

OFFICIAL FEEDBACK FORM

DIALOGUE DATE	Wednesday, 19 May 2021 14:00 GMT +01:00
DIALOGUE TITLE	The evolving role of an effective Agricultural Knowledge and Innovation System (AKIS) within a sustainable food system
CONVENED BY	Dr. Stan Lalor, Teagasc
DIALOGUE EVENT PAGE	https://summitdialogues.org/dialogue/16087/
DIALOGUE TYPE	Independent
GEOGRAPHICAL FOCUS	Ireland

The outcomes from a Food Systems Summit Dialogue will be of use in developing the pathway to sustainable food systems within the locality in which they take place. They will be a valuable contribution to the national pathways and also of interest to the different workstreams preparing for the Summit: the Action Tracks, Scientific Groups and Champions as well as for other Dialogues.

1. PARTICIPATION

TOTAL NUMBER OF PARTICIPANTS

71

PARTICIPATION BY AGE RANGE

0-18

2

19-30

42

31-50

27

51-65

66-80

80+

PARTICIPATION BY GENDER

43 Male

28 Female

Prefer not to say or Other

NUMBER OF PARTICIPANTS IN EACH SECTOR

22 Agriculture/crops

Fish and aquaculture

4 Livestock

Agro-forestry

3 Environment and ecology

Trade and commerce

8 Education

5 Communication

1 Food processing

Food retail, markets

5 Food industry

2 Financial Services

Health care

1 Nutrition

5 National or local government

Utilities

Industrial

Other

NUMBER OF PARTICIPANTS FROM EACH STAKEHOLDER GROUP

3 Small/medium enterprise/artisan

7 Large national business

1 Multi-national corporation

1 Small-scale farmer

Medium-scale farmer

Large-scale farmer

Local Non-Governmental Organization

3 International Non-Governmental Organization

Indigenous People

10 Science and academia

Workers and trade union

Member of Parliament

Local authority

32 Government and national institution

Regional economic community

United Nations

1 International financial institution

3 Private Foundation / Partnership / Alliance

Consumer group

Other

2. PRINCIPLES OF ENGAGEMENT

HOW DID YOU ORGANIZE THE DIALOGUE SO THAT THE PRINCIPLES WERE INCORPORATED, REINFORCED AND ENHANCED?

Each of the Principles were highlighted in the opening comments by the convenor at the start of the Dialogue, and all the discussion facilitators were briefed in advance to champion the Principles within the discussion sessions.

HOW DID YOUR DIALOGUE REFLECT SPECIFIC ASPECTS OF THE PRINCIPLES?

The Dialogue included a wide and diverse group of individuals that represented the range and variety of actors that participate in the Agricultural Knowledge and Innovative System (AKIS).

DO YOU HAVE ADVICE FOR OTHER DIALOGUE CONVENORS ABOUT APPRECIATING THE PRINCIPLES OF ENGAGEMENT?

Having participants aware in advance of the background to the discussion topic was useful to help to make good use of time during the break-out discussions.

3. METHOD

The outcomes of a Dialogue are influenced by the method that is used.

DID YOU USE THE SAME METHOD AS RECOMMENDED BY THE CONVENORS REFERENCE MANUAL?

Yes

No

4. DIALOGUE FOCUS & OUTCOMES

MAJOR FOCUS

The focus of the Dialogue was to explore the importance of an effective Agricultural Knowledge and Innovation System (AKIS) in order to support sustainable food systems in the future. The AKIS is a complex and inclusive network or system of actors that collectively participate, interact and contribute to the generation and flow of information and knowledge, and the creation and implementation of innovations within the food system.

The scope of the AKIS is very broad. It extends beyond the more traditional model of top-down or linear knowledge flow from research to knowledge transfer actors to farmers. The AKIS is inclusive of the broader end-user concept that includes not only farmers, but also the wider impact on consumers, rural communities and society in general. It also includes a broad and complex pool of actors that have a role in the agri-food chain through policy; regulation, funding bodies, research; advisors; education, farmers, professional services, financial services, input suppliers, media, food processors, consumers and society.

The goal of having a more sustainable food system will require the generation and application of knowledge and innovations to an extent that surpasses what we do currently. All of the Action Tracks identified require multi-actor participation. The AKIS has a significant role to play in achieving this by providing the framework through which the actors can work together.

