Evaluating incentive program success: a hill land class fencing case study

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Abstract. Incentive programs are often employed to encourage landholders to adopt practices that are desirable from a policy perspective. A commonly used measure of the success of these programs has been landholder utilisation of incentives. When utilisation declines it is important to ascertain if this is because the program has been successful and there are few potential participants remaining; or because there is still a large pool of potential participants but the program is failing to attract them. In this study we investigated the reasons for a decline in landholder utilisation of incentives for hill land class fencing (HLCF). Our results suggested that there were a number of on-farm characteristics that described the farms where HLCF was adopted. These included the proportion of property that was classified as steep hills, stock management practices, the affect of steep hill management on lowland areas of the farm and revegetation priorities. While we did not obtain a quantitative estimate of the population of potential adopters of HCLF the information supplied by the farmers we interviewed suggested that HLCF had been adopted by a high proportion of potential adopters; hence landholder participation in the program was approaching a ceiling. This suggested that the observed decline in participation of graziers in the incentive program was an indication that the program had been successful.

Introduction

Incentive programs are often employed by government to encourage landholder behaviour to achieve public policy objectives (Pannell 2005; Cocklin et al. 2007; Pannell 2008). Incentive program success may be assessed, in part, through measuring utilisation of incentives by the target group (Stanely et al. 2005). Examples of this can be seen in King (2007), Pearson and Fletcher (2008) and Patterson-Majoor (2005). When utilisation of an incentive declines it is important, from a policy perspective, to ascertain if the decline is due to a high rate of eligible participants already utilising the incentive meaning there are few potential participants remaining; or because there is still a large pool of potential participants failing to be attracted, for whatever reason, to the incentive program. Determining which of these is the case will have profound implications for any policy decisions about future directions of an incentive program.

Staff of Victoria's Department of Primary Industries (DPI) in the Upper Wimmera region faced this situation when the utilisation of a Hill Land Class Fencing (HLCF) incentive program began to decline.

Management of the steep hills of the Upper Wimmera region of Victoria is important for the control of dryland salinity and water quality in the region. The steep hills in this area commonly have a shallow top soil layer, are prone to water and land erosion and tend to lack essential nutrients for productive pasture growth. Therefore, appropriate management of livestock grazing in these hills is important to the Victorian government (Department of Primary Industries 2003; Land and Water Australia 2006; Andrew 2008). Key management strategies to prevent dryland salinity or water quality issues include encouraging deferred grazing, or removing livestock from the steep hills for several months of the year to support the reseeding and growth of native pasture (Department of Primary Industries 2003; Land and Water Australia 2006).

A key factor to using deferred grazing is the practice of erecting fences to separate steep hills from the rest of the property, called Hill Land Class Fencing (HLCF). HLCF can help graziers manage stock access to steep hills more effectively, minimising the risks of overgrazing on fragile soils in the steep hills (Land and Water Australia 2006). HLCF has been encouraged by the Victorian government in the Upper Wimmera for 30 years, with incentives available for the last 10 years (Andrew, pers. comm. 2007).

The Wimmera Catchment Management Authority (CMA), in partnership with DPI, have implemented an extension and incentive based program to encourage the use of HLCF in steep hill country of the Upper Wimmera as a part of the Wimmera Regional Catchment Strategy (RCS) (Wimmera Catchment Management Authority 2003). The RCS identified targets for landholder utilisation of HLCF incentives within the Regional Salinity Action Plan (Wimmera Catchment Management Authority 2005).

Staff in the Wimmera DPI found that grazier interest in HLCF incentives had declined over the past few years and were concerned the rate of incentive utilization by graziers would not be

enough to reach the targets outlined in the Regional Salinity Action Plan. There was concern that this could mean graziers were not implementing HLCF on their properties, with potentially detrimental effects on soil and water health in the region (Andrew, pers. comm. 2007). Additionally, the decreased utilisation of HCLF incentives could be indicative of a need for changes to the DPI extension and incentive program.

To address these concerns Wimmera DPI staff investigated potential ways to modify the HLCF incentive and extension program (Andrew, pers. comm. 2007). We assisted in this task by conducting research to identify and describe the population of potential adopters of HLCF in the Upper Wimmera region, with the aim of helping Wimmera DPI understand the reason for decline of grazier involvement in the incentive program.

