

Farming within limits: using an agricultural innovation systems approach to identify barriers and opportunities for change

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Abstract. Farm plans have been identified as one tool for enabling farmers to respond to New Zealand's fresh water policy objectives. Regional councils are taking different approaches to the use of farm plans. However, the Horizon's Regional Council is requiring many of its landowners to have plans in place by 2016. This paper discusses how an agricultural innovation systems approach was used to investigate the opportunities for the development, delivery and implementation of farm plans within the Horizons region. The challenges of the innovations systems approach included the need to break down the theoretical framework and language into a more accessible process. However, the inclusive nature of the approach meant that a wide group of stakeholders were involved in identifying their roles within the wider system. This supported a shared understanding of the issues, enabling a range of barriers and opportunities to be identified, and shared actions for improved adoption to be developed.

Keywords: Farm plans, agricultural innovation system, stakeholder engagement, on-farm adoption.

Introduction

In New Zealand, the National Policy Statement for Freshwater Management (2014) directs regional councils to establish objectives and set limits for freshwater in their regional plans. The Ministry for Primary Industries (MPI) has a key role in supporting the primary sector to enhance productivity and profitability within the freshwater objectives that are being set and implemented through the regional councils. Farm plans have been identified by MPI, regional councils and industry-good organisations, as one of the tools for enabling individual farmers to respond to water quality regulations through identifying, planning and implementing on-farm management changes.

The Horizons Regional Council for the Manawatu-Wanganui Region (Horizons), and the Canterbury Regional Council are more advanced in the implementation of their regional freshwater objectives through the use of farm plans than other regions in New Zealand. Therefore, the Horizons region was considered to be appropriate for a case study to investigate the barriers and opportunities to the use of farm plans required to meet these objectives, and in doing so aiming to improve environmental and economic outcomes on farm and in the region.

In the Horizons Region, the One Plan is the regional plan for the implementation of the National Policy Statement for Freshwater Management. Under the Horizon's One Plan, which became operative in December 2014, over 500 landowners in targeted catchments are required to each have a consent by 2016 to manage their nutrient losses (Horizons Regional Council 2014). Of these 500 landowners, the majority are dairy farmers, with the rest being horticulture and arable landowners, and small number of sheep and beef farmers on irrigated farms. The majority of sheep and beef farmers in the region already have non-regulatory farm plans in place, and so are currently excluded from the regulatory regime. This case study focussed on the landowners required to have a regulatory consent in place (predominantly dairy, horticulture and arable); having a farm plan for nutrient management is a major part of gaining this consent.

MPI and Horizons together identified a number of challenges to adoption and implementation of farm plans that included: a number of different players with differing motivations and objectives; a potential lack of advisers with the right skills to advise and assist farmers; and challenges to the effective allocation of resources for farm plan development and implementation. However, there were also opportunities for potential gains in economic performance of farms through improved management and the requirement to focus on improving environmental performance presents an opportunity to integrate these goals into planning. The use of farm plans thus supports more than just meeting freshwater objectives.

MPI and Horizons entered into a joint project with AgResearch with the objectives of a) understanding and learning from the development and delivery of farm plans in Horizons so that lessons could be shared more widely, and b) identifying barriers and opportunities for increased adoption of good quality farm plans and resulting practice change, over and above the current regulatory requirements. Another explicit objective of the project was to begin the process of

developing trust and working relationships between the different stakeholders in order to set up a cooperative and coordinated implementation programme for the long term.

The purpose of this paper is to outline how an agricultural innovation systems approach was taken to achieve these project objectives outlined above and the challenges and outcomes of this approach. Various studies have used an agricultural innovation systems approach to diagnose barriers and opportunities to enhanced innovation and adoption in a range of agricultural sectors and countries (Amankwah et al. 2012; Jiggins 2012; Totin et al. 2012; Turner et al. 2013; Lamprinopoulou et al. 2014). This is the first time the approach has been applied to adoption of farm plans. It is also one of the few studies that explores how using an agricultural innovation systems approach supports the potential for action by stakeholders participating in the diagnosis. A previous example is an analysis of the impact of system analyses on individual and joint learning, practice and institutional change by participants in horticultural and greenhouse projects in the Dutch agricultural sector (van Mierlo et al. 2010b).

