Prospects for Farmers' Support: Advisory Services in European AKIS
WP 4 – AKIS ON THE GROUND: FOCUSING KNOWLEDGE FLOWS SYSTEM | Topic 3
Country Report for the United Kingdom

Designing, implementing and maintaining (rural) innovation networks to enhance farmers' ability to innovate in cooperation with other rural actors

Monitor Farms in Scotland, UK

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List of Acronyms

AKIS	Agricultural Knowledge and Information Systems
EBVs	Estimated Breeding Values
EIP	European Innovation Partnerships
EIP Agri	European Innovation Partnerships: Agriculture and Innovation
HGCA	Home Grown Cereal Authority
LEAF	Linking Environment and Farming
MFDG	Monitor Farms Development Group
NFU	National Farmers Union
NFUS	National Farmers Union Scotland
NGO	Non-Governmental Organisation
PRO AKIS	Prospects for Farmers' Support: Advisory Services in European AKIS
QMS	Quality Meat Scotland
SAC	Scottish Agricultural College/ Consulting
SAOS	Scottish Agricultural Organisation Society Ltd.
SG	Scottish Government
SOPA	Scottish Organic Producers Association
SFQC	Scottish Food Quality Certification Ltd.

Executive Summary

In Scotland, the Monitor Farm Programme was selected as a case study to provide comparable results from similar investigations into rural innovation networks across the European partners of the PRO AKIS project and the network's ability to enhance farmer innovation in cooperation with other rural actors. Three monitor farms (therefore three networks) were selected for investigation. Each network is delimited by the actors involved in the respective monitor farm project, comprising of the monitor farmer, the facilitator, the community of participating farmers and any invited experts, enterprises and scientists.

The Scottish Monitor Farms Programme is implemented by Scottish Government in collaboration with delivery partners including levy bodies such as Quality Meat Scotland (QMS). It is coordinated by the Monitor Farms Development Group (MFDG), made up of funders, project managers and the Scottish Government. The Monitor Farms Programme therefore aims to "improve the profitability, productivity and sustainability of Scottish farmers by discussing and demonstrating business improvement" (Watson Consulting 2014, p1).

Two of the selected monitor farms - Hartbush and Arnprior – were investigated in detail via interviews and participant observation, with findings from observations and informal talks at the third farm – Savock – used to complement these results. Different farmer types participate in the monitor farm network, representing the range of enterprises in the geographical area of the monitor farm, as well as young farmers and new entrant farmers. Many participants were known to each other prior to the network initiating, from other groups or memberships, or from farming in the same area. The selection of topics covered in the community group meetings is relatively farmer community-led. Around six meetings per year are held on the monitor farm, including visits to different areas of the farm to discuss current/relevant issues, and often incorporating a visiting external speaker or specialist. Meeting attendance is influenced by weather, the perceived relevance of the meeting topic, members' personal connections with the monitor farmer, and the timing of meetings close to other events.

The interviewees highlighted two main motivations and gains from participation in the monitor farm network, namely the potential to learn new agricultural knowledge or best farming practice, and the social aspect of participating, in terms of renewing and building networks with other local farmers. The monitor farmer also perceived a key gain in terms of working towards farm profitability. A further motivation for all participants was the low costs associated, with the monitor farm programme delivered free of charge to farmers, with only time and travel costs incurred.

There are many links between the monitor farm programme and existing knowledge and advisory services, not least due to the role of the programme facilitators, many of whom are agricultural advisors, and through the wider network including invited specialists, industry representatives and student/researcher attendees. As this investigation into the monitor farm programme reveals, the network provides an opportunity to bridge gaps in advisory services, for example, providing practical on-farm demonstrations.

In addition a survey of monitor farmers, monitor farm management committees and facilitators was carried out at the National Monitor Farm event on 28 November 2014 to complement the interview and

participant observation research. The results of this survey highlight specific aspects of monitor farm organisation and indicate that monitor farmers, management committee members and facilitators of monitor farms:

- *Are split in their preferences for the duration of the programme with half of them preferring three years and the other half preferring a longer duration;*
- *Consider the composition of participants in their monitor farm project as appropriate;*
- *Believe that no fees should be charged or payments made, and if payments were to be introduced it should be the monitor farmer who should receive a small payment;*
- *Would have liked to see other monitor farm participants share information on financial performance, cost savings and experiences of innovations.*

With regards to the flow and transfer of knowledge, the objective of the monitor farm network is to develop best practice through on-farm changes. Thus the processes and dynamics developed to generate and exchange knowledge for co-innovation focus on communication, knowledge exchange and co-creation, for example through the informal discussion and sharing of ideas and experience between monitor farm participants. The knowledge flows and diverse sources of information utilised by the monitor farmer and participant interviewees in adopting innovations or changes to farming practice are derived and presented diagrammatically. The report concludes with reflections on the interview and survey data that provide insights into the features of the network that enhance the farmers' ability to co-innovate in cooperation with other actors and future lessons. This includes the need to maintain the positive features of the network at present (e.g. high quality learning and networking opportunities), and to build the potential for further benchmarking and a focus on profitability.

1 Introduction

The overall goal of WP4 (case studies) was to explore and describe selected forms of advisory services and agriculture knowledge flows in Europe within the broader context of AKIS, accounting for the diversity and demand conditions across different countries/regions and diverse types of farmers. Within this overall goal, Topic 3 focused on exploring and identifying the **possibilities, the conditions and the requirements of rural innovation networks** that constitute examples for the 'European Innovation Partnership' by increasing farmers' capacities to create, test, implement and evaluate innovations in cooperation with other rural actors.

These goals were broken down to several research questions. In order to design and maintain innovation networks that enhance farmers' ability to innovate in cooperation with other rural actors, we needed to understand what motivates farmers to enrol in these types of networks (influencing factors). Another core question was how to evaluate the knowledge flows (both formal and informal) and the success of the innovation network (including the degree to which it promoted best-fit practices). The key research question posed was:

- Which features of the agricultural/rural networks enhance farmers' ability to co-innovate in cooperation with other actors?

This was supported by the following sub-questions:

- How do the selected agricultural/ rural networks link to existing knowledge infrastructures and advisory services?
- Which factors influence the network's stability over time?
- Do these networks contribute to productivity and sustainability through innovation as expected by EIP-Agri, and if so, how?

A prominent conceptualization of the adoption and spread of innovation is the innovation-diffusion model (Rogers 1993, Nowak 1987). According to the model, the spread of innovation is a rather formalised social process that begins with the adoption of a technology by a small number of innovators, which is then taken over by a larger group of early adopters, followed by early and late majority takeovers, and remaining farmers considered 'laggards'. This understanding builds on the notion that an innovation is developed independently (e.g. by researchers, industry) and then transferred to farmers.

Schneider et al. (2012) criticised this conceptualization of innovation development as divided into two fundamentally different processes, with knowledge production preceding knowledge diffusion and application in a linear way. These authors argue that the presumption of knowledge being created independently of its use and application would "underestimate the active and creative role of farmers and other actors in generating innovation, as well as the complex and reciprocal interactions between all actors involved (e.g. farmers, agricultural contractors, input suppliers, traders)" (ibid., 243). We agree with the notion that knowledge production and exchange, learning and practice change (= innovation) are intimately intertwined.

This resonates with recent voices from the EU. According to Inge van Oost (2013) at DG Agriculture and Rural Development, innovations are "ideas put into practice with success". They are "new, improved or successfully applied products, processes or services (e.g. products with adapted quality, new production methods, opening to new markets and new forms of organisation). Innovation is more than dissemination of research results: it occurs as a result of the creativity and interplay between actors for combining new and/or existing (tacit) knowledge (…) only when a new creation really becomes more or less mainstream it is called an innovation."

According to Oerlemans and Assouline (2004, 469), "farmer networks can be an effective means to contribute to sustainable agricultural development. Farmers can learn from each other, with each other, act as a negotiating partner, invest collectively and involve relevant partners". However, the authors criticize that in the process of building, maintaining and expanding the network, the management of the group itself is often neglected. The tendency to focus on a key innovation that brings the network together runs the risk of overlooking group management aspects such as balanced leadership, collective responsibility and learning, coherence of the group and enrolling capacity which determine to a great extent the success or failure of networking strategies (Oerlemans and Assouline 2004).

2 Selecting and delimiting the case-study

The Europe 2020 flagship initiative "Innovation Union" specifies European Innovation Partnerships (EIP) as a new tool for fostering innovation, aimed at closing the 'innovation gap' between research and farming practice. Among the European Innovation Partnerships (EIPs), the EIP on Agriculture and Innovation (EIP Agri) is the most relevant for AKIS and advisory services (EU SCAR 2013). Within the EIP-Agri, Operational Groups in different countries form a network where they share results so that groups in the network can benefit from each other's work. Operational Groups are action and result-oriented groups where people from diverse practical and scientific backgrounds come together (e.g. farmers, advisors, agri-business, NGOs and researchers). They work on concrete, practical solutions to a problem and their project is funded by the EU Rural Development policy.[1]

In Scotland, the 'Monitor Farm' programme was selected as an example where diverse actors come together to share information, knowledge and experience, and address selected production-related problems of the 'monitor farmer'. In that respect, monitor farms share some of the characteristics of an Operational Group. They are different in that they are not part of the EIP-Agri network and do not receive direct Rural Development Programme funding, but are funded by the Scottish Government and Quality Meat Scotland, an industry-focused public body. The monitoring of inputs, outputs and management actions allows members of the monitor farm 'community' to observe the impact of changes on the monitor farm so that they are supported in their own decision making and implementation of innovations. The communication and knowledge sharing process helps to increase farmers' capacities to test and implement practice changes. In addition to farmers, monitor farms are supported by local businesses such as animal feed and additives suppliers, auctioneers and valuers, seed and grain merchants, accountancy and business services, veterinarians, abattoirs, accountants, livestock associations, and rural insurance[2] which indicates their relevance as rural (beyond purely agricultural) networks.

Three monitor farms (= three networks) were selected for investigation. Each network is delimited by the actors involved in the respective monitor farm project, comprising of the monitor farmer, the facilitator, the community of participating farmers and any invited experts, enterprises and scientists. This report includes insights from the wider 'network' of monitor farms (a total of 16[3] across Scotland in 2013 with further agri-tourism and pig monitor farms launching in 2014[4]), through interviews with the main funder, two facilitators, a recent evaluation on Scottish Monitor Farms by Watson Consulting (2014) and results of a survey conducted at the 2014 National Monitor Farm Event.

There are other agricultural networks in Scotland that have potential as Operational Groups. These include machinery rings, demonstration farms, discussion groups, and technology partnerships. Machinery rings help farms to coordinate access to machinery, labour and other resources.

[1] http://ec.europa.eu/eip/agriculture/en/content/eip-agri-operational-groups-turning-your-idea-innovation
[2] http://scotland.gov.uk/News/Releases/2010/05/04110058
[3] http://www.qmscotland.co.uk/monitor-farms

Demonstration farms are established by a variety of actors such as research institutes, Scotland's Rural College (formerly Scotland Agricultural College) and non-governmental organisations (LEAF Linking Environment and Farming) to demonstrate particular management practices. Discussion groups are informal, bottom-up initiatives by farmers in one locality to share knowledge and experience. Among the Technology Partnerships, there is one on energy that covers topics with a potential impact on farming such as renewables and anaerobic digestion, however, agricultural innovation is not their main focus. The advantage of studying the monitor farm programme was that it is government funded, therefore the delineation of what constitutes a monitor farm is explicit, their overall aims are comparable and they align to a common framework (as opposed to, for example, demonstration farms that differ according to the objectives of the establishing organisation).

The selection of monitor farms as innovation networks can be further justified by their focus on increasing the productivity and profitability of the farms involved, and the improvement of farming practices, adopting new or adjusting existing technology, coupled with the acquisition of new skills to manage the innovation process. Monitor farms appear to increase participants understanding of issues, awareness of the importance of recording and monitoring inputs and outputs, and enhancing skills of the individual farmer as an essential first step on the road to adopting an innovation. The effect of the network's activities is most pronounced in the case of the monitor farmer who tends to adopt most practice changes.

