



**EVALUATING THE IMPACTS OF COVID-19
ON KNOWLEDGE EXCHANGE IN AGRICULTURE
STAKEHOLDER INTERVIEW ANALYSIS
FINAL REPORT
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Highlights

Sixteen semi-structured interviews with key AKIS stakeholders were conducted and analysed. A number of interconnected themes were identified (and supported in the survey and workshop analysis). The main points raised for each theme in the interviews are as follows:

Access and Engagement: The AKIS community has responded to restrictions in face-face activities with increased online provision. This is seen to be largely positive, enabling greater access and opening up new information sources for farmers and other stakeholders. The numbers and diversity of people engaging has increased offering more inclusion, however, equally, there is a risk of exclusion for some farmers due to poor broadband connectivity and a preference/unwillingness to engage.

Adaptability, digital literacy and confidence: A 'digital re-set' in the AKIS community was described for some. Farmers have generally been adaptable and positively engaging with new KE arrangements (digital and hybrid). However, there is a cohort of farmers who lack confidence and digital skills.

Social interaction and shared learning: There was a strong consensus that online delivery cannot replicate the peer to peer learning that happens in face-to-face events, nor provide social benefits for isolated farmers. Many farmers and stakeholder value and miss social interaction.

Adapting to digital – using digital tools effectively: KE approaches have been adapted extensively over the last year and several examples of creative hybrid activities where face-to-face and online are combined to complement each other were described.

Robust and trusted information: Although ensuring credible and trusted information in online delivery is important, especially given the plethora of news sources, respondents suggested that existing principles of trust would translate to the online arena.

Connectedness and fragmentation: Online provision allows KE stakeholders to be better connected through enhanced networking opportunities, however, it also creates additional fragmentation in the AKIS as there are now multiple platforms as well as providers.

Providers: impacts, responses and implications: Online and hybrid provision has allowed more efficient use of resources and flexible planning for a number of organisations. However, it is demanding on capacities and capabilities and the need to professionalise and upskill was emphasised.

Future innovation/Implications for future delivery: Although digital tools and media have been widely embraced and offer many learning opportunities and other benefits, KE will need to be flexible and responsive, and depend on objective, context and audience. There was universal agreement that the future of KE will be balanced between face-to-face and online provision (hybrid) but this needs to be delivered well and adequately resourced.

Future opportunities: Building on the lessons and skills learned so far will be important, as will fostering the digital re-set and reappraisal of requirements in the AKIS that COVID-19 has prompted. Managing knowledge and coordinating delivery will be key to avoid further fragmentation.

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1. Introduction

COVID-19 has disrupted the normal way information and advice is shared and accessed in agriculture in the UK, most fundamentally by restricting face-to-face interaction. It has also brought new opportunities for the use of digital media and tools. This research aims to examine responses to COVID-19 in the UK Agricultural Knowledge and Innovation System (AKIS), specifically asking: How is the AKIS responding and what are the implications and opportunities for the future.

A rapid appraisal methodology, using an online survey, a workshop and semi-structured interviews consulting farmers and key AKIS stakeholders, was undertaken in the period Feb-April 2021, which was underpinned by two overarching questions:

- What has been the impact of COVID-19 on knowledge exchange activities?
- What are the opportunities for future knowledge exchange activities?

Although knowledge exchange activities are the main focus of the research, the research is underpinned by the AKIS framework, defined as: a system of diverse actors from the private, public and non-profit sectors that links people and organizations to generate, share and utilize agriculture-related technology, knowledge and information (Birner et al., 2009)¹.

As such, the research is concerned with both knowledge exchange activities (KE) and with the wider system in which they are situated. It asks: how are stakeholders responding to restrictions on face-to-face interaction? How are they adapting to digital ways of communicating? What has been the impact on knowledge flows? What are the opportunities for future digital delivery that can facilitate interactive knowledge sharing, learning and innovation? What are the AKIS responses more widely in terms of adaptability, governance, connectedness and innovation capacities?

This report presents the analysis for the interviews, it complements analysis presented in two accompanying reports (survey and workshop) and a synthesis report.

The findings of this research will be used to inform the co-design of an online platform in the Farm-PEP project that allows the agricultural sector to collaborate and share knowledge.

2. Methodology

Project approach

A rapid appraisal methodology of the AKIS drawing on Schut et al (2015)² was conducted using complementary methods of an online survey targeted at farmers and a workshop and semi-structured interviews with key AKIS stakeholders. The survey was oriented towards the farmer community, while the workshop and interviews aimed to consult stakeholders representing organisations engaged in KE delivery across the AKIS, although it recognised that the boundary, between those who produce and

¹ Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., ... Benin, S. (2009). From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services worldwide. *Journal of Agricultural Education and Extension*, 15, 341–355.

² Schut, M., Klerkx, L., Rodenburg, J., Kayeke, J., Hinnou, L.C., Raboanarielina, C.M., Adegbola, P.Y., van Ast, A. and Bastiaans, L., 2015. RAAIS: Rapid Appraisal of Agricultural Innovation Systems (Part I). A diagnostic tool for integrated analysis of complex problems and innovation capacity. *Agricultural Systems*, 132, pp.1-11.

provide information and advice and those who use it, is diffuse³. The survey collected farmer (together with stakeholders) experiences and adaptations with respect to KE activities, the stakeholder consultations examined KE providers' perspectives and their adaptabilities and capacities (and implications for the AKIS overall). This combination of quantitative and qualitative methods allows a broad understanding of patterns of KE delivery and use (survey) together with an in-depth analysis of these patterns (workshop and interviews). Clearly an online survey precludes those farmers, who cannot or will not engage digitally, from responding. This was addressed by asking some questions about broader issues in farming and giving them the opportunity to add additional comments and answer the open question at the end. Furthermore, participants in the workshop and interviews were specifically asked to consider farmers who do not engage digitally.

These methods were run sequentially (with some overlap between the workshop and interviews) each validating, and steering the other through iterative analysis (Fig 1). The survey analysis provided insights for structuring (and seeking feedback at) the workshop, while the survey and workshop analysis informed the interviews. Themes identified in the survey formed the basis for the subsequent analysis.