Methodology

An agricultural innovation systems (AIS) approach was used in this project to identify possible limitations in the implementation of farm plans, and develop and implement solutions with stakeholders. The reason for choosing this approach is that it is particularly suited for complex problems, whereby multiple dimensions (e.g. biophysical, social-cultural, economic, political) are embedded in interactions across different levels (e.g. local, regional and national) and involve multiple actors (Spielman et al. 2009; Schut et al. 2014). Ekboir and Rajalahti (2012, p.15) describe an innovation system as system in which actors do not innovate in isolation, 'but through interacting with other actors (farmers, firms, farmer organisations, researchers, financial institutions, and public organisations) and the socioeconomic environment'. Ekboir and Rajalahti (2012, p. 15) continue to say that agricultural innovation is an:

Organisational phenomenon influenced by individual and collective behaviours, capabilities for innovation, and enabling conditions. Interaction, coordination, and collective action are based above all on the actors' capacity to identify opportunities for innovation, assess the challenges involved, and access the social, human, and capital resources required for innovating, learning, and sharing information.

In this project in the Horizons region it would have been tempting to address issues, such as extension delivery, in isolation and offer solutions such as up-skilling consultants. However, as it is a complex situation, with many players involved, such interventions could be misdirected if the whole system and the role of the different players in that system were not first understood.

Previous work (Wieczorek & Hekkert 2012; Murray-Prior 2013; Turner et al. 2014; Payne & Mackay 2014) has shown that an AIS approach can be used to:

Identify what systemic problems in the agricultural innovation system are hindering progress to solving the overall challenge (e.g. absence of interaction between stakeholders; absence of sufficient resources (physical, financial or knowledge)).

- Identify together with the relevant stakeholders what solutions can be put in place to address, or speed up progress to addressing, the challenge.
- Identify the roles stakeholders in the network will have in identifying and implementing solutions.

In order to analyse the system, the systemic innovation policy framework, developed by Wieczorek and Hekkert (2012) was used. Turner et al. (2013, p.90) describe it as following:

This framework integrates two streams of innovation system enquiry – structural and functional – to enable analysis of the effectiveness of the important functions (or processes) that support innovation, along with the presence and quality of the structural components that are needed for these functions to be effective.

The following seven functions (adapted from Hekkert et al. 2007) are needed for an innovation system to operate effectively:

1. *Entrepreneurial activities* undertaken by entrepreneurs who can turn new knowledge and technologies into business opportunities.
2. *Knowledge development* which includes formal research as well as on-the-ground knowledge and learning.
3. *Knowledge exchange*, a two way sharing of knowledge or learning (e.g. not just top down or bottom up).
4. *Processes, rules, expectations of society*, clarifying the wants and needs of users of knowledge and technology.

5. *Market formation*, creating a (protected) space for both knowledge and technologies to developed and embed themselves in society.
6. *Resources*, including people as well as physical and financial resources.
7. *Enablers of change*, those organisations that lobby for change or innovation and take away resistance to change.

Each of these seven functions depend on the presence and quality of four structural components (Wieczorek & Hekkert 2012; Turner et al. 2013) of an innovation system:

1. actors, such as farmers, research, firms, government, etc.
2. interactions among the actors
3. institutions, i.e. the rules of the game that influence behaviour and interactions
4. infrastructure that supports the other 3 structural elements, e.g. patent offices or funding organisations.