3 General description of the case study

In the Scottish case study 'monitor farms' were investigated as an example of agricultural/ rural innovation networks. The Scottish Monitor Farms Programme is delivered by Scottish Government in collaboration with delivery partners. Delivery partners include levy bodies (Quality Meat Scotland (QMS), DairyCo, Home Grown Cereal Authority (HGCA)), National Farmers Unions Scotland (NFUS) and the Scottish Organic Producers Association (SOPA). Different sources provide differing numbers for monitor farms in England; ranging from six monitor farms North West England established and part funded through the Rural Development Programme for England from 2010 (Watson Consulting, 2014) to 46 monitor farms in England as of 2012 (Nicholson, 2012). As described:

> "The Monitor Farm Programme commenced in Scotland in 2003 following a model developed in New Zealand to help farmers rapidly adapt to changes and become market focused. In the Scottish context the industry was still in recovery from the aftermath of Foot and Mouth Disease in 2001-2002 and needed assistance in recovery.
>
> The Programme sets out to improve the performance and profitability of a commercial farm, typical of the local area, over a three year period. The concept is for one farmer to open his business to a wider community group, mainly consisting of other farmers, but also professionals such as veterinary practices, bank managers and feed specialists. The Monitor Farmer agrees to host regular group meetings at his business, where subjects are discussed in practical ways,

involving site tours, working groups and open discussion. There are also less frequent open meetings, usually annually.

The monitor farmer is supported by a facilitator, who provides advice on objective setting, data analysis and management of meetings. The concept is that group members, together with the Facilitator and Monitor Farmer agree a range of improvements at the monitor farm, and that changes put into practice will be adopted by the wider community group of farms" (ADAS 2008, 1).

Between 2009 and 2013, 18 Monitor Farms were established by Scottish Government and the Delivery Partners. To date a total of 40 monitor farms have been initiated in Scotland, funded mainly through the Scottish Government's Rural Development Programme Skills Development Scheme.[5] In the period 2009-2013, the scheme made almost £900k available to a range of levy bodies and member organisations to project manage the individual monitor farms (Watson Consulting 2014). The bodies either directly facilitate the projects or contract consultants to facilitate the Monitor Farms on their behalf. An industry contribution to each project of at least 25% of the total cost is required and this can be delivered in a combination of financial funding, costs accrued and in-kind contributions by the bodies and organisations (Watson Consulting 2014, p10). Industry contributions have totalled over £400k for 16 farms between 2009 – 2013, bringing total funding to over £1.3M. Three pig monitor farms have since been funded under this scheme as part of a larger industry development scheme, the Pig Business Network (Watson Consulting 2014). During 2013 most projects (9) were sponsored by Quality Meat Scotland (QMS). Consultants from the Scottish Agricultural College (SAC Consulting) remain as the dominant facilitator. Other facilitators are independent consultants such as Peter Cook and Linda McLean, private companies such as Smiths Gore, and organisations such as SAOS, DairyCo and SFQC.

The Scottish Monitor Farms Programme is co-ordinated by the Monitor Farms Development Group (MFDG), made up of funders, project managers, Scottish Government and a Facilitator representative. The MFDG approves the Monitor Farms Programme strategy (the latest published in 2009; cf. QMS, 2009). The strategy called for close co-operation between funders, greater emphasis on collection and use of baseline data, greater support for farmers and Facilitators and closer links with industry and research bodies. The Monitor Farm strategy stated that improvements to Knowledge Transfer to the Scottish Agricultural industry lay at the heart of the Programme.

According to the programme, farms are selected for being representative of a local area. Our interviewees also considered that the monitor farms were selected because they represent a diverse business (therefore with multiple areas of interest for others) and, often, with 'room for improvement' – so with some opportunities to implement best practice and evaluate changes.

Three current monitor farms were selected for an in-depth study and for purposes of triangulation (to avoid biased or one-sided results). Two of the selected monitor farms - Hartbush and Arnprior – were investigated in more detail via interviews and participant observation, with findings from observations and informal talks at the third farm – Savock, and results of the survey responses from the National Monitor Farm event, used to complement these results.

[5] http://www.scotland.gov.uk/Topics/farmingrural/Rural/business/monitor

Hartbush and Arnprior farms are similar in that they are classified as livestock farms. Savock was classified as an Arable farm (Watson Consulting, 2014). However, all three farms combine arable, grassland and livestock farming (Table 1).[6]

The monitor farm programme typically runs for 3 years, with bi-monthly meetings held during this period. In the case of Savock Farm, an extension of 6 months was arranged by the facilitator. Hartbush hosted their first monitor farm community meeting in December 2012, with Arnprior holding their first meeting in November 2012, and Savock monitor farm in May 2011.

Table 1: *Characteristics of investigated monitor farms*

Arnprior Farm, Kippen, Stirlingshire	Hartbush Farm, Amisfield, Dumfries	Savock Farm, Foveran, Aberdeenshire
Funder / Industry Partner: QMS	Funder/ Industry Partner: QMS (with support also provided by A.K. Stoddarts and Highland Meats)	Funder / Industry Partner: HGCA
Facilitator: SAC Consulting	Facilitator: Smiths Gore	Facilitator: SAOS
• Total of 330ha. • Suckler Cows and breeding sheep. Livestock Details: 50 Suckler Cows (SIMX, Simental & Limousin Bulls - all progeny finished), 500 Breeding Sheep (Mules to the Texel tup producing finished lambs). • 80 hectares of arable with rotation of spring barley 35ha, spring oats 37ha, winter wheat 11ha and spring beans 7ha. • Grassland details: temporary grass 146ha, permanent grass 22ha, rough grazing 60ha.	• 245ha Owned, 52ha Seasonal Lets. • Main Enterprise: Beef, Sheep and Arable Livestock: 260 Simmental Suckler Cows, using Charolais, Limousin and Simmental Bulls; Finishing 180 cattle per year, other young stock sold store; 360 Half Bred Ewes put to Suffolk tups. • Grassland & Cropping Details (ha): Winter Barley grown for own use- Grazing 137ha- Cut for silage, hay and haylage 74ha- Barley 26ha.	• Total of 345ha across four blocks, mostly owned. • range of soils but generally on the heavy side with clay, poor drainage • Combinable crops (280ha) include: winter barley, winter oilseed rape, wheat, spring barley, winter and spring oats • One full-time employee; business uses an independent agronomist. • Livestock: 250-300 Aberdeen Angus cross • Farm shop and café enterprise employs 22 staff, supplying farmers markets, Waitrose stores, local hotels and restaurants.
Meeting reports: http://www.qmscotland.co.uk/monitor-farms/arnprior	Meeting reports: http://www.qmscotland.co.uk/monitor-farms/hartbush	Meeting reports: http://www.saos.coop/what-we-do/monitor-farms/

4 Methods and data collection, local stakeholder involvement

The selection of cases (networks) was based on an evaluation report of monitor farms (Watson Consulting, 2014) commissioned by Scottish Government in late 2013 and discussion with facilitators and sponsors. Selected cases were not among the 7 farms consulted via face-to-face interviews for the monitor farm evaluation (Watson Consulting, 2014, 5) but instead monitor farms that were chosen were

[6] A map of the location of monitor farms up until 2008 can be viewed here: http://www.scotland.gov.uk/Publications/2008/10/29093936/16

only covered in the evaluation by means of a web survey. Our selection was also guided by suggestions from the facilitators of the respective group who were contacted in the first instance.

Arnprior and Hartbush monitor farms were selected as a result of initial contact with the facilitators of a small number of the beef monitor farms (~4 farms, to permit further comparability with beef discussion groups in Ireland) and with the Head of Industry Development at QMS. The two farms were therefore chosen in terms of their availability, willingness to participate and appropriateness in terms of their outputs. The two farms were also at similar points in the monitor farm programme (roughly half way through the 3 year programme), which permitted an additional potential point of comparison and corresponded to the time constraints of the PRO AKIS project. The facilitators of the two monitor farms were contacted by phone/email before the researchers began participant observation by attending the monitor farm community meetings. In one case, this contact assisted the researcher to identify potential interviewees. Savock monitor farm was already attended by one of the researchers so this attendance simply continued with additional participant observation during the case study period for the PRO AKIS project.

Table 2: *Interviewees and roles*

Farm	Role of interviewees
Hartbush	1 Monitor farmer
	1 Management committee member
	3 Regular members
	1 Facilitator
Arnprior	1 Monitor farmer
	4 Management committee members
	1 Facilitator
External	1 Sponsor
Total interviews	**10 farmers, 2 facilitators, 1 external**

The empirical data for the study were collected by means of interviews with a range of actors involved in the two monitor farms Hartbush and Arnprior (Table 2). In addition, participant observation was conducted at these two farms and at a third monitor farm (Savock), during monitor farm community meetings and open days. As Table 2 illustrates, for both Hartbush and Arnprior monitor farms, the monitor farmer, the facilitator and a range of members (some of them with involvement in the group's management committee) were interviewed, using a semi-structured interview guide. In one case all of the interviewees were a part of the management committee (including the monitor farmer) and in the other case only 2 out of 5 were part of the management committee (including the monitor farmer). Nevertheless all interviewees regularly attended the community meetings.

Two different interview guides were used, one designed for the farmers and the other for the facilitator. The interview with the external actor partially used the facilitator guide and was complemented by questions helping to place the monitor farms into the wider context. Interviews were recorded, transcribed, and imported into Nvivo 10 software for qualitative data analysis. Analysis was carried out by coding statements to predetermined themes to allow comparison with the three other case studies under Topic 3 (see Section 5).

Participant observation was carried out at all three farms, specifically:

- One community meeting at Hartbush (29 May 2014).
- Two community meetings at Arnprior (29 May and 24 June 2014); one open day (31 July 2014).
- Five community meetings at Savock (5 February and 16 July 2013; 13 February, 15 July and 11 November 2014).

Notes and observations from each meeting attended were documented by the researchers, complementing and validating findings from the thematic interview analysis.

Additional empirical data was also collected by the means of a short survey conducted at the National Monitor Farm event in November 2014. There were a total of 57 responses, of which 37% were monitor farmers, 33% were facilitators and 25% were members or chairs of a management committee. This questionnaire explored views on the duration of the monitor farm project, the composition of the monitor farm group, potential charges and payments, as well as the sharing of data and information.

5 Results

5.1 The rural/agricultural network: description of Monitor farms

5.1.1 Structure

Structure and Actors

The main actors within the monitor farm are the monitor farmer, the facilitator, the participating farmers ('community members') and various invited experts and industry representatives. At the programme level, other monitor farms, as well as the funders and sponsor organisations are also part of the network. These actors and their respective roles may be considered the network nodes, and are described in Table 3.

The interviewees describe the characteristics of the types of farmers who frequently attend the monitor farm 'community' meetings. They describe a range of farmer types, although most can be classified as livestock or mixed farms (arable farmers would not find the livestock-focussed discussion of relevance), and those that represent the range of enterprises in the geographical area of the monitor farm.

Furthermore, the results of the survey highlighted that in general the respondents were content with the mix of participants in the monitor farm groups, with 49 respondents (89%) stating that the composition should remain unchanged (Figure 1). Five respondents would have liked to see an increase in the farm types represented, and one monitor farmer thought that having a higher share of larger commercial farms would be beneficial.

Table 3: *Actors involved in monitor farms and their roles*[7]

Actors involved	Roles
Funder	• Initiate the monitor farm project by providing funding.
Facilitator of the monitor farm	• Driver of the process. • To enable the group of farmers to co-operate in the project. • Suggests and arranges topics, speakers and experts (mainly from their professional network) in conjunction with the management group, and provide input themselves. • In some cases responsibility for topic identification is transferred to the Management Group over the course of the project.
Monitor farmer: the farmer who hosts the monitor farm meetings and whose farm data is used to discuss questions of interest	• Central actor, participates in every meeting, compiles data, and influences topics. • Receives support from consultants in the form of reviews, baseline monitoring, analyses, surveys and benchmarking.
The farmers participating in the network and regular meetings ('community members')	• Farm information is made available (e.g. comparative business data for benchmarking against the Monitor Farm) to the group and discussed at meetings. • May also be made available through minutes and publications. • Supposed to provide knowledge, skills and experience to help drive the Monitor Farm's performance and profitability. • Set up sub-groups to tackle short-term projects. • May volunteer to be members of Management Groups, whose roles include steering a project in collaboration with the farmer and Facilitator.
The experts who are invited to speak at meetings	• Provide support in the form of reviews, baseline monitoring, data analyses and interpretation, surveys and benchmarking. • Advisors, technical experts.

