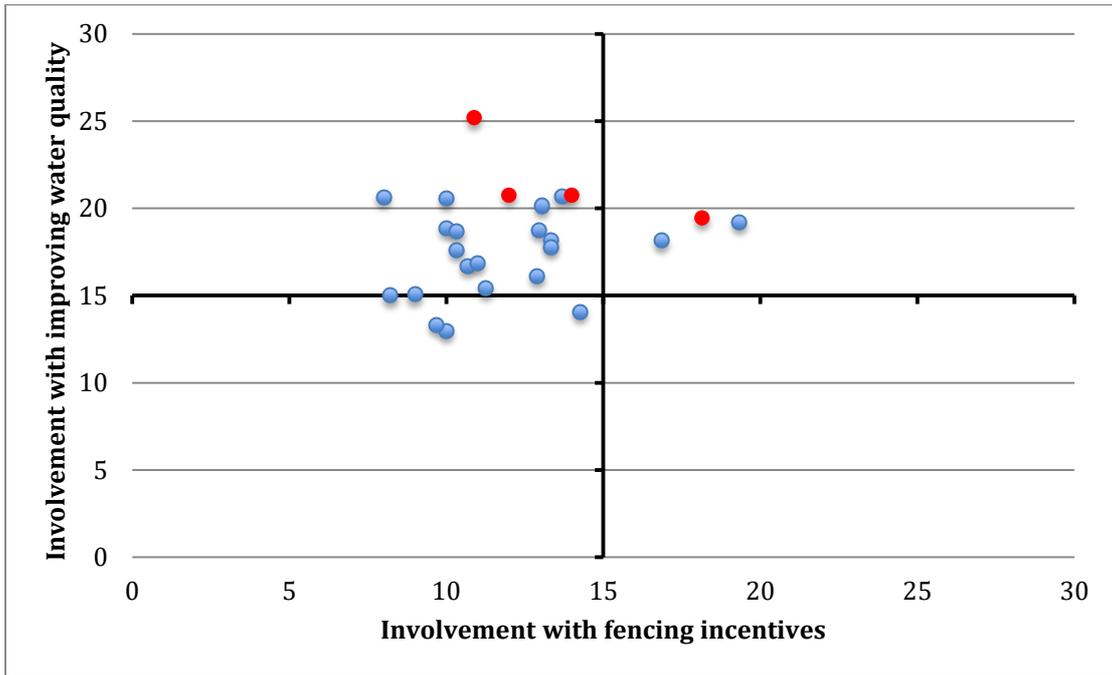


Figure 4 Interviewees' involvement with improving water quality and incentives for fencing waterways

