



Landholder responses to incentives for wild dog control

Service Design Research Working Paper 08-11

September 2011

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Published by: Department of Primary Industries
Farm Services Victoria Division
DPI Tatura, Ferguson Road,
Tatura, 3616, Victoria, Australia
September, 2011

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Acknowledgments

This research was funded by DPI's Biosecurity Victoria Division.

Thanks are due to the landholders and agency staff who gave their time to be part of this research. Thanks to Melissa Drew, Michael Rosier, Andrew Wernert and Gina Paroz from Biosecurity Victoria and the project steering committee for their support and input into this research. We would also like to thank the North East and Gippsland Wild Dog Management Groups for their assistance.

The authors would like to recognise the contribution made to this research by project team members Megan Higson, Jo Vigliaturo and Brigette Keeble from DPI Victoria. The authors would also like to thank Environment Waikato Regional Council, New Zealand for its support. We also would like to acknowledge the valuable input into scale development from Natalie Tostovrsnik, John Ford and Helen Murdoch. Thanks also to our colleagues in Service Design Research who have contributed to the development of the Policy Choice Framework, the components of the Framework, and who supported this research.

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Executive Summary

Invasive species including wild dogs are known to cause a range of serious problems through their impacts on parks, forests, waterways, land assets, agricultural production and rural communities. The Victorian Government invests in invasive species management and research, public awareness activities and regulation of certain activities. The general principle of government involvement in invasive species management is that government invests in the most appropriate intervention to maximise public benefit. However, there are a range of actions that can be taken to manage invasive species. Furthermore, it is not feasible or cost-effective for government to enforce or fund the control of all invasive species, nor is it practicable to apply regulation against them all. Consequently, identifying when and how best to intervene is a complex problem. The challenge for government then, is to design programs that are effective in using limited public resources to foster private management of pest animals while meeting community expectations.

The aim of this research was to contribute to Biosecurity Victoria's efforts to identify effective and efficient policy responses to the problems posed by wild dogs by understanding and predicting the likely responses of landholder to incentives. The incentives considered were incentives for participation in a coordinated program, incentives for guard animals and incentives for wild dog exclusion fencing. This understanding provides an opportunity to refine the wild dog program by considering the likely response of landholders in program design.

In this paper we describe the results from the application of the I₃ Response framework to identify the key factors that influence the behaviour of landholders. In the I₃ Response Framework landholders' responses to a policy depends on their level of involvement with the policy issue and the policy instrument. Landholders can form favourable or unfavourable attitudes to the issue and to the policy instrument. Understanding and predicting the motivation of individuals to change their behaviour can be used in assessing the effectiveness of proposed program changes. We used both qualitative and quantitative data to assess landholder involvement and attitude to the issue of reducing wild dog attacks and the proposed incentives.

We found interviewees' involvement with the issue of reducing wild dog attacks was high to very high. Consequently, interviewees were likely to have definite views about what control methods (including the public provision of dog control services) work best for them.

While landholders' high level of involvement in the issue of reducing wild dog attacks suggests they may be predisposed to take action, what action landholders will take will depend on:

- their perception of the private benefit their action will realise, and
- constraints imposed by their context

Consequently, the high level of involvement of landholders may not necessarily translate into action and where it does these actions may not align with government objectives.

We also found that, on average, interviewee involvement in the proposed financial incentives was relatively high suggesting they will give serious consideration to applying for financial incentives for those control methods that suit them. However, the variation in interviewees' philosophy about how best to deal with the problem of wild dogs, and variation among them in their preferences for methods of control, suggests that the participation of landholders in regard to the financial incentives will depend on the extent to which flexibility is designed into the program.

The strength of interviewees' views about wild dog showed that all interviewees thought that reducing attacks was the right thing to do. The majority of interviewees thought that the provision of incentives for a coordinated control program and exclusion fencing was the right thing to do. There was a much greater degree of uncertainty about the merit in providing incentives for guard animals.

Interviewees' attitudes were favourable to the proposed incentives. However, the results suggest that some were unsure of merit of providing incentives for some of the control activities. This uncertainty was around the effectiveness of the control methods. This means landholders could form unfavourable attitudes towards incentives if, for example, the program favoured particular activities that they may perceive as ineffective, or did not include elements they consider important such as exclusion fence maintenance. The evidence is that once formed these attitudes will be strongly held.

In the design and administration of any financial incentive and coordination program there needs to be careful consideration about accommodating the variety in landholder philosophies about the control of wild dogs and their preferences for particular control methods. Careful consideration also needs to be given in the design of programs to avoid, as much as is possible, generating unfavourable attitudes towards financial incentives and coordination among landholders.

1. Introduction

Invasive species including wild dogs are known to cause a range of serious problems through their impacts on parks, forests, waterways, land assets, agricultural production and rural communities. The Victorian Government invests in invasive species management and research, public awareness activities and regulation of certain activities (Department of Primary Industries 2010a). The general principle of government involvement in invasive species management is that government invests in the most appropriate intervention to maximise public benefit (Department of Primary Industries 2010b). However, there are a range of actions that can be taken to manage invasive species. Furthermore, it is not feasible or cost-effective for government to enforce or fund the control of all invasive species, nor is it practicable to apply regulation against them all (Department of Primary Industries 2010b). Consequently, identifying when and how best to intervene is a complex problem. The challenge for government then, is to design programs that are effective in using limited public resources to foster private management of pest animals while meeting community expectations.

The purpose of the research reported here was to contribute to Biosecurity Victoria's efforts to identify effective and efficient policy responses to the problems posed by wild dogs.

In this paper we describe the results from the application of the I₃ Response framework (Murdoch et al. 2006; Kaine et al. 2010) which forms part of the Policy Choice Framework (Kaine et al. 2007). The Policy Choice Framework (PCF) brings together a number of economic and social frameworks to identify the key factors that influence the behaviour of landholders who are the target of a policy intervention. Knowledge of these key factors is used in the PCF to formulate intervention programs to change landholders' behaviour.

The I₃ Response framework is used here to predict landholder responses to the issue of reducing wild dog attacks and incentives for participating in a coordinated program of control activities, incentives for guard animals and incentives for exclusion fencing. In principle, the application of the I₃ Response framework and the PCF in this research will provide guidance for improving program design and resource allocation for wild dog management.

This research is a component of the Future Farming Strategy project: "Securing wild dogs through improved management", led by the Invasive Plants and Animals Branch within Biosecurity Victoria. Development of new policy instruments for wild dog management is a key deliverable for this project. The outcomes of this research will contribute to a paper outlining preferred options for wild dog management in Victoria.

2. Background

Wild dogs are widespread across all their potential range in the forested areas of East Gippsland, the north east of Victoria, and some areas in the north west of Victoria. Studies of tracked dogs have shown that wild dogs dwell in tightly defended territories within forested areas the majority of the time, rather than living or breeding on pasture or semi cleared land (Robley et al. 2010). The forested land inhabited by dogs is primarily public estate, managed by Parks Victoria and Department of Sustainability and Environment. Losses of livestock due to wild dog attack are usually confined to properties adjoining forested public land (King 2008). The percentage of forested land in private ownership is not known but is small relative to public owned forested reserves, forest parks, and national parks.

2.1 Impacts on the environment and agriculture

Wild dogs originate from dogs of domestic origin and have interbred with native dingos. In 2008, dingos were listed as a Threatened Species and protected under the *Flora and Fauna Guarantee Act 1988*. In practical terms, it is not possible in the field, to distinguish purebred native dingos from hybrid animals that are not protected under the Act.

Wild dogs have a number of adverse impacts on agriculture and rural communities. They attack livestock, impact on dingo populations through hybridisation, present potential human and livestock disease problems and can cause psychological damage for affected landholders. The variety of these impacts, and the fact that dog attacks arise from wild dogs, feral dogs, and dingoes and their hybrids, creates substantial challenges for the effective management of wild dogs. These challenges are complicated by animal welfare issues, the status of dingoes as a protected species, environmental factors, and the behaviour of target groups such as pet owners and landholders.

While wild dogs are not recognised as a threat to native fauna in most circumstances, they can have a damaging affect on agricultural enterprises. The majority of the damage is caused by wild dogs moving from public land onto adjoining private land to attack livestock, particularly sheep. Wild dogs have both an economic and social impact on the communities where they are present (King 2008). Economic impacts tend to be focussed on individuals and small communities rather than the sheep industry in general (King 2008). No direct threat from wild dogs to humans has been reported in Victoria.

2.2 Roles and responsibilities

The principle legislation in Victoria relating to the management of wild dogs is the *Catchment and Land Protection Act 1994*. Wild dogs are defined under this legislation as feral or wild populations of dogs (*Canis lupus familiaris*) and dingo-dog hybrids (*Canis lupus dingo x Canis lupus familiaris*) and are declared an Established Pest Animal. The dingo has been listed as a Threatened Species in Victoria under the *Flora and Fauna Guarantee Act 1987* and as a result is protected wildlife under the *Wildlife Act 1975*.

All landowners (including State and Local Government and private landowners) have a responsibility under the *Catchment and Land Protection Act 1994* to take all reasonable steps to prevent the spread of, and as far as possible eradicate, established pest animals such as wild dogs (Department of Primary Industries 2010a).

The management of wild dogs on public land is largely undertaken by Department of Primary Industries (DPI) on behalf of the Department of Sustainability and Environment (DSE) and Parks Victoria (PV). The wild dog management program within DPI has a number of components, with the largest proportion of resources and activity devoted to the public provision of dog control activities. DSE and PV play a supporting role in wild dog control with input into planning and the approval of control activities on public land.

2.3 The DPI wild dog management program

DPI works with owners of private land bordering public land and with the community to prevent wild dog attacks on livestock. The focus for wild dog management is protecting livestock in the buffer zone between public and private land. The control program for wild dogs includes baiting, trapping, and shooting through trained wild dog controllers. The program also encourages the adoption by landholders of exclusion fencing and animal husbandry practices to minimise attacks.

DPI offers support to landholders who have experienced attacks from wild dogs. Landholders may provide local knowledge and information to support wild dog controllers.

3. Predicting compliance behaviour

3.1 Involvement

To change the behaviour of individuals it is necessary to understand how they make decisions. When an individual is presented with a stimulus they will consciously or sub-consciously assess the importance of the stimulus in relation to the satisfaction of their needs and, consequently the need for decision-making (Derbaix and Vanden Abeele 1985). An individual's perception of the importance of a decision in relation to the satisfaction of their needs represents their involvement with the decision (Verbeke and Vackier 2004).

Involvement will determine the attention given to a decision and the effort an individual will spend on gathering and processing information (Celsi and Olson 1988; Poiesz and de Bont 1995). High involvement decisions invoke extensive information search which means an individual is likely to seek out information about alternatives, and deliberately evaluate, compare and judge them before making a decision (Assael, 1981; Kassarian 1981). With low involvement decisions little time is devoted to the consideration of alternatives before making a decision and relevant attitudes are likely to be weak, to the extent they are formed at all (Priluck and Till 2004).

In addition to considering the level or intensity of involvement, Laurent and Kapferer (1985) argue that understanding the source or cause of involvement may provide insights into decision making, and so how behaviour, can be influenced. There are three fundamental sources or causes of involvement; interest, sign, and hedonic (Laurent and Kapferer 1985; Mittal and Lee 1989). Interest relates to the consequence of a decision in utilitarian, economic and functional needs. Sign concerns the consequences of a decision in terms of self-concept and impression management needs. Hedonic is the extent to which the consequences of the decision satisfy pleasure or experiential needs (Kaine 2008). The intensity of involvement can also be influenced by an individual's perception of the uncertainty entailed in making a decision (Dholakia 2001; Laurent and Kapferer 1985). The perception of risk of the decision is an intensifier rather than a source of involvement (Kaine 2008).

3.2 Attitudes

An attitude is an individual's tendency to evaluate a stimulus with some degree of favourability or unfavourably (Petty 1997; Eagly and Chaiken 2007). Attitudes are a function of beliefs, social norms and commitment to comply with relevant social norms (Legg 2004; Wright 2004) and our actions are governed to some degree by our attitudes. Individuals who have invested time and effort in considering a stimulus are more likely to have formed strong attitudes towards it (Glasman and Albarracin 2006). Hence, relevant attitudes are likely to be well considered and strongly held where involvement is high while attitudes are likely to be weak, if they are formed at all, where involvement is low (Priluck and Till 2004).

3.3 Predicting behaviour

The I₃ Response framework (Murdoch, et al. 2006; Kaine et al. 2010) draws on the concept of involvement to explain and predict likely responses of landholders to policy instruments. In the framework landholders' responses to a policy depends on the landholders' level of involvement towards (1) the policy issue and (2) the policy instrument. For instance, landholders' responses to policy promoting adaptation to climate change may be motivated more by their attitudes towards the policy instrument than by their attitudes to climate change issue itself. An issue is defined here as the policy objective the policy instrument is intended to address.

Involvement with the issue represents the level of personal relevance of the policy objective. Issue involvement signals the degree to which the policy issue itself is a source of motivation for the individual, irrespective of the intervention. This allows for individuals to be motivated to take action in response to an issue, even though the associated intervention does not impose an obligation on them directly (Kaine et al. 2010).

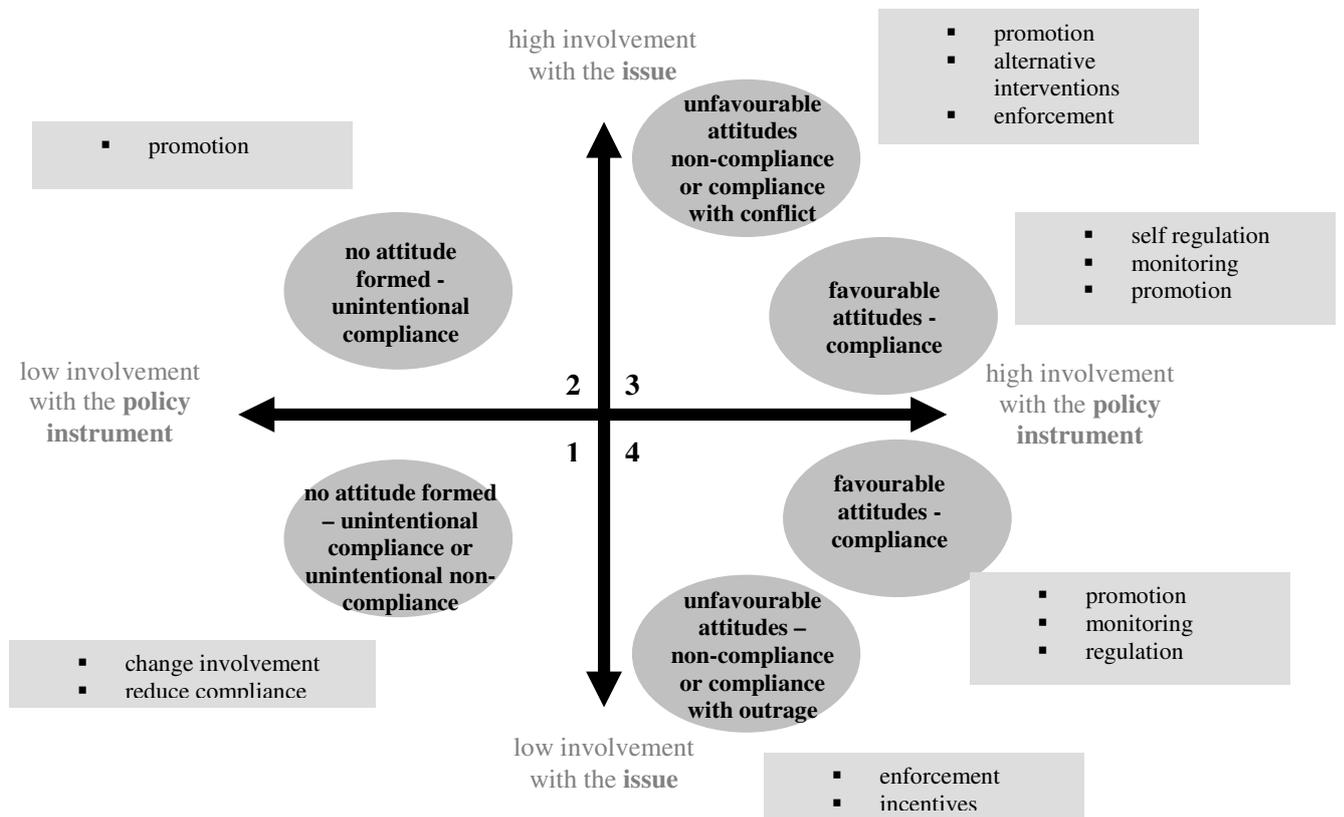


Figure 1: I₃ Response Framework with likely behavioural responses and suggested strategies for promoting compliance in each quadrant

(Adapted from Kaine et al. 2010)

Involvement with the policy instrument represents the level of personal relevance created by the intervention. It signals the degree to which the intervention is a source of motivation for the individual, irrespective of the policy issue. 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 (Kaine et al. 2010).