These functions, combined with the structural elements, form the framework for analysing an innovation system. Thus, in order to have a well-functioning innovation system each of these functions need to be present and of a certain quality. The functions themselves are supported by the four structural components. For example, knowledge development requires individuals and organisations that develop knowledge; this can be a university or a research organisation, as well as a farmer through a process of learning-by-doing. These different organisations or individuals need to be interacting to make the function of knowledge development more effective, and they need to be supported by rules and regulations, as well as infrastructure, that allow them to interact or be present in the function of knowledge development.

The systemic innovation policy framework was used as the basis for classifying the stakeholders and the barriers and opportunities. This was undertaken during one facilitated workshop, and in two follow up focus groups. The focus group method was used to support the AIS approach in that the researcher can work interactively with a group, modify or change questions as the group proceeds, and the group can interact with each other and feed off the discussion of others within the group (Morrison 1998). During the focus groups the participants were asked to draw basic network maps of the relationships between involved actors in relation to each of the seven functions. These visual maps are a representation of a 'network structure at a particular point in time' (King & Nettle 2013, p. 4) and 'can help to address questions about how the flow of resources [e.g. knowledge] may be enabled or constrained' (King & Nettle 2013, p.3).

Using the information gathered from this process, the key themes around barriers and opportunities were identified and causal analysis was used to identify and visually illustrate the underlying causes of barriers and opportunities (van Mierlo et al. 2010a). The causal analyses formed the basis of the final workshop discussion and were used to identify the actions and potential solutions to deriving environmental and economic benefit from adoption of farm plans.

The use of the participatory workshops and focus groups with a range of stakeholders was also to fulfil the project objective of beginning to develop trust and relationships between the stakeholders. The workshops provide the space for the participants to interact and begin to build a shared mental model on a specific issue (van Mierlo et al. 2010b).

Results

The results below discuss the use of the innovation system approach that supported the project to identify the barriers and opportunities in relation to the development, delivery and implementation of the farm plans. The use of this approach aimed to enhance the understanding and learn from the process that was used in Horizons in order to meet the freshwater objectives.

An initial scoping meeting between AgResearch and representatives from MPI and Horizons was held to confirm the scope and focus of the project, as well as explain the AIS approach and process that was to be used. This meeting drew on the background work and knowledge of both MPI and Horizons. The reason for having this scoping meeting was to start building relationships between the involved organisations and to get buy-in from a wider variety of people within those organisations. The participants of the meeting were asked to identify a group of key individuals representing the dairy, horticulture and arable sectors, who could be invited to the stakeholder analysis workshop, based on their background knowledge and involvement in development and implementation of farm plans, and consenting processes in the Horizons region.

Stakeholder analysis workshop

The purpose of the stakeholder analysis workshop was to identify which stakeholders were important for the process of development, delivery and implementation of farm plans, as well as the roles these different stakeholders play in that process. Although this stakeholder analysis could have potentially been undertaken based on the knowledge of MPI and Horizon's staff (i.e. without any involvement of key stakeholders) by doing so, they would risk missing parts of the innovation system. Involving a small sub set of the stakeholders in the wider stakeholder analysis allowed the project to gain momentum and buy-in, as well as to start building trust and relationships amongst those involved in the development, delivery and implementation of farm plans.

Representatives from the following organisations were involved in the stakeholder analysis: Horizons, central Government, industry-good organisations, a processor, an advocacy group, as well as a grower, dairy farmers and a farm consultant. At the start of the workshop the seven functions and the four structural elements of an innovation system were explained to the participants. This explanation was kept at a basic level, in an attempt to not confuse participants, as well as to keep within the time frame that was set aside for the workshop. During the workshop the participants were asked to brainstorm who (individuals or organisations) they thought were critical to the success of the development, delivery and implementation of farm plans for consenting purposes, as well as for achieving wider economic and environmental benefits. The participants were then asked to look at the seven functions of an innovation system and match the range of identified stakeholders to one or several functions, if relevant and possible. Table 1 gives an overview of key stakeholders per function.