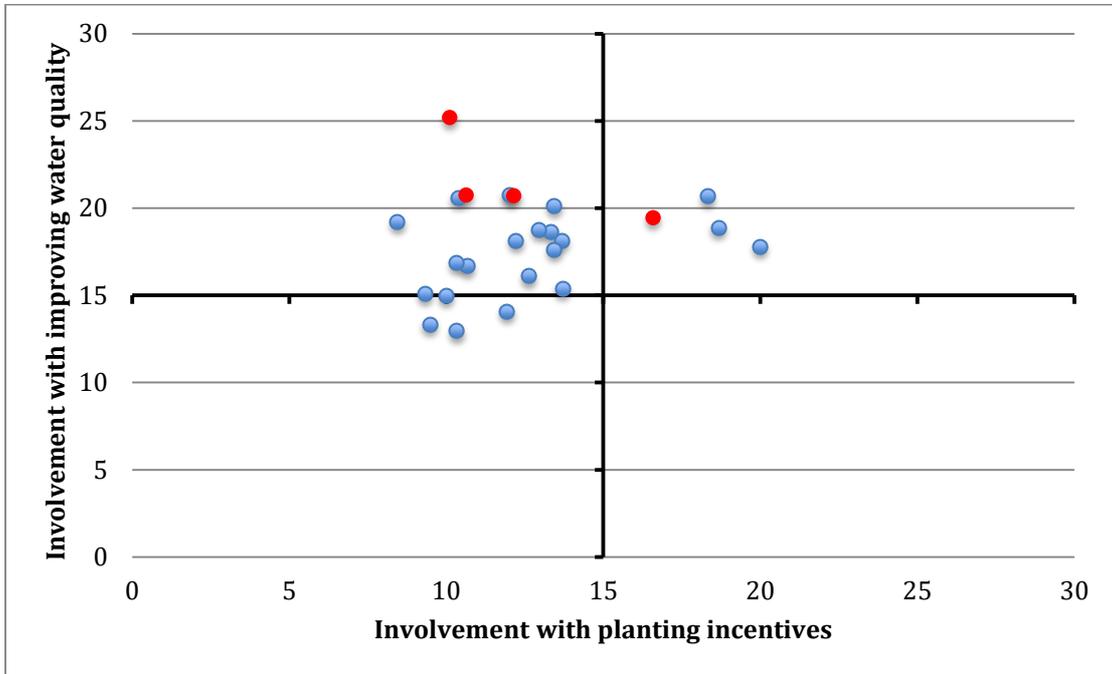


Figure 5 Interviewees' involvement with improving water quality and incentives for planting waterways

Notes: Blue dots indicate dairy farmers in both figures
 Red dots indicate drystock farmers in both figures

planting. There was no significant difference in their level of involvement with incentives for fencing and incentives for planting.⁵

Interviewees' levels of involvement with improving water quality and the three interventions were uncorrelated with the exception of their involvement with water quality and their involvement with compulsory fencing and planting, which was positively correlated.

Inspection of the figures:

1. Confirms most interviewees had moderate to high involvement with the issue of improving water quality. A few interviewees exhibited high involvement. In addition, analysis of the attitude scales revealed that all interviewees felt that improving water quality was the right thing to do.
2. Reveals involvement in compulsory fencing and planting varied from low to high. Some interviewees were unsure that making fencing and planting compulsory was the right thing to do, and one thought having to fence and plant waterways would be a bad thing. This indicates there is potential for unfavourable reactions to such an intervention.
3. Reveals involvement in incentives for fencing waterways was mostly low to moderate, and nearly all interviewees felt that having incentives for fencing waterways was the right thing to do.
4. Reveals involvement in incentives for planting waterways was mostly low to moderate, and nearly all interviewees felt that having incentives for planting waterways was the right thing to do.

The moderate to high involvement with, and favourable attitude towards, the issue of improving water quality of these interviewees indicates they are motivated to act to improve water quality, possibly at some cost to them and their businesses. It also indicates they would be likely to devote substantial time and effort to considering options for improving water quality. The moderate to high involvement of interviewees with compulsory fencing and planting suggests that they will have definite views on how improvements in water quality should be pursued. In this regard, a majority of interviewees (72%) raised concerns about the practicality and effectiveness of fencing designs, compulsory rules, width of riparian strips, etc.

Attitudes, intentions and behaviour

Reliability of attitude scales

Interviewees' attitudes towards the improving water quality by compulsory fencing and planting waterways and incentives for fencing and planting were measured using psychometric scales. A reliability analysis (Carmines and Zeller

⁵ Statistically significant differences in involvement were identified using paired samples t-test (Cooksey 1997, Tabachnick and Fidell 1989) and treating the policy issue and the three interventions as different treatments.

1979) was conducted to assess the internal consistency of interviewees' responses to the statements in the attitude scales.

The estimated alpha coefficients (Carmines and Zeller 1979) for the reliability of the scales with regard to their attitude towards the policy issue of improving water quality and the three interventions were all greater than 0.70.⁶ Allowing for the small sample in this study, and the conservatism of alpha as a measure of reliability, these results indicate that the attitude scales were highly reliable.

As mentioned earlier interviewees exhibited surprisingly favourable attitudes towards improving water quality and incentives for riparian planting and fencing. Interviewees also exhibited unexpectedly favourable attitudes towards making fencing and planting of riparian strips compulsory.

Involvement and attitude strength

A key proposition in the I₃ Response Framework is that the greater landholders' involvement with an issue or intervention, the stronger will be their attitudes and opinions about the issue or intervention. Analysing interviewees' involvement scores and attitude ratings with respect to each intervention tested this proposition.

The proposition was partially supported with regard to involvement.⁷ Interviewees who were more certain that having to fence and plant was 'the right thing to do' exhibiting higher involvement with compulsory fencing and planting than those who were unsure. Also, interviewees who were more certain that giving incentives to fence waterways was 'the right thing to do' exhibited higher involvement with incentives for fencing than those who were unsure. No other significant differences were identified. The absence of significant differences probably reflects the small sample size and the small proportion of interviewees in the sample that were ambiguous about the value of incentives.