When involvement is sufficiently intense, an attitude toward that issue or policy instrument is formed. Depending on an assessment of the consequences of the decision the attitude may be favourable or unfavourable (Mittal 1995).

Kaine et al. (2010) predict that the combination of intensity of involvement with, understanding the source or cause for involvement, and attitudes toward, the issue and the instrument determine the subsequent response of landholders.

The relationships between issue and policy instrument involvement and the types of likely behavioural responses are summarised in Figure 1. Four quadrants are formed by the intersection of the two involvement axes:

- Quadrant 1: Low issue involvement and low intervention involvement
 - no attitude formed - unintentional compliance or unintentional non-compliance
- Quadrant 2: High issue involvement and low intervention involvement
 - no attitude formed - unintentional compliance or unintentional non-compliance
- Quadrant 3: High issue involvement and high intervention involvement
 - unfavourable attitudes – non-compliance or compliance with conflict, or
 - favourable attitudes - compliance
- Quadrant 4: Low issue involvement and high intervention involvement
 - unfavourable attitudes – non-compliance or compliance with outrage, or
 - favourable attitudes - compliance

These quadrants represent types of likely behavioural responses to policy instruments.

The resulting placement of landholders within the Framework provides a basis for predicting their responses to the instrument. These predictions could be used to identify strategies that would influence landholders' behaviour in a way that would promote the achievement of policy objectives (Kaine et al. 2010).

The I₃ Response framework is used here to predict landholder responses to incentives for participating in a coordinated program of control activities, incentives for exclusion fencing and incentives for guard animals based on their involvement in, and attitudes towards:

- The policy issue of reducing wild dog attacks;
- Incentives for participating in a coordinated program of control activities;
- Incentives for guard animals; and
- Incentives for exclusion fencing.

4. Measuring involvement and attitudes

To predict landholder responses to incentives for participating in a coordinated program of control activities, incentives for exclusion fencing and incentives for guard animals we interviewed a sample of landholders and measured their involvement in, and attitudes towards, the policy issue of reducing attacks by wild dogs and the three incentives.

A questionnaire was developed and piloted for the interviews which contained:

- involvement and attitude scales for the issue of reducing attacks by wild dogs,
- involvement and attitude scales for incentives for participating in a coordinated control program for baiting, shooting and trapping,
- involvement and attitude scales for incentives for guard animal,
- involvement and attitude scales for incentives for exclusion fencing,
- attitudes scales to measure the role of government and the role of landholders in reducing wild dog attacks, and
- behavioural intention statements

These are described below.

4.1 Involvement

Involvement cannot be inferred from the actions of individuals. Individuals may have high involvement in a stimulus but that stimulus does not require them to take action. For instance, a landholder may have high involvement in the issue of reducing wild dog attacks but may not need to take action because wild dogs do not affect their enterprise. Alternatively, mediating factors may prevent an individual from responding to a stimulus that is highly involving. For example, a landholder may have high involvement in reducing wild dog attacks on their property but time, disability or resource constraints may prevent them from taking action. Furthermore, differences may arise among individuals in terms of the nature and extent of action that high involvement may invoke. For example, a landholder may have involvement in the issue of reducing wild dog attacks and are motivated to regularly undertake action to manage wild dogs on their property. Such a landholder, because they are managing dog impacts on their property, may not be motivated to seek information on their obligations in relation to this pest animal.

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). Consequently, a questionnaire was developed which consisted of a series of structured questions to measure issue and intervention involvement and attitudes towards the issue and the intervention. A series of open-ended questions to elicit beliefs and behaviours in regard to the management of wild dogs were also included. The responses to the open-ended questions were intended to provide a qualitative validation of the estimates of involvement.

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

4.2 Attitudes

To better understand and predict landholder responses we measured interviewees':

- Strength of attitudes and attitude valence, ambivalence and non-attitude to the policy issue and the proposed incentives,
- Strength of attitudes and attitude valence, ambivalence and non-attitude to the role of government and landholders in reducing wild dog attacks.

We measured strength and valence of attitude by asking interviewees to rate a series of evaluative statements. Interviewees scored their agreement or disagreement with each statement using a five point

Likert rating. A score of 1 representing strong disagreement with a statement while a 5 representing strong agreement. Reasons for interviewees' ratings to the statements were sought by the interviewers.

Attitudes can contain positive beliefs, feelings and behaviours and negative elements leading to attitudinal ambivalence (see Table 1). It can therefore be difficult to interpret the neutral point in a one dimensional scale for measuring attitudes. For example, interviewees could choose the halfway point between favourable and unfavourable on the scale because it represents a compromise between the positive and negative elements of their attitude, or because they have no positive and negative attitude elements (Maio and Haddock 2009). Consequently, statements were developed to test for strength of attitudes and distinguish between attitude ambivalence (mixed feelings), indifference or non-attitude (Olsen 1999).

| Attitude elements | Definition | Scale statement |
|-------------------|--|--------------------------|
| good quality | positive extremity | right |
| indifference | neither positive nor negative | doesn't really matter |
| ambivalence | conflicting valence or mixed feelings, equally (or both) positive and negative | not really sure |
| non-attitude | uncertainty or non-accessibility | haven't put much thought |
| bad quality | negative extremity | bad |

Table 1: Attitude properties when measuring attitudes - understanding attitude responses in scales (Developed from Olsen 1999)

4.3 Behavioural intentions

To test the strength of the association between involvement, attitude and behaviour we constructed scales to measure the behavioural intentions of interviewees with respect to a range of wild dog control activities. Interviewees were asked to report their intention of undertaking control activities, working cooperatively, seeking information, and expressing opinions publicly.

Intentions were expressed as a series of statements and interviewees scored their agreement with each of the statements using a five point Likert rating. A score of 1 representing strong disagreement with a statement while a 5 representing strong agreement. Interviewees were also asked to indicate if they had engaged in these behaviours in the past or if they considered they were not applicable to their enterprise or situation.

4.4 The interview process

The interview contained both qualitative and quantitative components. The interview opened with semi-structured questioning to gather information about the interviewees' enterprise, current and past experience with attacks from wild dog and their response to, and management of, wild dogs. Interviewees were then asked to complete the questionnaire.

The questionnaire was divided into six sections. The first section contained the scale questions on involvement with, and attitude to, the policy issue of reducing wild dog attacks across Victoria. The next three sections contained scale questions on involvement and attitudes about incentives for participating in a coordinated control program, incentives for guard animals, and incentives for exclusion fencing. The fifth section contained attitudes scales about the roles of government and landholders in reducing attacks. The final section contained questions about the behavioural intentions and actions of landholders in relation to wild dog control. As landholders completed the scales they were questioned about their responses. Detailed notes were taken of reasons for their responses.

The interviews were conducted at a location chosen by the landholder, usually their property. Two interviewers were present at interviews which provided a means for comparing and checking interpretations of responses to the open-ended questions.

4.5 Sampling

A total of twenty-nine face-to-face interviews were undertaken with landholders covering a range of enterprises of different sizes. Twenty-three sheep, beef and grape producers were interviewed in the north east of the state. Six sheep and beef producers were interviewed in East Gippsland. Each of the interviewees differed in their experiences with wild dogs and dog control activities, including exclusion fencing and guard animals.

We interviewed landholders in four areas; Yea/Mansfield (including Murrindindi, Glenburn, Molesworth, Limestone, Merrijig), King Valley (including Carboor, Upper Ryans Creek, Rose River, Molyullah and Cheshunt), Tallangatta (including Bullioh and Tallangatta Valley) and Omeo/Dargo (Benambra). One emailed survey was received. Interviews were conducted during March and April 2011.

Landholders were chosen for interview from a list provided by members of the North East and Gippsland Wild Dog Management Group, DPI staff or landholders we interviewed. Some of the interviewees were members of a Wild Dog Management Group or on community formed wild dog groups.

5. Analysis

In the next section we present the results from interviewee's responses to the semi-structured questioning about their experiences with wild dogs. This is followed by the results from analysing the responses of interviewees to the quantitative component of the interview.

5.1 Landholder experiences with wild dogs

Interviewees were asked about their experience of wild dogs on their property. The majority of interviewees with livestock had experience with wild dogs. They reported hearing or sighting dogs, and had experienced dogs chasing, maiming or killing adult sheep and goats and young stock, including calves. Many interviewees also mentioned they knew of neighbours or other landholders in their area who had similar experiences, or had heard about others in the area who have experienced some kind of dog activity including dogs attacking their stock.

When asked, interviewees generally had not noticed any pattern in the timing of the dog attacks. Interviewees reported sheep and goat losses across all age classes, although most noted that young animals were particularly targeted by dogs.

Some interviewees felt there may be differences between when dingoes and wild dogs were active. Those interviewees who felt there might be differences in timing, or intensity of dog and dingo activity suggested factors such as when mothers have pups to feed, when pups are abandoned and have to fend for themselves, or activity from single predator dogs. Some felt that there were times when their stock were more at risk; namely during lambing and when calves are very young.

There were some differences among interviewees with respect to experience with dog attacks on cattle. In the north east of the state, most interviewees said they had had no problems with wild dogs and cattle, though a few said they had heard of neighbours with cattle having some problems. These interviewees were less concerned about where they put their stock, believing the wild dogs would not attack their cattle. Some managed their very young calves to protect against wild dogs.

In Omeo/Dargo area, a few interviewees reported calves being killed by wild dogs. These interviewees had seen calving cows being attacked by dogs or finding wounds on the ears and legs of yearling heifers that had been grazed on leased land that was forested.

Some interviewees mentioned that wild dogs were more of a problem for them after major fire events. The reasons given included fences being destroyed by fires, and dogs being one of the few species that survived the fire event after which they relied on livestock as a source of food.

5.1.1 Perceptions of frequency of attacks

Experiences with wild dogs varied across the four interview areas. Most interviewees in the Yea/Mansfield and the King Valley areas reported they had experienced fewer attacks relative to interviewees in other areas. However, interviewees in all areas reported attacks were increasing in frequency and intensity. Most of these interviewees commented that wild dogs were more numerous, more likely to be seen in packs, and were becoming more of a problem for their business in terms of severity and frequency of attacks. Several also commented that they had noticed wild dogs showing more aggressive behaviour toward humans, or saw this as a potential problem in the future.

The dog problem for me - it's like a deck of cards, you take out a card and there's another card to replace it...Even 10 years ago we still got single dogs. If there wasn't one to replace it there would at least be a gap.

Sheep and cattle

With hybridization, dogs come in to heat twice a year and pack structure changes so more than one bitch has pups. More dogs

together.... We used to see them singly or in pairs, now we see big packs.

Sheep and cattle

I've got a lot of respect for dingoes as an animal; other dogs are pretty horrible.

Cattle and sheep

Interviewees from Tallangatta and Omeo/Dargo area were more likely than other interviewees to raised issues with wild dogs and calves.

I don't lose many calves, these cows are protective of their calves, not all cows are as protective

Cattle

Have had dogs that kill calves.

Cattle

Periodically, you come onto cattle and have 3-4 cows lost calves, you know its dogs. ... because the chances of all 3-4 cows having a still born calf is remote.

Cattle

Worried that dogs might start to attack adult cows, bullocks.

Sheep and cattle

Calves killed this year, at least 3 by dogs, others not sure. Dogs attacked cows this week.

Cattle, horses and off farm income

5.1.2 Perceptions of impacts of attacks

Interviewees reported a range of financial and social impacts as a result of dog activity and attacks. Some of these included: loss in condition of stock, lamb and sheep losses, distress caused by attacks on stock and dealing with injured and maimed stock, constant uncertainty about when they may next find injured and maimed stock, the lengthy time frame over which attacks can continue to occur, and time spent on prevention activities, and impact of neglecting the rest of farm when dealing with managing wild dog. This suggests that interviewees should be highly involved in the issue of reducing attacks by wild dogs.

Examples of farm business and farm management impacts were:

Lost heaps of lambs. Can't say how many because haven't marked them. Not keeping count. I can tell if it was dogs, got hole punched out of them and often still alive.

Sheep and cattle

I suppose you would say I am pretty passionate about it. We came up here to farm sheep but if we can't do that we're wasting our time, the problems are getting worse not better.

Cattle and sheep

... Can't work with sheep once they have been dogged [wild dogs]. They bolt from the lambs.

Sheep

... [After an attack] they'll [the flock] only eat to live, to survive, won't put weight on.

Sheep and cattle

Took all the lambs at one attack in the paddock with 200 wethers, only left 40 after wild dog attacks

Cattle and sheep

If you could run more sheep would make more money.

Cattle and sheep

When dogs are killing, I do long hours. I did 37 hours in 3 days; I'm up there every night.

Sheep and cattle

Examples of social and psychological impacts were:

Impact on me? Relationships- I'm always out all night chasing dogs. Can't go on holiday or see people because dogs take priority.

Sheep and cattle

Not a lot of people have experienced a wild dog attack, but once you have lost [stock]...physical scarring

Sheep

With dog attacks you never know how long it goes on. The money is not the important thing. It's the emotional impact on us.

Sheep and cattle

Interviewees in Omeo/Dargo and Tallangatta area were more likely than those in other areas to comment on the affect they thought wild dogs were having on wildlife abundance and diversity on their land or in the surrounding bush. For example:

They [wild dogs] devastate the fauna. It will eat anything. They kill absolutely anything they can get- an echidna, a fox, a lizard- anything.

Cattle

Not just farmers, it's the whole community. Businesses and people who walk in the bush- they're not seeing or hearing wildlife.

Sheep and cattle

Nothing in bush anymore; no native wildlife. You used to hear lyre birds everywhere now nothing used to see thousands of Kangaroos, not hundreds, now I hardly see any.

Sheep and cattle

For some interviewees the perceived decline in wildlife was an indicator that there were more wild dogs in the bush and that the decline in wildlife was forcing dogs to move out of the bush and attack stock on their properties.