Research Approach

Kaine (2004) has developed a framework for identifying the benefits sought by landholders when adopting an innovation and therefore defining the population of potential adopters of an agricultural innovation. Kaine (2004) suggests decisions regarding the adoption of innovations in agriculture are high involvement decisions invoking a complex decision-making process (Assael et al. 1995).The adoption of agricultural innovations is high involvement because adoption decisions are financially and socially risky, novel and can be linked to self image (Kaine 2004). The Kaine (2004) framework proposes that the farmer's farm context, (i.e. the resources, mix of practices and techniques used in a farm enterprise) is the key driver determining the benefit the landholder is seeking from an innovation. Farm context is therefore the key to determining whether an innovation is relevant for a farmer to adopt (Kaine 2004; Kaine et al. 2005).

As not all farm contexts are the same, different farm contexts may mean that the same innovation could provide different benefits to different farmers (Kaine et al. 2005). Given farmers use complex decision-making regarding the adoptions of innovations, they are able to articulate their decision-making process, including the benefits they are seeking, when adopting an innovation (Kaine 2004). By understanding the benefits landholders seek when adopting an innovation and their farm contexts we can classify landholders into segments. These segments can then be used to inform the design of extension messages to landholders based on the information that is likely to be relevant to them (Kaine et al. 2005; Ambrosio et al. 2006).

The Kaine framework has been successfully applied in a number of studies across different agricultural industries (Kaine and Bewsell 2005; Kaine et al. 2005; Linehan et al. 2005; Ambrosio et al. 2006; Bewsell et al. 2008; Kaine and Bewsell 2008). In this research we used the method developed by Kaine (2004) to identify the benefits landholders sought from HLCF and to define the population of potential adopters of HLCF, with the aim of helping the staff of Wimmera DPI understand the reason for declining interest in HLCF incentives and offer recommendations for changes to the program.

Methods

First, we conducted three semi-structured interviews with DPI representatives who administered incentive programs in the Upper Wimmera. The purpose of the interviews was to assemble background information on extension and incentive programs currently offered to graziers. These interviews helped us to understand the context in which Wimmera DPI was operating.

We then conducted 22 personal interviews with graziers during March 2007. Interview responses were recorded manually by the two interviewers and then transcribed. Transcribed interview notes were cross-checked for accuracy, both in terms of relevance to the research and the transcription process (Patton 1990).

We used convergent interviewing (Dick 1999) to identify the key issues influencing the adoption of HLCF. Convergent interviewing is a structured process of interviewing that has some similarities with laddering (Grunert and Grunert 1995). Using this process in our interviews, we asked broad open questions and encouraged the interviewees to keep talking. The interviewee largely guided the direction of content in the interviews. We asked more probing and clarifying questions in order to follow the reasoning of their opinion about HLCF and link it to their specific farm context (Kaine 2008).

Convergent interviewing involves the use of a sequence of interviews. The information in each interview is analysed and interpreted for consistency with previous interviews (Kaine 2008). We used purposive and snowball sampling to identify suitable interviewees. Purposive sampling allowed us to selectively target interviewees, with a focus on ensuring that we explored a range of farm contexts and experiences with HLCF (Patton 1990). Snowball sampling (Patton 1990) aided our further selection of interviewees as interviews progressed. It was useful because the

range of farm contexts that were relevant to the adoption of HLCF was unknown and could only be identified by interviewing graziers (Kaine 2008). Using snowball sampling we asked initial interviewees to recommend other graziers, who they considered may add insights to our findings, including those who had similar and dissimilar experiences to themselves. This process continued until we achieved convergence, i.e. when no more substantial information was gained (Patton 1990), which occurred after 22 interviews.

In our sampling process we sought graziers who had not adopted HLCF and those who had adopted HLCF and then chosen to no longer use it. We were not able to identify any graziers in the hill country of the Upper Wimmera region who fit either of these categories.