The proposition was fully supported with regard to attitude strength.⁸ Interviewees who were more certain that compulsory fencing and planting, or giving incentives for fencing and planting was 'the right thing to do' expressed stronger attitudes towards these interventions than those interviewees who

⁶ Alphas were 0.73, 0.85, 0.90 and 0.91 for improving water quality, compulsory fencing and planting, fencing incentives and planting incentives respectively.

⁷ $F=4.42$, $p=0.02$ for differences on involvement with compulsory fencing and planting in relation to attitude towards compulsory fencing. $F=4.52$, $p=0.04$ for differences on involvement with improving water quality in relation to attitude towards incentives for fencing.

⁸ $F=10.58$, $p=0.00$ for differences on strength of attitude toward compulsory fencing and planting in relation to certainty about compulsory fencing. $F=4.59$, $p=0.04$ for differences on strength of attitude toward incentives for fencing in relation to certainty about incentives for fencing. $F=9.03$, $p=0.01$ for differences on strength of attitude toward incentives for fencing in relation to certainty about incentives for planting. $F=17.31$, $p=0.00$ for differences on strength of attitude toward incentives for planting in relation to certainty about incentives for planting.

were uncertain of the merit of the interventions. This is consistent with expectations and increases confidence in the validity of the I₃ Response Framework.

Involvement, attitudes and intentions

Another key proposition in the I₃ Response Framework is that the greater landholders' involvement with, and the stronger are their attitudes towards, an issue or intervention the stronger will be their motivation to act. Regression analysis of interviewees' involvement scores, attitude ratings and their rating on intentions to undertake a range of actions in regard to water quality was employed to test this proposition.

Overall, the proposition was well supported (see table 6). Statistically significant relationships were found between involvement, attitudes and intentions to act for nine actions (out of 19). This was considered an excellent result given the small sample size and limited variation in interviewees' ratings of some intentions.

In principle, the stronger are landholders' motivations and intentions to act, the more likely they are to act. This principle was tested by comparing differences in intention ratings (table 7) and involvement scores (table 8) between interviewees who had undertaken actions and those who had not.

Allowing for the small sample and instances where few interviewees had undertaken particular actions, and the possibility that not all interviewees had an opportunity to act, this principle was well supported with respect to intention ratings. In all instances, and on average, the intention ratings of interviewees who had acted were higher than those who had not, where the differences were statistically significant.

The issue involvement scores of interviewees who had expressed an opinion publically (favourable or unfavourable) about how water quality was being improved were higher, on average, than those who had not. Further analysis revealed that those who had expressed their opinions publicly had higher functional, social and hedonic involvement with the issue of water quality than those who had not expressed their opinion publicly.

The issue involvement scores of interviewees who had worked with Council to plant waterways on their farm were higher, on average, than those who had not. Further analysis revealed that the difference in scores was the result of relatively higher functional involvement on the part of those who had worked with Council.

The issue involvement scores of interviewees who had taken actions to improve water quality when it best suited them were higher, on average, than those who had not. Further analysis revealed that the difference in scores was the result of relatively higher functional, social and hedonic involvement on the part of those who had taken action.

Table 6: Regression results for involvement, attitudes and intentions

Intention	R ²	\bar{R}^2	Significant variables	F-test
Apply for an incentive to fence waterways	0.64	0.43	Involvement with planting incentives; Attitude to planting incentives	3.10, p=0.03
Would express opinion to others about improving water quality	0.69	0.52	Attitudes to improving water quality, fencing incentives and planting incentives	3.97, p=0.01
Work with Council to fence waterways	0.67	0.48	Attitude to planting incentives	3.48, p=0.02
Work with Council to plant waterways	0.69	0.51	Involvement with planting incentives; Attitudes to fencing and planting incentives	3.82, p=0.01
Invest in measures to improve water quality	0.75	0.60	Involvement with fencing incentives; Attitude to planting incentives	4.88, p=0.01
Change use of paddocks to prevent problems with water quality	0.83	0.74	Involvement with compulsory fencing, fencing incentives and planting incentives; Attitudes to compulsory fencing and planting incentives	8.82, p=0.00
Plan to plant waterways to improve water quality	0.62	0.41	Involvement with planting incentives; Attitude to planting incentives	2.88, p=0.04
Seek information on how to fence waterways	0.73	0.58	Involvement with planting incentives; Attitude to compulsory fencing	4.72, p=0.01
Read publications about improving water quality	0.65	0.44	Attitudes to fencing incentives and planting incentives	3.07, p=0.04

Table 7: Tests of differences in intentions ratings across actions

Action	Intention rating (Have acted)	Intention rating (Have not acted)	F-test
Expressed opinion publicly if unhappy	4.00	3.00	7.36, p=0.01
Expressed opinion publicly if happy	4.50	3.56	6.47, p=0.02
Worked with Council to plant waterways	4.50	4.00	5.13, p=0.03
Invested in measures to improve water quality	4.58	3.20	22.3, p=0.00
Changed use of paddocks to prevent problems with water quality	4.42	3.15	8.60, p=0.01
Sought information on how to fence waterways	4.56	3.78	5.27, p=0.03

Note: Intention ratings have a minimum of 1 and a maximum of 5.