Some interviewees attributed the decline in sheep producers to attacks by wild dogs, on top of changes in wool prices and years of dry conditions. A small number of interviewees had changed their enterprise mix or type (by reducing sheep and adding cattle) in response to wild dogs, or had contemplated changing as a response to continued stock losses.

5.1.3 Reducing dog numbers in forests to reduce attacks

The majority of landholders interviewed spoke about the need to take steps to reduce the dog population in forests where they were living and breeding. The key reason given was that dogs travel far and fast across country from their forest refuge to pasture areas.

I knew a dog that killed at home; I followed him 11 miles into the bush one night. Only trapping on the [bush] margin is a waste of time.

Cattle

This place is fairly clear, not a lot of shelter. Dogs go back to where they have good cover, they don't stick around.

Cattle and sheep

I doubt the dogs are breeding here. The nature of the dogs, I doubt they are sedentary in the area. We have gas guns for cockatoos. Dogs won't stay around and breed here. They move far and fast.

Sheep and horticulture

Consequently, reducing dog numbers in forested areas was seen as addressing the source of the problem. Many of the interviewees emphasised this was a more important factor in reducing attacks than excluding dogs from farms or guarding stock.

Great idea to have funding but you can put up as many miles of electric fencing as you like it's not reducing the problem; it's like putting a band aid on the problem. They've got to eat something, they'll eat native wildlife. They have to, it's a survival thing.

Sheep and cattle

Every dog [you] catch two would come to the funeral.

Cattle and sheep

Reducing attacks equals reducing dog numbers...success of the program should be measured by country that can be returned to original grazing or there have been no attacks.

Sheep and cattle

5.1.4 A range of measures are needed to control wild dogs

Many interviewees' held the view that a range of measures were needed to control wild dogs. While all interviewees favoured some measures over others, many felt that some measures would only work in particular situations, or were needed in conjunction with others. For example:

Will only get young inexperienced or old dogs with baiting, not the middle aged strong dogs, those ones like hot meat.

Sheep and cattle

When catching a killing dog they're hard to catch.

Sheep and cattle

Some interviewees, who used guard animals or exclusion fencing, believed that these measures need to be combined with others that reduce pressure on guard animals or fences such as trapping and shooting.

For example one sheep interviewee with Mareema dogs and had substantial exclusion fencing also shot dogs and baited on their land. They felt that:

...you know that things are being done to manage wild dogs if you are doing it yourself.

Sheep

They felt the government trapping program was:

Not reliable, don't tell you if no traps out ... doggers [wild dog controllers] help, not comfortable that it enough don't know if covered, bugged if traps not there and dogs come back in.

Sheep

Another sheep farmer with exclusion fencing stated they relied on trapping by the wild dog controllers to reduce pressure on their fences and to help to capture wild dogs if they get through the fence.

Some interviewees expressed a concern that changes to control measures would result in an increase in the number of wild dogs. Interviewees raised the changes in the timing of checking of traps, the influence of animal welfare groups, and the protection of dingoes in this regard.

I don't know if dog trappers are doing as well since they stopped using steel traps.

Cattle and sheep

...24 hour checks on traps, that is wrong because traps would have to be covered in weekends, etc. when dog men [wild dog controllers] don't work.

Sheep and cattle

5.1.5 Control activities should occur on public and private land

Some interviewees felt that because wild dogs were based on forested public land they need to be controlled at the boundary of public and private land. For example:

Might kill you own dogs, baiting better off on their ground... I think it's the way they are going about it, I think there is too much influence from the soft side, from the greenies.

Cattle and sheep

We're not breeding dogs in our paddock and they're going into your [State Park] paddock. Instead you're breeding them up in State Parks and they're coming on our land.

Cattle, horses and off farm income

5.1.6 Concern over public efforts to reduce dog numbers

Many interviewees commented that they believed the public effort devoted to reducing the dog population had decreased in recent years. Many described their experiences with wild dog controllers employed by the Department and referred to generally as 'doggers'. Some were concerned that fewer resources were being invested in wild dog controllers, or that they were required to spend too much time on other activities.

We need more staff...succession plan for doggers [wild dog controllers], a lot are getting older... No cover for when they are away. Also doggers [wild dog controllers] get called off dog work to do other animals...In the past there were two doggers [wild dog controllers], now there is only one and there's more dogs, dogs are not as timid, they are more aggressive. What I'm worried about is there is a limited bucket of money and that incentives would come out of this, rather than spending it on wild dog controllers.

Sheep and cattle

With on-set of 24 hour trap inspections the government will expect more of farmers.

Sheep and cattle

5.1.7 Landholders regard themselves as having expertise

Many interviewees had thought deeply about how wild dogs are being managed and raised various aspects of the public control program. Some aspects raised by interviewees were: views about the buffer

zone, distinguishing dingoes and wild dogs, controlling dog numbers deeper in the bush, options for controlling dogs, local input into policy development and operational decisions, need for more resources, speed of government response to actual problems with dogs, resources for wild dog controllers, time before control activities are disturbed (trap checking) and control methods (eg type of traps, baits and poisons used, delivery method, fence design).

For example:

With dingo protection zones, that is making the breeding easier. The dingo protection people have a powerful voice and is done on legal grounds.

Sheep and cattle

You can tell the ones that have been eating mutton, they're shiny.

Sheep and cattle

Alpine dingoes – small percentage in this area that have cross bred.

Sheep

Torn between putting up with dingoes and having wild dogs.

Sheep

I think dogs have a place in society, they are still the top order predator.

Goats, sheep and vegetables

5.1.8 Views on control methods

Interviewees who had undertaken control activities tended to express strong preferences for some methods and a dislike of others. Some interviewees would shoot wild dog themselves or allow someone they knew to shoot on their property. Some would not trust others to shoot on their property.

I would only take someone to shoot I know and who can shoot and I'd have to be there with them so I'd have the local knowledge about where it was safe to shoot.

Cattle and sheep

You have to be sure of success or leave it alone.

Sheep and cattle

I wouldn't allow shooters. No one in the valley would allow shooters they didn't know, too risky, 'gung ho', shoot at anything.

Goats, sheep and vegetables

I actually think they [government] are not doing a bad job, but I think there should be a bounty. That would be a cheap way to get things done.

Sheep

Some interviewees would only use baits whereas others would not want to risk their own farm dogs or other non-target species by baiting on their property:

Anything could eat it, I don't like baits.

Cattle and sheep

Some interviewees baited for foxes but not for wild dogs. Not all interviewees were aware of the requirements around baiting for wild dogs, or aware if they are allowed to bait or trap for wild dogs. Many had not felt the need to do baiting or felt that they should not have to bait on their property. For some baiting was an activity that should occur on public land, not their property.

Department [DPI wild dog controller] poisoning behind us... no point in getting a free feed here... 1080 training, pain to get... don't bait too bloody big a job... kill the white dogs [Maremma] with baits.

Sheep

To get access to bait is extremely difficult, only allowed fox baits, don't know if allowed wild dog baits.

Sheep and off farm income

Some interviewees were sceptical about the effectiveness of baiting; some questioned the effectiveness of chemicals used and delivery method of baits:

I think baits on private property are not the most effective control. Once dogs are on property I feel they don't go round scavenging, they go for what they've got there- for the live animals... I'm happy to try [baiting again] but I didn't see much result [last time]. None of my baits were taken that time, I don't know if it was just me.

Cattle and sheep

Others raised the matter of restrictions on where landholders can engage in control activities. For example baits need to be placed in the bush before the dog come onto property.

Land holders can only bait or trap on own property. We're restricted in what we can do. Not allowed to control on the boundary or on public land

Sheep and Cattle

Interviewees' raised a number of potential problems with using exclusion fencing for wild dog control including; cost, placement, fence access, time and cost of checking fences and ongoing maintenance, lack of suitability for their country and its ongoing effectiveness.

Electric fence is no good for here. High maintenance because hilly areas, also with shorting out from weeds and vegetation on electric wires.

Goats, sheep and vegetables

It's not 100% anyway and it's very difficult in areas where there are lots of trees.

Sheep and horticulture

Had netting fencing for rabbits and wombats, but in disrepair now.... They're not dog fences but useful to set traps in holes in netting that dogs choose to go through.

Sheep and cattle

Fencing is not be all and end all, fence gets shorted, wombats put holes in and dogs get through... Decision on what type of fence was partly on what could afford. Ring lock netting with hot wire top and bottom - feel that's pretty effective.... There's a lot of maintenance and down time from rest of farm work.

Cattle and sheep

Fence placement was raised by some interviewees involved in government funded fencing, with varying preferences for placement on an existing fence line versus locating fence further in the property for access and maintenance and to reduce potential for damage from trees.

[fence] needs to be put on a line where it can easily be maintained and checked on... Not as if the country's lost got to put the right sort of animals on the other side

Cattle

A number interviewees expressed frustration with government as a neighbour not sharing half the cost of fencing as other neighbours do.

Problem we got here is on crown land government doesn't want to participate [in costs] if I do it with my neighbour we pay half and half. If I do on crown land boundary government doesn't want to know about it
Cattle

Other issues raised with joint fencing included the need for cooperation among all the landholders along the fence, that landholders may have different options about maintaining it, and that:

... While you maybe directly impacted by wild dogs you can't control all the parts of the fence.

Sheep

Interviewees who had experience with wild dog controllers commented on the specialised nature of dog control, due to the intelligence of the animal and that dogs lived in difficult, forested terrain. A few interviewees stated they had skills in setting traps, tracking and baiting. These interviewees had been either taught by experts or people with 'bush skills', had worked with wild dog controllers, or had learnt from years of experience working to control wild dogs. However, many interviewees did not feel they were sufficiently skilled to control wild dogs, either on their property or in the bush.

For instance:

Skill in being a dogger [wild dog controller] is native cunning more than anything else. It's probably very difficult to teach someone. They need to be using the remnants of the old guys to teach the new ones.

Sheep and horticulture

If you've got a dog man and you don't do what he says, you're a bloody fool... They're the experts.

Sheep and cattle

We can't run the place and be a dog controller as well. Their [wild dog controllers] skills aren't recognised. We don't have those skills- it's hit or miss.

Sheep and cattle

If I fire at it [wild dog] and miss it makes it twice as hard [for the wild dog controllers].

Cattle, horses and off farm income

Very hard to get wild dog in the spot light, have only shot a few in my life.

Sheep and cattle

Finally, interviewees stated they report sightings of wild dogs or hearing dogs in the area. For some this simply meant letting neighbours know that dogs were in the area, or let neighbouring farms with sheep know that they had seen wild dogs. Not all report sightings or dog attacks to wild dog controllers or to a DPI contact.

Yes report them to neighbours but not to authority.

Cattle and sheep

I shoot them, I don't report that.

Sheep and cattle

5.1.9 Stock management

Most interviewees argued that stock management was not a feasible option for dealing with wild dog attacks. Moving stock was not an option for most of the sheep farmers because: they were not being able to move sheep far enough away from bush; move them during lambing; ewes abandoned lambs; or their flock was too large. For example;

If dogs were in I would bring them [sheep] by the house, but you can't house 1600 sheep by the house.

Sheep

If Phil [wild dog controller] says move them I move them. But when you move the stock, you move the dog.

Sheep and cattle

It's not something that I was able to do because I haven't got a lot of small paddocks next to house.

Cattle and sheep

Some interviewees were able to use stock management to a certain extent but there were limits to what was practical. For example, if seasonal conditions are poor the capacity to move stock would be restricted as feed supply will be limited or there may be problems watering stock. Consequently, there is no alternative but to use paddocks further from their house, or use their entire farm.

It does make a bit of difference. We're under stocked here anyway but sheep have to go back - will have to put them further out on the farm as grass stops growing, which is more dangerous.

Cattle and sheep

The interviewees considered patrolling stock as ineffective in most circumstances because they were not able to patrol all the time and that wild dogs move in when they are not patrolling. Some interviewees spoke about being uncomfortable with even having wild dogs amongst their stock and that this can affect the behaviour of their stock. Some interviewees manage their farm by running their cattle in the paddocks closer to bush, keeping their sheep closer to the house or behind exclusion fencing, or running sheep only on blocks that have not been invaded by wild dogs. Some interviewees restricted the areas in which they ran very young calves, or placed them, on leased blocks in a safe area.

A few interviewees spoke about working with the wild dog controllers to help catch wild dogs and that they would follow the wild dog controller's advice on whether to move their stock or not.

Yes, if had advice [from the wild dog controller] to leave them or move them. In general, don't have the choice to move stock, there's nowhere to move them.

Sheep and cattle

In this section we presented the results from interviewee's responses to the semi-structured questioning about their experiences with wild dogs. In the next section we present the results from responses to the quantitative component of the interview.

5.2 Measuring involvement - scale reliability

To predict landholder responses to incentives for participating in a coordinated program of control activities, incentives for exclusion fencing and incentives for guard animals we measured interviewee's involvement in the policy issue of reducing attacks by wild dogs and the incentives 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. A scale with a Cronbach alpha of 0.70 or above can be interpreted as internally consistent and therefore reliable. The results are reported in

Table 2 and indicate that the internal reliability of the scales measuring the interest, sign and hedonic sources of involvement were generally satisfactory. The reliability of the scale measuring the probability and consequence antecedents of involvement were, for the most part, unsatisfactory.

Inspection of Table 2 reveals that the reliability of the probability and consequence antecedents varies across contexts; issue, coordination, guard animals and exclusion fencing. This suggests the low reliability of these scales is unlikely to be due to a particular statement. This suggests that some caution should be exercised in drawing conclusions that depend only on results derived from the scales for the probability and consequence antecedents.

| | I₃ Component | | | |
|-------------------|--------------------------------|--------------|---------------|-------------------|
| Antecedent | issue | coordination | guard animals | exclusion fencing |
| interest | 0.81 | 0.61 | 0.94 | 0.88 |
| sign | 0.93 | 0.95 | 0.90 | 0.95 |
| hedonic | 0.34 | 0.90 | 0.95 | 0.86 |
| probability | 0.45 | 0.68 | 0.50 | 0.08 |
| consequence | 0.71 | 0.52 | -0.22 | 0.60 |

Table 2: Reliability analysis of involvement scales¹

¹ The values in the table are Cronbach's alpha for the involvement scales (Carmines and Zeller 1979). Given the small number of statements in each scale a score of 0.7 or higher was regarded as satisfactory.

5.3 Measuring involvement - involvement profiles

An involvement profile is the pattern of interviewee involvement across the five antecedents; interest, sign, 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 (Kaine et al. 2010).

The profiles for involvement with the issue of reducing wild dog attacks, and the three proposed incentives are presented in Figure 2. The profiles show the average score for the interviewees on the various antecedents of involvement. These results indicate that interviewees' involvement in the issue was extremely high for all antecedents. This suggests that interviewees were highly involved in the issue of reducing attacks by wild dogs from utilitarian, social and hedonic perspectives. This is consistent with the results reported earlier on the business and social impacts attacks from wild dogs have had on interviewees.

Interviewees' involvement in the incentives was moderate for most antecedents except for risk probability. This suggests that interviewees were moderately involved in the proposed incentives from utilitarian, social and hedonic perspectives but they believed that the likelihood of making a mistake in applying for incentives was low.