In the interviews, many respondents emphasised the existence (and importance) of a mixed age range, including members who may be classified as young farmers and new entrant farmers[8], as described:

> "If there's a monitor farm happening, a new [entrant] will be there... If they can afford to…The very fact you're a new entrant, you know, you're...you're probably still having to hold down a job to keep the business up and running. So if they're not there it's because of time" (External).
>
> "…there's quite a wide variation of...ages...'cause we do get the young farmers involved, so...I would say, it's...a fairly broad brush spectrum..." (Monitor farmer).

In addition, members of the local Young Farmers Club have attended monitor farm meetings, and in one case, the monitor farm has developed positive links with the local agricultural college, hosting students as part of the community meetings and involving the students in monitor farm mini-projects. The younger generation was mentioned by a survey respondent as a type of participant that monitor farms

[7] Based on Watson Consulting 2014, p14-15, and the interviews.

[8] Although one interviewee doubts whether 'genuine' new entrant farmers really exist, given the large investment/loan required, therefore argues that there are no new entrant monitor farm community members; all those classified as 'new entrants' actually have a farming background and have gained from family links/investment.

should try and draw in. Furthermore, the monitor farm meetings were attended by industry stakeholders, such as pharmaceutical companies, local meat plants, grass seed or chemical retailers, or tractor dealers.

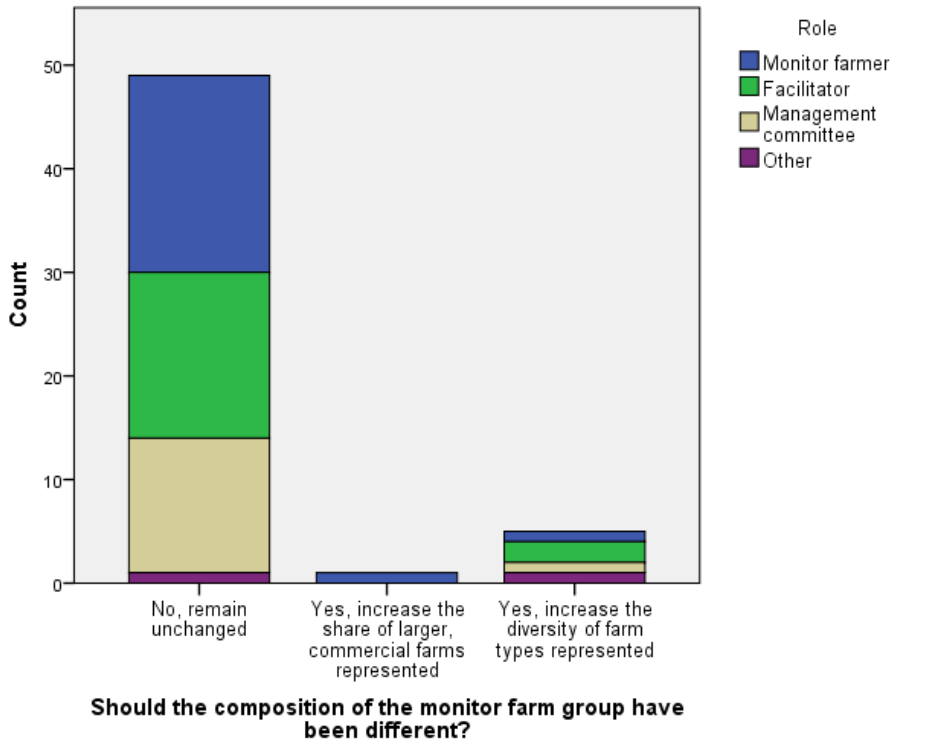

Figure 1: *Opinions on the composition of the monitor farm group (n=56)*

The interviewees recognised the types of farmers who do not attend the monitor farm meetings, not least the large-scale agri-businesses, including dairy businesses, who, it is thought, believe that they will not learn any further efficiency from the monitor farm programme. A further interviewee explained that a prevalence of hobby farmers/lifestyle land managers attending the monitor farm meetings so far has not contributed to the aims of the programme, because they are typically not faced with the same economic challenges as the commercial farming enterprises selected as monitor farm and can lower the level of discussion due to an apparent lack of basic farming knowledge.

On the other hand, there were suggestions from survey respondents that the group "must be free access [and] form its own composition" and "should be self-selecting based on a willingness to share". Concerns were raised with regard to predetermining the types of participants. "If the group is handpicked it's not a community-led project". Rather the focus should be on the importance of knowledge exchange (from a variety of actors). As one interviewee asserted, the monitor farm meetings are "not a forum for learning how to farm" (External), and insist that:

> "We want to work these guys really hard…You just want to come along and see a monitor farm, and not contribute anything, and just see it and 'take, take, take' – that's what open days are for, community group meetings aren't for that. Community group meetings are for working" (External).

This is an important distinction to recognise with regard to the aims of the monitor farm programme (i.e. focusing on knowledge exchange), and will be considered further in section 5.1.2. The question of who gains and the costs of the monitor farm programme are further considered in Section 5.1.3.

Nature of the network and governance structure

The networks (monitor farms) are formal in that they follow a common programme that predefines the type of roles in the network (e.g. funding for facilitation), adopt mailing lists for formalized one-way communication, and reporting requirements. The network of participants (Table 3) is recruited in various ways (Table 4) and formally established for the duration of the project. It appears to be based on informal networks. Many participants are known to each other from other networks or memberships, or from farming in the same area. For example, the interviews showed that many of the regular attendees and members of the management committee at Arnprior were friends and neighbours of the monitor farmer before the programme and his nomination. Similar previous connections existed and were highlighted during the interviews associated with Hartbush. In this way, the formal network is complemented with informal networks that each of the participating farmers bring with them, but also the networks of the facilitator and other actors (such as representatives of fertilizer or machinery companies).

Although the monitor farm programme was initially instigated from a top-down Government-funded programme and the institutional set up is led by an industry agency (QMS, SAOS) with support from the Scottish Government Monitor Farm Steering Group the subsequent action in the group is determined by the farmer members. The selection of topics to cover in meetings appears to be completed in conjunction with the management group of the Monitor Farm (i.e. it is relatively farmer community led), according to the interviewees. This can create potential tension with the funder, because they would like the programme to tackle certain challenging topics, whilst the farmers appear to prefer more seasonal and locally-specific topics.

Further details on the content of monitor farm community meetings are included in Section 5.1.2.

Table 4*: Actors involved in Monitor farms and their recruitment*

Actor Type	Recruitment process
Monitor Farmers	• Are almost exclusively selected through a process of nomination (by self and others) and interview. They were often encouraged by local farming leaders to apply.
Facilitators	• Were recruited to their posts through a process of expression of interest, tender and assessment and were drawn to the Programme because of its unique nature and profile.
Community Group Chairs	• Were usually invited to take on the role by the Monitor Farmer or Facilitator and were often enthusiasts of the MF concept and knowledge exchange
Management Groups	• Were less subject to recruitment, but tended to emerge from a core of committed Community Group Members who were enthusiasts of the project.

Source: B*ased on Watson Consulting, 2014*

Configuration of the network

The main hierarchy of the monitor farm network surrounds the funding structure, which involves part funding from the Scottish Government, as well as a matched contribution from industry, as described. Otherwise, there is little clear hierarchy in the monitor farm network and individual communities. With its management team and chair recruited from among the participating farmers, monitor farms tend to have a flat hierarchy. The roles are well defined and members support each other. However, as the external funder interviewee highlights, some community members become 'complacent' and simply observe rather than make suggestions at meetings, leading to knowledge transfer that is "like a one-way valve" (External), a view reiterated by the monitor farmers, as described for example:

> "I personally think we could do with...more personalities...who...upset the apple cart…The first meetings...it was more like a kind of college lecture, it was just…turn up and listen, whereas now...they're starting to get into it and...the debate goes from there…I think that's when people really start to learn…" (Farmer).

Monitor farms are structured by sector (livestock, arable, dairy, pig, organic, agri-tourism) although monitor farms are open to any farmer (and indeed any interested person). Quality Meat Scotland, as a levy body, also runs a network of Business Improvement Groups (currently 22 across Scotland, each involving 18 farmers). Similarly, the 'Planning For Profit' initiative, is supported by the Scottish Government's Skills Development Scheme, QMS and NFUS, and assists farmers in ensuring their businesses are well-placed to operate profitably in the face of reduced support payments (QMS, 2014). In the arable sector, the Home Grown Cereal Authority (HGCA) runs Arable Business Groups (7 in Scotland, 21 in England as of 2014) which are comparable to QMS Business Improvement Groups, as well as a Business Development Programme "Reaping Rewards".

With regard to spatial relations, monitor farms have a clearly defined spatial extent due to monitor farm 'catchment' areas. A monitor farm tends to draw on farmers in a defined local area (catchment), within approximately a 30 mile radius of the host farm. This is the distance that farmers report to be willing to travel for a half day meeting (Watson Consulting 2014), however the monitor farmers report attendees from further afield: "they can go to...sixty miles towards [city]. So we're quite surprised how we've drawn it in" (Monitor farmer).

5.1.2 Content

The Monitor Farms Programme aims to "**improve the profitability, productivity and sustainability of Scottish farmers** by discussing and demonstrating business improvement" (Watson Consulting 2014, p1). As such, innovation is not named as the main focus. However, innovation is captured by the aim of the monitor farm process to be effective in delivering changes in farm practice that have led (or are likely to lead) to improvements in farm enterprise profitability. The focus is on the improvement of the farm's financial performance (efficiency). In order to achieve efficiency (and even be able to assess it), attention is paid to the monitoring and recording of financial data (which many farms appear not to achieve sufficiently, as reported by Watson Consulting, 2014).

As described by one facilitator, the main aim of the monitor farm programme is to: "...basically improve the...the profitability and viability of farms in this area, through using Arnprior [the monitor farm] as an example...and to promote best practise" (Facilitator).

The interviewees also note several further perceived aims of the monitor farm programme, not least improving and updating knowledge in farming, providing a platform for sharing ideas between farmers and for farmers to gain much wanted information on 'disasters' such as livestock disease. The monitor farm programme is therefore considered to expand and provide knowledge transfer to the wider farming community, and to facilitate the dissemination of messages regarding how to improve farming techniques and efficiency.

A further aim of the monitor farm programme as asserted by the interviewees is to **improve the monitor farm itself**, in terms of its practice, efficiency, profitability and farming business outcomes, for example: "you want, within the three years on the monitor project, you want that grassland to be the best it can…" (Monitor farmer). The aim is therefore also to support the monitor farmer in making the monitor farm a "more efficient unit" (Farmer), and to increase efficiency and production throughout the range of enterprises on the farm, through management systems.

The monitor farm programme also aims to **demonstrate best practice** in improving the profitability and performance on the monitor farms and how community members can also achieve such improvements. It is also noted as highlighting strengths and weaknesses throughout the industry (not just on the monitor farm).

Business improvement is a key aim for the monitor farm programme, as perceived by the interviewees, including providing ideas to the monitor farmer to improve their farming business, and to try and achieve more efficient and profitable farming more widely, in order to 'up the ante' (increase the importance or value). The monitor farm programme provides a trial period for different practices, but interviewees explain that these tests depend on the farmer and that "it has to work for his resources" (Farmer).

The interview findings indicate that the monitor farm network contributes to innovation through providing experience and real farm data to justify why decisions were made to change farming practice (which in turn may be considered innovation), therefore:

> "…whatever we're doing, we can always do it a wee bit different, or a wee bit better, or a wee bit more efficient, but we just maybe need to see somebody else doing it." (Farmer).

One of the co-funding bodies would like to achieve a scenario where members of the monitor farm community are willing to share their own farming business outcomes and financial data, in order to build understanding and overcome issues on the monitor farm. This view is shared by the facilitators and monitor farmers interviewed. As described:

> "what they do need to do, is get better organised…so that they can maybe say 'well, we need ten of you, at the next meeting, to bring your figures...so that we can really…work out exactly how

we're going to improve'... Because if it's all based on gut instinct and feel, you'll never really...you'll never really move the thing on enough" (External).

Other interviewees reiterate this suggestion of the need to underpin decision-making processes with real farm data, by suggesting to the monitor farmer to 'cost out' every issue and potential farm practice change. Community members agree that it would be beneficial to understand wider financial issues, in particular the sharing of partial budgets for the range of different enterprises.