Table 8: Tests of differences in involvement scores across actions

Action	Involvement with	Have acted	Have not	F-test
Expressed opinion publicly if unhappy	Improving water quality	19.7	17.1	6.22, p=0.02
Expressed opinion publicly if happy	Improving water quality	19.5	17.2	4.07, p=0.05
Worked with Council to plant waterways	Improving water quality	19.2	17.0	4.28, p=0.05
Taken action when best suits me	Improving water quality	18.9	16.7	4.92, p=0.05
Expressed opinion to others about improving water quality	Planting incentives	11.2	13.9	5.90, p=0.02
Managed stock to prevent problems with water quality	Planting incentives	11.6	15.0	8.39, p=0.01
Applied for incentives to plant waterways	Fencing incentives	10.6	13.3	6.66, p=0.02
Invested in measures to improve water quality	Fencing incentives	11.5	14.5	4.90, p=0.04
Worked with Council to fence waterways	Fencing incentives	11.0	13.3	4.70, p=0.04
Planted waterways to improve water quality	Fencing incentives	10.7	13.1	4.92, p=0.04

The results in regard to actions and differences in issue involvement were consistent with the principle that the stronger landholders' motivations to act are, the more likely they are to act.

The scores for involvement with planting incentives for interviewees who had simply expressed an opinion about improving water quality to others were lower, on average, than those who had not (see Table 8). Further analysis revealed that, in this case, the difference in scores was the result of relatively lower scores for risk probability on the part of those who had expressed their opinions.

Similarly, the scores for involvement with planting incentives of interviewees who managed their stock to prevent problems with water quality were lower, on average, than those who had not. Further analysis revealed that, again, the difference in scores was the result of relatively lower scores for risk probability on the part of those who had managed their stock to prevent problems with water quality.

The scores for involvement with fencing incentives of interviewees who had applied for incentives to plant fenced waterways were lower, on average, than those who had not. Further analysis revealed that the difference in scores was the result of relatively lower risk involvement on the part of those who applied for an incentive. Similar results were obtained with respect to investing in measures on the property to improve water quality in the catchment; working with Council to fence waterways; and planting waterways to improve water quality in the catchment.

At face value the results in regard to actions and differences in involvement with incentives for fencing and planting are not consistent with the principle that the stronger are landholders' motivations to act, the more likely they are to act. One possible explanation for this result is that interviewees' perceptions of risks are reduced because of the learning that occurs in undertaking the actions. An alternative explanation is that those who perceive risks to be relatively low will be more confident of acting than those who perceive risks to be relative high, holding the other antecedents of involvement constant.

If the latter explanation is the case then the relationship between the antecedents of involvement, overall involvement and actions may be highly non-linear. Consequently, the expression that was used to calculate involvement with the policy issue and the interventions may need revisiting.⁹

⁹ See page 22.

Implications

The objectives for this investigation were, first, to develop and pilot scales for quantifying farmers' motivation to improve water quality in streams, and to comply with regulation and incentives with respect to riparian fencing and planting. Second, illustrate the use of the I₃ Response Framework (Kaine et al. 2010) and to consider the implications of the application of the Framework for policy interventions to reduce nutrient emissions from farms. The investigation was based on a pilot application of a model of compliance behaviour for landholders proposed by Kaine et al. (2010).

In regard to the first objective statistically reliable scales were developed which measured the motivation of dairy and drystock farmers to improve water quality in streams, and to comply with regulation and incentives with respect to riparian fencing and planting. The results indicated that although there was an absence of any systematic bias in the scales there might be some potential to further refine the scales.

The results with regard to farmers' intensity of involvement, attitude strength, intentions and behaviour were all consistent with the propositions of the I₃ Response Framework. This suggests the Framework has merit as a means of predicting the responses of farmers to policy interventions. A number of important implications for designing policy interventions arise from the results of this application of the I₃ Response Framework.