Table 1 indicates that some actors can play a role in multiple functions, for example: farmers are critical for entrepreneurial activities, knowledge development, knowledge exchange, providing resources and enabling change. However, no single organisation or individual fulfils a function on their own; they need to work together with others for the function to be effective.

In the process of mapping the identified stakeholders against the different functions it became clear to the facilitators that it was quite difficult for the participants to understand the meaning of the different functions, the level that these functions operate at (e.g. beyond the project or farm level, but on a regional or national level) and to keep the functions separate from each other (despite the earlier mentioned explanation). Hence, the facilitators had to prompt examples and give some guidance on what type of stakeholders are normally seen in each of the functions. Despite some difficulties with the understanding of the framework, the participants were able to identify a wide range of specific individuals or organisations that are related to the farm plan process. Most participants were able to spark ideas off each other, and having both dairy and horticulture sector representatives present allowed for shared learning and understanding of the difficulties each sector faced. This resulted in some questions and observations that may not have otherwise been forthcoming in a less diverse group.

The results of the stakeholder analysis workshop were used to inform who should be invited to the subsequent focus groups and the final stakeholder workshop.

Focus groups

Two separate focus groups were held in December 2014, and attended by 21 people in total. Participants included representatives of central, regional and local Government, industry-good organisations, farmers and growers, farm consultants, advocacy groups and a processor. The focus groups were used to further complete and verify the list of stakeholders and the functions they fulfil. The aim of the focus groups was also to identify barriers or opportunities related to each of the seven functions, thereby not only looking at the structural element of 'actors' but also at the other three structural elements (interactions between actors, institutions (rules), and infrastructure) that support each of the seven functions. The purpose of collecting this information was to enable an analysis of the current functioning of the innovation system that sits around the development, delivery and implementation of farm plans and the on-going practice change.

A similar set-up to the stakeholder analysis workshop was used, whereby the systemic innovation policy framework was explained to the participants before splitting into smaller groups to work on different functions. Although the amount of time spent on the explanation was extended after the experience from the previous workshop, the participants struggled to understand the role and definition of some of the functions, such as processes, rules and expectations of society; market formation; and enablers of change. Therefore they spent some time further discussing the meaning of the functions in the smaller groups.

Table 1. Identified stakeholders by innovation system function

Function	Organisation/Group
Entrepreneurial activities	<ul style="list-style-type: none"> • Farmers/Growers • Farm consultants • Suppliers: fertiliser companies etc.
Knowledge development	<ul style="list-style-type: none"> • Universities • Crown Research Institutes • Industry-good organisations • Farmers/Growers • Farm consultants
Knowledge exchange	<ul style="list-style-type: none"> • Industry-good organisation • Suppliers: fertiliser companies etc. • Farmers/Growers: (farmer discussion groups/ farmer-to-farmer/ demonstration farms) • (Social) Media • Farm consultants • Horizons Regional Council
Processes, rules and expectations of society	<ul style="list-style-type: none"> • Processors: dairy companies etc. • Local politicians/councillors • Horizons Regional Council • Central government • Media • Advocacy groups
Market formation	<ul style="list-style-type: none"> • Education providers • Horizons Regional Council • Industry-good organisations • Central government • Suppliers: fertiliser companies etc. • Land valuers
Resources	<ul style="list-style-type: none"> • Industry-good organisations • Farmers/Growers: through levy, individually (time) or in groups (time & money) • Horizons Regional Council • Central government • Suppliers: fertiliser companies etc. • Farm Consultants • Universities • Crown Research Institutes
Enablers of change	<ul style="list-style-type: none"> • Farmers/Growers • Advocacy groups • Education providers • (Social) Media • Industry-good organisations • Central Government