5.4 Measuring involvement - level of involvement

To place interviewees in the appropriate quadrant of 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; the risk; intensify involvement arising from the three source antecedents (interest, sign and hedonic). 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 source of involvement (interest, sign and hedonic). 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. This argument has two implications.

The calculation is summarised in the following expression:

$$(1) \quad TI = SI + SI * R_p$$

$$(2) \quad SI = (I_{\text{interest}} + S_{\text{ign}} + H_{\text{edonic}}) / 3$$

Where TI denotes intensity of involvement, SI denotes mean source involvement; Interest, Sign, and Hedonic denote scores on the interest, sign and hedonic scales; and Rp denotes scores on the risk probability scale.

Alternatively, the expression for involvement intensity can be written in full as:

$$(3) \quad TI = ((I_{\text{interest}} + S_{\text{ign}} + H_{\text{edonic}})/3)*(1.0 + R_p)$$

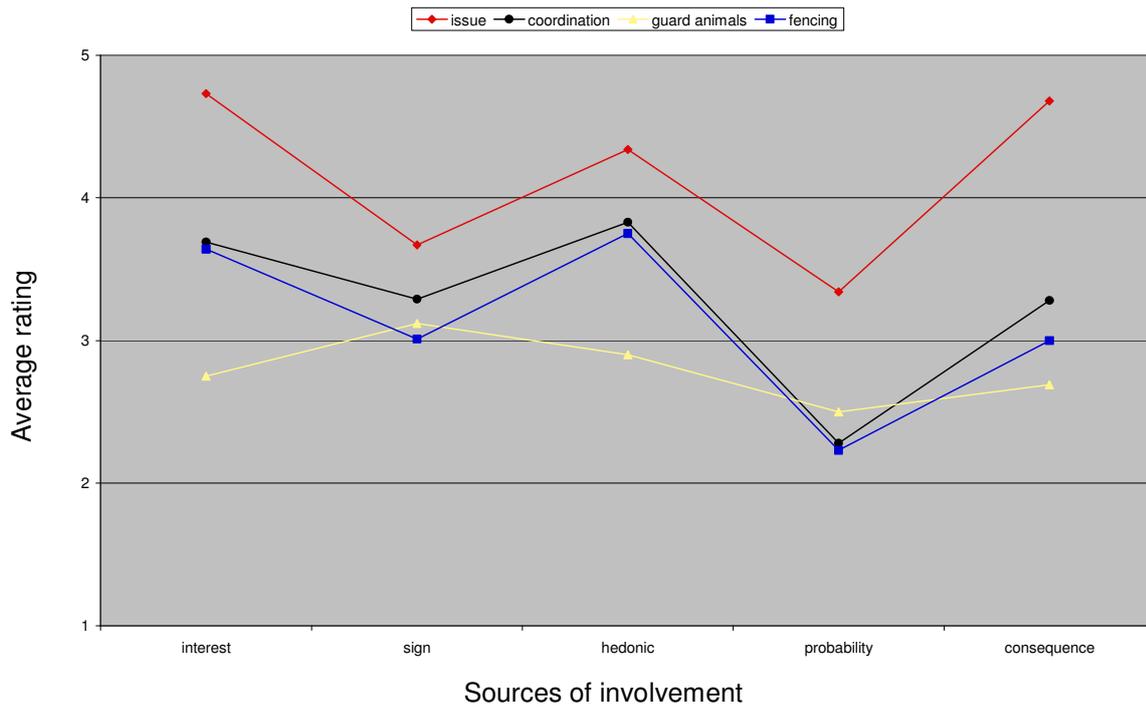


Figure 2: Interviewees' involvement in the issue and proposed incentives²

² Measures of sources (interest, sign and hedonic) of involvement and risk probability and risk consequence were based on landholder ratings of 15 statements. A minimum score of 1 indicates low ratings and a maximum score of 5 indicates high ratings.

Expression (3) has the following useful properties:

- (i) A minimum of 2 for the minimum possible scores for source involvement and risk
- (ii) A score of 6 for the minimum possible score for source involvement and maximum possible score for risk
- (iii) A score of 10 for the maximum possible score for source involvement and minimum possible score for risk
- (iv) A maximum of 30 for the maximum possible scores for source involvement and risk

To assist interpretation of results we interpreted scores equivalent to (iii) above as moderate involvement. That is, the score obtained from the combination of maximum source involvement and minimum risk. Consequently, the intersection of the involvement axes in graphs of the I₃ Response Framework set at an involvement intensity score of ten (10). Hence, interviewees with scores above 10 were deemed to have moderate to high involvement while those with scores below 10 were deemed to have low to moderate involvement.

The mean levels of interviewee involvement calculated using expression (3), in the issue of reducing attacks by wild dogs and in incentives for coordination, guard animals and exclusion fencing are reported in Table 3. The results indicate that interviewees' involvement in the issue was extremely high while their involvement in the three incentives was moderate. This is consistent with the results reported earlier on the involvement profiles and the qualitative results on the business and social impacts attacks from wild dogs have had on interviewees.

The very high level of involvement in the issue of reducing attacks by wild dogs suggests the interviewees were likely to have devoted considerable time and effort to consideration of the problem of reducing wild dog attacks and they were likely to have definite views about what control methods (including the public provision of dog control services) would work best for them. This is consistent with the qualitative results reported earlier on interviewees' views on control methods and the role of public control.

We had expected that the level of involvement in the issue of reducing attacks by wild dogs would be higher in East Gippsland than in other areas given the perception that attacks were perceived to be more frequent in East Gippsland than in the other areas. However, no statistically significant differences were found among the areas for involvement scores in the issue of reducing wild dog attacks, nor, incidentally, for incentives for coordinated control (see Table 3).³

We found that the level of involvement in incentives for guard animals and exclusion fencing was lower among interviewees in the King Valley area than in other areas.⁴ The level of involvement in incentives for guard animal incentives and exclusion fencing among interviewees in the Tallangatta, Mansfield/Yea and Omeo/Dargo areas were not statistically significantly different (see Table 3).

³ F=1.84, p=0.17 and F=2.01, p=0.14 for issue and coordinated control respectively.

⁴ F=3.56, p=0.03 and F=4.63, p=0.01 for guard animals and exclusion fencing respectively

| Area | I ₃ Component | | | |
|----------------|--------------------------|--------------|---------------|-------------------|
| | Issue | Coordination | Guard animals | Exclusion fencing |
| King Valley | 16.48 | 9.96 | 7.72 | 8.47 |
| Tallangatta | 16.24 | 11.38 | 10.87 | 11.46 |
| Mansfield/Yea | 20.84 | 12.25 | 11.69 | 12.60 |
| Omeo/Dargo | 19.45 | 13.64 | 9.27 | 12.07 |
| Average | 18.37 | 11.66 | 10.30 | 11.08 |

Table 3: Involvement in issue and incentives for coordination, guard animals and exclusion fencing by area

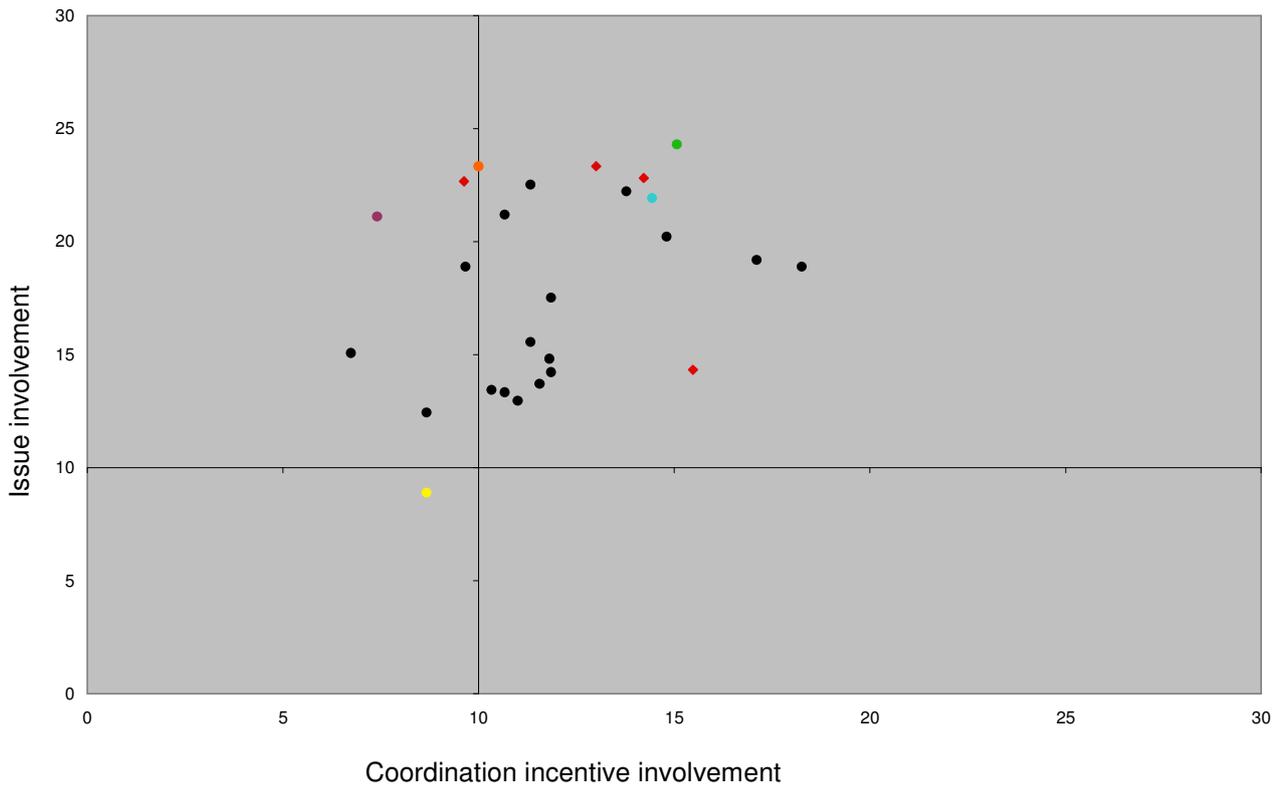


Figure 3: Interviewees' involvement in the issue and incentives for coordinated control⁵

Jo a sheep and cattle farmer
(purple data point in Figure 3, 4 and 5)

Jo runs 2000 sheep and 420 cattle, over two properties, a home block and a bush block that borders state forest. Jo has had problems with wild dogs on the bush block in the past and as a result hasn't run sheep there for the last 20 years. Jo now runs cattle on the bush block, but because of wild dogs doesn't run very young calves there. Jo doesn't bait, he hasn't got a permit for 1080 and wouldn't like to get one and risk his own dogs.

Jo is hoping to put in an electric fence on the bush block with the assistance from an incentive, hopefully to manage a number of pest animals including wild dogs. He feels if the fencing was up and working effectively to keep wild dogs out he would consider putting sheep back there. He has shot wild dogs in the past, including problem domestic dogs. Jo hadn't really thought much about guard animals. He had heard of management issues with Maremmas, training requirements, and felt they would not work with the way he manages his flock. He felt that alpacas also have management problems and are suited more for fox control.

Incentives for coordination: Jo felt that "getting rid of the dogs should be incentive enough rather than getting paid to do it, really protecting your own livelihood"

Incentives guard animals: Jo felt that getting wild dogs sorted should be incentive enough.

Text Box 1: High issue involvement and low intervention involvement
(Incentives for coordinated control and guard animals)

⁵ Refer to text boxes for summaries of the coloured data points. Red data points represent current or past members of a Wild Dog Management Group.

5.5 Involvement with the issue and incentives for a coordinated control program

The scores for interviewees involvement with the issue of reducing wild dog attacks and their level of involvement in incentives to participate in a coordinated control program for baiting, shooting and trapping were used to place interviewees in the I₃ Response framework.⁶ The placement of interviewees in the Framework is shown in Figure 3.⁷

5.5.1 Quadrant 1: low issue involvement and low intervention involvement

Only one interviewee exhibited low involvement in the issue and low to moderate involvement in incentives to participate in a coordinated control program for baiting, shooting and trapping. This interviewee disliked baiting because of the potentially unfavourable impacts on wildlife and would not allow shooters on their property. They believed that preventative trapping was the best solution to the wild dog problem.

5.5.2 Quadrant 2: high issue involvement and low intervention involvement

Six interviewees exhibited a high level of involvement in the issue and low to moderate levels of involvement in incentives to participate in a coordinated control program for baiting, shooting and trapping. Given the placement of these interviewees in the I₃ Response framework we expect that, though these interviewees might be highly motivated to reduce attacks by wild dogs, they would not be strongly motivated to apply for incentives to participate in a coordinated control program.

In general we found that these interviewees had not undertaken control activities because they did not have problems with wild dogs because of their enterprise, or felt they were able to manage wild dogs by themselves. For instance:

No issue with it [incentive] but not for my property because I've got no issue here

Vineyard and cattle

One of these interviewees now ran cattle instead of sheep on their out blocks where they have had problems with wild dogs in the past. This interviewee's response to the idea of incentives was that managing wild dogs is about protecting your livelihood which they felt should be incentive enough to take action.

Another felt that the problem was managed through their exclusion fencing and the trapping done by the wild dogs controllers. This interviewee's response to the idea of incentives for coordination was that they:

Never thought that other people should help, you choose to run them [sheep] here. Public land manager didn't put them [wild dogs] there, they breed there.

Sheep and cattle

This interviewee felt that if government were to withdraw assistance then controlling wild dogs would be more difficult. They would then have to add trapping to their skills as, until now:

I haven't needed to become proficient in it, they [wild dog controllers] very good at it

Sheep and cattle

⁶ The proposed intervention was described to landholders as incentives for participating in a coordinated control program for baiting, shooting and trapping of wild dogs by all land managers. This could mean working with other farmers and agencies to coordinate the timing of baiting, shooting and trapping.

⁷ The data for the I₃ analyses was incomplete for four interviewees (16, 19, 23, and 27).

One of the interviewees, who was a sheep farmer and shot wild dogs, did recognise that an incentive might encourage others. Their response was that incentives:

...are the way to go, the incentive could be a bounty and or involve shooters associations in a coordinated program.

Sheep

One interviewee in this quadrant, who exhibited an unfavourable attitude towards incentives for coordination, expressed the view that they didn't believe landholders have the expertise needed to effectively implement control methods:

Don't think we should have incentives ...Feel better about getting rid of dogs rather than getting an incentive.

Cattle

5.5.3 Quadrant 3 - high issue involvement and high intervention involvement

Nineteen interviewees exhibited a high level of involvement in the issue of reducing attacks by wild dogs and moderate to high involvement in incentives to participate in a coordinated control program for baiting, shooting and trapping. Given the placement of these interviewees in the I₃ Response framework we expect that these interviewees would be highly motivated to reduce attacks by wild dogs and to apply for incentives to participate in a coordinated control program. However, we would also expect these interviewees to have strong views on how a coordinated program should be designed and managed.

Generally speaking, most of the interviewees placed in this quadrant believed coordination was a good idea but, as expected, pointed to potential problems with coordination such as the timing of a coordinated program, how and where the program was run, and the choice of control activities and getting agreement eg dates and timing. For example:

Aerial baiting is indiscriminate so a problem ...depends on the program and whether it is coordinated right. Mistakes would be lack of coordination, [you] have to know area and what could go wrong, safety, shooting.

Cattle and sheep

I did a fox baiting exercise a few years ago. My neighbour who I tried to encourage to come in with me wasn't keen because [he was] worried about his farm dogs getting poisoned... Unless you do a concentrated effort with everyone involved it's no good.