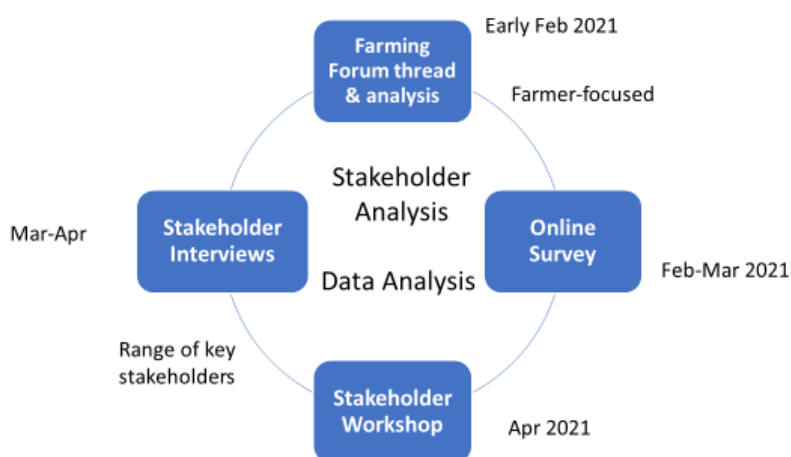


Figure 1 The main phases of the rapid appraisal methodology

A rapid stakeholder analysis was carried out in consultation with project partners and members of the steering committee, which involved a mapping exercise framed around categories identified previously (Knierim et al., 2017)⁴, shown in Table 1 in blue. Each grey cell was populated by the team with a number of organisation and stakeholder names. This provided a sampling framework for the survey, workshop and interviews.

³ Stakeholder represent Innovation Support Services (ISS), a term that refers to organisations and activities which make innovation happen by fostering interactions and co-constructing knowledge between provider and beneficiary.

⁴ Knierim, A., Labarthe, P., Laurent, C., Prager, K., Kania, J., Madureira, L. and Ndah, T.H., 2017. Pluralism of agricultural advisory service providers—Facts and insights from Europe. *Journal of Rural Studies*, 55, pp.45-58.

		FARM SECTOR			
		Arable & horticulture	Livestock & Grassland	All, mixed systems	Env
AKIS CATEGORY	AKIS SUB CATEGORY				
PUBLIC SECTOR	Policy/context setting				
	Advisory services (incl levy board KE)				
PRIVATE SECTOR	Advisory services				
	Agri-tech/digital businesses and services				
FARMER BASED ORGANISATIONS	Unions, Cooperatives Buying groups, Clusters				
NETWORKS/ PARTNERSHIPS	Farmer centric networks & partnership initiatives				
NGOS & CHARITIES	Initiatives with non-commercial aims				
RESEARCH & EDUCATION	Universities, HE				
MEDIA	Farming press/online forums				

Table 1. Stakeholder analysis framework

Details of the methods and analysis are given in the respective reports. All methods were designed iteratively with project partners. In designing the online survey, The Farming Forum analytical tool FarmIQ and a discussion thread was initiated to identify any particular trends in KE activities or topics of concern in the farming community which needed to consider. The workshop questions and the interview schedules were designed according to: the aims of the project, the inputs from the survey analysis and with reference to key elements of the AKIS such as capacity and governance (Birner et al., 2009).

Interview methods

Sixteen semi-structured interviews were undertaken with a range of stakeholders purposely selected to represent a cross section of knowledge exchange activities in the AKIS, according to the stakeholder analysis sampling framework (Table 2).

The interview questions were framed around the two key questions of the rapid appraisal:

- What has been the impact of COVID-19 on knowledge exchange activities and the AKIS more widely?
- What are the opportunities for future knowledge exchange activities and the AKIS more widely?

Participant Number	Sector	Stakeholder Category
ADAS_01	Agronomy	Independent adviser
ADAS_02	Agronomy	Agri-Chem
ADAS_03	Advisory	Advisory Service
ADAS_04	Advisory	Advisory Service
ADAS_05	Livestock	Independent adviser
ADAS_06	Livestock	Independent adviser
ADAS_07	Horticulture	Advisory
ADAS_08	Fertiliser	Agri-Chem
ADAS_09	Environment	Advisory (NGO)
CCRI_10	Livestock	NGO, advisory
CCRI_11	All	Agri-tech networking
CCRI_12	Crops	Media (Press)
CCRI_13	All	Media (Online forum)
CCRI_14	All	Farmer membership organisation
CCRI_15	All	Data management
CCRI_16	All	Policy maker

Table 2. List of interview participants

The interviews were recorded, transcribed and analysed (with consent of individuals) to look for common themes (extending those from the survey analysis). These interlinked themes reflect and expand on those which came out of the survey and workshop analysis, as shown in Figure 2. These are discussed in the following sections.