Results

The graziers we interviewed suggested the topography of their properties could be classified into 3 categories; lowlands (flat ground usually near a water course), undulating country and steep hills. Interviewees identified the transition point between the undulating land and steep hills as the break in slope above which they could not drive machinery safely. This aligned with the definition of steep hills used by the DPI and the CMA when determining whether an area qualifies for the HLCF incentive (Wimmera Catchment Management Authority 2005; Andrew, pers. comms. 2007).

Due to the nature of the steep hills, interviewees stated that they had to manage them differently from the flat or undulating country. The steep hills predominantly consisted of native grasses mainly due to a shallow top soil layer and a lack of indigenous nutrients available for more productive pastures. Graziers described a range of problems that they had experienced which they related to a loss of productivity on the steep hills including soil loss, a decline in the amount of native grasses and an increase in weeds; as well as problems in the lowlands that stemmed from the steep hills such as run off, sheet erosion, gully erosion, salt discharge, land slips, silt and other debris.

Some landowners also suggested that north and south facing slopes of the steep hills needed to be managed differently, because they believed the northern slopes had more fragile soils due to being exposed to harsher climatic conditions than the southern slopes. Some of the graziers we interviewed noted that the risk of negative consequences from poor management decisions was greater on these northern slopes.

Graziers described a number of ways they managed their steep hills differently. The majority of graziers we interviewed believed appropriate management of the native pasture on the steep hills was important for their farm. While some of the graziers we interviewed had tried improving the pasture by aerial sowing and/ or fertilising at some stage, most of the interviewees did not deem this a viable long term option for steep hill management. Some landowners had decided planting trees on the steep hills or letting the steep hills regenerate naturally was more appropriate than having to manage native pastures for grazing.

We found that practices to control stock were a major part of the graziers' management strategy to maintain pasture productivity. Graziers suggested the native grasses in the steep hills responded well to these grazing practices. Most of the graziers we interviewed de-stocked the steep hills over summer to allow the native grasses to naturally seed. The length of time hills were de-stocked varied among graziers. Also, graziers described how the decision regarding timing and length of de-stocking was dependent on feed availability elsewhere on the property. This meant that at times the hills were not always de-stocked for as long as the graziers would have liked.

Many interviewees also used lower stocking rates or allowed stock to crash graze the steep hills. These were described as different management practices to those that were used on their undulating or lowland areas. Some interviewees said they did not run ewes in the steep hills, as ewes increased the grazing pressure on paddocks because they require more feed per head compared to wethers. Most graziers believed wethers had a less environmentally detrimental impact on the fragile hills compared to ewes.

Erecting fencing at the break in slope between the undulating land and steep hills was identified by most interviewees as a key management practice for keeping the hills in a viable state as it allowed them to control stock access to these fragile areas. Some interviewees described how they also fenced across the north/south ridgelines to control these slopes separately.

We found that there was a high level of adoption of HLCF in the study area, which seems reasonable given the importance graziers placed on fencing to control stock and manage the hills. In fact, we could not find any graziers in the target area who had not adopted HLCF.