Cattle

It's almost pointless doing things on your property when the dogs are feeding in [from the bush].

Sheep and horticulture

[I am] concerned the government is wanting to get rid of the doggers [wild dog controllers] and get landholder to do it.

Sheep and off farm income

Shooting really wasn't an option on my property, too steep – do a bit of spotlighting on the place but know how difficult and cagey these animals are, they are very difficult to shoot

Cattle and sheep

Another issue raised by some interviewees was that some control activities can influence the behaviour of the wild dogs. Dogs may become trap shy or more difficult to shoot after a missed shot, and that by their nature dogs are able to learn to respond to fences in different ways, such as finding a way through

exclusion fences when electricity down. Some interviewees were concerned dogs could become more difficult to catch if control activities were conducted by the inexperienced.

If there's a choice between the two [incentive versus current program], I would go for well designed dog control with experts doing baiting, trapping and shooting and land owners doing their bit. ..This is preferable to doggers [wild dog controllers] being reduced in time and expertise and instead expecting land owners to do more/do everything.
Sheep and cattle

Generally, interviewees in this quadrant had a favourable attitude to the idea of incentives for participation in coordinated control. Some interviewees did make the point that while favouring the idea they were unsure if it would work as success would depend very much on the design of the program.

I think incentives would probably help people make a decision - from doing nothing to doing something.
Cattle

Dogs are out in the bush so if they're giving farmers incentives on our land but we're not allowed to go out in the bush to tackle the problem... Money could be better spent....Bush is not our place so we shouldn't be expected to go there. I'm happy to tackle [the dogs] if they come onto my property... I'm sure if got numbers down that would help. They've eaten everything out in the bush.
Cattle and sheep

It's almost pointless doing things on your property when the dogs are feeding in [from the bush]... They're not breeding here.
Sheep and horticulture

Some interviewees in this quadrant felt that controlling dogs would be incentive enough, or that they don't need an incentive to manage wild dogs, but if an incentive was on offer that they would take it up.

If you are really worried about the dogs you shouldn't need an incentive... but I guess if you get an incentive that's going to help.
Cattle

We don't need an incentive to do dog control. If there was an incentive on offer, we would take it.... We've taken advantage of fencing incentives in the past.
Sheep and cattle

Wouldn't need an incentive would just do it we've seen the devastation and that is incentive enough.
Sheep and cattle

One interviewee in this quadrant who exhibited an unfavourable attitude towards incentives for coordination view was:

If we had incentives, would get every bloody cowboy in on the game... I disagree with paying farmers incentives because I don't think farmers are capable, they are not the dog catching experts. If we have to be involved, I think there should be incentives... I think getting landholders to do the control is a lousy way of getting things done.
Sheep and cattle

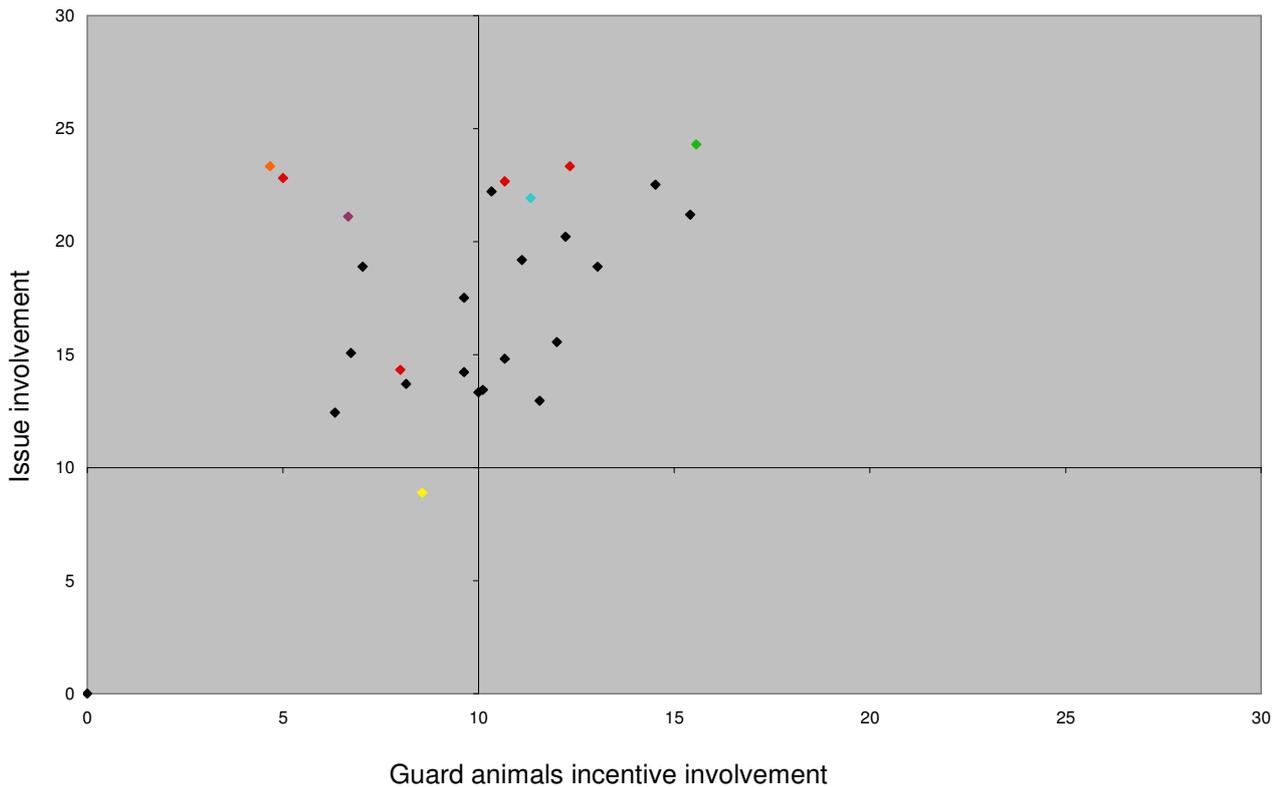


Figure 4: Interviewees' involvement in the issue and incentives for guard animals

Fred and Lauren "lifestyle" farmers

(blue data point in Figure 3, 4 and 5)

Fred and Lauren run a few steers and have on agistment 30 sheep. Their property doesn't abut forest but is close to the forest. They have had wild dog attacks over the years. They feel it has been dogs because of the nature of the wounds on their stock. Fred has seen dog chasing lambs and has shot one wild dog. They also experienced domestic dogs causing problems on the property. They do not do proactive wild dog control. In general Fred and Lauren don't report wild dog activity to the agencies; instead let landholders know about any problems in the area. They felt that if they have a major problem they would contact the wild dog controller. Fred described himself as quite passionate about managing feral animals.

Incentives for a coordinated program: Fred and Lauren were undecided about the chances of making a mistake when getting incentives for a coordinated program. They felt it would depend on the program and whether it is coordinated right. Mistakes would be a lack of coordination and organisation, they felt that you have to know the area and what could go wrong eg safety, shooting and not wanting to take out other animals. Fred felt a coordinated program could work and it could include an alliance with shooters organisation and gave example of coordinated feral animal shoot on Phillip Island.

Incentives for guard animals: Fred and Lauren felt they did not need a guard animal because of the type of stock they run. They felt that the cattle are safe from dogs and their small number of sheep means it is not worth getting a guard animal. If they were to have a dog problem they would go out shooting.

Incentives for exclusion fencing: Fred and Lauren response to fencing was that 'exclusion fencing is not for us on this property'. They felt they wouldn't need one unless it also excluded kangaroos which are also problem for them.

Text Box 2: High issue involvement and high intervention involvement
(Incentives for coordinated control, guard animals and exclusion fencing)

5.6 Involvement with the issue and incentives for guard animals

The scores for interviewees' involvement with the issue of reducing wild dog attacks and their level of involvement in incentives to participate in guard animals were used to place interviewees in the I₃ Response Framework. The placement of interviews in the Framework is shown in Figure 4.

5.6.1 Quadrant 1 - low issue involvement and low intervention involvement

One interviewee exhibited low involvement in the issue and low to moderate involvement in incentives for guard animals. This interviewee already had alpacas for fox management. They felt that it would be cruel to have dogs permanently out in the paddock so they were not tempted to have Maremma dogs. This interviewee's response to incentives was that they would use guard animals without the incentive but not for controlling wild dogs. Overall they had a strongly favourable attitude to the use of guard animals for foxes but not for the management of wild dogs.

5.6.2 Quadrant 2 - high issue involvement and low intervention involvement

Eleven interviewees in this quadrant exhibited a high level of involvement in the issue and had low to moderate level of involvement in incentives for guard animals. Overall, these interviewees had not invested much time and effort in considering guard animals generally, and guard dogs in particular, for wild dog control. Most had some limited knowledge of guard dogs or alpacas; of the management issues and requirements of using guard animals; and had formed an opinion about the potential of guard animals to assist in controlling wild dogs on their property. Some believed that guard animals were still an untested control option for wild dogs.

A few interviewees in this quadrant had tried alpacas for fox control. One of these interviewee felt that because individual animals protect stock differently their performance can vary:

*We had 4 alpacas - one was proactive in protecting lambs from foxes,
3 others were just passengers.*

Sheep and cattle

Some interviewees felt guard animals wouldn't work on their property because of factors such as size, layout, stock type, and their stock management practices. Some felt because of their enterprise (cattle) they would not need a guard animal, some felt guard animals would be another management job. A few felt they shouldn't have to have a guard animal because the problem of wild dogs is caused by someone else.

For example:

[I] would need 20 alpacas... for myself I'm not into them.

Sheep and cattle

*Shouldn't have to have them to guard our own animals because dogs
shouldn't be there.*

Sheep and cattle

*Maremma dogs would be a total hassle for me ...you'd put up with the
hassle if you knew they worked.*

Cattle and sheep

Some interviewees would rather invest, or see government invest, in other control activities before considering guard animals.

*Fencing and ring the dog boys [wild dog controller] working well for
what we are... its effective.*

Sheep and cattle

It's a sense of security you get [from guard animals] rather than actual security.

Sheep

Consistent with their low to moderate level of involvement with incentives for guard dogs many of the interviewees in this quadrant were unsure of the merit of providing an incentive.

I don't think the government should be paying for guard animals they're not proven, they don't reduce the dog numbers.

Sheep and cattle

All your doing is pretending that dogs aren't breeding up behind you...

Sheep

Getting problem solved should be incentive enough, or should be

Cattle and sheep

Shouldn't have to have them to guard our own animals because dogs shouldn't be there ... If I get them it'll mean that I will have given up.

Sheep and cattle

We would expect that a relatively low proportion of interviews in this quadrant to have definite views regarding guard animals compared to interviewees in quadrant 3. This was the case with only 18 per cent of those in this quadrant expressing either a strongly favourable, or a strongly unfavourable, opinion about incentives for guard animals.

Harry a sheep and horticulture farmer
(green data point in Figure 3, 4 and 5)

Harry runs merino for fine wool and horticulture, and his property borders crown land and a large portion of property is privately owned bush. Five years ago Harry experienced his worst wild dog worst attack where he lost 30 ewes in one night, he was unsure if it was a domestic or wild dog. Harry hasn't seen wild dogs but hears them all the time. He lost fifteen of his best young sheep young stock only last week. Harry's response to the latest attack will be to work with the wild dog control on a coordinate program of baiting and trapping. Harry does bait for foxes prior to lambing. Harry feels that exclusion fencing is not 100% effective and it's very difficult in areas where there are lots of trees, like his property.

Incentives for coordinated control: Harry felt his recent sheep losses will probably lead to a change in his behaviour, expecting to do more where wild dogs are concerned. Harry feels that it's almost pointless doing things on your property when the dogs are feeding in from the bush where they are breeding.

Incentives for guard animals: Harry has had experience with Maremmas for fox management, and had mixed experience with them. He is unsure if he would go down that path again. He is currently thinking about alpacas, only emerged since last sheep kills by wild dogs; he felt that they are very expensive and would need one for each of his 3 flocks.

Incentives for exclusion fencing: Harry feels that small pockets of fencing could never be a solution to the problem because it's not addressing the wild dog numbers. He feels as numbers of dogs build up this will put pressure on fences and dogs will find a way through the fence.

Text Box 3: High issue involvement and high intervention involvement
(Incentives for coordinated control, guard animals and exclusion fencing)

Bill a sheep and cattle farmer
(orange data point in Figure 3, 4 and 5)

Bill runs 1400 ewes and 100 Limousin cattle on a property that Bill describes as country suited to lambs, that he can get a late season and can finish off his lambs. Two thirds of the property is surrounded by crown land, the rest by privately owned pines. Bill has some electric exclusion fencing that he strategically uses to lamb up against. Bill has experienced sheep losses from wild dog attacks, and spoke about the impact on the remaining sheep after the attacks. Bill has shot a few wild dogs in his time on the property, but feels that it's very hard to shoot wild dogs. Bill also calls the wild dog controller if having dog problems. During lambing Bill spends time out with his gun patrolling stock.

Incentives for guard animals: Bill would not be interested in incentives for guard animals because he doesn't think they work for wild dog management. He also felt for his property he would need a significant number of alpacas and would consider them to be another management job.

Incentives for exclusion fencing: Bill has been applying for funding for more exclusion fencing.

Text Box 4: High issue involvement and low intervention involvement
(Incentives for coordinated control and guard animals)

5.6.3 Quadrant 3 - high issue involvement and high intervention involvement

Fourteen interviewees exhibited a high level of involvement in the issue of reducing wild dog attacks and had a moderate to high level of involvement in incentives for guard animals. These interviewees were placed in Quadrant 3 of the I₃ Response framework.

Consequently, we expected that these interviewees would have invested time and effort in making decisions about the relevance of guard animals to their situation. These interviewees were able to distinguish between the value of guard animals in their particular situation and the merit of providing incentive for the use of guard animals by others. Most of these interviewees had knowledge of guard dogs or alpacas, knew of some of the management issues and requirements of using guard animals, and had formed an opinion about the potential of guard animals to assist them in controlling wild dogs.

A few of the interviewees in this quadrant had, or had tried, alpacas for fox control and guard dogs for wild dog control. Some had given considerable consideration to guard animals for wild dog control and whether guard animals fitted with their circumstances. Opinions were varied:

Not here full time, can't have dogs [Maremma], can't have alpacas... I would need more research to see about their effectiveness ...on this property need something solid, permanent...need when were not here.
Cattle, horses and off-farm income

We don't need one...type of stock we run – cattle are safe from dogs and the number of sheep – the problem means it is not worth getting a guard animal.
Cattle and sheep

Others raised issues such as the need to be on the farm full time, the investment in time and effort before guard animals begin to work, that their success depends on the performance of the individual Maremma dogs and, consequently farmers might have to try a few animals before getting a satisfactory one.

Some interviewees would rather invest, or see government invest, in other control activities before considering guard animals.

Use other options to manage wild dogs, if we have a problem would go out and shoot dog.
Cattle and sheep

I would rather put the money into something else rather than guard animals.
Cattle, horses and off-farm income

Eradicate the [wild] dog is the answer rather than get another animal to manage.
Sheep, cattle and cropping

A few raised possible issues with the implementation of the incentive, such as the ongoing care of the guard animal.