Agenda setting for monitor farm meetings

Subjects for monitor farm community meetings are chosen based on being topical (e.g. with regard to seasonal changes/practices and the type of farm), interesting (to attract attendees), and to a certain level of detail to provide understanding and to answer key questions: "We do try and keep it very topical, so as it's... pertaining to...season, and...people, what they're going to come for" (Farmer). The agenda of speakers and discussions during a community meeting aims to reflect the range of enterprises on the monitor farm, for example, including a section on sheep, even though the focus of this monitor farm is stated as 'beef finishing'. It is agreed that ensuring the sheep enterprise is profitable is also of interest to the monitor farm community who may be tackling similar challenges.

Interviewees on one case study monitor farm explain that community members can suggest topics to be covered in future meetings, such as soil fertility or grassland management, through completing a form during the community meetings. The facilitators review the completed forms and try to cover the most popular suggestions during future community meetings. Other interviewees state that they value to have the option to suggest an issue, but they would only do so if they felt strongly about it. Facilitator interviewees describe the process of annual community member evaluation, providing the opportunity for the farmer attendees to highlight their most important aspects of learning and their priorities for future meetings.

The management committee (including the monitor farmer) and local vet (especially if they are an invited speaker) also provide input to the selection of topics and agreeing the agenda for community meetings. Topic prioritisation and selection is apparently ultimately decided by the monitor farm facilitator, as explained: "...sometimes you can't do it all, but sometimes…you think 'well actually, I've just got to do that'" (Facilitator). Nonetheless, interviewees report a lack of consideration of agri-environmental topics in the monitor farm meetings, which they believe should have a higher profile in the programme, as explained:

> "Although there are a lot of people that are doing...good things...and managing for wildlife, there is still a lot more we can do. And I think the monitor farms have really missed a trick. And I know it's supposed to be farmer-led and the farmers decide on the agenda, but I think there should be an integration of...wildlife management, into all these monitor farms" (Farmer).

Farmer interviewees mention that they believe that the facilitator reports to QMS on the topics for the meetings, and QMS/SG have never prohibited or been overly prescriptive regarding the topics planned

for community group meetings. QMS representatives are reported to make positive suggestions, such as sharing the experience of other monitor farms or suggesting possible speakers.

The types of innovations generated and discussed during the monitor farm community meetings investigated are considered in Sections 5.3 and 5.4.

5.1.3 Dynamics

All three monitor farms (networks) were in a mature stage, i.e. they had been established more than 18 months before the investigation took place. Themes relevant for understanding the dynamic within the network are the pre-existing cohesiveness within the network, the motivations for actors to join, whether farmers or other actors exited the network, and the influence of other actors and factors.

Pre-existing social cohesiveness between actors

Pre-existing social cohesiveness appears very context dependent, i.e. it differs from one monitor farm group to the next. One monitor farm community seemed to be based a lot on neighbourliness and previous social links, for example as described by the monitor farmer:

> "The type of folk that come...a lot of them are my...neighbours or near neighbours...I think they're just generally interested to see...you know, follow through the process of the monitor farm…" (Monitor farmer).

Many farmers agreed to join (and especially participate in the management group) because they are neighbours or friends with the monitor farmer. There is an indication that social cohesiveness is not achieved as a result of a monitor farm project, as according to Watson Consulting (2014) monitor farm groups generally do not meet again after the funding programme finished. The interviewees expressed mixed views about setting up their own discussion group after the monitor farm programme has finished (they think it would be a positive idea but hard in practice without a facilitator such as SAC), but they are in agreement that they have made/cemented connections and would more easily contact a neighbouring farm for advice/to do business with.

The importance of building positive relationships between different actors for the governance of the monitor farm is highlighted by the interviewees. In particular, the relationship between the monitor farmer and the facilitator is critical for progress to be made in the monitor farm programme, and good communication is crucial, as explained:

> "The first thing was the nomination and interview…The next thing was having facilitators…and building a relationship with them…That's very important…if you don't have a good working relationship with them…you'll go nowhere" (Monitor farmer).

> "…other times, when things have gone a bit off the rail, it's possibly been a slight lack of communication. The communications between farmer and consultant and management committee needs to be...pretty much on the boil….generally a phone call or me even popping in…But communications are key" (Facilitator).

Facilitator interviewees describe a need to be understanding and 'subtle' in providing information and guidance to the monitor farmer and monitor farm community. Monitor farmer interviewees also recognize the influence of building a cohesive management group:

> "…the build up of the...community group, your management group, your experts, your vet...that brings you all closer. Your advisors...that's variable, with some...you build a relationship with them or you don't" (Monitor farmer).

Dynamic with regard to meetings

Up to 6 meetings annually are organised on or around the respective Monitor Farm but the format allows occasional off-farm visits, including to progressive farms, abattoirs or grain merchants. The annual open day serves to attract a wider audience, which can include the general public. All members of the monitor farm community are invited to each meeting through an email mailing list, administered by the facilitators. Interviews with the facilitators and monitor farmers of Arnprior and Hartbush report high levels of participation at each open day (both farms estimated ~150 attendees for the first open day), with relatively lower, but still highly satisfactory participation at the regular community meetings (estimated between 20 - 30 attendees). As the interviewees explain:

> "I think it was widely expected that, at that initial open day...there was going to be a huge amount of folk there, and actually, as time goes by, you get left with a core of people...who...want to be there" (Farmer).

> "But I think on average, attendance is twenty-seven…[is] absolutely tremendous. I mean that's really, really good, to get twenty-seven farmers coming out to every meeting" (External).

Meeting attendance is apparently influenced by weather (and therefore whether the individual farmers are required to prioritise on-farm tasks), the perceived relevance of the topic to be presented/discussed at the meeting (i.e. to individual community members), members' personal connections with the monitor farmer, and the timing of meetings close to other events, such as the Royal Highland Show (where again, members may feel that they don't have time to attend). For example:

> "…some...topics not being relevant to...certain farmers...but I'd say...workload and weather being the...the main things...as soon as you set a date it'll be a good day and...folk'll be at silage…" (Monitor farmer).

> "…He said 'I went to one or two [monitor farm community meetings] at the start, but I just don't have time now'. And I sort of got the impression he's like 'well, to be honest...there's not very much good for me anyway'. When actually, he could've learnt so much" (External).

In addition the survey results indicated that although a high attendance rate at meetings is typically a goal, one respondent cautioned that any increase in farm types may lead to too large a group: "got 70-120 attending, don't need any more coming along" (Facilitator).

Interviewees expressed a wish to support the monitor farmer as a motivation for regular attendance at the meetings, and noted that the meetings were usually well organised to suit the farming year; further consideration of the motivations for community group membership is included in the following section.

Key points covered in the monitor farm meeting are written up as a report by facilitators, including photographs, and distributed to all on the email mailing list. Journalists from the Scottish Farmer have also attended meetings and written articles based on their experience, thus disseminating the meeting's discussion beyond the immediate community group[9].

The motivations, gains and costs of participation for different actors

According to Watson Consulting (2014) the interests and motivation of Monitor Farmers were focused on improving their business productivity and profitability through third party input and time out to make decisions. A number also expressed an altruistic desire to improve their area or sector. The primary interest of 50% of Community Group Members was in learning about or sharing experiences in better farming practice. For a further 20% the primary interest was in improving productivity or profitability. Community Group Chairs' interest stemmed from being part of a project that could highlight opportunities for a sector of Scottish agriculture through an effective forum. They also valued their roles in setting agendas for the Community Group. Facilitators whilst motivated by commercial interest and selected by tender were often attracted by the unique format of the role and potential for involvement over several years (Watson Consulting 2014).

The interviewees highlight two main motivations to participating in the monitor farm network, namely social and learning aspects, and the associated benefits that they gain from participation. Firstly, the interviewees report that participation is worthwhile due to the opportunity to gain new knowledge and ideas that can be put into place in their own farming systems: "I'm always keen to learn new things, and look for...different ways to try and improve and progress… and I thought the monitor farm was quite a good way to do that" (Farmer). It is a learning opportunity for those not from a farming background, as well as young farmers (e.g. involvement of agricultural college students; the next generation being able to take over management of parts of their family farm business), therefore the network is seen as developing new people for the industry. The monitor farm meetings also facilitate bringing the local farming community together, which reportedly helps to reassure individual farmers regarding shared struggles and pressures, as illustrated in this quote:

> "…a very common thing you'll hear a community group member say is…you think you're the only one who's struggling, you think you're the only one whose stock aren't performing or whatever. And then you go and you talk to three or four other folk at a monitor farm meeting, and they're all...dealing with the same issues. And you can get ideas from them. And that's why it works really well" (External).

[9] For example, see: http://www.thescottishfarmer.co.uk/news/crowds-turn-out-at-arnprior.19480258

Fundamentally, the participants gain through gathering new ideas with the goal of making their farming more efficient and productive, therefore benefiting the business and trying to improve their 'bottom line' (economic situation). One monitor farmer interviewed explained that his motivation for participation was to try and ensure that his farming business survives and prospers in the future; other interviewees mention payback on investment figures from monitor farms, claiming that £1 spent on the programme is converted to £5 within the industry. The monitor farm programme is also perceived as an opportunity for established farmers to see how others are farming, and be challenged as to whether they have room for improvement. The network is considered inclusive and relevant to farmers of all scales/productivity levels, e.g.: "it can be from the man that's only got five hundred pounds to the man that's got five thousand" (Monitor farmer). A further benefit mentioned by one interviewee is that it is free to participate with the monitor farm programme, they enjoy a free lunch, and the close location is an advantage (they would be less motivated to attend if the monitor farm was further away).

Furthermore, interviewees are interested to see a local farm with similar enterprises, and to hear relevant talks from attending vets, nutritionists from feed companies, soil specialists, agricultural equipment sales representatives, etc. The monitor farm meetings reportedly cover a wide variety of topics which are of interest and benefit to the farming community members, as well as providing the opportunity for 'seeing is believing', i.e. for changes made to practice on the monitor farm to be followed and the progress analysed by the community group. For example:

> "Likes of the paddock grazing, SAC could stand and give you a lecture and tell you all the benefits of paddocks, but basically, when you actually go and see the paddocks in operation, you learn far more than somebody standing in a room, waffling on" (Farmer).

However, it is recognised that such benefits are only provided to those who 'belong' (i.e. to the monitor farm community) and are willing to participate and share, whilst "many people would like to keep things to themselves" (Farmer). The QMS interviewee asserts that to ensure participation, the monitor farm organisers must: "get them in early, and hook them, and make it worth their while" (External). The monitor farm itself is also a draw for participants, as interviewees explain they consider that the farm is 'well farmed' and the monitor farmer himself is popular and has a good reputation for his farming business. Previous personal and business connections are also noted as reasons for wishing to participate, and there is a perceived benefit to providing support to the monitor farmer.

Indeed, as mentioned, the social gains from participating in the monitor farm network are of high importance to the participants, and it is described as 'healthy' to have the chance to leave the farm and meet others, especially to combat loneliness; for example:

> "Folk just getting the chance...to talk, and...catch up…I mean farming...this is like a one and a half man unit...there's a huge number of farmers in the same position. In the sixties this farm had four or five men on it... And fifty years later... we're down to one... (Facilitator).

Interviewees explain that it is beneficial to meet new contacts, to develop their local farming network, and to meet up with others in a similar situation. The monitor farm meetings are a good opportunity to

meet interesting people and listen to their ideas; bringing the group together is therefore considered important both socially and psychologically: “they actually begin to think about the world differently themselves” (Facilitator). A further gain perceived by one monitor farmer is the potential for personal development through participation.

Whilst the farmers are not charged to participate in the monitor farm programme, there are costs associated, namely participants time and travel costs (fuel): “…just my time, and travel... I’m very fortunate it’s so close” (Farmer). Whilst QMS believe that it is a big commitment, the interviewees appear broadly happy with the time required to participate, stating that “it’s not a huge amount of time really” (Farmer) and they are keen to attend but for some “finding the time can be tricky” (Farmer).

The time commitment is therefore estimated to be between 3 – 5 hours per community meeting (not including travel time), which are held around 6 times per year. The interviewees who are also members of the monitor farm management group estimate that they attend a further 3 to 4 management meetings, which last around 2 hours; therefore a further day per year is dedicated to the monitor farm in addition to the community meetings, due to this commitment. The monitor farmer must also commit further time in order to gather information to for the community meeting discussions, but they are supported by the facilitators: “But there is more information gathering and making sure it’s collated right. But, Smiths Gore’s facilitators...are good at...you give them the figures, they will collate them into...for other people to understand. So...yes, there is a bit of extra work, but...it’s getting it into the finer details for other people and so it can be explained to other people” (Monitor farmer). No costs are incurred by monitor farmers, but as explained by one monitor farmer interviewee, “contrary to public belief, we do not get paid to do it” (Monitor farmer). Furthermore, others explain that the monitor farmer is likely to pay more on farm improvements initially, with the aim of long-term payback (see Section 7).