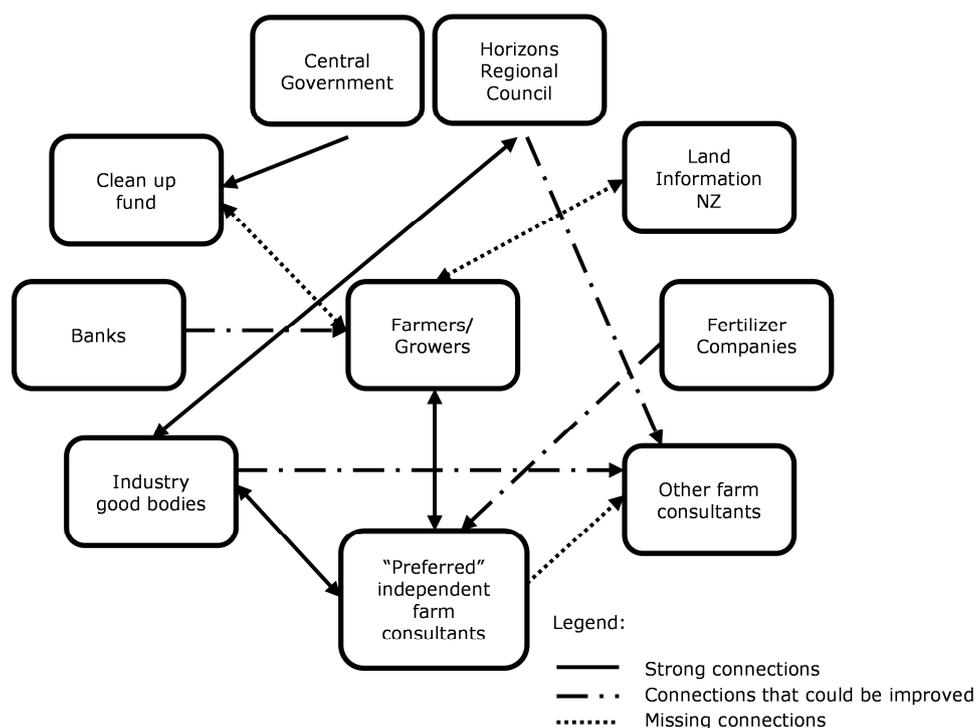
Each of the focus groups had a different set of functions of the innovation system to discuss, using the list in Table 1 as a starting point for creating a network map per function. The focus groups answered questions such as:

- Who are the relevant stakeholders for this particular function?
- How are they connected?
- What is the reason for that connection?
- What is the quality of these connections in relation to the farm plans? Why? (trust, regular contact, long history, etc.)
- What supports that connection? (rules/laws, funding, time, proximity to each other, good infrastructure?)
- Which connections need to be improved in relation to the farm plans? Why? (competition, power issues, distance, lack of understanding about topic etc.)
- Which connections are missing? Why?

- Are these missing connections necessary for the implementation of farm plans? If so, what is needed for creating these connections?
- Have any connections, or the aspects that support connection, changed since the start of the implementation of farm plans? Why?

These conversations resulted in the joint creation of seven different networks representing the different functions of the innovation system, in relation to the development, delivery and implementation of farm plans. Figure 1 is an example of one of these network maps, in this case for the function of 'Resource Mobilisation' as perceived by the participants at the first focus group.

Figure 1. Network map for Resource Mobilisation



The network map is only a representation of the conversation during the focus group; connections that were not discussed (but which would exist, for example between the fertilizer company and the farmer/ grower) are not presented here. The directions of the arrows are also based on the discussion, sometimes a two-way stream was discussed, whereas with other connections only one direction of the connection existed or was mentioned.

Figure 1 shows, for example, that there is a group of farm consultants ('Other farm consultants') who have weaker connections with the industry bodies and the regional councils. Given that more consultants are needed for resource mobilisation, these connections would require attention. The focus group also discussed another example of 'mobilising resources' in relation to the cost of farm plans: In one example, Central Government and a group of growers contributed to the Manawatu Clean Up Fund, which funded farm soil maps (as well as other things). The data gathered through this funding was initially meant for other purposes, however, it was also useful for the farm plans. The farmers that did not apply for this funding had to either pay for their soil map (about NZ\$2,500) or had to use the regional soils maps which are not accurate at the sub-farm scale. Creating these diagrams added detail to the list in Table 1; for example specific funds, such as the Clean Up Fund, had not previously been mentioned.