Others might get a guard animal and not look after it...never feeds it, checks it.
Sheep and cattle

While interviewees may have had doubts about the effectiveness of guard animals, or the relevance of guard animals for their farm context, we would expect that a relatively high proportion of interviews in this quadrant to have definite views regarding guard animals compared to interviewees in quadrant 2. This was the case with 38 per cent of those in this quadrant expressing either a strongly favourable, or a strongly unfavourable, opinion about incentives for guard animals.

In a practical sense, I have reservations. I have no doubt they [guard animal] work but whether they would fit into the scale of our operation, I don't know. We'd need 15 Maremma and we'd have to break them in ... [but]... I think it's the right thing, if government gave us incentives they're acknowledging their responsibility. I don't think farmers should do it all.

Sheep and cattle

Type of stock we run, cattle are safe from dogs and number of sheep it not worth getting a guard animal... If I was relying on income for sheep, it would mean a lot more to me to get an incentive for guard animals.

Cattle and sheep

Only reason [we] have guard animals [is] because of the financial burden of wild dogs. To have that [cost] supported by the state government could be good.... Cost lot to look after them [Maremma guard dogs] .. if you could get help with them that would be useful

Sheep

If there is an incentive and it work, more people would get guard dogs, you'd get to know the experience and then might get them

Cattle and Sheep

Finally, as expected we found a statistically significant relationship between the placement of interviewees in the I₃ Response framework and the strength of their attitude towards guard animals.⁸ This result confirms, in accord with theory, that there is a positive association between intensity of involvement and attitude strength.

⁸ F = 7.53, p = 0.00 for attitude towards guard animals.

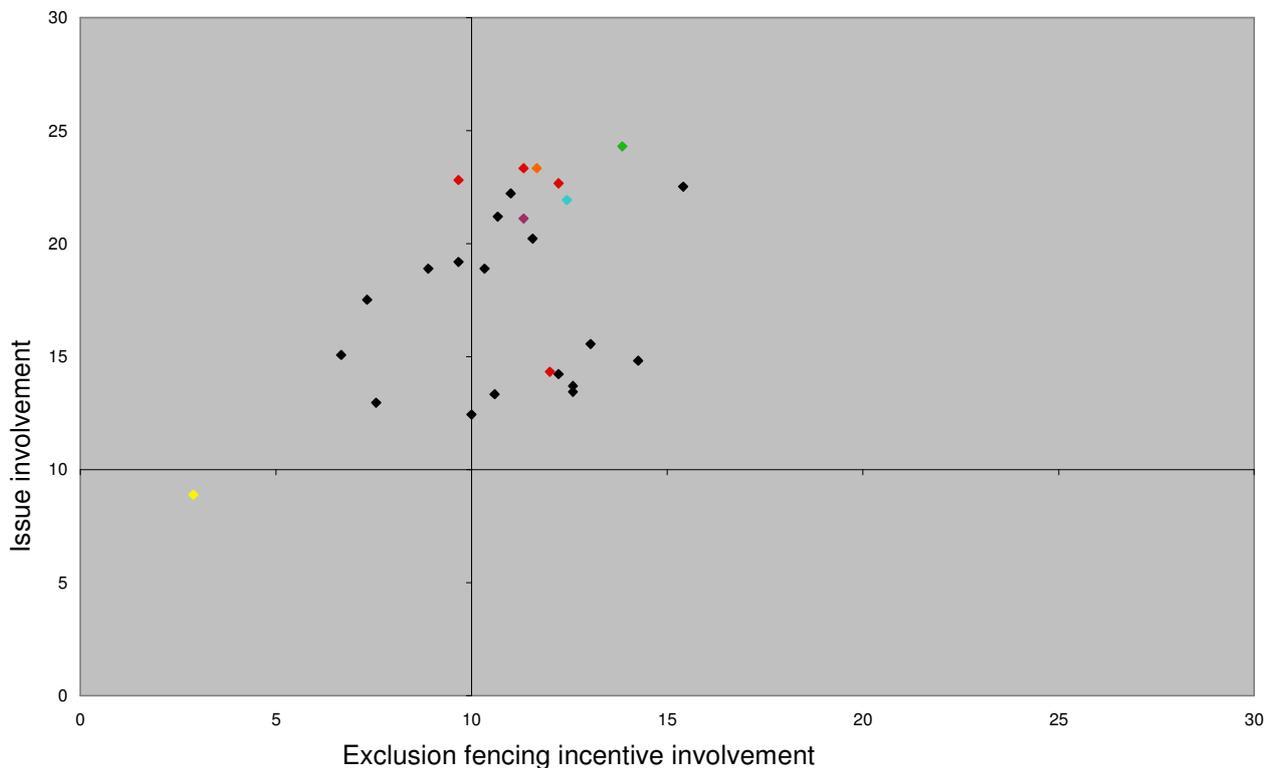


Figure 5: Interviewees' involvement in the issue and incentives for exclusion fencing

John a sheep farmer

(yellow data point in Figure 3, 4 and 5)

John has an ultra fine and super fine merino business. John's property is surrounded by crown land on three sides, and one side by privately owned land. John has experienced wild dog attacks, on one occasion lost 170 head to one dog in early 1990's, his last attack was by a dingo prior to the 2007 fires. John considers the dogs in his area to be alpine dingoes and that only a small percentage in this area have cross bred. John uses alpacas for fox management, running alpacas with his lambing ewes. John doesn't allow shooters on his property. John is against baiting on his property because of potential impacts on wild life and doesn't have any exclusion fencing.

Incentives for exclusion fencing: John feels that snaring set by wild dog controllers is the best way to manage wild dogs. He feels trapping prevents attacks as well as active controlling the dog numbers. That control measures like exclusion fencing could leave you at times would have no protection, and would require a fair portion of your time on maintenance. John feels that exclusion fencing whilst keeping the dog out of his place would be diverting wild dogs to another property; he feels the focus should be on big picture control.

Incentives for guard animals: John would use guard animals anyway without the incentive, he already has alpacas for fox management. He is not tempted to have mareema dogs as he feels it's cruel to have dogs out in the paddock.

Text Box 5: Low issue involvement and low intervention involvement
(Incentives for coordinated control, guard animals and exclusion fencing)

5.7 Involvement with the issue and incentives for exclusion fencing

The scores for interviewees' involvement with the issue of reducing wild dog attacks and their level of involvement in incentives to participate in exclusion fencing were used to place them in the I₃ Response Framework. The placement of interviews in the Framework is shown in Figure 5.

5.7.1 Quadrant 1 - low issue involvement and low intervention involvement

As before, one interviewee exhibited low involvement in the issue and low to moderate involvement in incentives for exclusion fencing. Their view on exclusion fencing was that fencing would simply divert dogs to another property; that they would have to spend a fair portion of their time on maintenance and would have no protection when the fence was not working. They felt that that the best way to spend government money was on a full-time dog trapper.

5.7.2 Quadrant 2 - high issue involvement and low intervention involvement

Seven interviewees exhibited a high level of involvement in the issue but had a low to moderate level of involvement in incentives for exclusion fencing. These landholders were placed in Quadrant 2 of the I₃ Response framework. We would expect that these interviewees would be relatively uninterested in an incentive for exclusion fencing.

Some of these interviewees had little experience with exclusion fencing but knew of the management issues, requirements and costs of exclusion fencing or investigated the option but ruled out as impractical due to difficult country. Three interviewees in this quadrant had invested in exclusion fencing to control wild dogs. These interviewees had self-funded fencing in part of their property to carry sheep. These interviewees were in a position to use exclusion fencing to control wild dogs on their property independently of the actions of other landholders. The low to moderate involvement of these landholders in incentives for exclusion fencing is consistent with these circumstances. One of these interviewees had received government funding which they used to expand their existing exclusion fencing.

There were things that they wanted that we didn't want – electric fence with earth return on bottom and wanted bottom wire hot – stop wombats but harder to manage.

Sheep and cattle

One interviewee had reduced sheep numbers and kept their sheep in a fenced area of the property and have cattle on the unfenced area of their property. They had funded the fencing themselves but felt that, with an incentive, they might perhaps fence the whole property by adding a couple of low wires to existing fences.

The response of the interviewees in this quadrant to the proposed incentive was that they would not be interested in fencing because; it was impractical because of the country or their enterprise was not suited to fencing. Others felt that; incentives may be worthwhile for other landholders, its good for others to get an incentive, or incentives should only be offered in some circumstances (e.g. where people are more remote and may not get a lot of other support in managing wild dogs).

Exclusion fencing; investigated that but steep country on this block ...I think there's a good strong case for exclusion fencing but has to be in the open country.

Cattle

...would do exclusion fencing without incentive but equally think its good for others to get it

Sheep and cattle

One interviewee in this quadrant had extensive experience with exclusion fencing and had spent a lot of time developing and modifying fence design:

Believe electric fencing is a tool cockies can use... No obligation under any of [government] schemes, to operate the fence as electric... We had continuous [joint] electric fence 30kms, but big sections aren't functional- as land owner's change... We put the pressure on the neighbours and they put in a fence. A lot are privately funded, not government... Inefficient fence [design] and gaps in electric fences [have the] potential [to cause] behavioural changes problem in animals including dogs. [These] have to be accounted for when designing fences or modifying the design.

Sheep and cattle

A few were unsure if an incentive for exclusion fencing was the right thing to do, their attitude was:

Its overlooking the main problem... I don't mean to wipe them out but they got to be controlled

Sheep

...best thing to do is to reduce the dog population not to put in electric fencing.

Sheep and cattle

5.7.3 Quadrant 3 - high issue involvement and high intervention involvement

Eighteen interviewees exhibited a high involvement in the issue of reducing wild dog attacks and high involvement in incentives for exclusion fencing. We would expect that these interviewees would be well-informed on exclusion fencing and have strong interest in exclusion fencing and incentives for exclusion fencing.

Many of the interviewees in this quadrant had experience with exclusion fencing and knew of the management issues, requirements and costs of exclusion fencing. Some of the issues raised by people with experience with electric fencing or who applied issues they have with regular fencing to exclusion fencing including: the type of fence (e.g. ring lock, adding live wires to existing fence), and materials used (steel posts and insulation), access to the fence, problems with branches falling on fences, fences shorting out with grass, spraying to keep grass down.

Some interviewees in this quadrant had received government funding for their exclusion fencing, including some involved in the community wild dog fence in the Tallangatta Valley. To be able to control wild dogs on their properties these interviewees depended on other landholders to erect and maintain exclusion fencing. Hence, the high involvement of these interviewees with incentives as a mechanism to encourage landholders to invest in exclusion fencing is consistent with their circumstances.

We couldn't afford to put that electric fence up ourselves

Cattle, horses and off-farm income

A few interviewees had funded their fencing themselves or with neighbours.

Decision on what type of fence was partly on what could afford. Ring lock netting with hot wire top and bottom - feel that's pretty effective.

Cattle and sheep

All the interviewees with exclusion fencing in this quadrant had a line of fencing, rather than a fenced in cell.

A few interviewees had been approached about exclusion fencing, but because of what was offered by government it didn't work with their context (eg clearing trees, have a number of properties, type of country). For example one interviewee had the opportunity to put in electric fencing with government contribution after the fires but because they couldn't clear trees and the management issues that would cause they decided to go with a normal fence.

The response of the interviewees in this quadrant to the proposed incentive was that for some, they have already invested in fencing with the assistance of an incentive; however some would consider investing in exclusion fencing with a few open to consider accessing incentives to make use of parts of their farm impacted on by dogs or expand the fencing they have already done. However, interviewees felt cost, on-going maintenance, knowing if fencing would continue to manage wild dogs meant they had reservations about incentives for exclusion fencing.

It [exclusion fencing] wouldn't get off the ground without incentives, for example for tree planting we're getting some help and people just don't have the money.

Sheep and cattle

For some exclusion fencing didn't suit their circumstance so wouldn't invest in fencing.

I don't really care from a personal point of view, because of my enterprise I would never build dog fences here simply because they are very high maintenance and I have no use to them Got to watch them like a hawk, wombats make holes, dogs cunning know weak points, if its [fence power] off dogs follow the wombats out Own dogs really sensitive, don't have electricity – that's why own fences not have low hot wire – bottom wire.

Cattle

Consistent with their high involvement some of these interviewees had definite views about how incentives for exclusion fencing should be implemented, some giving example of landholders' use of fencing incentives in the past. One problem with incentives they identified was the provision of incentives for construction but not for maintenance.

I know that there were fences put up, taking money from government but no one audited that they were maintained properly... Fencing is not be all, or end all, fence gets shorted, wombats put holes in and dogs get through.

Cattle and sheep

If don't provide a maintenance grant it's not good. It's like getting a piece of machinery then not maintaining it, that's no good... To just get small pockets of fencing could never be a solution to the problem because it's not addressing the wild dog numbers... Because pressure is building up outside the fence, as numbers build up, dogs will find a way through the fence, they're clever animals.

Sheep and horticulture

Maintenance is a big job. You have to walk it, the country is rough.

Sheep and cattle

In order to provide enough money for exclusion fencing that takes money away from dog control...I believe that would end up with dogs being a serious problem outside the fence to people

Sheep and horticulture

Joint fence, needs cooperation ...your not keeping your bit going, people change,...really got to be an individual farm, where you are directly impacted.. percentage of landholders along it [joint fence] can't control parts of it

Sheep

In conclusion, the quantitative results reported in this section indicate that virtually all the interviewees were highly involved in the issue of reducing attacks by wild dogs. Their involvement with incentives varied, being lower on average than their involvement in the issue of reducing attacks. On the whole,

interviewee's attitudes towards incentives for a coordinated control program and exclusion fencing were favourable though interviewees had definite views about how coordination should occur and how incentives should be offered for maintaining fences as well as their construction.

The quantitative results were consistent with the impression gained from the qualitative analysis that interviewees had strong, passionate views on wild dog control.

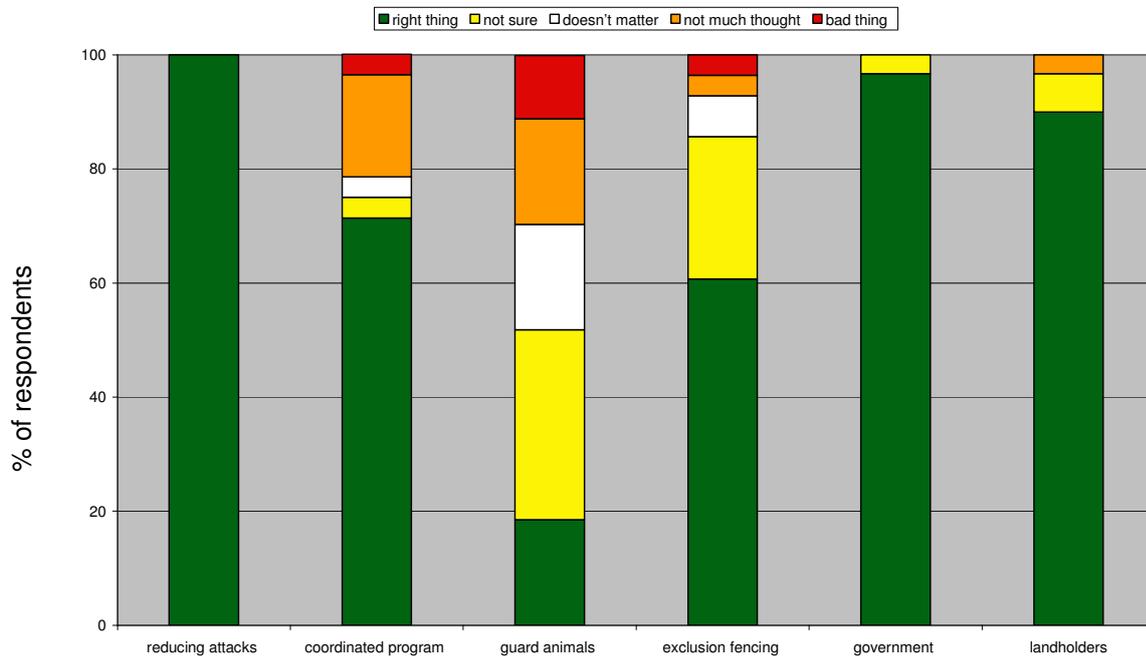


Figure 6: Interviewees' attitudes to the issues, incentives and roles of government and landholders

6. Landholder attitudes

6.1 Attitude to the issue, incentives and respective roles of government and landholders

In Figure 6 interviewee's attitudes towards the issue of reducing attacks by wild dogs, incentives and the role government and private landholders in reducing wild dog attacks are presented. Inspection of the figure reveals that all the interviewees agreed with the statement that reducing attacks was the right thing to do. The majority of interviewees also agreed with the statement that the provision of incentives for a coordinated control program and exclusion fencing was the right thing to do. There was a much greater uncertainty among interviewees about the merit of providing incentives for guard animals. This is consistent with the relatively low involvement of interviewees in incentives for guard animals.