Other groups that the monitor farm community participate in do incur costs, e.g. SAC Business Improvement Group who require participants to become members of SAC if they are not already (therefore membership fees are paid). A further example of an agricultural discussion group is mentioned, which meets once a month during the winter (5 or 6 meetings) and costs £2-3 per meeting to attend. However interviewees are positive regarding this discussion group and the various interesting topics presented.

Nonetheless, the monitor farm programme is considered more cost effective than these groups, because it is located more locally and it is free. Indeed, it is believed to be cost saving because participants do not need to be members of SAC, as explained: “…we’re not in the SAC or anything like that...so that’s a big plus for us…I don’t even take a...regular farming paper now, and I suppose...the biggest attraction for it is... the cost, basically, you know, you’re not spending any money. You even get lunch, its great” (Farmer). However, the QMS interviewee suggests that having to pay to attend such a discussion group may be beneficial in terms of attendance rates, because in their opinion, participants will “value things more , if they’re putting a few quid into them”, and otherwise:

"…they've had these monitor farms at free at the point of delivery…Which sometimes can be its downfall. 'Cause people are like 'ach, I don't have to pay anything, I'll not bother, I'll not go'" (External).

To research the issues of payments and charges further the survey respondents were asked whether they thought the participants or the monitor farmer should be charged a small fee or whether they should receive a payment. 28 respondents (53%) stated that only the monitor farmer should receive a payment (Figure 2).

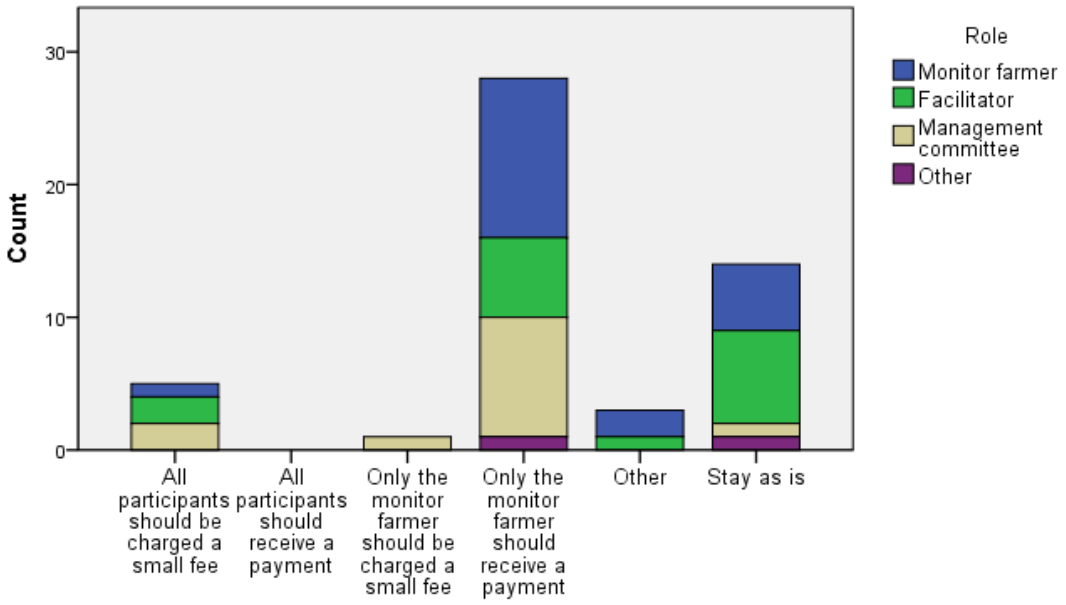

Figure 2: *Views on the costs of the monitor farm project (n=52)*

However, another 14 respondents (almost 30%) chose none of the four answer options provided but instead commented that the programme should remain as it is, with no payments made or fees charged. The researchers assume that if this answer option had been available on the questionnaire, the majority of respondents would have chosen it. Other responses were "don't know" and "Many not ready to pay for monitor farm activities. If you charge we risk losing attendees who would benefit from MF". One respondent suggested that all participants should be charged a small fee and the monitor farmer should receive a payment (grouped as 'Other').

Nonetheless, it seems that despite the lack of economic investment by the community members in the monitor farms investigated, participation rates have been maintained at a satisfactorily high level (see section 5.1.3).

None of the interviewees recalled any members of the monitor farm network choosing to exit the network (including both the monitor farmer and community members), therefore it may be assumed that the benefits of participation outweigh the costs as described, and overall the farming community members remain committed during the length of the programme funding for their local monitor farm. Nonetheless, the QMS representative explains that if members are not attending then they might be asked to give up their place for others: "if somebody's a member of a group and they're not turning up...and maybe there's a demand to get onto this group...people might say 'look, you need to start coming to these meetings, 'cause other people could be coming in your place'" (External).

The role and influence of the facilitator, as well as other knowledge and advisory services, will be considered in Sections 5.2 and 5.3.

Compatibility of objectives: cooperation vs. competitor's position

Interviewees from the monitor farm programme do not explicitly mention cooperation, but as described, their motivations for participation in the network appear to align themselves with objectives of cooperation, in particular, learning from each other and providing support through sharing ideas and solutions to common problems. These interviews illustrate that the objectives of the monitor farm programme as described in Section 5.1.2 are compatible with the functioning of the network, as perceived by the farming members.

Elements of competition between the farming members of the community are also not a feature of the interviews. Only two key opportunities for competition arise during the monitor farm programme, as described by the interviewees; firstly, the tendering process to support the Delivery Partners in facilitating the individual monitor farms (e.g. between agencies and organisations such as SAC Consulting and Smiths Gore, successful in the cases investigated). Secondly, the selection of the monitor farmer can be competitive if there is more than one farm nominated in the catchment area, as described:

> "…we were approached by the SAC (…) I think they had two other farms that they'd shortlisted amongst themselves...and basically a panel came round, we got interviewed and we showed them round the farm and... then we were selected from there. There was definitely at least two other farms that I know of, that were in the running for it" (Monitor farmer).

> "There was a scoring process (…) the most of important of all is probably the farmer, and their openness and their willingness to take on views of other people and actually facilitate change themselves. (…) the other important thing was that the farm had to be representative of farms in the area" (Facilitator).

The network depends on the recruitment of a monitor farm, therefore there is a balance to be struck between competition and the later benefits of collaboration through the network. Furthermore, the recruitment of the 'best' monitor farmer also depends on the personal characteristics of the proposed farmers, as well as their willingness, enthusiasm, and their plans for being the monitor farmer. Nonetheless, interviewees do report an element of competitiveness in how and whether members of

the local farming community participate in the monitor farm programme, for example due to traditionally-held views and anxiety regarding sharing data or knowledge regarding their farm business (and its success or otherwise). For example:

> "…farming's a funny...industry...because everything's so visible, when you drive along the road you can see if someone's crops are good, you can see what their stock's like and what have you...there's definitely an element of competition…there's a part to...certain farmers that I hate is that...that they like seeing other farmers fail..." (Monitor farmer).

5.2 The links between the network(s) and the knowledge and advisory infrastructure

The context of the monitor farm network has been detailed in Section 3 and the relationship of the monitor farm network with actors outside of the network has been alluded to in Section 5.1.1. As explained, the formal network of the monitor farm is complemented by informal networks brought by each of the participating farmers, in addition to the networks of the facilitator and other actors (such as representatives of industry and invited speakers). Other sources of information identified and utilised by the farming interviewees are considered in Section 5.4.

There are clear and numerous links between the monitor farm network and existing knowledge and advisory infrastructure, not least due to the fact that the facilitator may be employed by an organisation or agency that provides agricultural advice (as in the case of SAC or Smiths Gore, who facilitate the farms under investigation). The facilitator is therefore likely to be an agricultural advisor and have professional relationships with other advisors and relevant actors in the field. Further discussion regarding links between the monitor farm network and existing knowledge and advisory infrastructures is detailed in Section 7, in particular highlighting the role that the network appears to play in bridging the gaps in the current infrastructure.

The key advisory organisations and AKIS organisations that are important for the monitor farm programme are displayed in Table 5 below, with the key ones in bold, i.e. those that are either directly involved in the running or organisation of the monitor farm network, or those that were frequently mentioned by the interviewees. These advisory infrastructures can be described as supporting the monitor farm network, although not all of them play a role in each monitor farm network all the time, and not all are relevant to all monitor farms equally.

A gap in knowledge by the report authors exists regarding links between the monitor farm programme and other research; no ongoing or completed research on the monitor farm network has come to the attention of the researchers during the period of study for the PRO AKIS project, other than reports commissioned by the funders or Government (cf. Watson Consulting, 2014). Nonetheless, one example is described in the interviews, regarding the involvement and role of students from the local SRUC agricultural college in the monitor farm (therefore providing a link to higher education). The students have been given mini-projects to complete within the monitor farm programme, feedback results and make the connection between research undertaken at SRUC, the specific farm context and considering wider implications. In addition, interviewees also highlight how participation in the monitor farm

network appears to increase the likelihood of participation by the local farming community in other initiatives, such as attending industry events. Off-farm visits, as part of the monitor farm community meetings, may also contribute positively to building links with other knowledge infrastructure and advisory services, and are highly regarded by the participants through providing first-hand experience of other agricultural industries, e.g. abattoirs.

Table 5: *Agricultural advisory organisations relevant to the Scottish monitor farm programme (major providers in bold)*

Status	Type	Organisation
Public sector	Government departments	The Department of Agriculture, Scottish Government's Rural Payments and Inspections Directorate (SGRPID)
	Government agencies	Scottish Environmental Protection Agency (SEPA)
	Parastatal organisations	**Scotland's Rural College (SRUC/SAC)**
Research and Education	Universities (Higher Education Institutes)	SRUC (e.g. Barony College Campus, Ayr Campus)
	Research Institutes	James Hutton Institute (JHI), **Scotland's Rural College (SRUC),** Moredun College, Glasgow Vet School
Private sector	Food chain actors (upstream/ downstream industries)	**Animal Feed Stuffs & Additives; Auctioneers & Valuers; Seed and grain merchants; Abattoirs**, processors, manufacturers, buyers and retailers, accreditation organisations, multi-national companies (e.g. supermarkets, processors, machinery, fertiliser)
	Independent consultants / Private agricultural advice companies/ Commercial companies Levy bodies	= consultancies and service providers **Veterinarians** **Consultants** – **Accountancy and Business Services,** Accountants, Rural insurance, technical, crop, livestock, energy, agribusiness, soil specialists, nutritionists, e.g. **Smiths Gore (as advisors and facilitators), Harbro** Land agents – agribusiness/ management/ financial **Scottish Agricultural College (SAC, the consultancy arm of SRUC; see above)** **Levy bodies:** Agriculture and Horticulture Development Boards (AHDB) with six sector operating divisions: **HGCA, DairyCo**, BPEX, EBLEX, HDC, **Quality Meat Scotland (QMS)** **LINK, LEAF**
Farmer based organis-ations	Farmers' cooperative	**Scottish Agricultural Organisation Society** Ringlink and other machinery rings
	Producer organisations	**Horticultural Producer Organisations,** Suffolk Society (and other breed specific organisations)
	Farmers' circles/groups	(other) **Monitor farms (run by QMS/ HGCA and facilitated by SAOS, Smiths Gore, Peter Cook, DairyCo), Business Improvement Groups (run by QMS and facilitated by SAC), The Farmer Forums**
	Land manager representative bodies	**NFU of Scotland (NFUS)** Scottish Association of Young Farmers Clubs (SAYFC) Federation of Young Farmers Livestock Association Tenant Farmers Association/ Tenants Association **Scottish Organic Producers Association (SOPA**) Monitor Farm Development Group
Multi-status	Policy/working group	Monitor Farm Development Group

5.3 Processes and dynamics to generate and exchange knowledge for co-innovation

This section considers the knowledge processes involved in the monitor farm network, including the co-creation, exchange, conversion and the storage of knowledge, and the actors involved, as displayed in Table 6. The knowledge sources identified by the interviewees in order to gain/generate knowledge are discussed below, in addition to an indication of the innovations generated by these knowledge processes.