There was an opportunity to improve the focus group process in preparation for the second focus group. As a result of the confusion about functions, at the second focus group key questions were posed at the start of the discussions for each of the functions that were going to be discussed. This provided participants with a chance to explore the meaning of the function and the level at which this function operates. It was still difficult for the participants of both focus groups to keep the functions separate. It was, for example, difficult to focus only on knowledge development without its obvious links to knowledge exchange. While this highlights a

potential limitation of using this framework in a practical situation, it also demonstrates the interconnectedness of barriers and opportunities in the innovation system.

The participants were also very solution and farmer focussed, putting the farmer at the centre of each the network maps. By doing this they unknowingly brought the level of the problem down to the farm gate, rather than looking at what influences or causes the problem in its wider context. For example in Figure 1 (resource mobilisation) it implies all resources that are mobilised should mainly be focussed on the farmer adopting a farm plan, thereby overlooking the wider opportunities. These wider opportunities include achieving economic and environmental benefits by the use of the information in the farm plan over and above its use as a consenting document.

Nonetheless, the list of questions above allowed for all the structures to be discussed under each of the functions. This resulted in some unanticipated levels of depth in the discussions and exposed some unexpected issues related to the development, delivery and implementation of farm plans. For example, the influence of bankers and land valuers on the adoption of farm plans had not been previously considered by all participants. The participants suggested that as it may be difficult in future to sell a farm without a consented farm plan, those involved in property sales, including bankers and valuers, have an important role in sharing knowledge and creating awareness around farm plan adoption.

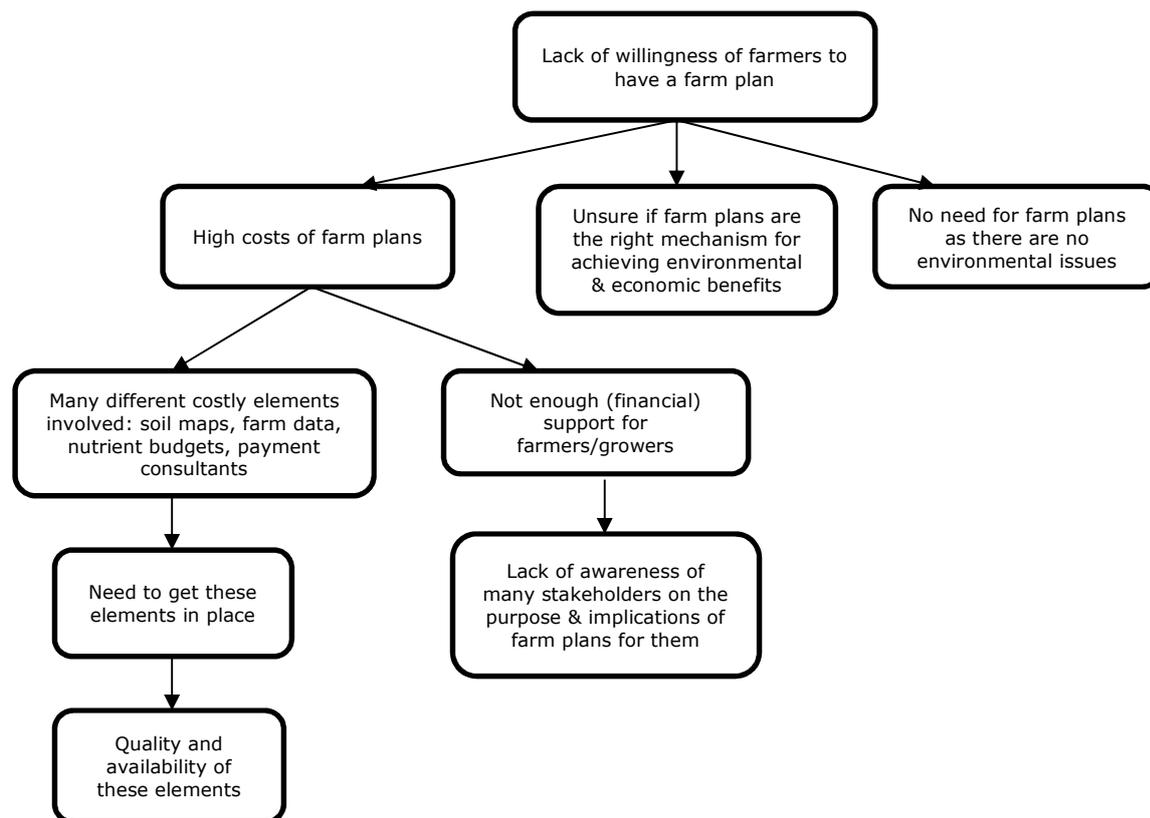
Some of the participants from the stakeholder analysis workshop were also present at the focus groups, which increased the level of confidence of participants in the workshop and the project purpose. The process enabled multiple views to be expressed and heard, and learning to take place across sectors. The focus groups were another step forward for building relationships and networks and a shared understanding of some of the issues around farm plan adoption. The information from the focus groups was used to jointly develop solutions to barriers identified to increase the effectiveness of the overall system for the development, delivery and implementation of farm plans.