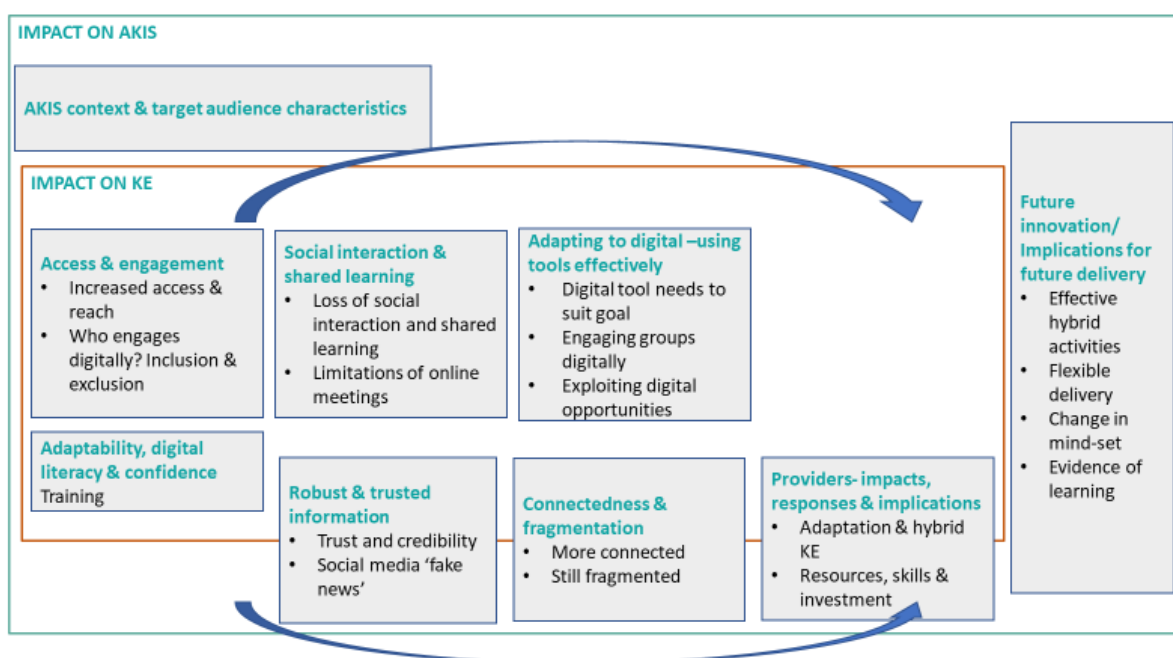


Figure 2: Key themes revealed in the analysis

3. AKIS context and target audience

This theme (which is specific to the interview analysis) looks at the AKIS context, the scope of activities and the target audience. Interviewees were asked about their views on, and their role in, the AKIS, 'to set the scene'.

Diversity

The diversity in KE actors and activities is illustrated in the list below of stakeholders interviewed. This spans from traditional advisory services to NGOs, and emerging agritech networking and data management intermediaries. It also illustrates the range in KE approaches and the significance placed on interactive innovation approaches such as field labs and monitor farms across the AKIS.

- traditional advisory services (private, independent and public advisers) providing face-to-face advice on farm to a range of mainstream sectors and the environment)
- levy bodies and NGOs with established interactive KE activities (participatory approaches, monitor farms)
- agritech networking organisations linking different businesses (previously using face-to-face meetings)
- media – online discussion forum and farming press
- data organisations who act as intermediaries between supply chain and farmers
- farmer membership organisation with 550, 000 business members, lobbying and supporting activities such as CFE
- policy maker

AKIS characteristics

The AKIS was described as fragmented with multiple providers not acting in an integrated way. The disconnection between public and private research and KE was also highlighted. Some interviewees point to the sophisticated KE approach of commercial companies when they launch products, for example, compared to the outreach of publicly funded research, which struggles to get to farmers, and cannot easily be reported in the agricultural press. The point was also raised that some private online services are charged for. Another interviewee described the multiplication of providers in the environment domain, despite attempts to bring them together under one umbrella. Non- traditional organisations are emerging as important players in the AKIS such as intermediary networking organisations, data management services, agritech businesses and online farmer forums.

The influence of providers was perceived to be different depending on the domain: type of knowledge the mode of delivery, and the audience. For example, AHDB are viewed as a major player due to the target audience of levy payers and their emphasis on KE. Equally, The Farming Forum plays an influential role facilitating informal peer to peer online exchange, with 32,000 active members and daily visits by 30-50,000 farmers.

Characteristics of audiences

The scope of the target audiences of the stakeholder organisations involved in the interviews is indicative of the AKIS as whole, it covers:

- Advisory services interviewees tended to perceive their audiences as innovative, progressive and as seeking to learn new information.

- Networking (agritech) organisation members were described by interviewees as more forward-thinking farmers that are used to “pushing their own boundaries and kind of thinking outside the box”.
- NGOs that engage farmer networks describe their farmers as often more progressive in the sense that they are interested in regenerative agriculture, conservation and soil health.
- The media (press and online forum) represent all types of farmer businesses although the online platform has an audience that can engage digitally.
- The farmer member organisation represents all size and types of farm businesses, although their council, regional and county representatives often come from larger businesses.

Policy - innovation and adoption

Interviewees reminded us that the policy environment is in transition in the UK and this has an impact on policy goals, KE approaches and as well as the capacities and motivations of the KE organisations and the farming community. The policy interviewee explained that there is no knowledge exchange policy per se in England, but that the R&D innovation programme is relevant and sits within the overall agricultural transition, and the future for farming food and the environment, programme. They described the main principles:

“Within that, there are core principles of how do we go about policy and delivery. And one of those is co-design... So, a co- designed user led model for knowledge exchange is about saying to farmers, what works for you, what would make it easy for you to, you know, take on or take up these novel approaches and accelerate adoption across the sector ...” Policy maker 16

The aims of the R&D programme, to deliver productivity and sustainability goals through the three stranded farming innovation pathways, were also described. The focus of the third strand, which is on using knowledge exchange effectively post-project to accelerate adoption, is particularly relevant to this study, as the participant explained: “It’s [the strand] about trialling evidence, evaluation, knowledge exchange adoption outcomes” with an emphasis on communicating and demonstrating real world benefits to farmers. The participant continued:

“[we ask] how do we support sharing of that information, how do we enable farmers to access the information in a way that’s not written by academics, but it’s written in a way that speaks to farmers, makes it easy for them to understand the benefits to them as users and farmers, and then gets this kit or process much more widely adopted much quicker than normal” Policy maker 16

Policy - the needs of target audiences

Stakeholders agreed that any discussion of KE should be considered against the backdrop of the transition in payments, the introduction of ELMs, and the post -Brexit trade negotiations, since COVID-19 is not the only driver determining change in the AKIS. Knowledge exchange is regarded as a priority in this context and supporting all farmers is seen as the responsibility of all:

“I mean, I think from our point of view, as representing all farmers, including probably some of those farmers who aren’t engaged, I think we were probably aware that a lot of them are blissfully unaware of what is coming down the track [post Brexit]... So I think we probably are engaging with researchers and knowledge exchange type activity to try and get the combined brainpower of everybody involved to think about that group.... as an organisation we wouldn’t want to see them just left behind” Farmer membership organisation 14

4. Access and Engagement

Greater access and opening up knowledge

The way in which COVID-19 has led to an increase in online events, particularly webinars, was viewed as positively impacting farmers and the wider industry. This has also opened up access to experts within UK and internationally. A strong theme relating to the benefits of COVID-19 restrictions, is convenience, reduced need to travel to events meaning that farmers are no longer constrained by location. This increased access to information through online events, has been popular among farmers and is viewed as being a permanent change beyond COVID-19, as demonstrated in this quotation:

“We started all this [webinars] because of COVID but obviously if COVID goes away we’ll carry on doing it because you’re able to get farms in Cornwall, Lincolnshire on the computer at the same time, in real time, that we could never do before” Horticulture Advisory 7

There have been noticeable benefits for providers as they can extend their reach beyond a limited geographical area (meetings and trials). They have attracted more people than previous face-to-face events and feedback has been positive, especially from those who could not previously attend due to distance and time. Private industry stakeholders remarked that they have managed to engage a wider audience. However, an agri-chem representative questioned how many farmers were attending webinars compared to the wider industry stakeholders (employees from organisations or independent consultants).