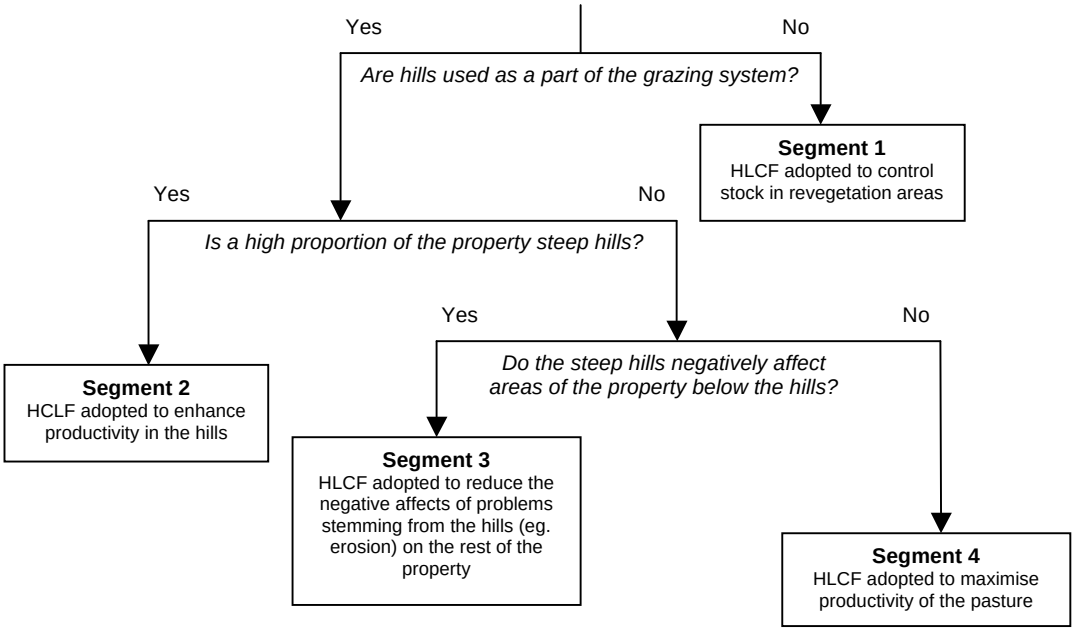
While there was a high level of adoption, this did not mean that all hills were fenced. In this study we defined adoption as the first time a grazier erected a HLCF. Once HLCF was adopted it could then be implemented across the property. Most graziers we interviewed had a number of steep hills on their property. As well, graziers generally had their hills divided into multiple paddocks.

There were two reasons interviewees gave us for not having wholly implemented HLCF on their properties. First, graziers described the implementation of HLCF as something they did as a part of pasture renovation. Yet graziers did not generally undertake pasture renovation on a large proportion of their property at once due to its effect on farm productivity; hence it was something they did over time. Secondly, graziers described a number of constraints to the implementation of HLCF on specific hills. These reasons were related to water access for stock and limitations of farm layout. While some graziers had not wholly implemented HLCF, we still found the implementation of HLCF to be high, i.e. most hills had been fenced.

Most of those who had adopted HLCF did so with the support of various government incentive programs which had been available over several decades. Some graziers had fenced all or part of their hills before the grants were available while others had bought property with the fencing already erected. As well, some graziers used different incentive programs that included additional financial support for revegetation.

Interviewees described a range of benefits that they sought through the adoption of HLCF, which we used to classify graziers into segments (see figure 1).

Figure 1 Segmentation for adoption of HLCF in the Upper Wimmera



Segment One: Controlling stock in revegetation areas

Graziers in segment one did not use their hills as a part of their grazing system. These graziers adopted HLCF to exclude stock from revegetation areas. Graziers in this segment could broadly be described as lifestyle farmers. They were more likely to rely on off-farm income for their livelihood compared with those in the other segments. These graziers were interested in promoting tree growth on the hills for aesthetic reasons.

- These graziers were not as concerned by the pasture productivity of the steep hills, when compared with those in the other segments. While these graziers may have derived some income from their property, grazing stock was less important to their income.
- These graziers kept livestock in some areas of their property, although the stocking rate tended to be lower than that set by graziers in the other segments.
- These graziers tended to plant trees over larger areas of their steep hills, often accessing different grants and subsidies for fencing through tree planting incentive programs, rather than through HLCF incentives.
- These graziers valued the aesthetic nature of the trees on the steep hills and were mainly concerned with keeping stock off the steep hills in order to protect the trees and views.

Stan, who lives in Melbourne, bought a 600 acre block of land a couple of years ago because he wanted a bit of land to play with. Stan has the aim to move out there some day. He currently goes up to the property every second weekend, and is actively working to improve it. He wants it to look aesthetically pleasing.

Stan fenced and treed 178 acres of his steep hills, and says he still has more that he wants to plant to trees, once the first lot gets established. A local sheep grazier has agisted his sheep on Stan's land. Stan believes the HLCF is beneficial because it helps him to establish and develop trees on the steep hill while also meeting the needs of the local sheep grazier.

Segment Two: Enhancing productivity in the hills

Graziers in segment two used their hills as a part of their grazing system. These graziers had a high proportion of steep hills on their property when compared to those in the other segments. Given this high proportion of steep hills, productivity in these hills was important for the viability of the grazing enterprise. Hence, these graziers adopted HLCF to enhance productivity in the hills.