First, on average, the interviewees exhibited moderate to high involvement with the issue of improving water quality in streams, and a strongly favourable attitude towards improving water quality. This result indicates these interviewees were motivated to think about, and act to, improve water quality. Possibly at some personal cost to them. However, their moderate to high involvement with compulsory fencing and planting and their moderate to high involvement with incentives for planting suggest that they will have definite views on how improvements in water quality should be pursued. This means they are likely to react strongly to policy interventions they do not favour and are even likely to challenge the design details of interventions they do favour.

Second, on average, interviewees rated the likelihood of making mistakes in policy decisions about water quality as high. They also believed the consequences of mistaken policy decisions about water quality were relatively large. These results suggest interviewees lacked confidence that the policy process would provide practical, sound solutions to the problem of improving water quality in streams in the Waikato. This is especially important as it is farmers, like those interviewed here, that will be expected to implement whatever policy intervention is finally settled on by the Council.

The apparently high involvement of interviewees with improving water quality signals a willingness on their part to participate in finding a solution to the policy problem of improving water quality. This, together with their lack of confidence in the policy process, suggests that meaningful engagement of farmers in the

design, development and implementation of sound and practical policy will be important to policy success. Though the terms of the engagement would need to be carefully negotiated.

Third, there was a strong inverse association between interviewees' functional involvement with water quality and their perception of the potential to make mistakes in regard to water quality. In other words, interviewees with high functional involvement in water quality and the interventions tended to perceive the risk of making mistakes in regard to these matters as low. In contrast, interviewees with low functional involvement in water quality and the interventions tended to perceive the risk of making mistakes in regard to these matters as high. This inverse association is consistent with the results obtained in regard to involvement and behaviour. In particular, an inverse association is consistent with the possibility that interviewees' perceptions of risks are reduced if they do take actions to improve water quality because of the learning that occurs in undertaking the actions.

In simple terms, these results indicate that the less involved and knowledgeable interviewees were, the higher they rated the chances of making mistakes, both from a policy perspective and on their farms. The less involved are likely to be less motivated to participate in the policy process, less motivated to implement policy interventions, and less likely to have a favourable view of the policy issue and associated policy interventions. Consequently, the less involved may be an obstacle to policy success, particularly if success depends on their taking action to improve water quality.

A number of options may be employed to counter this obstacle. One option is to increase the motivation of the less involved by raising their functional, hedonic or social involvement with the issue of improving water quality. The opportunities here appear limited, especially as social involvement appears to be personality-based and therefore immune to change.

A second option is to reduce the time, effort and cost to farmers entailed in complying with interventions to improve water quality. Again the opportunities here appear limited unless the public is willing to pay for fencing and planting materials and services, or contribute their time.

Another option is to reduce perceptions of risk by engaging representatives that are credible to farmers to act on their behalf in the policy development and design process. This has the potential to reduce the likelihood that the less involved will react unfavourably to the final choice and design of policy interventions.

Yet another option is to ensure interventions to improve water quality maximise the opportunity for farmers to decide on the specifics of the implementation of interventions on their properties. This means, for example, providing farmers with some discretion in regards to the siting and design of riparian fencing and the management of riparian planting. Such flexibility would allow farmers to

tailor the implementation of interventions to their circumstances and, consequently, increase the potential for farmers to respond favourably.

Fourth, generally speaking, interviewees' scores on functional involvement, hedonic involvement and risk involvement were not strongly correlated. This means interviewees involvement with matters in relation water quality was largely contextual. In other words, their involvement with any particular matter relating to improving water quality depended on the specific details of that matter, and was somewhat independent of their involvement with other water quality matters.

This implies interviewees' attitudes and opinions about the interventions were, generally speaking, formed independently of their attitude and opinions about improving water quality. This implies that efforts to change farmers' attitudes and opinions by promoting the benefits of improving water quality, are unlikely to have a major impact on their attitude and opinions about the merits of any particular intervention, such as compulsory fencing and planting.

Finally, all of the interviewees expressed moderate to very high involvement with improving water quality in streams. Hence, all were placed in the upper quadrants of the I₃ Response Framework. This implies all of the interviewees would be sensitive to communications about improving water quality; sensitive in the sense that they would be likely to notice, and attend to the content of, such communications. This result also implies that all of the interviewees would seriously consider acting, and will act, in some way to improve water quality in streams. This is unlikely be the case with a larger, more representative, sample of farmers.