It was noted that the hosting of online meetings or webinars was positively received by the industry as a way of adapting work practices to overcome the challenges of face-to-face restrictions. There is an acceptance of the situation and an appreciation that more people can be reached: “I think we’ve all missed the face-to-face, but actually I think we’ve all appreciated the fact that we couldn’t do face-to-face and we probably got to a wider audience” (Agri-Chem 2).

Increased reach but depth of engagement questioned

Some of the interviewees have monitored the amount of views or listens that a podcast or webinar receives and have recorded significant increases in numbers attending, for example, events pre-pandemic that may have attracted 20-30 attendees have increased to ‘literally hundreds’ and some webinars and podcasts have received over 800 views. These numbers were supported by statistics from traffic on online interactive forums: “We saw that same step change, about 15% of traffic just went up across the board, Farmers are just doing more online” (Media Online Forum 13). However, formal monitoring or the effectiveness of online events was not being extensively undertaken by all those interviewed.

Furthermore, questions were raised about how effective the engagement is when such large numbers are involved. It was suggested that some people may have a webinar on in the background whilst completing other tasks and not engage, as illustrated by the quotation below. Therefore, although the viewing figures can be perceived as being high, if participants are passively engaging then it is important to investigate the effectiveness of their participation:

“So I think, people got to the point, with some webinars that they were sort of just, you know, they were kind of just prepared to tune in and listen, and not really, necessarily participate in chat” Advisory NGO 9

Who engages digitally? Inclusion and exclusion

Overall there is a sense of positive engagement and experiences among farmers, with many now being comfortable about going online. Sectors cannot be characterised and stereotypical views of livestock farmers being less engaged were queried. The farmer online forum, for example, has more active livestock farmers than arable, as they tend to join for social benefits while some livestock sectors are further ahead in digitalising than many cereal farms. Horticulture was highlighted as a sector which has always had a lot more technology, however it appears that individual preference is more influential than sector in deciding whether to engage:

“There's a portion of the population farming community, though, you know, absolutely loving the fact that more things are online. And then there's definitely a fraction that, you know, lump that” Advisory NGO 10

In some more progressive businesses, they are already competent and engaging online is not a barrier:

“We deal with people that are, you know, continually innovating or producing new digital products. That's something they're already used to. But I think overall, it's definitely pushed everybody's boundaries” Agritech networking 11

Inclusion - reaching new people

The numbers and diversity of people engaging has increased with more online provision attracting people who would/could not attend meetings previously so, according to one participant: “you're reaching a different audience you haven't engaged with before”. Participants also remarked that activities moving online has forced people to become ‘digitally savvy.’ Furthermore, the online environment provides a safe/anonymous forum for some: “it might empower some people who wouldn't necessarily speak up in a meeting, maybe feel more empowered to put their hand up” (Farmer membership organisation 14). This was reported for technical questions for example:

“So we don't obviously tend to get a lot of questions, because people perhaps don't want to ask something that they think is a silly question ...whereas when you're behind the screen, and no one else can see what you've asked, or who's asked it, then, yeah, we tend to get some of the well, say, for example, an hour long webinar, we might get more questions in, whereas if you're in a room of people, you might be lucky to get two questions” Agri-Chem 8

Exclusion - disengaged

However, there will be individuals who will not engage due to personal preference, for example, more traditional farmers or those lacking confidence/digital skills (see next theme). Rural broadband remains a significant barrier especially for live streaming events in some regions:

“Broadband is the biggest issue and with teams in large meetings sometimes you lose bandwidth. In rural areas internet is not very good. And you lose the personal feel because you everyone switches the camera off, so you get more bandwidth and you're not sure whether anyone's there. When you when you present you kind of look at your audience and you can pick up stuff. You can see he's not interested and trying to engage them or get the audience involved” Agri-Chem 2

There is also a group that would not have attended face-to-face meetings and will not attend online. Additionally, it was noted that farmers could suffer from online fatigue due to the significant number of online events, as well as find it difficult to decide which is the most suitable for them to attend. The difficulty of attracting the disengaged when they are not identifiable was highlighted:

“So the digital world has made me realise that the ones we are communicating with are very digitally connected when you start seeing the same names and places ... But then we you never see the ones on the digital media aren't connected in that way” Advisory NGO 10

5. Adaptability, digital literacy and confidence

Digital re-set but not for everyone

Interviewees agreed that COVID-19 has certainly accelerated change and focused people's minds on the digital technology availability and the ability to use it, something that would not have happened otherwise. Some farmers are thought to have been historically slow to adopt some digital services: "I think farmers were a little bit behind the curve in terms of sort of online peer to peer networks" (Media Online forum 13). However, COVID has forced farmers to change and this has improved their digital literacy skills making them more technology aware and more capable, according to this interviewee:

"And in more than one way, because what it's also caused people to do is have to embrace digital. So two years ago, if you'd asked the farmer about zoom, or teams, he would not have known what he talked about. Now, they will know exactly what you're talking about, and have probably used it. Yeah. So what it has done is put a fantastic digital reset into the community. And it's made people more technology aware, and more capable, through necessity of using the technology and have available to them, which wouldn't have happened without COVID"
Data management 15

Participants typically described the process of having to learn and adapt to new technology as an inevitability that has been accelerated by COVID-19 but a number of them cautioned that farmers who were less IT capable or engaged could be left behind:

"We are forced down using it more like say for example we have a WhatsApp group for our clients and you can see you know the more IT savvy clients like that sort of thing, But the less IT savvy clients could too since then get left behind because they don't use that information and we have to be very careful as a company when we send that information out by that route, not all our clients will receive it and that, that can create uncertainties" Independent adviser 1

Participants reported that the industry had responded well to having to use online tools more frequently but it was noted that it could be due to the demographic of the groups they support:

"I think because there's been so many webinars and things in the last year and I haven't given them any specific instructions or training on zoom, I think they've just picked it up. To be honest, most of the guys I deal with are reasonably young, you know, there's a few that are probably my age, you know, mid 50s sort of thing. But most of them are younger than that. So and then, you know, they've got their phones, they're all on social media, they picked it up fairly well really to be honest with you. I don't know, the only thing that's the only thing that holds a few of them back is the broadband". Independent adviser 6