- These graziers used the steep hills as a regular part of their grazing regime, so they tended to have stock in the steep hills for longer periods of the year than those in the other segments.
- These graziers were more likely to have invested resources (fertiliser, time and/or pasture seed) in the steep hills to maintain and increase productivity.
- These graziers believed they needed to focus their management on issues to prevent soil loss, decline in the amount of native grasses and weed infestation on the steep hills, to maintain productivity of the steep hills.
- While some of these graziers had gully erosion problems in their lowland areas, they managed these problems by implementing management options in the lowlands rather than the steep hills (e.g. gully battering).
- These graziers did not believe they had serious problems with run off, silt in dams, sheet erosion, salt discharge or land slips.
- These graziers tended to only plant trees on the parts of the slopes that were substantially degraded, as most of the steep hills were maintained as pasture.

Bill runs a superfine wool business on a 640 hectare property. More than half of the property is made up of steep hills that are not arable. It is too steep to get machinery on the steep hills to fertilise and introduced pasture doesn't persist up there. Bill believes that it is good superfine wool country in the steep hills, with fewer problems with worms and fly strike. He runs wethers on his steep hills as they require less feed and management than ewes and lambs. Bill fenced his steep hills to stop the topsoil and groundcover loss he was experiencing caused by sheep camping on the tops of his steep hills. He also fenced to divide the north and south facing slopes on his steep hills because the sheep were having more of an impact on the north side.

Segment Three: Reducing the negative affects of problems stemming from the hills on the lowland areas

Graziers in this segment adopted HLCF to reduce problems they believed stemmed from the steep hills which affected the productivity of their undulating and lowland areas. While the hills were likely to make up a smaller proportion of the property compared to segment two the impact on the lowlands was deemed to be substantial, therefore the risk to farm productivity by using the steep hills as a part of the regular grazing regime was high.

- These graziers believed they had problems such as run off, sheet and gully erosion, salt discharge, land slips, silt and other debris; they attributed to the steep hills. These problems if not properly managed were believed to affect the productivity of their lowlands.
- These graziers believed the risk to the lowlands, by inadequately managing their steep hills, was too high to use their steep hills as a regular part of their grazing regime. Therefore these graziers grazed steep hills opportunistically and tended to not have stock in the steep hills as long as those in segments two and four.
- These graziers tended to plant trees onto bigger areas of their hills than those in segment two and four, and were more likely to tree the entire north side of hills.

Elliot has a prime lamb and wool sheep farm on a 480 hectare property. The property is mostly undulating land with about 80 hectares of steep hills. Elliot has

found that the steep hills are harder to manage than the undulating country. He believes if steep hills are not managed differently, it can really affect his business. For example, he recently had 100 mm of rain in 20 minutes, and run-off from his neighbour's steep hill destroyed his fencing and put a lot of silt in his dams. Elliot has also had a problem with erosion which he believes has required him to do a lot of extra work over the last five years.

Elliot has been treeing up more areas of his steep hills and said that one day all of the steep hills will be trees. He believes this will provide stable soil structure in the hills so as not to affect the undulating land below.

Segment Four: Controlling stock to maximise productivity of the pasture

Graziers in segment four adopted HLCF to control stock on their property to maximise productivity of their pasture. These graziers did not have a high proportion of steep hills, nor did they have erosion problems that they believed stemmed from the steep hills. While the steep hills may not have been as important to farm viability for these graziers when compared to segment two, the risk to the farm of using the hills as a part of the regular grazing regime was minimal.

- These graziers believed they had no or minimal productivity problems stemming from the steep hills (i.e. no sheet erosion, silt, land slips or salt discharge problems).
- While some of these graziers did have gully erosion problems, they associated these with the dispersive and erosion prone soil types in their lowland areas and not with their steep hills.
- These graziers were likely to focus on issues related to stock management including ensuring stock grazed all the pasture in a paddock before moving them and keeping stock off paddocks that were being improved.
- Similar to those in segment two, these graziers tended to only tree the parts of the slopes that were extremely degraded, as most of the steep hills were maintained for pasture.