Within this dialogue, six aspects of the AKIS were explored and discussed as key elements to how the AKIS can be developed in the future. These areas were: 1) diversity within the AKIS; 2) attracting talented people into careers within the AKIS; 3) training and skills development within the AKIS; 4) how data and digital tools can empower the AKIS; 5) facilitating innovation; and 6) ensuring the AKIS is fast and effective in achieving changes towards sustainable food systems. Six separate break-out discussions were held on each of the above topics. The approach adopted involved the setting of a 'vision statement' for the topic, followed by the discussion around the actions and challenges in achieving this vision statement by 2030.

A keynote session also preceded the break-out discussions. The keynote was conducted as a conversation with two international experts on the topic of the AKIS; Ms. Inge Van Oost, DG Agri European Commission; and Prof. Dr. Andrea Knierrim, University of Hohenheim, Germany. The objective of the keynote session was to introduce the AKIS to the participants and to explore how the AKIS in Ireland compares to other countries, and to understand the policy and regulatory instruments that are in place now and into the future to support the development of the AKIS.

ACTION TRACKS

- ✓ Action Track 1: Ensure access to safe and nutritious food for all
- ✓ Action Track 2: Shift to sustainable consumption patterns
- ✓ Action Track 3: Boost nature-positive production
- ✓ Action Track 4: Advance equitable livelihoods
- ✓ Action Track 5: Build resilience to vulnerabilities, shocks and stress

KEYWORDS

- ✓ Finance
- ✓ Innovation
- Human rights
- ✓ Women & Youth Empowerment
- ✓ Policy
- ✓ Data & Evidence
- Governance
- Trade-offs
- ✓ Environment and Climate

MAIN FINDINGS

Creating an effective AKIS is a significant challenge in the context of the wide diversity of knowledge and actors involved. Developing more sustainable food systems requires many elements to be connected in a cohesive and collaborative way in order to make progress across all of the Actions Tracks identified. The discussion highlighted that we do not know precisely what we need in the future in terms of information, innovations, etc. However, we can be sure that we will be required to continually adapt our Food Systems, and the ability to have a structure in place by way of a well-functioning AKIS, can help ensure that we have the capability to adapt to emerging challenges. We cannot depend on traditional top-down information flows. We need to adopt a more 'multi-actor' approach in problem solving, innovating and implementing new practices.

The development of an effective AKIS is well recognised and supported within the policy framework as the need for faster delivery of utilisable information, practices and technologies to end-users continues to increase. Challenges within Food systems are becoming more complex, and require faster and well-integrated solutions. Amongst the initiatives currently supported by policy are the Operational Groups within the European Innovation Partnership (EIP) network.

Studies that evaluated and compared the AKIS across countries have identified that Ireland as well as other countries such as Austria do already have a strong and integrated AKIS when compared to some other countries. However, the discussion highlighted the need to continue to build on this. Areas of development should include:

- widening the reach to farmers beyond those currently engaged with public and private advisory services;
- broadening our understanding of the AKIS to be wider than just agriculture to include a more inclusive engagement of rural areas, communities and citizens; and
- utilising more 'multi-actor' approaches in order to improve collaborations and connections to provide innovations and solutions.

A key overall outcome of the discussion was a recognition that ideas and solutions can arise from people within any branch of the AKIS. The challenge for the AKIS is to be able to provide an inclusive platform whereby ideas can be connected to the capacity to develop these ideas and innovations into actions.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 1/6

DISCUSSION TOPIC 1:

"An inclusive AKIS which bridges science and offers appropriate knowledge support for the diverse agri-food rural actors".

Everyone recognised that we are not yet where we need to be in terms of a diverse and inclusive AKIS. Key actions arising from the discussion included:

Key Actions:

- Integrating the whole farm family rather than just focusing on the one, usually patriarchal, landowner. This can be done by integrating women and young farmers through discussion groups, KT consultations, and recognition on correspondence related to the farm. The farming media can play a significant role here in reversing the usually male-dominated stereotype. There is a need to focus on integrating women more for future resilience and young farmers for generational renewal and innovation.
- Need to dispel misinformation and bring all members of the chain, including consumers, together so the context is known, trust is built and knowledge sharing increased and consistent across the chain. This would strengthen the networks within the AKIS. Further mapping is needed to identify who is missing in the AKIS and to be able to demonstrate at a local level a specific AKIS and the actors involved.
- Need to engage with the youth from a young age and a lot of work is already ongoing in this area (for example, Food Buddies at national school level). However, divergence emerged where where secondary school level is where the messaging of agriculture can be lost, with an example emerging of secondary school teachers not wanting Agricultural science or any integration of Agriculture in their school because of their perception of its destructive nature. This needs to be addressed.
- There is a time lag for young farmers from when they complete their education to actually getting the farm – so additional professional training is needed here to bridge this gap.
- Knowledge sharing remains the biggest challenge, particularly from private consultants who feel they are not getting enough information to disseminate from research and demonstration farms – these links need to be strengthened to build and strengthen links within the AKIS.