However, a view repeated by some interviewees is that farmers are able to join (where connectivity allows) but do not want to in many cases: "I do think we're at the point where technology isn't the limitation anymore...I don't think it's possible to farm in 2021, without an enabled device of some kind" (Media Online forum 13). This is supported by two interviewees who suggested that farmers may be self-excluding from online learning:

"I think that some [farmers] of them are maybe more confident about using technology. At the outset some of them had no idea. But there's always a kind of continuum you know there are some people who just don't do techie stuff". Independent adviser 5

"I think there's some [farmers] that aren't too comfortable with it [online], so it's harder to build that kind of rapport with them. It seems to kind of stay for more stilted for longer than I think we'll do in person, and perhaps some people aren't as comfortable talking about more personal stuff I think there's just a kind of perhaps a slight nervousness about you know, and some of them say, is this being recorded or I don't want anyone to see this". Advisory NGO 9

6. Social Interaction

Loss of social interaction and shared learning

Typically the social interaction element of face-to-face knowledge exchange is reported as important to the farming community. It is felt that online cannot replicate the peer to peer learning that happens in face-to-face events, and the opportunity to socialise with other farmers was viewed by many participants as an important element. Interviewees described farmers as isolated and that the 'down time' of face-to-face events was important providing social benefits and the chance for spontaneous conversations with their peers:

"I think if you probably asked the farmers this as well, they just miss the social. It's a key part of knowledge exchange activities, and particularly the peer to peer stuff it's also very much a social thing. I don't think I don't think we should underestimate that. I think it's it fundamentally actually is part of these kind of businesses where, you know, you're not in an office, you may only have family members, particularly in the red meat sectors, as any family members of staff bracket, and a lot of them if you ask them why attend or why come to these meetings, the social side is quite high up as well as the learning is and you think that's kind of because farming is as a job is quite isolating" Independent adviser 5

"I do hope we go back to face-to-face because there is a multitude of approaches, isn't it? And lots of people respond in lots of ways to information and building knowledge at different times. So I do really believe in the value of peer to peer learning and face-to-face because you, you just get to dig into things a lot more, like tactile and physical. We are like social creatures" Advisory NGO 10

"You know when they're doing group trials for example, any farmer will tell you that it's not just about the information they get from it, but it's the whole element of that social interaction with the, with the group. It's this group of like minded people coming together, and just the talking that banter exchange of ideas that they get so much more out of it. And it goes beyond just the data itself, and the results of whatever they're trialling, and you can't quite put your finger on it. And that is the element that you simply cannot replace through any other medium apart from farmers, physically getting together and talking to each other" Media (Press) 12

It was also noted that people providing KE on-farm are also offering social support and networks to more isolated farmers. This was viewed as important for mental health of the farming community and particularly in the current agricultural context, with COVID-19 and Brexit transition worries common among farmers.

Face-to-face meetings are equally important for connecting progressive farmers who gain a lot from meetings, picking up business information and ideas. "It's a huge basis of exchanging ideas you know they hear from other farmers what they're doing and they take those ideas home and they put them into practice on their farm" (Media Press 12).

In-field interaction

The need for interaction in the field was also highlighted as important in understanding the farm environment, whether in one-to-one advice or in bigger groups. One interviewee thought that the decision-making process with farmers can be longer by having to do things online because spontaneous discussion is lost:

"If you're, out in a field and say they've got a stream or something, and you're talking about buffering it or not buffering it or doing a different type of crop in that field or something, it's a

lot easier when you're both sort of looking at it, and you can kind of chat about options there. And then if you're not together, I suppose then afterwards, you'd have to follow up, but you might not have that kind of to and fro conversation then or it might be quite stilted, you know, it might take longer to go through a few options" Advisory NGO 9

For the agricultural press respondent, who prepares profiles of farmer cases stories by visiting farms, it is hard to really understand a farmer's experience unless it is face-to-face: "you can do it over the phone or zoom, but you don't get the same feeling, you don't get as good an article" (Media Press 12). They continued:

"That [online] is not the farmers' natural environment... it's not until you actually get out onto the farm, and you get them into their natural environment, that's where the story always comes out...You're not getting right into what makes the farmer tick, what their passions are, and things like that. And that's the, that's the essential difference that comes up, comes across, when you're actually on their farm in that situation". Media (Press) 12

These problems can be addressed to some extent when advisers have longstanding, established relationships with farmers. For example, familiarity with the farmer or grower was highlighted as a benefit by the horticultural attendee, who remarked that moving KE online has been successful for him, partially due to the knowledge that he has of the growers beforehand. Other interviewees had longstanding relationships with their group of farmers, and they thought that online events were useful in retaining engagement of their groups.

Limitations of online meetings for social interaction

For those who do not have a prior relationship with the group or the audience they are intending to engage, there is a perception that it is difficult to build a rapport with farmers online, this is especially difficulty in building new relationships with farmers through online events.

Some stakeholders are missing personal contact and networking that usually happens around meetings. For example, journalists cannot now attend press briefings which provide valuable insights through social interaction:

"So you've come away from it with a really good rounded idea of what the story is and what all the angles are behind it [...whereas with zoom...] you don't get the insight into the industry that you do from these get-togethers, and so that's something that agricultural journalists, technical journalists are really missing at the moment" Media (Press) 12

Online events are "no replacement for actually .. seeing people and the interaction that you get from that and also the feeling, you know, you get the mood of the industry". Although it is acknowledged that you can attend several webinars in one day and pick up a lot of information.

For others, digital delivery is seen as a springboard as it can help to connect people and launch new contacts:

"Certainly, from experience, from our events, digitally, we've seen a lot more interactions, like through in the chat, it's a really good springboard, I think, for people to share their experiences, that you just haven't got that available in a physical format [which is] I think in a way a bit more passive. Just the engagement happens differently" Agritech networking 11

For those in alternative supply networks which have sprung up, knowledge is circulating in a different way. There is a 'huge amount' of Google searching and internet resources that have been needed to support them in trying to identify the right people or support networks.

7. Adapting to digital – using digital tools effectively

Delivery needs to be suited to the aim of the meeting, form of knowledge being communicated, the context and audience. Interviewees reported that they adapted the design of online and hybrid events. They agreed that digital delivery can be effective for many KT activities but there are intangible elements of KE that can only be captured in the field or farm visits, as noted above.