Table 6: *Examples of knowledge processes and the actors involved in the monitor farm programme*

Knowledge process	Monitor farm network example	Actors involved
Co-creation	Reflecting as a group on the outcomes of trials on the monitor farm.	All monitor farm network participants, facilitators, visiting speakers.
Exchange	Presentations by invited speakers during monitor farm meetings and opportunity for questions from community members; Experience sharing and both formal and informal discussion at the monitor farm meetings.	All monitor farm network participants, facilitators, visiting speakers.
Conversion	Implementation by the monitor farmer and/or members of the monitor farm community of changes of practice on-farm based on recommendations derived from the monitor farm meetings; converting tacit knowledge into experiential (i.e. the experience of the monitor farmer).	Monitor farmer and community members.
Storage	The reporting of the monitor farm meetings by the facilitators	Recording led by facilitator; can be accessed online by any interested party.

The monitor farm programme can act as a stimulus for knowledge creation (and co-creation), both produced at and as a result of the meetings, through informal conversations amongst the attending farmers, formal talks given by visiting consultants and specialists during the meetings or advice procured after the meetings (where initial contact was made); for example:

> "…it's not just the...consultant or specialist talking…it's the discussion that goes on thereafter, and if you can get that right, that's where the value...really is" (Facilitator).

The facilitator plays a key role in managing the community group, ensuring that appropriate knowledge is shared amongst the group, and utilising a variety of sources. The facilitators have an additional role in collating and distributing relevant information to the community group and monitor farmers in the form of handouts at the meetings and follow up emails. At times, this is information that the sponsors would particularly like to be emphasised, and typically the facilitator produces this written information in conjunction with relevant advisory organisations.

The monitor farm meetings act as a platform for the exchange of knowledge; indeed the community group and monitor farmer themselves may also be considered important knowledge sources, as described:

> "...hopefully they're there to learn, but they're also there to share their own experiences…And that's what we're trying to encourage them to do. And…once they get going, and they begin to

realise the wealth of knowledge and understanding there is within the group – not from the facilitator" (Facilitator).

Generally this knowledge needs to be combined with other knowledge (e.g. sourced from other farm advisory organisations and farmer friends) before participants decide to implement changes to their farming practice or to adopt innovations. As explained:

> "…that [the monitor farm meeting] would be enough...to set the ball rolling, for them to go out looking for…the information from somebody" (Facilitator)
>
> "I mean, obviously I use...I'll use any information that I can, you know..." (Farmer).

The interviews also describe examples of changes made to farm practice based on the farmers' experience with the monitor farm network. As described:

> "…everybody can do something different...and you've got this kind of great...it's almost like a big experiment for them, and…it's moving them from where they are at with the issues...to try something...it might not be something really radical, but it might...just be a bit of change" (Farmer).

'Innovation' by the monitor farm is therefore encouraged by the facilitator, which includes adopting the Albrecht soil testing system, a paddock or rotational grazing system the use of EBVs and other technology (and weighing/handling systems). These farming practices are not 'brand new', but they can represent a change to farming practice. Nonetheless, whilst the monitor farm meetings can play a key role in initiating innovation adoption and farm practices changes, participants do not limit their information/knowledge sources to those accessed at the monitor farm meetings. Indeed, other key sources of knowledge raised by the interviewees, beyond the monitor farm programme, include internet sources, such as YouTube and online farmer forums, and agricultural shows. In fact, as one monitor farmer explains: "as a source of knowledge, I think it [online farmer forum] surpasses most things...probably even the monitor farm thing, to be honest. It's probably where I get most of my information" (Monitor farmer). Other sources of information identified and utilised by the farming interviewees are considered in Section 5.4.

5.4 The knowledge flows within the monitor farm network

In order to identify relevant information flows, in terms of what information and knowledge[10] is exchanged and between who and in what ways, the interviewees were asked to complete a diagram with regards to an innovation/ new technique they have recently adopted on their farm. They were asked to note the sources of information that they drew on and in what order up to the adoption of the innovation to date. The resulting diagrams highlighted that there was not a single common path that is followed to obtain information, with the farmers drawing on a wide range of sources and at a variety of

[10] According to Davenport and Prusak (1998), information is defined as "data endowed with relevance and purpose" and it is meant to change the way the receiver perceives something, whereas knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information.

times along the path to eventual adoption. The diagrams enabled the researchers to see that the adoption of a new technique or technology is not a linear process in that more than one information source can be, and often is, explored at any one time, and often sources are used at multiple times during the adoption 'process'. Figure 3 below represents a compilation and interpretation of the interviewee diagrams in terms of broad categories of sources of information and the frequency with which these sources were highlighted by the interviewees.

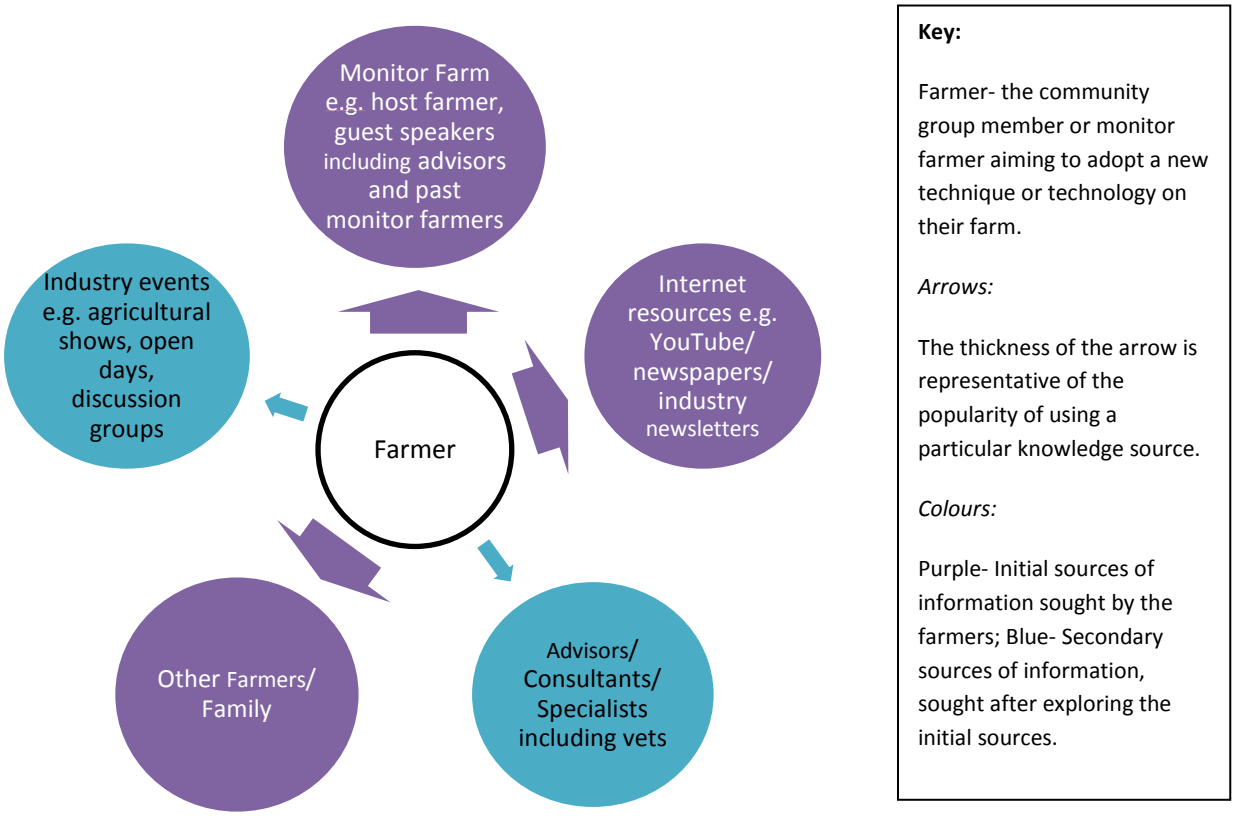

Figure 3: *The major sources of information drawn on by farmers*

The compiled diagram illustrates the apparent importance of the role of other farmers in the adoption of innovation or changing practice by the individual farmers. This finding is supported by the interviewee from QMS, who states that:

> "just before you seal the deal [in this case with a commercial specialist], you start phoning your fellow farmers and so on – 'I'm thinking of doing this, which one do you have, who do you use', and they say...they either ratify that and say 'oh yeah they're good, that's what I've got' or 'no don't go near them'" (External).

Similarly, this interviewee asserts that in many cases "one of the last things you do is you go to your advisor" (External), which is further confirmed in Figure 3. Our interpretation is that farmers tend to go

to the advisor as the final check, but the interviewee could also imply that advisors are not popular as a first source of information.

However, as mentioned, there is no standard direction to the flow of information therefore this cannot be captured in Figure 3, because the sequence in which information is sought differs depending on a number of factors. These factors include the type of knowledge that is desired (e.g. legal or policy advice, or regarding an efficiency innovation), the reasons for wishing to adopt the new technique or technology (e.g. if it is a legal requirement or a voluntary change) and the current farming situation of the adopter (farmer), in terms of how much money and time they are able to commit to the change. The reasons for adopting new farming practices/ innovations are explored in more detail in the following section, in addition to exploring what information is exchanged, who is involved and how the information is exchanged or transferred as a result of participating in the monitor farm programme.

Reasons behind adopting new innovations or farming practices

The PRO AKIS research and the report by Watson Consulting (2014) identified one of the main reasons for farmers to participate in the monitor farm programme was to increase their knowledge. As one interviewee stated: "the main things I'm looking for is to...improve my knowledge and take things back to the farm here that I can maybe implement and...try and do things better myself" (Farmer), in terms of being more efficient with time and money; similarly: "if it's losing me money, I need to get rid of it" (Monitor farmer). This view was prominent amongst the interviews as well as the Watson Consulting report (2014) (see also Section 5.1.3). The monitor farm meetings reportedly act as an effective platform for demonstrating new farming practices and creating new networks between farmers and other farmers or industry that did not exist previously. Interviewees spoke of changing a variety of farming practices such as using Estimated Breeding Values (EBVs) when purchasing bulls to improve technical performance, encouraging newborn calves to suckle at 2 hours after birth to obtain more colostrum, purchasing a 'Combi-Clamp' to make sheep handling more efficient in terms of time and man-power, and moving from their current stocking system to paddock grazing with the hope of improving their grass and animals. All of these farmers credited the monitor farm meetings as playing a major role in terms of initially highlighting these potential new practices to the interviewees.

In addition, in one case a change in farming practice came as a direct result of attending the monitor farm meetings, namely increasing the amount of bulls kept by one interviewed farmer, due to new connections made at the monitor farm meetings. As they explain, "as a result of being part of the group, I ended up supplying heifers to the monitor farm, and also to the monitor farm down in [town]" (Farmer). This is an example of a new business relationship which may not have formed without the monitor farm network.

What type of information is exchanged, in what ways and who is involved?

It appears there is exchange of information on all topics connected to agriculture (topics were defined as those from the PRO AKIS survey[11]) to varying degrees as a result of the monitor farm network and community meetings, be it more formally in terms of lectures, informally during the coffee and meal breaks or at a later date with advisors identified at the monitor farm meetings. As one interviewee highlighted:

> "…the subject areas are fantastic. I think from what we're learning, the feedback between industry and the farmer, and the monitor...is working. A lot more people are asking for a lot more help and support, and maybe questioning the experts more" (Monitor farmer).

Information flow at the monitor farm meetings may therefore be considered not simply a one way transfer from the industry 'experts' to the farmers, but rather a two way flow of information between some of the community group members themselves, with the industry representatives and other participants such as former monitor farmers (see also Table 6).

Information that interviewees took on board from the meetings to subsequently make changes on their farm, included soil sampling and testing, rotational grazing, improvements in cattle rearing and new technological ideas. These new practices are often adopted as a result of network participation, as explained: "they've done it on the back of the monitor farms programme, because they've seen it for a couple of years and they've gone 'yeah, I'm gonna do that'" (Farmer). The information obtained from the meetings may also be studied in conjunction with other sources such as internet resources or advisors, but on occasions (such as in one case with the provision of more colostrum to new born calves pre and post birth) the information provided at the meetings was sufficient for the participant to decide to adopt the changes, thus: "I didn't go anywhere else to find out more about it [about higher colostrum levels] because I trusted what people were saying [the monitor farm vet]" (Farmer).