Key Challenges:

- Knowledge sharing remains a big challenge between AKIS actors, consumers and consistent messaging but there is a cohort of farmers that do not want to engage (not specifically age related) – how do we reach these?
- Need for more co-operation and collaboration across the chain and the AKIS: Building trust and transparency takes time – how to do this?
- The AKIS focuses solely on agriculture but it does encompass everything rural (the ARKIS) – we must not forget the bigger picture e.g. rural development and the role of the LEADER programme in supporting rural communities & on-farm diversification.
- There needs to be respect in terms of the farming community and their own knowledge. They are not just vessels looking for information - they have their own tacit knowledge, which is valuable and must be treated accordingly.
- Young farmers are most likely to be innovative but how do we promote generational renewal and succession planning to get the land into their hands? Can we use the Rural Development programme?
- Veterinary services can be more recognised in terms of contribution to the value chain. There is scope for more knowledge transfer using evidence-based research within this area. The AKIS currently identifies them more as a service provider, but their role knowledge transfer can be strengthened and more recognised.
- Curriculums at school level are perceived as old and need to be updated – to include the whole food system, rural communities and the AKIS.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 2/6

DISCUSSION TOPIC 2:

"The AKIS attracts talented people who hold the relevant attributes, skills and ambition, into exciting rewarding careers. These talents will continue to transform our food systems."

Summary Feedback:

People who move into a career in agriculture are personally motivated by this and are potentially more aligned to the work they do than possibly in other careers. Therefore it is fair to conclude that most people who move into a career in agriculture want to stay in it. The group felt that a career in agriculture is attractive, exciting, flexible, progressive but that it can also be very challenging, pressurised and political. High application numbers for graduate programmes was highlighted as an example of the high demand that can arise from people seeking roles in the sector.

The group agreed that depending on the role you play in the sector, there can be less flexibility and pressure to have a sustainable income. In professional roles, participants agreed that roles are very diverse with many streams to work in. The group agreed that not just the skills and qualifications are important for talented people to excel and contribute meaningfully to the sector, but also the attributes and value system of the people.

Workshop participants described a career today in agriculture as "good". It has many positive features as well as some elements that need to be improved. Greater diversity & inclusion in the sector is required, better movement of talent across the AKIS and we need to continue our efforts to create clear career pathways for all the professional levels. There is a requirement for all personnel to keep up-skilling and we need to brand a career in agriculture as one where continuous professional development is the norm. Pay rates and income levels were discussed, and while participants viewed the remuneration for professional posts as good, income levels at farm level is obviously very challenging. Participants viewed that we need to promote the opportunity to join the sector at various life stages, this is a unique selling point. The group were critical of the bottlenecks that exist within the corporate sphere for women getting through the glass ceiling. At a secondary education level the group shared disappointing experiences of the lack of knowledge of career guidance to the opportunities within the sector and also to the poor offering of agricultural science in some schools, particularly all girls schools.

The group offered a number of actions to improve or address the issues summarised above. A career in agriculture needs a re-branding and better profiling in schools, with parents and society at large. Many actions can be taken such as use of national TV media and also making better use of profiling the positives of a career in agri-food through social media. Short term improvements can be made by greater use of networks, this will help to build collaborations and also help with diversity. In the short and medium term we can also influence the agriculture curriculum towards the future skills that the sector requires (technology, change management, collaboration skills, managing people, marketing, finance and more).

In the longer term the actors within the AKIS need to build career structure which will facilitate greater mobility, both across the sector within a country as well as across international boundaries. We need to encourage graduates to have a multi-stream of education (Ag + ICT, Ag + Marketing, Ag + Accountancy, etc.) as these hybrid graduates is what the sector needs to expand sustainably. Improvements are required to make longer term cultural changes across the sector – the sector is still quite male dominated with stereotypes that need to be challenged. The sector needs more diversity of thinking and practice in order to continue to attract a diverse talent pool.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 3/6

DISCUSSION TOPIC 3:

"The AKIS should provide effective training and skills, development opportunities to enable the agri-food sector to develop sustainably".

This group discussed the aspects required to provide effective training and skills development opportunities to enable the agri-food sector to develop sustainably.

There was a clear consensus from the group that sustainability in the Agri-food sector has environmental, economic, social and people elements to it. In order for the AKIS to support progress on all of these elements, every AKIS actor will need some level of training or upskilling to assist farmers or producers. The AKIS must respond to the training needs of the industry.