Engaging groups digitally – enabling social interaction

Getting the right platform to enable networking and creating a good digital social experience was identified as important by a number of interviewees. Some stakeholders have had good experiences with certain platforms and received positive feedback, however, it was emphasised that you cannot just replicate a physical event online:

“We had a day long conference ... you could almost get the bonus that you get from a physical event where you can see a lot of people chatting and interacting. We've been able to kind of successfully replicate that as much as possible in the digital format” Agritech networking 11

“People are missing face-to-face events. Because there's all these anecdotal conversations that you'd have, you know, in the queue to go to lunch or whatever, there is no way you can replicate that and, you know, aware of that, yeah, something I think in our events we've been really careful to do is just not bluntly replicate what a physical event is to digital because it just doesn't work... so it's about taking a completely different approach” Agritech networking 11

“I think it can work if people understand how to use the chat function, I could start to engage more that way. But then you can quite often see quite a lively chat going on” Farmer membership organisation 14

It is also thought possible to create a community of practice around a particular online facility, with a sense of loyalty. One participant described the The Farming Forum as:

“A classic sort of replicating what you get in the farmer groups or whatever in the, in, in a virtual world if you like,... if you're a regular user you get to know people and you get to know what their points of view are and why they say particular things” Media (Press) 12

Interviewees agreed that it is important to create a good online experience because if farmers think that they have had a negative experience, “they won't necessarily come back, and that can rub off the and affect the sector as a whole, so it's in everyone's interest to run a good event”. This extends to making it as easy as possible for farmers to register and join events.

Adapting- exploiting digital opportunities

Participants concurred that digital tools can be used effectively for KT. Providers are conscious of the number of events online, and some offer shorter more targeted events, such as a one-hour express format which makes it easier for people to fit it into their day. This is particularly suits a KT style of delivery.

Interviewees also agreed that it is essential that farmers can find information easily, by signposting- using videos and podcasts and ensuring the information is easily accessible to farmers. One participant remarked that the style of communication is also important, suggesting that while KT is generally delivered ‘in the third person’, KE online should aim for ‘first person’, to personalise the message and experience.

Hybrid/blended approaches

Providers of KE have adapted delivery over the last year based on their own experiences and feedback from audiences. Several examples of hybrid activities where face-to-face and online are combined to complement each other were described. Most of these are non-simultaneous activities with organisations or advisers using pre-recorded videos, as well as short WhatsApp messages as useful tools that can provide farm group members with information ahead of or after a farm visit:

“So we kind of have pivoted, and we've got now like an online e-learning platform...trying to allow farmers to still do the farm walk when we can't do it in person. So they've got their pre-recorded video and had the farmer talking to a group as if they were there, and they tune in for a set period of time” Advisory NGO 10

The event below was created to comply within COVID guidelines but farmers were able to meet on-farm:

“I did a mini podcast with the host farmer where he could give a lot of background information and just talk about the system and send that to the farmers that they could listen to before the meeting or in the car journey to the meeting. And then we literally had, I think, two, two and a half hours on farm, just to really see the farm to walk the farm. And, and to allow the group to ask the farmers questions. And then rather than having a sum up and the big kind of hour, hour and a half chat afterwards, I put the farmers to do an online feedback survey tool... I love the idea that when people were traveling to the farm, they had time to listen to it”. Independent adviser 5

This demonstrates the adaptability of the interviewee and the extent of preparation needed. The gathering of data beforehand was viewed as an effective way to ensure that the group did not spend a significant amount of time on farm. Additionally, the interviewee said that online feedback has been more successful than the traditional feedback forms (handed to farmers to complete at the end of an event as farmers were given time to reflect and the anonymity allowed them to more honest without the feeling of being watched whilst completing the feedback.

It is also pointed out by one participant that it is important to provide a follow up afterwards to optimise online events by creating a 'long tail' or lifespan for information:

“The key really to, to not think your job is done. When you finish the event, your job is done when it's written up and published in multiple places...the key learnings are to be as inclusive, repetitive, get things out as far and wide as possible” Media (Online forum) 13

Others agreed that publications online after an event can multiply the number of beneficiaries significantly and continue to outscale information and have an impact after the event. Another remark was

These flexible arrangements were also described by individual advisers who are still visiting farms using digital tools to support their work:

“In terms of how we transfer information to our clients has probably not radically changed, we still have to go to farm and look at the crops and see the crops and discuss with farmers but more online with them. We don't go to farm offices as much but meet people outside. Gatekeeper where I used to go sit in his desk in the office and sort it out and I'll log onto his computer remotely and sort it out using teams, it works really well” Independent adviser 1

Only one example was given of a simultaneous online and in field activity where a technical adviser had relayed live photos of crops from the field to demonstrate plant disease.

8. Robust and trusted information

Trust and credibility

Robust and trusted information was highlighted as an issue in the survey due to more information coming from new online sources. Supporting this, one interviewee highlighted the difficulty to validate information on the internet and that this is something people are conscious about when watching webinars from unfamiliar worldwide sources:

“All of a sudden we’re speaking to people in Australia, America and the UK based research organisations are possibly being put on the back foot by this and are behind in that knowledge, which brings massive issues because I have trust in UK based research organisations and suddenly I’m sat watching a webinar with an American guy talking away who I don’t know and I need to verify his information. I need to understand what he’s telling me and so the trust levels in the information being received nowadays from my own point of view are much lower”

Independent adviser 1

However, interviewees did not express strong opinions about this and felt that farmers could be discerning, also that credibility was perceived differently by different stakeholders, as this remark illustrates:

“It’s more about relatability, isn’t it? for them? That’s very credible. But for us, it might not necessarily be credible. And then the generally I find farmers will be quite aware of that’s coming from something they’re trying to sell me something. Yeah. which is one of your first principles, credible, critical, vested interest....Whether they’re getting that [information] from, you know, the classic farming press like the Farmer Guardian, or from their own sort of specific topic. Because it is a different kind of credible, isn’t it? from a research perspective, you think, you know, n equals one was but you know, there’s still it’s true for that guy” Advisory NGO 10

The extent to which these principles of trust translate to the online arena is interesting to explore. One view was that it is important that scientific and technical accuracy are presented, as well as farmer experiences, whether in publications or online. For example, for farmers to be able to communicate their own trials online using videos they need to show the scientific integrity and robust data behind the trial as well as their own experience and observations.