Joyce has a wool and prime lamb business on a 330 hectare property. A little over 15% of the property is made up of steep hills. Her property does have a gullying problem in the lowlands because it has dispersive soil. She is working to get rid of the gullies because it is hard to check for lambs in the gullies and more gullies mean less productive land. The steep hills on the property are shale and do not have any problems with water running off of them. Joyce has fenced off the steep hills to increase productivity in the steep hills and control the stock in lowland paddocks as a part of her cropping program.

Discussion

Most graziers in the Upper Wimmera had properties with a mix of low, undulating and steep country. This suggested that most graziers were potential adopters of HLCF. Given that we were unable to identify a grazier that had not adopted HLCF, graziers had identified a range of benefits from HCLF in the interviews, and the declining interest in the incentive program, we inferred that those who were likely to adopt HLCF had done so. This indicated the incentive program had been successful, having achieved a high level of adoption. This also indicated that future interest in HLCF incentives was likely to remain low.

Barr (2005) suggested that demographic trends point to the Upper Wimmera region moving away from production-driven grazing properties. Given the already high level of adoption by production-driven grazing properties (segments two, three and four) the number of graziers who may take up the incentive in these segments is unlikely to substantially increase. The graziers in these segments may take up the incentives when they continue their program of pasture renovation, leading to a low but consistent utilisation of HLCF incentives for a period of time.

Following from this, if demographic trends in the Upper Wimmera continued as described by Barr (2005), there would be an increase in smaller, lifestyle landowners in the region, which may lead to an increase in the number of graziers in segment one. This may not lead to a significant increase in the uptake of HLCF because any new property purchased is likely to already have HLCF, given the high level of adoption of those in the other segments. As well, these graziers are likely to be interested in incentives that pay for revegetation and associated fencing rather than the HLCF incentives. That is, HLCF program objectives are likely to be further achieved via adoption of related, but different, programs.

While not all of the steep hills in the Upper Wimmera had been fenced, this is likely to be due to graziers' current farm context not supporting the implementation of HLCF (e.g. lack of access to

water or area too small). Hence the implementation of HLCF was constrained by the implementation of farm renovations (e.g. paddock clearing, water access changes). Graziers are only likely to implement HLCF on these unfenced hills when there is a change in farm context to remove these constraints, which cannot be achieved through the existing HLCF incentive program.

The intent of HLCF was to support management of native pasture to control dryland salinity and water quality. Many interviewees suggested that the north-south slopes of their steep hills needed to be managed differently to maintain their native pasture. This was consistent with the finding of Andrew (2008). While many graziers suggested that north-south slopes needed to be managed differently, not everyone was managing the hills accordingly. There was a possibility that grazier management of the north-south facing steep hills as a unit was leading to further degradation of the hills. The Wimmera CMA and DPI may like to consider providing incentives for north-south aspect fencing, as this may encourage better use of the steep hills in line with catchment outcomes. Graziers in segments two and four may be interested in an incentive of this nature.

Given the already high level of adoption, our findings suggested that the Wimmera CMA and DPI may benefit from consideration of whether continuing HLCF incentives was the most relevant way to use resources to achieve catchment outcomes. Modifications to the extension and incentive program were unlikely to increase adoption and implementation of HLCF.

In 2008 the HLCF incentives were discontinued (Andrew, pers. comm. 2009).

Conclusions

The Wimmera HLCF case study is an example of one extension and incentive program that DPI was considering modifying in response to low utilisation of the incentive. However, we found that modifications were unlikely to increase utilisation of incentives, as the program had been highly successful. This means that resources can be better placed to achieve desired catchment outcomes.

This case study has shown that measuring utilisation of incentives by the target group only provides a partial picture of program success. The Kaine Framework has been useful here as a method for identifying and describing the population of potential adopters for the practice supported by the incentive. By understanding the population that is likely to utilise the incentive, decisions about future directions for the incentive are likely to be more successful.

Summary of key findings

- Measuring utilisation of incentives by the target group only provides a partial picture of program success.
- The Kaine Framework has been useful here as a method for identifying and describing the population of potential adopters for the practice supported by the incentive.
- By understanding the population that is likely to utilise the incentive, decisions about the future directions for the incentive are likely to be more successful.

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