Final stakeholder workshop

The purpose of the final stakeholder workshop was to verify the barriers and opportunities identified during the focus group discussions. Together, the participants identified ways to enhance the opportunities to achieve environmental and economic benefits from the implementation of farm plans, and what role they and others could play in realising these opportunities or overcoming barriers.

Further analysis of the network maps and the extra detail provided by the focus group participants resulted in a set of seven overarching themes. These themes were all based around (a set of) barriers that caused problems for the development, implementation or adoption of farm plans, but often also indicated potential opportunities for improvement. The seven themes were visually represented in the form of causal diagrams (see Figure 2 as an example), showing the theme at the top, with arrows drilling down to the identified root causes of the problem. These root causes are the points around which solutions can be developed to overcome barriers or strengthen opportunities. Figure 2 illustrates one theme that was described as the 'lack of willingness of farmers to have a farm plan'. Participants identified a number of reasons for this. Firstly, the perception held by a small minority of farmers that there are no environmental issues in the region. Secondly, some farmers could not see how a farm plan would actually help to achieve environmental and economic benefits and considered the process as another 'tick in the box' exercise. The third, and main reason, was the perceived high cost associated with obtaining a farm plan. It was suggested that there was little financial support available because other stakeholders, such as banks and land valuers, were unaware of the implications of (not) having a farm plan. The development of a farm plan also has costly elements (for example detailed soil maps), which are not always readily available, or are of debatable quality.

The soil map provided an example of a barrier where participants were able to suggest a possible solution. Participants identified an opportunity for subsidising the creation of farm level soil maps through the government owned Land Information Database (see also the currently missing connection in Figure 1) in return for the soil maps being recorded in the database. This would not only provide some financial support for farmers, but support the implementation of regional policy, and have benefits for the central government in terms of the availability of quality data.

Figure 2. Causal diagram of the lack of willingness of farmers to have a farm plan

Seventeen participants attended the final stakeholder workshop, again from a wide range of organisations, including: industry-good organisations, central, regional and local government, farm consultants, farmers and growers, as well as advocacy groups, a supplier and a processor. Some of the participants were the same as in the focus groups, whereas others were new. During the workshop the participants were organised in smaller groups, and went through each of the causal diagrams of which the content was explained to them by a facilitator. Participants had the opportunity to discuss and add to the information presented on the causal diagrams. The new participants were able to quickly pick up on the process because of the causal diagrams that were discussed, allowing them to fully engage and participate. Having new participants at the end on the project was valuable as they provided a new perspective. For example, a fertiliser company representative gave his perspective on the perceived struggle between farm consultants and fertilizer reps regarding the development of good quality nutrient budgets (or lack thereof) that are part of farm plans, which was one of the identified barriers. This additional view gave a more complete picture of the problem, allowing all participants, and especially farm consultants and the fertiliser rep, to learn from each other and to discuss potential opportunities.