In terms of trust, participants noted that a lot of pre-COVID KE activities were built on trust and these would continue, such as the one-to-one adviser relationship or sharing experiences in participatory groups. In the agricultural press, for example, trust was described as being important in terms of being true to the contributors and ensuring that they have been correctly represented as well as building a reputation for your magazine by ‘going the extra mile’. As the press interviewee remarked: “I think people do trust the editorial, we’ve got quite a good reputation for editorial integrity and technical accuracy”. This is the same with ensuring transparency about the magazines relationships with commercial firms that advertise with them, and they “try to be as open and honest as possible”.

Self-regulation was described among farmers who engage with the online forum as a way of validating information, as this participant explained with reference to discussion threads: “Basically, it works on a feedback loop for the forum. So good content receives the most likes”. In this way it is not heavily moderated but relies more on the farmers’ ‘honest opinion’.

9. Connectedness and fragmentation

More connections

Overall there is a sense of stakeholders being better connected and linked up, enabled by digital tools and media, as well as having access to more sources of information. One participant suggested that “because of all these webinars and online events, it’s almost a node for people to go to, and see and talk to people, which would have been really difficult physically”. For intermediary and networking organisations, participants explain that this is their aim, to create new initiatives and partnerships:

“People come to us through, you know, to be open to new connection with, with other people... certainly, from experience, from our events, digitally, we’ve seen a lot more interactions”
Agritech networking 11

However, this connectedness does not appear to translate into greater integration in terms of more coherent or coordinated activities for delivery, although there are some areas which have emerged as a focus point for some integration, for example ELMs:

“I think there has been attempts to be more coherent, there’s definitely movements in the regenerative farming organic sector to try and coalesce around ELMs. ELMs has definitely brought people together” Advisory NGO 10

Still fragmented

Despite this connectedness, increased online provision is seen by some to create additional complications to the existing fragmentation in the AKIS as there are now multiple platforms as well as providers. For KE providers and other professionals the amount of online activity can be overwhelming, making it hard to keep up and “you can’t switch the digital world off”.

Independent advisers and agronomists still have an important role, particularly as farmers face a large amount of information from multiple (and competitive) sources and, according to one interviewee: “maybe feel a bit of dissatisfaction with the level of quality of information that they get from some organisations”. This remark suggesting that farmers often return to their adviser when they are faced with too much information, resonates with the comments about trust above:

“We’re more and more competing for advice now... I think what we’ve got at the moment is a lot of info in silos. I think a lot of people will listen to various people and then go to their agronomists. We debate on re gen about how much we talk about it with our audience ‘cause it’s so trendy but probably 90% of our audience aren’t ready to hear it yet. Yeah, they want to have solutions from the can and stuff, so it’s a tricky one”. Agri-Chem 2

The proliferation of information online is regarded as a challenge for farmers and providers alike. It was pointed out that a lot of online material can get lost. For example, the lifespan of a discussion thread on an online forum was described as typically 20 mins. The view was therefore that there should be ways of ensuring information remains accessible, in a forum context, this would mean that a certain topic would have to keep “bubbling to the surface so people can find it”, according to one interviewee.

10. Providers: impacts, responses and implications

Implications for business

For some organisations there have been more business opportunities following increased digitalisation of delivery, for example, for those concerned with data management:

“Well, from our perspective, it's been relatively positive. As things have become more digital as contact between people has reduced, there's been a bigger demand to do things remotely and, you know, certainly, in terms of data exchange, then that's at the forefront of what we do. And we've been supporting some significant developments in the sector to bring forward plans, as they had to reduce those some sorts of interactions” Data management 15

According to one participant, the online forum for farmers has also benefited from an increase in customers wanting to advertise due to restrictions on agricultural shows which has released a budget for online advertising.

More efficient use of resources and flexible planning

A key impact for providers has been the cost and time savings of the new arrangements. For example, a horticulture consultant reported that by using technology he is able to decide whether it makes business sense to visit a potential client:

“Especially with new people you get a lot of information before you actually do the visit. Now, you can get a really good grounding with a, you know, a short Whatsapp Video and discussion about the basic production and marketing sort of issues and what they hope to do and whether it's realistic or not. And you could do all that before you travel. And do you drive all the way down somewhere and find the person you're going to see as a complete no hope so, you know, obviously we can be a bit more selective”. Horticulture Advisory 7

Participants described the opportunity for reducing costs and pressure on staff (and achieve a wider reach) compared to a previously inefficient system of extensive travel to meetings, where there was poor attendance. Those who worked for farmer-funded organisations also questioned the value for money:

“The amount of hours that XXX staff spend on the road driving to deliver a three hour meeting and then drive hours back, you spend nine hours away from home, and you've spent two and a half hours in that meeting. That's not the most useful use of levy payers money. And it's not necessarily worth the benefit to maybe those 15 people who turned up to that event or 20 people that turned up to that event. So we do have a responsibility to keep getting smarter about how we do this. And we're definitely well on track to improving, and we've made a big, big jump forward” Advisory Service 3

Another interviewee concurred, concluding that digital delivery will continue, although recognised the challenge this represents for reaching all farmers:

“Digital is probably going to be the future of our delivery...b But yeah, I think that the issue where we're all toying with as an organisation is how you reach people, the people you've missed, who, who don't, don't know how to use zoom, or teams, or don't always go online” Advisory Service 14

New analytical tools

Participants pointed out that analytics are now available to monitor activity at digital events, by tracking the number of interactions and connections that people have made. This provides valuable information not previously available. It is possible to see “who has really engaged, for example, track

the average time that people have been listening into a session". These analytical tools are valued by providers as they can help to target activities and make them more responsive to people needs.

The potential for online forums to use analytics to identify trends and natural language processing to target messages was also highlighted. Through this, according to one interviewee, with the right data it is possible to use AI to undertake profiling and target messages towards certain individuals and even potentially reach the more disengaged:

"I think the key thing with knowledge transfer these days is identifying who you want to hit....Digital does actually enable you to get to some of those guys who won't pick up the magazine every week, probably aren't reading anything over social media. But if they're there, and you know where they are, and you know how they farm, and you take time to learn who they are and what they do, and listen to them" Policy maker 16

Capacities and capabilities

Demanding on skills and time

Several interviewees mentioned that their organisations had some online presence or ambitions previously but that COVID-19 had accelerated these. In response they have 'upped their game', or 'pivoted' very quickly.