These results presented in the figure also show that nearly all interviewees thought that reducing wild dog attacks was the responsibility of landholders and government. This is consistent with impressions gained from the open-ended questioning of interviewees on the role the government and landholders and the issue of reducing wild dog attacks. This questioning revealed that most interviewees felt both landholders and government have a responsibility in addressing the issue, with many considering it a joint responsibility.

It's a joint problem; therefore it's a joint responsibility.

Sheep and horticulture

There were however, differences in what interviewees thought that their responsibility might be relative to government, such as landholders should participate rather than have responsibility for reducing wild dog attacks. Common descriptions of the respective roles involved sharing of tasks and responsibilities:

It is cut and dried that government is involved. I strongly believe landholders should have a crack at [managing wild dogs] too... The more people that are having a crack at it, the better.

Cattle and sheep

They're not government dogs, they're everyone's dogs. The government has some but not all responsibility.

Goats, sheep and vegetables

Governments' responsibility is to reduce the dog's numbers. A good fence would do a lot and is a good management tool for land holders because it stops wandering stock, good for animal health, keeps pest grazing animals out.

Sheep and cattle

I do what the dog man says no matter what I've got on. Some farmers think it's totally up to dog man... We don't want a slow erosion in government responsibility, to switch to put all responsibility on the landholder. ... I think it's a good question, I think its right that landholders are involved.

Sheep and cattle

What people are nervous about of is the Department is going to do less and less.

Sheep and cattle

It's a numbers thing. To get the numbers down we'd have to be allowed in the bush ... The dogs aren't living on our place but I don't think it's up to us to reduce numbers on the public land.

Cattle and sheep

Interviewees stated that wild dogs were coming off public property and that meant government had a responsibility to manage them.

If government didn't breed them [on public land] we wouldn't have them.

Sheep and cattle

If government gave us incentives they're acknowledging their responsibility. I don't think farmers should do it all.

Sheep and cattle

They're not our dogs. They're on government land. The government should also be responsible for native wildlife.

Sheep and cattle

A few interviewees compared the situation with wild dogs with the case where their farm dogs were killing their neighbours' livestock. In the latter case, as owner of the dog the interviewee would be liable and have the responsibility to do something about their dog. Consequently, as wild dogs are coming off government land the responsibility lies with government to control the dogs.

Interviewees also felt government were seen to have a role as they have the capacity and people with the expertise to undertake control activities.

Trapping is a specialist and skilled job that should come under the guise of government.

Cattle and sheep

Farmers don't have the facilities or infrastructure to do it all themselves.

Vineyard and cattle

If government would do their bit it would make our job easier.

Sheep and cattle

Interviewees believed that private landholders had a responsibility or role to play to reduce wild dog attacks. They mentioned factors such as they are on the land all the time and so have a role in reporting activity and working with wild dog controllers.

We're at the coalface and there's a lot of things we can do on our property to minimise the risk. But the dogs come out of the state forest, so they [government] should take responsibility...It should be a partnership I think.

Cattle

Landholders they know which way they [dogs] run. It's really on the landholders that have the guns, your not going to run them down with a stick.

Sheep

Should be a combination, landholders there day to day and see what happens in their own backyards.

Vineyard and cattle

Any which way they can to slow and stop the problem and at the end of the day it in their best interest.

Sheep, cattle and cropping

A few interviewees spoke about the choice they had made to farm in areas subject to attacks by wild dogs and therefore they were obliged to contribute to control activities. For example, one interviewee felt it was his choice to farm sheep in an area known for wild dogs and surrounded by public land. They also felt they

would find it harder to manage without government assistance. They believed farmers needed to take responsibility for their own problems.

While they [wild dogs] breed on public land, the public land manager didn't put wild dogs there but landholders still have a role.

Sheep and cattle

If I want to run sheep or goats, I should take responsibility.

Goats, sheep and vegetables

Some comments were made by interviewees about government approach to wild dog management and the program design:

It's a very difficult problem. You don't know what the problem is. There's a basic level of research that hasn't been done we don't know what the long term effects are of the change in generic makeup of the dog populations. It is probably becoming more hybrid and behaving differently and having different effects in the food chain.

Sheep and horticulture

For a start, the government banning deer hunting with dogs. Most dogs are from deer hunters. We get hunters turning up here and saying I've just lost 5 dogs have you seen any?

Goats, sheep and vegetables

In conclusion, consistent with their high involvement in the issue of reducing attacks by wild dogs, interviewees had favourable attitudes towards the issue of reducing attacks and incentives for exclusion fencing and coordination. Relatedly, they had definite views that controlling wild dogs was a shared responsibility between private landholders and government, though each had a different role to play.

7. Behavioural intentions

Interviewees were asked to provide an indication of their intentions to engage in a range of behaviours in regard to wild dog control by rating a series of statements covering reporting, coordination, control methods, information seeking and publicly expressing their opinions. The results of interviewees' ratings for behavioural intention rating and their reports as to which of these activities they had done are shown in Figures 7 through 10. The line in each figure is the average of the interviewees' intention ratings while the columns represent the percentage of interviewees that had engaged in the activity.⁹

We found a statistically significant relationship between behavioural intentions and actions for baiting, use of guard animals, patrolling stock, expression of opinions, and investing in exclusion fencing.¹⁰ We also found statistically significant relationship between involvement in the issue of reducing attacks by wild dogs and seeking information on wild dogs and on guard animals, and working with government.¹¹

In Figure 7 the results in regard to cooperation in controlling wild dogs are reported. All interviewees expressed an intention to work cooperatively with their neighbours and government and a substantial proportion of interviewees indicated that they had done so in the past. This is consistent with a high involvement in the issue of reducing attacks by wild dogs and favourable attitudes towards the sharing of responsibility and roles between government and private landholders.

In Figure 8 the results in regard to measures for controlling wild dogs are reported. There were substantial differences among interviewees in terms of intentions to engage in particular control measures and the proportion of interviewees that had engaged in each measure in the past. These results reinforce the earlier findings that different landholders have preferences for different control measures. The relatively low proportion of interviewees who intended to use, or had used, guard animals is consistent with the earlier findings in regard to the relatively low involvement in guard animals and the uncertainty about their effectiveness.

In Figure 9 the results in regard to seeking information about controlling wild dogs are reported. While interviewees indicated, on average, they had intentions to seek information about wild dogs only a minority of interviewees that had already done so. This result is consistent with interviewees regarding themselves as having expertise about how wild dogs are being managed and therefore felt that they had all the information about wild dogs they needed.

In Figure 10 the results in regard to publicly expressing opinions about controlling wild dogs are reported. Interviewees indicated that, on average, they would express their opinions about wild dogs publicly and a surprisingly high proportion of interviewees had already done so, though not necessarily in the mass media. Examples of interviewees' responses to the statements of their intention to be vocal about their opinion about wild dogs were:

Awful lot of trouble being made with the wild dog problem by people expressing their opinion in the paper... Yes agree but always vocal in a constructive way... I've been misreported in the paper.

Sheep and cattle

Speak to neighbours rather than public.

Sheep and cattle

The apparent readiness of a high proportion of interviewees to publicly express their opinions, favourable or unfavourable, about the control of wild dogs is consistent with a high level of involvement in the issue of reducing wild attacks by wild dogs.

⁹ Ratings ranged from a minimum of 1 (strongly disagree) to a maximum of 5 (strongly agree).

¹⁰ $F = 6.80, p = 0.02$; $F = 12.10, p = 0.00$; $F = 5.76, p = 0.03$; $F = 7.35, p = 0.01$; and $F = 15.88, p = 0.00$ respectively.

¹¹ $F = 6.66, p = 0.02$; $F = 7.38, p = 0.01$; and $F = 4.79, p = 0.04$ respectively.