In terms of how information is exchanged, as well as more formal lecture style sessions during the monitor farm meetings and informal discussions during breaks, information is also exchanged through feedback and conversations between all involved in the meetings. Visual aids such as flipcharts are also used to illustrate the performance of the monitor farm on a specific topic over the course of the programme, for example: "if you've got something that you can check the progress of, from when you were last there each time, then that is real pull...you can see their eyes lighting up, and it's something tangible" (Facilitator). This 'performance' information, in addition to a narrative of the suggestions made regarding new farming practices by the participants, is disseminated through the meeting reports (as detailed in Section 5.1.3). According to the external interviewee, the monitor farm programme is bringing about transformation and change to many farms:

> "…it's changing...the way farmers think and make changes to their business. And it's bringing in (…) loads of other types of major projects, based on the monitor farm's principles. Which – it's so

[11] These topics are: Crop production; Livestock production; Agriculture building design; Book-keeping and Taxes; Machinery; Rural Development; Cross-compliance; Business diversification; Environment; Agri-environmental programmes and Renewables. Further information is available at www.proakis.eu

simple (…) – is just based on a farmer standing in front of another group of farmers saying 'this is what I'm doing, and I think it could work for you" (External).

However it is important to emphasise that the monitor farm meetings themselves do not guarantee changes in the farming practices of participants as this is dependent on the presence of effective speakers and engaged participant farmers before any changes may occur as a result of participating in the meetings. As one interviewee highlighted, rather than concentrating solely on subject matter: "it's more about…getting the right people, 'cause it does sound like the personality of the farmer matters quite a lot..." (External), with regard to ensuring that effective information is exchanged. The monitor farm meetings may therefore be considered as "acting [more] as that little catalyst...to get them to...to make that move" (Facilitator), for example, for participants to conduct further research into new farming practices (with the potential for adoption of these practices) and to make changes to their farming practices. Therefore, the monitor farm programme provides: "…a good reminder...of what...we should and could be doing" (Farmer), in terms of new and improved farming practices.

Furthermore, we investigated through the survey what kind of data and information the participants would like or would have liked the other farmers in their monitor farm group to share (e.g. information that what not currently being shared/ exchanged). Over three quarters of respondents would like/have liked to see the following information shared:

- Figures on financial performance of others' farm business/ farming enterprise (84%);
- Cost savings achieved through more efficient use of key inputs (77%); and
- Experience of innovations implemented on their farms (75%), respectively.

Less than half of the respondents would like/have liked to see yields and sales prices of arable crops (42%) or sales prices for livestock (32%) of other farmers in the group. This might reflect the different sectors in which monitor farms are established, but also the higher interest in financial performance and potential for cost savings as opposed to sales prices.

Figure 4 shows the results by type of respondent. All facilitators in the survey wanted the monitor farm participants to share information on cost savings, whereas a higher share of monitor farmers were interested to see other farmers share figures on the financial performance of their farms. The responses from the management committee expressed a comparatively lower interest in sharing data and information, which could be related to the fact that many of them are already involved in a benchmarking group and perhaps see a benefit of discussing in a subgroup rather than sharing data amongst everyone in the community group. One of the management committee members stated "the group shared various data", and another expressed an interest in sharing production figures.

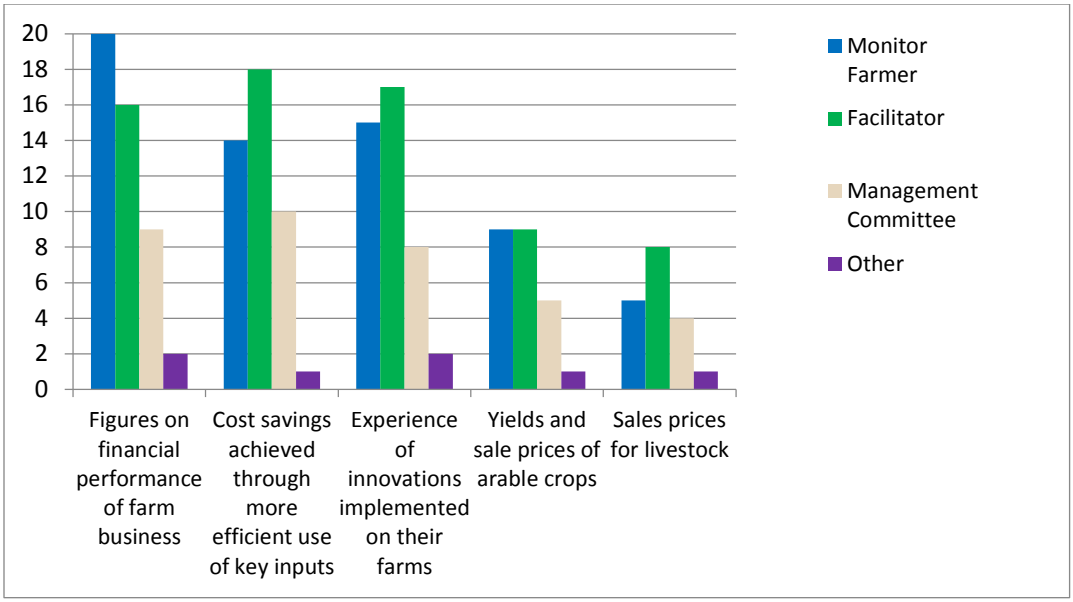

Figure 4: *Number of respondents that would like to see increased information-sharing on five specific topics (n=55)*

Additionally, as explained by a facilitator interviewee, all those who participate in the monitor farm community meetings could be, and often are, involved in this exchange of information (both actual and potential). As this interviewee describes:

> "…because the ones that participate, quite often are the guys...that are more knowledgeable and maybe doing it already, and they're sharing their experiences... [But I] don't think that the quiet ones are a lost cause. Perhaps they're just taking more of it in" (Facilitator).

This interviewee continues and asserts that the 'quiet' participants could in fact be more prone to make changes to their farming practices. Interviewees also described the importance of informal discussions with the host (the monitor farmer), and fellow participant farmers, believing these to be more valuable than the more formal and larger group discussions at the meetings, because: "although they maybe discuss it [a specific topic or query], you...you maybe don't get persuaded enough, just at that one meeting (Farmer).

As such, informal small group discussions can be more beneficial in terms of resulting changes in farming practices. The exchange of knowledge and information connected to the monitor farm meetings can also, in some cases, either extend past the end date of the monitor farm projects or more broadly across the sector, for example, in terms of discussion groups and other new projects/networks. As one interviewee stated: "'cause they've had the monitor experience, they probably will go along to these other new initiatives" (Monitor farmer), in order to obtain more information and knowledge.

6 The performance of the knowledge flows and identification of best-fit practices for advisory services

The discussion below centres on evaluating the network in terms of changes in productivity, sustainability, profit, cost reductions and any other relevant changes to those involved in the network. The potential for ongoing farmer collaboration after the monitor farm project ends will also be highlighted.

Watson Consulting (2014) distinguishes between the benefits and outcomes of co-innovation for the monitor farmer and the wider community group. Monitor farmers considered that the project content was relevant to their farms and most noted that it had initiated changes in their farm practice. They also assessed the projects as having provided a large, diverse range of knowledge transfer activities to be carried out and experienced by the Community Group. Watson Consulting (2014) also state that monitor farmers attributed changes in their farm practice to their Monitor Farm project and evaluate the projects as "universally successful in introducing improved farming practice and enterprise management on the Monitor Farms"(Watson Consulting 2014, p19). The model was found to be effective in encouraging knowledge exchange which in turn is said to be converted into changes in farming practices amongst (almost half of) the target audience of Community Group members (ibid.).

Many of the Monitor Farmers interviewed by Watson Consulting (2014) reported an increase in monitoring and recording of farm performance and stated that they now paid closer attention to the collection and application of information on key inputs, outputs and productivity on their farms. In addition, many of the monitor farms interviewed by Watson Consulting (2014) had adopted learning from a wide range of trials conducted on their farm and then demonstrated this to the wider community group. This was also the goal of the two farms investigated within the PRO AKIS interviews, as described: "often what you are doing is showing them [the community group] a proven solution, showing something...that has been done somewhere else, and that works" (External-AC). Given that the two monitor farms investigated are only halfway through the process it is difficult to comment on their levels of monitoring and farm performance recording, but it is hoped that similar findings will be identified on Hartbush and Arnprior in due course. In addition both Watson Consulting and a number of the interviewees reported valuable learning from visits to downstream processing facilities leading to better understanding of the impact of animal welfare and nutrition on the quality and usability of carcasses.

According to Watson Consulting (2014), several community group chairs commented that it was difficult to attribute change to the monitor farm projects as quantifiable data on uptake of ideas and practice by the community groups had not been collected by the facilitators, which it is noted as necessary to consider for future monitor farm programmes. However some positive effects on productivity, delivering cost-savings, increasing turnover, increasing profit and financial performance were more pronounced among monitor farmers than only community member farmers (Watson Consulting, 2014). This again was a similar finding in the interviews, with the greatest changes to farming practices to date apparently being made by the monitor farmers themselves. Nonetheless, neither respondents to the survey by

Watson Consulting nor the PRO AKIS interviewees were able to quantify the effects of their participation in the monitor farm network on key measures of financial performance. This is a wish by the funders, QMS, for future monitor farm programmes:

> "We want to work these guys really hard…what they do need to do, is get better organised and...and so that [the facilitators] can maybe say 'well, we need ten of you, at the next meeting, to bring your figures...so that we can really…work out exactly how we're going to improve...this guy'. Because if it's all based on gut instinct and feel, you'll never really...you'll never really move the thing on enough" (External).

In order to achieve future farming practice innovations, the ability to quantify financial benefits from participation in the monitor farm network may in turn be viewed as a distinct prerequisite innovation.

Both the Watson Consulting (2014) report and the interviewees highlighted a number of social outputs from the monitor farm programme; whether they can be considered 'social innovations' requires further discussion and comparison with other case studies in the PRO AKIS project. As mentioned in Section 5.1.3, the sociable situation and atmosphere at the monitor farm community meetings is perceived by interviewees as a key benefit of participation:

> "Well it's quite social, that's...I suppose that's the good thing about it. In that, you get there, and you get a chance to actually talk to other farmers and...if you're covering a hot topic…the farmer might ask a question, you can... bounce questions off him…I think that's probably its greatest strength" (External).

The social nature of the meetings has contributed to participants becoming more likely to engage in networks, having taken up leadership or representative roles, becoming more confident at speaking in public, being more willing to adopt new farming methods, and being more willing to share learning, information and practices with others (Watson Consulting 2014). Two key social outputs noted by the PRO AKIS interviewees are the new connections between farmers in a local area and the development of industry networks, which may be defined as 'innovative'. How such connections are maintained and their longevity may be considered as the next stage in this key innovative process.

In addition to benefits, the interviewees raise several limitations with the monitor farm programme, including the short timeframe of the programme, issues with the recruitment process and community group set-up in terms of a variety of knowledge needs, as well as a potential lack of engagement with and a lack of coverage of key topics, such as agri-environmental issues (as mentioned in section 5.1.2). For example, one facilitator emphasised that the monitor farm programme should really be a ten year process as "it's going to take us fully three years, to perhaps map out...the direction" (Facilitator), indicating that perhaps the group and the monitor farm will not reach their full potential within the three years of funding which are assigned to the monitor farms. Differing opinions on the duration of the monitor farm programme were reflected in the survey which showed that respondents were split between assessing the duration of the monitor farm programme to be 'just right' and wanting it to be longer (Figure 5). Among the facilitators, the opinion which dominated was that the programme had the

appropriate duration. In contrast, slightly more management committee members believed that the programme should be longer. None of the respondents thought the programme should be shorter.