The next step in the process was to identify opportunities focusing on how the development, delivery and implementation of farm plans could be enhanced and in which part of the innovation system. The suggestions of participants were grouped together, resulting in six key opportunities, including reducing costs of farm plans; increasing confidence in the nutrient management model used for the development of farm plans; improving the quality and consistency of communication around farm plans between different stakeholders; and increasing the number of farm consultants to support the development, delivery and implementation of farm plans. During the workshop all participants identified actions that they as a group and individually could take, which were linked to the six key opportunities.

Conclusions and recommendations

The objective of this case study in the Horizon's region was to identify the barriers and opportunities for better development, delivery, and implementation of farm plans over and above the regulatory requirements. An agricultural innovation systems approach was taken to achieve this, as it allowed the consideration of the whole system rather than just the extension component.

Taking an AIS approach meant involving a range of people and organisations representing the different functions within the innovation system. The identified stakeholders covered all the functions as identified in Table 1, and many contribute to more than one function in the system, which ultimately enhances the integration between them, making the system work more effectively.

The inclusive process of identifying stakeholders and their roles in the farm plan process supported the stakeholders to develop a shared understanding of their role and influence as evidenced by the identification of collective as well as individual actions.

The process described in this paper resulted in the joint development of solutions that covered a broader range of problems and suggestions than those identified by MPI and Horizons prior to this project. It also highlighted there was no one 'silver bullet' approach, but that there were (at least) six key opportunities to address. This was evidenced by the participants' ability to identify and take responsibility for particular actions to solve problems, knowing that everyone had a particular role to play in developing and implementing solutions, as well as identifying others that could contribute to a particular action for it to be a success. For example, one of the actions developed during the final stakeholder workshop was from an industry good stakeholder who wanted to further coordinate the farm plan process with fertiliser companies and a processor. The innovation system approach also enabled a group of stakeholders from different primary sectors (dairy, horticulture and arable) to interact around a specific issue and co-develop a set of recommendations, learn from each other, build networks and enhance the connections. This was apparent during the final stakeholder workshop. Not only did a large variety of cross-sectoral stakeholders attend, but they also explicitly mentioned that they would like to stay informed and connected, allowing space for a new network for implementing solutions to be formed. This goes some way to one of the objectives of the project, which was to "begin the process of developing trust and working relationships between the different involved stakeholders". One of the actions for the Regional Council staff that was agreed to at the final workshop was to facilitate these on-going relationships.

The use of the systemic innovation policy framework proved to be challenging as a method for gathering information about the innovation system in this case study. The challenge came from the language associated with this framework, the high-level (off-farm) approach, and the interconnectedness of the functions described in this framework. However, the framework was also used to a) point out the need for involvement of a wider group of stakeholders, and b) to generate the questions about the functions and the structures used in the focus groups. This resulted in a diversity of perspectives and a sufficient level of depth in the discussions to identify root causes for the lack of adoption of farm plans.

The systemic innovation policy framework supported further analysis of the information gathered during the project, which contributed to the development of the causal diagrams. The causal analysis helped with the identification of the barriers to, and opportunities for, achieving environmental and economic benefits, again contributing to the shared understanding of the innovation system. The range of opportunities and related actions reveals the complexity of the issue and shows that to achieve the desired environmental and economic benefits a wider range of issues that sit around the development, delivery and implementation of farm plans need to be dealt with first. It appears from the identified opportunities, as well as the actions, that although there was not a large focus on the actual economic and environmental benefits ultimately needed, addressing the barriers and opportunities can assist in bringing about these desired outcomes.

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