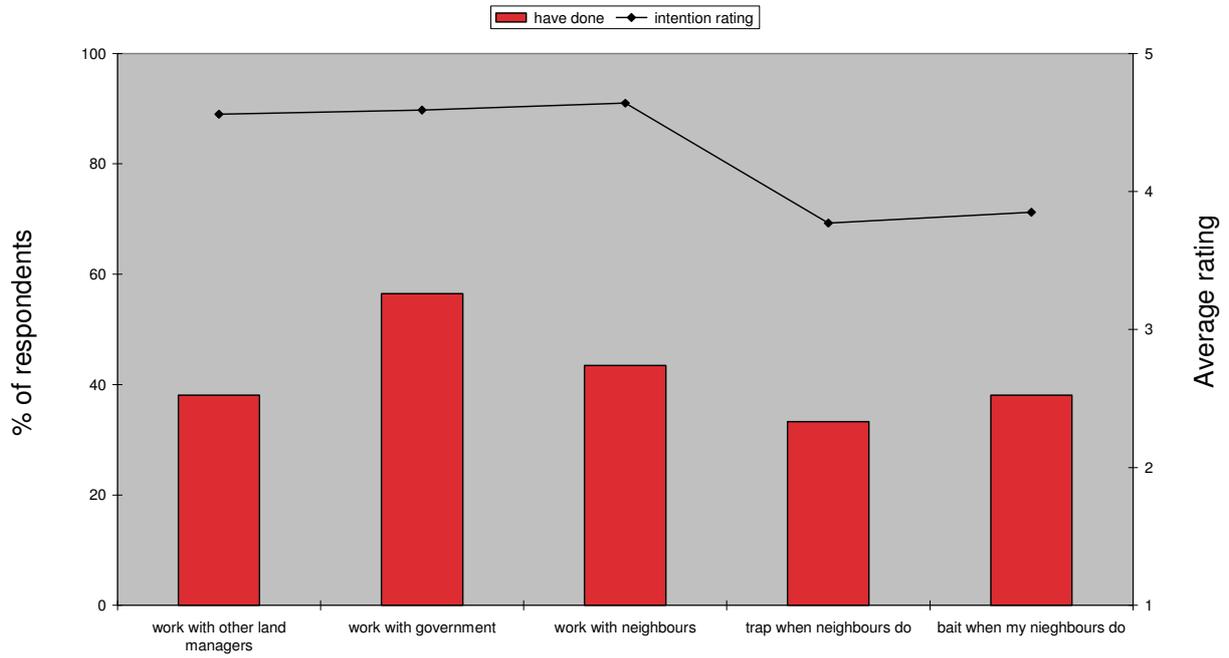


Figure 7: Interviewees' intention and action for cooperation

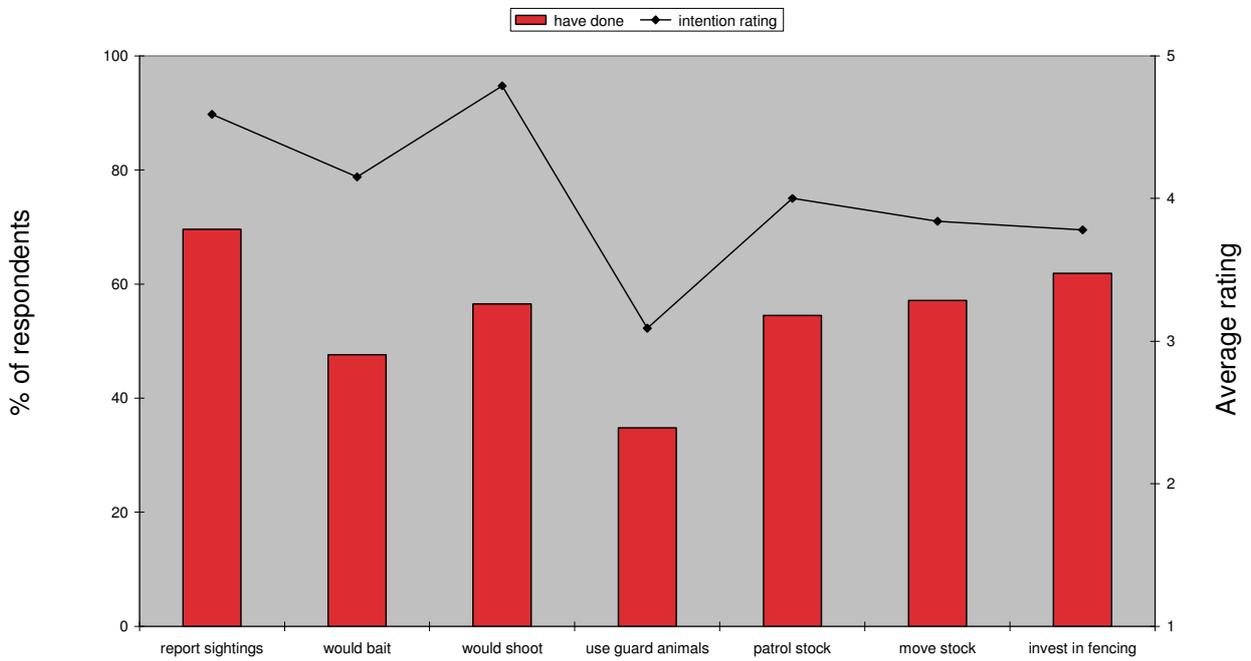


Figure 8: Interviewees' intention and action for control measures

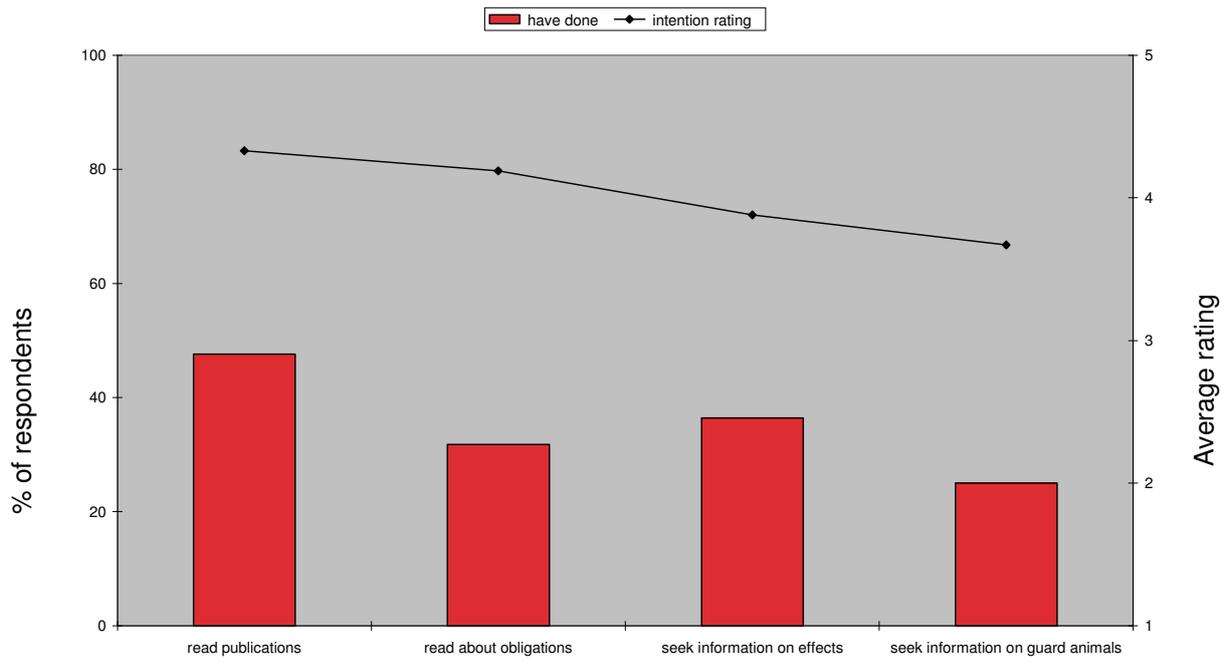


Figure 9: Interviewees' intention and action for information seeking

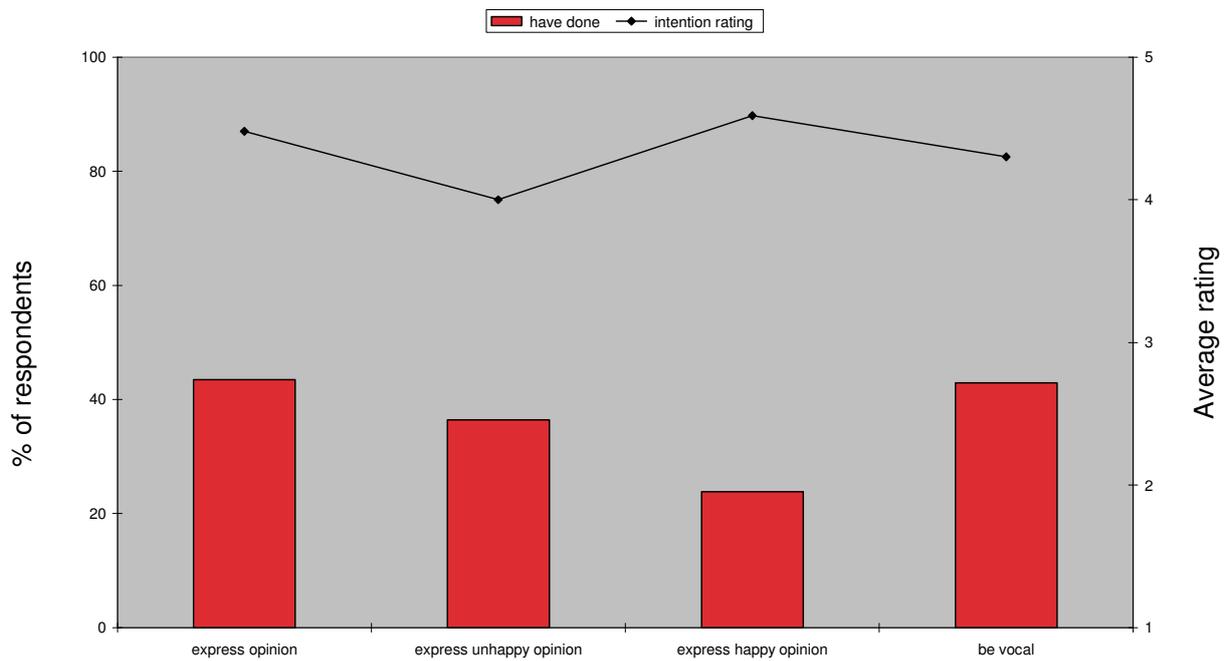


Figure 10: Interviewees' intention and action for public expression of opinions

8. Discussion

The I₃ Response framework was used to understand and predict the likely responses of landholders to incentives for participation in a coordinated program for wild dog control, incentives for guard animals and incentives for wild dog exclusion fencing. We used both qualitative and quantitative data gathered from personal interviews with 30 landholders in north-east Victoria and Gippsland to assess landholders' involvement with, and attitude towards the issue of reducing wild dog attacks and the proposed incentives.

The results suggest that:

1. Landholders were highly, often extremely highly, involved in the issue of reducing wild dog attacks. **This means landholders will have devoted considerable time and effort to consideration of the problem of reducing wild dog attacks and they are likely to have definite views about what control methods (including the public provision of dog control services) will work best for them.**

Fitzgerald and Wilkinson (2009) in a case study of the social impacts of invasive animals including wild dogs in the Upper Hunter Valley NSW identified a range of impacts of wild dogs including: loss of income from stock losses and reduction in material quality of life for the farming household; constraints on business development and difficulty in optimising production; wild dogs creating a sense of psychological insecurity, emotional upset, frustration and uncertainty in farmers lives, and increasing work to protect remaining stock. This suggests that losses from wild dogs have consequences for the functional, utilitarian and economic needs of landholders from impacting on farm performance.

The extremely debilitating nature of attacks means that losses from wild dog attacks also have consequences for the hedonic needs of landholders. The uncertainty about when attacks occur and the uncertainty about the effectiveness of control techniques create chronic stresses that impact severely on landholders. Therefore it is not surprising that landholders express high involvement in the issue of reducing wild dog attacks.

2. The high level of involvement suggests that landholders have devoted time and effort thinking about the issue of reducing attacks by wild dogs and will be predisposed to take action. However what action they take will depend on: their perception of the private benefits of taking action and constraints imposed by their context. Consequently, the high level of involvement of landholders may not necessarily translate into action and where it does these may not align with government objectives. This suggests that financial incentives may help stimulate landholders to undertake control activities and help align the action of landholders with government objectives.
3. On average, landholder involvement with the proposed incentives was relatively high **suggesting they would give serious consideration to applying for incentives for those control methods that suit them.**
4. Overall, there was variation in landholders' opinions about how to deal with the problem of wild dogs and there was substantial variation among landholders in their preferences for different methods of control such as baiting, guard animals and exclusion fencing. **This suggests that any program integrating control activities, and any incentives for control activities would require careful design to accommodate this variety.**
5. Landholders' attitudes were favourable to the proposed incentives. However, some landholders were unsure of the merit of providing incentives for some of the control activities. This uncertainty was around the effectiveness of the control methods. **This means landholders could form unfavourable attitudes towards a program that, for example, included particular control activities that they may perceive as ineffective, or did not include control activities they consider worthwhile.**
6. The high involvement of landholders, supported by the comments of landholders in interviews, suggests that once attitudes are formed they will be strongly held. O'Cass and Griffin (2006) suggest that attitudes formed under high involvement tend to be hold more opposition to counterarguments, be more enduring and have a stronger effect on the attitudes of individuals

than for low involved individual (O'Cass and Griffin 2006). **Therefore in the design of incentives programs careful consideration needs to be given to the mix of activities that are eligible for incentives to avoid generating unfavourable attitudes.**

7. There was a perception among landholders' that the problems posed by wild dog were increasing (see also Fitzgerald and Wilkinson 2009 and Lightfoot 2011). **Such perceptions are likely to intensify landholders' involvement and reinforce their opinions and attitudes in regard to control activities and how the program should be managed.**

8.1 Implications for incentives on coordination, guard animals and exclusion fencing

Generally, the results indicate the involvement of interviewees in the issue of reducing wild dog attacks was high to extremely high. Their involvement in the proposed incentives for participation in a coordinated program, incentives for guard animals and incentives for wild dog exclusion fencing on average involvement was moderate. These results have the following implications.

- The high to extremely high involvement in the issue of reducing wild dog attacks suggests that interviewees will have a favourable attitude towards activities aimed at reducing wild dog attacks and will be predisposed to participate in coordinated control programs.
- The high involvement of interviewees in the issue of reducing wild dog attacks means they will have devoted considerable time and effort to considering measures to control wild dogs. Consequently, we predict they will have strong preferences about how the wild dog program should be managed especially if the wild dogs are a problem for their property and enterprises. These preferences are likely to include views about the extent to which control activities should occur on public land as well as private land. This will influence their readiness to participate in coordinated programs. If the views of landholders about control measures, and when and where they should be implemented, are different from those of the agencies then landholders will be less likely to participate in a coordinated program. This is particularly important given the preferences of landholders are well-established and difficult to change.

For example, many interviewees were concerned about wild dog numbers and some believed the best way to reduce attacks was to reduce dog numbers on public land in order to reduce the incidence of attacks on private land. Consequently, their preference was for control activities that killed dogs well within public land. Landholders with these preferences would be unlikely to respond favourably to a program that concentrated on non-lethal control activities such as exclusion fencing and guard animals on the periphery of public land.

- Some of the interviewees who were using exclusion fencing or guard animals, believed that for these control activities to be fully effective they need to be combined with other control activities that reduce pressure on fences or guard animals, such as trapping on public land. This suggests landholders' participation in incentive programs for fencing and guard animals could depend on public provision of complementary control activities.
- While landholders may feel they have the expertise to make sound judgements about the effectiveness of different control options and how the wild dog program should operate this did not mean that they thought they possessed the skills to correctly implement each control method. Many interviewees expressed the view that they did not have the specialised skills necessary to, for example, bait or trap wild dogs. Consequently, they were strongly of the view that control methods which required specialised skills should be publicly provided. The implementation of incentive programs must be sensitive to such views, especially if such programs are perceived to divert public investment away from control methods that landholders feel they are not competent to conduct themselves.
- Many interviewees' believed that a range of activities were needed in the management of wild dogs. Tensions are likely to arise if they perceive there are restrictions on control activities they regard as a high priority, or a focus on control activities they regard as a low priority. Landholders may also feel that the wild dog program is not performing its advocacy role effectively when

changes to legislation are introduced that restrict control activities. For example, interviewees expressed concern about the perceived inadequacy of public funding for wild dog controllers and concern that changes to legislation may mean that trapping would not be feasible for wild dog controllers in the future and changes that protect dingoes will influence wild dog management. This is consistent with Fitzgerald and Wilkinson (2009) who found farmers 'experienced a degree of anxiety and uncertainty over their rights' to manage the risks posed by wild dogs. This was attributed to perceptions of increasing constraints imposed in response to animal welfare groups, natural resource managers and changes in types of landholders. This suggests that landholders may respond unfavourably to the introduction of financial incentive programs if those programs are perceived to reduce the allocation of public resources to control activities they believe are most effective, especially if financial incentives are offered for control activities they believe are less effective.

- The moderate level of involvement of interviewees in the proposed incentives, together with generally favourable attitudes to financial incentives, suggests landholders will give serious consideration to applying for financial incentives for those control methods that suit them. However, their propensity to apply for incentives will depend on their philosophy about how to deal with the problem of wild dogs and their preferences for different methods of control. This means the success of coordinated program incentives will depend on the extent to which such a program and the incentives offered, can be designed and administered with the flexibility to accommodate differences in landholder preferences.
- Though highly involved, there were constraints on the time and effort interviewees could commit to control activities, especially given their perception of the skills required. This means landholders will respond unfavourably to any external efforts perceived to be compelling them to increase control activities beyond what they consider practical. It also suggests that landholders will not necessarily be well-informed about their obligations in regard to control of wild dogs. They are likely to assume that, provided they implement some kind of control activities, they are meeting their obligations in regard to managing wild dogs.
- The high involvement of landholders in the issue of reducing wild dog attacks means that a proportion of landholders would be willing to participate in decision-making about control activities through mechanisms such as coordinated control programs with all land managers. For example landholders, who give their time to be representatives on Wild Dog Management Groups or involved in wild dog community groups. As described above, such landholders are likely to have devoted considerable time and effort to developing views about the issue and control activities, and see themselves as having expertise. This means these landholders will expect to have influence on decisions about the design and implementation of control programs. In other words, they will expect to be included in decisions about strategic and operational matters, and so expect to have some influence over the allocation of program funds and other resources.

If these expectations are not met then these landholders are likely, at best, to become disillusioned and resign. This is consistent with interviewees' who had been involved in a Wild Dog Management Group and subsequently resigned, feeling that they were unable to influence operational decision making. The more involved in the issue these landholders are the more likely they are to become public critics of government policy and programs and to seek to influence policy and programs by other means; such as the political process.

9. Conclusion

The main objective of the research was to better understand and predict the likely responses of landholder to incentives for participation in a coordinated program, incentives for guard animals and incentives for wild dog exclusion fencing. This understanding provides an opportunity to refine the Wild Dog program by considering the likely response of landholders in program design.

In the I₃ Response Framework landholders' responses to a policy depends on their level of involvement with the policy issue and the policy instrument. Landholders can form favourable or unfavourable attitudes to the issue and to the policy instrument. Understanding and predicting the motivation of individuals to change their behaviour can be used in assessing the effectiveness of proposed program changes. We used both qualitative and quantitative data to assess landholder involvement and attitude to the issue of reducing wild dog attacks and the proposed incentives.

We found interviewees' involvement with the issue of reducing wild dog attacks was high to very high. Consequently, interviewees were likely to have definite views about what control methods (including the public provision of dog control services) work best for them.

While landholders' high level of involvement in the issue of reducing wild dog attacks suggests they may be predisposed to take action, what action landholders will take will depend on:

- their perception of the private benefit their action will realise, and
- constraints imposed by their context

Consequently, the high level of involvement of landholders may not necessarily translate into action and where it does these actions may not align with government objectives.

We also found that, on average, interviewee involvement in the proposed financial incentives was relatively high suggesting they will give serious consideration to applying for financial incentives for those control methods that suit them. However, the variation in interviewees' philosophy about how best to deal with the problem of wild dogs, and variation among them in their preferences for methods of control, suggests that the participation of landholders in regard to the financial incentives will depend on the extent to which flexibility is designed into the program.

The strength of interviewees' views about wild dog showed that all interviewees thought that reducing attacks was the right thing to do. The majority of interviewees thought that the provision of incentives for a coordinated control program and exclusion fencing was the right thing to do. There was a much greater degree of uncertainty about the merit in providing incentives for guard animals.

Interviewees' attitudes were favourable to the proposed incentives. However, the results suggest that some were unsure of merit of providing incentives for some of the control activities. This uncertainty was around the effectiveness of the control methods. This means landholders could form unfavourable attitudes towards incentives if, for example, the program favoured particular activities that they may perceive as ineffective, or did not include elements they consider important such as exclusion fence maintenance. The evidence is that once formed these attitudes will be strongly held.

In the design and administration of any financial incentive and coordination program there needs to be careful consideration about accommodating the variety in landholder philosophies about the control of wild dogs and their preferences for particular control methods. Careful consideration also needs to be given in the design of programs to avoid, as much as is possible, generating unfavourable attitudes towards financial incentives and coordination among landholders.

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