"All of our events used to be physical events face-to-face. Since COVID, we've had to change that quite drastically. It was in our pipeline to try digital events. But that was more, you know, a long term as part of our long term strategy ... So it's been a steep learning curve for the whole team" Agritech networking 11

"So in terms of kind of the infrastructure that was there and the capacities and the skills of the staff. It was it was latent" Advisory NGO 10

This has been demanding on skills and capacities but, on the whole, providers have been agile and adaptable and as one participant said they "deserve a pat on the back". Most KE providers interviewed do not seem to have had training but have been learning on the job: "I've managed to like, well started to learn how to facilitate online groups and do workshops, deal but online which has mixed results" (Advisory NGO). Those people in organisations with skills in videos, editing and social media tactics have been in demand.

Need to professionalise and upskill

There is acknowledgement that KE providers have had to (and will in the future) have to upskill and professionalise. Those putting video content online, for example, have had to purchase new equipment and undertake training in video making, as they recognise that their previous efforts were 'amateurish':

"We're going to need probably training up people to like, really continue doing so you can do more of the blended approaches and more digital expertise. I don't think we can, like I've accepted I'm going to need to get better at doing recording and digital media and like facilitating stuff" Advisory NGO 10

Different organisations will need to professionalise in different ways, for example, networking organisations realise they need to push the boundaries to gain an advantage when competing for an audience in the online world of intermediaries:

"We want to be able to provide that additional level of networking and engagement that, you know, people may not be necessarily finding elsewhere". Agritech networking 11

11. Future innovation/Implications for future delivery

Hybrid activities

All participants identified that the future of KE is likely to be more balanced between face-to-face and online KE provision. The adaptation and innovation reported by the interviewees in their response to COVID-19 could be viewed as an important process in this respect.

“Everybody seems to have come on board and embrace the opportunity. But people definitely miss these face-to-face events. And, you know, once we come out of all of this, we will, we'll definitely carry on doing digital. But, you know, managing this balance between digital and physical will be a conversation I think we'll be having in the summer” Agritech networking 11

How this balance is managed is a point of debate. Although digital delivery has been widely embraced and offers many learning opportunities, this is not the only route for the future as many farmers prefer face-to-face events or are unable to interact online, as this remark explains:

“So the challenge now is about finding the right balance between physical and digital activity. With digital activity, we've found people engaged with us who have never been to events because they couldn't spare the time. And they didn't, they didn't want to, but they found the digital. So it's been a great learning. They will watch it a webinar in their own time, the legacy of the webinars is something that we're valuing, which, obviously, with the physical event, once it's over, it's over. And that's been really good. The challenge now is that we know that there have been a number of people who were used to the discussion group, the farm activity, and they liked that farm meetings, and they haven't interacted with digital and also in an agricultural community, not everybody has the kind of internet access that makes it easy. So, we know that there are still lots of farmers who have not been able to interact with what we've been doing” Advisory Service 3

Regarding running hybrid events, there was concern that simultaneous events with both online and physical provision at the same time risks that neither is done very well, also it would be resource intensive.

Bigger questions are also being asked at the organisational level, as the opportunity to have greater reach and save costs has to be weighed up against the audiences' preferences, needs, and benefits:

“We have always struggled with funding, the way we did, we did delivery, it was on a regional basis with funding coordinators to run farm events. And actually, a lot of those I think, tended to just be for the farm adviser network and only a couple of farmers. So actually, by running more of an online event, anyone in the country can attend, we are probably going to stick with that way of delivery, because it does make more sense financially” Farmer membership organisation 14

“I think I mean, as a [farmer] membership organisation, I think the other thing we're weighing up is how that has impact on people who pay their subs. Some of them will still want that physical contact. So a lot of our staff on the ground still feel that there is benefit in actually going to meet members and talking to them. So some of that will probably still continue” Farmer membership organisation 14

It was also noted that face-to-face connections are an important way to gauge the needs of the community. Where these are reduced, there is a need to ensure feedback from the farm continues, to make sure that, as one participant put it, “we're doing things that the membership wants us to do”.

Change in mind set/approach/reappraisal

There is a sense that with everything else going on, the pandemic has accelerated people's thinking about a number of things (digital, climate change) and a common sentiment is “we can't go back to

the way things worked before". For some, this is seen as beneficial: "Crisis drives step change, and forces change upon things. And I think in a good way". Certainly, according to this participant, with increased digital delivery it has opened up opportunities and new ways of thinking: "There's so much content available. Now, that was trickier to access beforehand. And yeah, it's just opened Pandora's box of thinking new approaches new practices" (Agritech networking 11).

The pandemic has also prompted a reappraisal of the challenges and the associated knowledge requirements:

"And I think, at this stage, the metrics we've used in the past around productivity and production, won't be the metrics we use in the future so that everybody will have to change how they're measured. So it's I do think accelerating the way people are starting to look at productivity to think about the climate and to be more environmentally sustainable" Data management 15

There is recognition as well that we need to understand how new digital and hybrid KE influence farmers' decision making and behaviours. This is an ongoing question for KE providers but has greater resonance now in a context of accelerated digitalisation, as one interviewee remarked: "It's something pre-lockdown that we struggled with, like how do you measure whether someone coming to an event makes changes within their business?" (Farmer membership organisation 14).

Managing information and integrating platforms

There was support for development of a one-stop-shop interactive platform online but there was also concern that if post-COVID there is a return to normal practice, then the capacity and funds to maintain any new platform might be lost, as seen with multiple similar initiatives.

12. Synthesis and future opportunities

Synthesis

There was strong overlap between the themes described above, as illustrated in the Figure 1. The same themes emerged from the analysis of the data from the survey, workshop and interviews, thus providing a level of consensus and validation. Although there was consensus, there was a different emphasis given to some themes, and specific issues raised, by the two key groups of respondents (farmers and other stakeholders). A synthesis is provided in a separate report combining the analysis from all three data sources.

Future opportunities

There have been high levels of adaptability and positive engagement with online KE delivery since COVID-19 restrictions started, and an appreciation of the many benefits it provides. This presents a number of opportunities, however, when planning KE delivery in the future, it is important that the needs and preferences of all farmers and sectors are recognised. Key opportunities are outlined in the separate synthesis report.