A broader sample is likely to reveal:

- There are farmers that have a low involvement with improving water quality and interventions to improve water quality (lower left quadrant). Such farmers will not be sensitive to communications about improving water quality and will not be motivated to act to improve water quality. This is a serious problem if achieving targets for water quality requires that such farmers must take action.
- There are farmers that have a low involvement with improving water quality but have high involvement with, and unfavourable attitudes towards, interventions to improve water quality (lower right quadrant). Such farmers will not be sensitive to communications about improving water quality and will not be motivated to act to improve water quality. They will, however, be sensitive to the content of interventions that require them act to improve water quality. They are likely to react quite unfavourably to any form of compulsion. Achieving targets for water quality could be problematic if success requires these farmers to take action.

Conclusion

The I₃ Response Framework was used to investigate farmers' motivation to improve water quality in streams, and their motivation to comply with regulations and incentives for riparian fencing and planting.

Statistically reliable scales were developed that measured the motivation of farmers to improve water quality in streams, and also their motivation to comply with regulation and incentives for riparian fencing and planting. These scales were then used to place a small sample of farmers in I₃ Response Framework. The results with regard to farmers' intensity of involvement, attitude strength, intentions and behaviour were all consistent with the propositions of the I₃ Response Framework.

A number of important implications for designing policy interventions arise from the results of this application of the I₃ Response Framework. The moderate to high level of involvement of interviewees with the issue of improving water quality in streams suggests that many farmers will have devoted time and effort to forming opinions about improving water quality, and about the use of rules to mandate fencing and planting of waterways.

Interviewees indicated a lack of confidence that the policy process would provide practical, sound solutions to the problem of improving water quality in streams in the Waikato. This is concerning as it is farmers, like those interviewed here, that will be expected to implement whatever policy intervention is finally settled on by the Council. However, the moderate to high involvement of interviewees with improving water quality signals a willingness on their part to participate in finding a solution to the policy problem of improving water quality. This, together with their lack of confidence in the policy process, suggests that meaningful engagement of farmers in developing solutions that they, the farmers, regard as practical and sound will be critical to policy success.

The less involved and knowledgeable interviewees were, the higher they rated the chances of making mistakes in regard to improving water quality, both from a policy perspective and on their farms. The less involved are likely to be less motivated to participate in the policy process, less motivated to implement policy interventions, and less likely to have a favourable view of the policy issue and associated policy interventions. Consequently, the less involved may be an obstacle to policy success, particularly if success depends on their taking action to improve water quality.

Interviewees' attitudes and opinions about interventions such as compulsory fencing or incentives for planting were, generally, formed independently of their attitude and opinions about improving water quality. This implies that efforts to change farmers' attitudes and opinions by promoting the benefits of improving water quality, are unlikely to have a major impact on their attitude and opinions about the merits of any particular intervention, such as compulsory fencing and planting.

Finally, this pilot study has demonstrated that the I₃ Response Framework clearly has merit as a means of predicting the responses of farmers to policy interventions. Consequently, application of the Framework to a broader, representative sample would be worthwhile.

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Appendix

Table A: Tests of differences between policy issue and interventions in scores on antecedents of involvement

Antecedent	I ₃ Component	I ₃ Component	Mean difference	Paired t-test
Function	Policy issue	Compulsory fencing and planting	0.39	2.91, p=0.01
	Policy issue	Fencing incentives	0.49	3.20, p=0.00
	Policy issue	Planting incentives	0.41	3.00, p=0.01
Sign	Policy issue	Fencing incentives	0.36	3.26, p=0.00
	Policy issue	Planting incentives	0.25	2.67, p=0.01
Probability	Policy issue	Compulsory fencing and planting	0.60	2.65, p=0.01
	Policy issue	Fencing incentives	1.27	6.06, p=0.00
	Policy issue	Planting incentives	1.23	6.14, p=0.00
	Compulsory fencing	Fencing incentive	0.67	3.65, p=0.00
	Compulsory fencing	Planting incentives	0.63	2.47, p=0.02
Consequence	Policy issue	Compulsory fencing and planting	0.72	3.33 p=0.00
	Policy issue	Fencing incentives	0.77	4.50, p=0.00
	Policy issue	Planting incentives	0.51	2.84, p=0.01

Notes: See Tabachnick and Fidell (1989) or Cooksey (1997) for a description of paired sample, or within sample, t-tests. Paired differences that are not reported were not statistically significantly different.