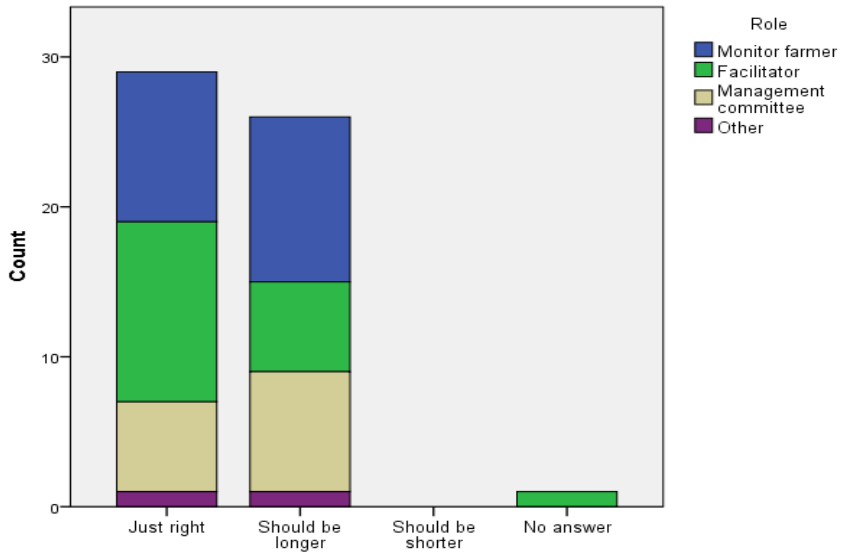

Figure 5: *Opinion on the duration of the monitor farm project (n=57)*

A further critical factor influencing the success of the process is the selection and recruitment of the monitor farmer themselves. As one facilitator explains:

> "…perhaps the selection of the monitor farmer is not quite right, and he's not keen enough to do that, you know, open up to...all that information. Or, even if he is, and...he's maybe not receptive to people suggesting he does things differently" (Facilitator).

In other words, it can be considered that the success of the monitor farm programme is dependent on the willingness and receptiveness of the monitor farmer. Similarly if the monitor farmer does not have good communication levels with the community group or the facilitator, then the process may be less effective in terms of knowledge transfer. The learning potential is further limited by the fact that the way the programme is organised provides information and advice at a group rather than an individual level, therefore: "you can only really move that discussion at the pace of the slowest member of your group" (External).

A variety of views were expressed regarding future collaboration amongst the monitor farm participants, following the end of the funding programme. Some were very hopeful for maintaining a discussion group; for example:

> "I'd like to see people staying together, and sharing their ideas and...what's happened over the year, and think of ways to improve. Just... much the same, but maybe on a smaller scale" (Farmer).

Others, however, were more sceptical that a farmer-led collaboration would materialise or be sustainable:

> "without these initiatives, like monitor farms and business improvement groups, I don't think they would ever get there" (Facilitator).

These views highlight the important role that the monitor farm programme has played, and continues to play, in igniting farmer collaboration in certain areas. However, as emphasised by the QMS interviewee, despite the benefits to the monitor farm and communities, these areas will not receive repeat funding during the next programme, thus:

> "No, that's definitely not the deal. And...we can't afford to do that…and it's not fair on everywhere else that hasn't had one…[However] We've got a map of Scotland, which shows the influence of the monitor farms programme… Well there isn't a part of Scotland that hasn't been touched" (External).

Similarly, many of the community group interviewees believe that continuing the same monitor farm networks once the funding ends may be unnecessary, because "these things...have a lifespan" (Farmer).

Nonetheless, community group interviewees agree that participation in the monitor farm meetings has made it easier to create informal networks, based on stronger social links between local farmers and key industry stakeholders, as explained:

> "…because we'll know each other better and, you know, if we see each other, at certain things…you might get together on other things" (Farmer).

> "I think [when the programme funding finishes]...there'll be a lot of the group, [who] will find it an awful lot easier to phone up other members of the group, and to ask questions, socialise" (Farmer).

However, whilst a more structured, self-organised discussion group is unlikely to follow the formal monitor farm funding programme without facilitation support, the interviewees express hope that informal farmer collaboration will continue, in terms of information and knowledge exchange, building on the links established by the monitor farm network.

7 Conclusions

In Scotland, the Monitor Farm Programme was selected as an example of a rural, rather than solely an agricultural, innovation network where diverse actors come together to share information, knowledge and experience, and address selected production-related problems of the 'monitor farmer'. Monitor farms are not currently part of the EIP-Agri network and do not receive direct Rural Development Programme funding, but instead are funded by the Scottish Government and industry partners such as Quality Meat Scotland. The monitoring of inputs, outputs and management actions allows members of the monitor farm 'community' to observe the impact of changes on the monitor farm so that they are supported in their own decision making and implementation of innovations. The communication and knowledge sharing process helps to increase farmers' capacities to test and implement practice changes. In addition to participating 'community member' farmers, monitor farms are supported by local

businesses such as providers of animal feed stuffs and additives, auctioneers and valuers, seed and grain merchants, accountancy and business services, veterinarians, abattoirs, accountants, livestock associations, and rural insurance (as recorded by Scottish Government, 2010) which indicates their relevance as rural (beyond purely agricultural) networks.

Our conclusions, regarding which features of the rural network enhance farmers' ability to co-innovate with other actors, are structured around the research questions posed in the Introduction. They cover (a) the factors that influence farmer motivation to enrol in the network; (b) how these networks link to existing knowledge infrastructures and advisory services; (c) factors that influence the network's stability; and (d) the extent to which networks contribute to productivity and sustainability through innovation.

The interviewees highlight three main **motivations** to participate in the monitor farm programme (i.e. factors that influence farmers' enrolment in the network), as outlined in Section 5.1.3. Firstly, the monitor farm programme provides an opportunity to gain new knowledge and information through on-farm demonstrations, trials and visits. It may be interpreted that the participating farmers find their experience of the monitor farm programme a more holistic learning environment than, for example, solely speaking to an agricultural advisor. Monitor farm meetings enable practical illustration and informal discussion regarding the broad range of topics and issues that confront livestock farmers (in this case) in the local area.

Secondly, and associated with this initial motivation, is the fact that participation in the monitor farm programme is free and only requires investment of time and travel costs, which is considered to be more cost effective than paying for other agricultural advisory services by interviewees. This is in contrast with the aims of the monitor farm programme (as stated by the programme funders and reiterated by the interviewees; see section 5.1.2) which does not explicitly focus on the provision agricultural advice.

Thirdly, a key motivation as highlighted by the interviewees (see also Watson Consulting, 2014) is the social aspect to the monitor farm network, which contributes to boosting participation rates, overcoming farmer isolation, as well as building new, and reinforcing existing, connections between farmers in a local area, both on a personal and business level. The interviewees explain that they also benefit from the opportunity to share struggles, questions, ideas and solutions, whilst also benefitting from a type of informal 'benchmarking' through participation. This aspect of farm business comparison (especially regarding finances) is reiterated by the QMS interviewee as being of value to the success of the programme, and an aspect that the funder hopes to develop in future programmes, in order to contribute further to underpinning farm profitability. Indeed, the examples described throughout the interviews of knowledge exchange and learning appears to meet the aims and objectives of the monitor farm programme, as well as the motivations for participation in the network by the farmers.

The monitor farm network presents many **links to existing knowledge infrastructures and advisory services**, not least through the facilitators, funders, invited community group meeting speakers, and through visits 'off-farm', for example to related industries and other (monitor) farms. Links are also developed through previous network participants moving into different roles within the industry, for

example into NFUS. Therefore, as well as the network continuing to build links and gain from current knowledge infrastructures and advisory services, through participation in the community group meetings by established agricultural advisors and specialists with agricultural expertise, the monitor farm programme itself has influenced these infrastructures and advisory services. This finding demonstrates that the network is successful in providing learning, building learning, and developing business and social connections that may contribute to industry development in the future. The monitor farm networks may be considered to bridge two gaps within the existing knowledge infrastructure, firstly through providing free and sociable events for the local farming community (which are a considerable draw, illustrated through high participation rates), and secondly through providing information which may be traditionally obtained through contact with various advisory services, as well as translating it into practical on-farm demonstrations.

Nonetheless, the impact of the monitor farm network may be limited by the three year timescale of the funding for individual monitor farms. This view was reinforced by the survey results whereby half of the respondents wished the programme was longer in its duration. Furthermore, some of the interviewees suggest a six month 'nursery period' between the farmers and the facilitators, as 'a stepping stone' into the project. This lead-in period would aim to increase the productivity during the formal programme, overcoming a reported lack of familiarity amongst all involved in the monitor farm, and in terms of expectations of participants during the community group meetings. Furthermore, the key factor for the stability of the network is the funding period. There is no evidence to date that any of the monitor farm groups have continued beyond the duration of the programme. Although an informal network is likely to continue to exist, the monitor farm network appears to rely on the impetus of a facilitator to organise meetings, speakers and topics. It could be argued that the programme's purpose is to initiate exchange and learning in various locations, rather than the permanent establishment of groups.

The monitor farm network case study demonstrates that there is scope to improve future monitor farms. Firstly, the **extent to which the network ultimately contributes to productivity and sustainability** is difficult to assess due to a lack of data. We expect it to be highest on the monitor farm itself, followed by those farmers who have had more intensive involvement (e.g., management group, arable business group). Recording changes in farming practice, adoption of technologies and social innovations is crucial to capture the extent to which the network contributes to productivity and sustainability through innovation. The need for monitoring and recording of impacts has also been recognised in programme evaluations (Watson Consulting 2014).

Secondly, there are a number of minor adjustments that could be experimented with in future. These include:

- Shifting the topics covered during the monitor farm meetings from 'of farmer interest' to 'of farmer need', i.e. selecting topics with regard to knowledge gaps and deficiencies by farmers. This selection may not be as straightforward as at present, and may require greater external influence, because the farmers themselves may not be best placed to identify appropriate topics.
- Exploring the potential for the facilitator to be chosen after the recruitment of the monitor farmer in order to maximise the farmer-led and bottom up features of the network. This could

provide a more tailored service and overcome issues surrounding the relationship between the facilitator and the monitor farmer, as discussed in Section 5.1.3.

- Making budgetary expectations of the programme clear and agree with the monitor farmer before commencement, as the outgoings during the period of the programme were reported to have been higher than anticipated. Nonetheless, given the aims of the monitor farm programme, these short term costs should lead to long term gain in terms of profitability and efficiency for the monitor farmer.
- Ensuring sufficient and high quality learning opportunities, for example, by selecting a monitor farm that is at a standard in terms of farming practice that the participating farming community can relate to, but ensuring that there are opportunities available to improve the farming practice. This approach assumes that a farm with greater room for improvement may offer more learning benefits, however, it may also then be more difficult to recruit a monitor farmer.

In summary, there are a number of **features of the monitor farm network that help to enhance farmer's ability to co-innovate** with other actors, and many of these could be transferrable to other agricultural or rural networks, both nationally and internationally. The first feature is the provision of a holistic learning experience coupled with succinct and continuous delivery of information, such as through the meeting reports, the use of flipcharts to display on-farm data during meetings, the promotion and advertising of upcoming meetings, and follow up press reports. The knowledge transfer features of this network contribute agricultural knowledge and information beyond solely the network's participants, thereby furthering opportunities for co-innovation and collaboration.

A second feature is the underlying principle of 'open-mindedness' and a willingness to consider different farming practices and innovation potential by the monitor farmer and community. This is considered 'challenging', but it is essential to the success of the programme. This feature of the network ('open-minded participation with a willingness to be challenged') therefore provides the greatest opportunity for learning by the monitor farmer and community group, according to the interviewees.

A third important feature is the benefit to the monitor farmer of obtaining different viewpoints on current and potential farming practices. It may be assumed that opportunities for co-innovation may be enhanced through the sharing of different perspectives and opinions on farming practices. Based on the survey responses where the majority considered the composition of participants in their monitor farm project as appropriate, we could assume this sharing to take place on most farms. However, there are reports from the two farms investigated that the balance has not yet been achieved regarding the mutual sharing of ideas, with the monitor farmers expressing a sense that they are required to maintain a level of openness that is not matched by input from the community group. This should be resolved in future programmes to enhance this feature, for example through a more explicit link to the Business Improvement Groups/ Arable Business Groups or through encouraging the gathering and sharing of benchmarking data by all participants.

Finally, and critically, 'good' communication is highlighted as a key feature of the monitor farm network that contributes to the potential for collaboration and co-innovation (as described in section 5.1.3). Communication channels must be established and maintained between the monitor farmer and the

facilitator, between the facilitator and community group, between all members of the management group (including facilitator and monitor farmer), and between the monitor farmer and the funder. The farmer-led approach to planning the monitor farm community group meetings (i.e. in terms of topic focus) is an example of constructive communication, ensuring that the meetings are relevant and interesting to the participants. As mentioned, communication of the outcomes of the monitor farm meetings and successes of changes to farming practice on the monitor farm, beyond the network of participating farmers is also important in terms of enhancing the potential for collaboration and co-innovation of farmers with other actors.

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