Further and higher education and training providers need to continue to include production agriculture and sustainable production practices in their programmes as core elements. It is important to recognise the need to follow on with a structured CPD programme that builds on sustainable practices. Approaches as to how less intensive farmers/producers can achieve greater efficiency from existing resources should be a new focus area.

Formal and informal education and training content is very often informed by relevant research. Research policy needs to include sufficient focus on areas that will help farmers/producers to see the benefits (economic, environmental, social and people) of sustainable farming practices.

The group expressed the view that some members of the AKIS such as manufacturers of farm inputs might have the potential to influence progress on environmental sustainability in particular. The group acknowledged that there may be challenges in getting a shared objective in some elements of sustainability. Education and training has a key communication role to play in achieving these shared AKIS wide objectives.

The following actions were proposed to achieve an impact in this area:

- ☐ Training and continual upskilling is required for all AKIS actors. The design of this training needs to be tailored to include the role that the participant can play in achieving the shared objectives around sustainable food systems.
- ☐ Undergraduate training in the agri-food sector should still have a focus on production as well as an added focus on sustainability. Sustainability is a life-long learning area, and there should be an expectation that CPD will have a role throughout the career of all AKIS actors.
- ☐ Farmer / producer continuous professional development in particular should be structured so that there is a progression in terms of learning. There should be mechanism to record training completed by farmers as part of this overall structure.
- ☐ The group identified a gap in the current AKIS skillset or knowledge base. AKIS actors that support farmers / producers should be upskilled if required to help less intensive farmer/producers to use existing resources more effectively. This includes an ability to communicate about sustainability in a supportive and positive manner.
- ☐ Formal and informal education and training content is very often informed by relevant research. Research policy needs to include sufficient focus on areas that will help farmers/producers to see the benefits (economic, environmental, social and people) of sustainable farming practices, including a new focus on efficient use of resources by less intensive producers. Dissemination of this research is key, and must be communicated so that it is applicable at farm level.
- ☐ Research plays an important role in informing training and skills development. Research policy needs to include sufficient focus on sustainable farming practices. Dissemination of research messages is key, and must be communicated so that it is applicable at farm level.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 4/6

DISCUSSION TOPIC 4:

“By 2030 the AKIS should be empowered by the adoption of digital and data-driven tools and technologies”

Major Focus

The focus of this discussion was to establish measures that could be undertaken to strengthen and empower the Agricultural Knowledge Innovation System in Ireland through the adoption of digital and data-driven tools and technologies.

Main Findings

A Digital Roadmap, developed using a multi-actor collaborative process and with the necessary resources, will be required along if Ireland's AKIS is to become more digitally enabled. This Digital Roadmap will need high-level coordination if it is to be successful. This will be important given the ambitious digital policy that the EU has embarked upon.

A fundamental requirement for any digital strategy is to ensure a high quality broadband infrastructure is in place throughout the country – without this, the digital divide will grow wider over time.

It was clear from the discussion that digital solutions must be value driven and offer clear benefits to the end user whether it be improving environmental sustainability, time saving, increasing profitability, improving traceability, improving transparency of value distribution along the supply chain, reducing the burden of compliance with regulations or improved lifestyle. The best way to ensure long-term buy-in and trust from the end user is to develop digital solutions in collaboration with the end users using proven co-design methodologies.

The group felt that there were enormous opportunities for different systems to communicate with each other particularly with the advent of technologies such as Application Programme Interfaces (API's). Also the need to combine datasets was highlighted throughout the discussion.

Actors across the AKIS need to be upskilled in the area of digital including farmers, advisors and other key actors. Farm advisors in particular should be highly digitally literate in order to support the transition to digital and act as proponents of digital. Users should be segmented based on their digital literacy. Farmers could be segmented based on age, size of farm or enterprise. Farmers can play a vital role in promoting digital and could act as digital coaches to other farmers.

The discussion also highlighted the need for simplification of the array of apps and services available to the agricultural community. The concept of a trusted library of apps was proposed during the discussion.

The group agreed that a lot of awareness building was needed across the AKIS and one way to address this was to establish a Digital Showcase Farm that would demonstrate the latest technologies in place and could potentially act as a test bed.

Financial incentives are required where capital investment in hardware is required. There is an opportunity for the agricultural investment scheme, which is operated by the Department of Agriculture Food and the Marine, to be expanded to support investments in digital at a farm level.

The group identified a number of challenges/tensions:

- Some farmers are defensive
- Many enterprises are limited by income
- Technology scares some farmers
- Farmers don't always trust processors

There are opportunities from engaging with the open source community that should be exploited. In addition, digital has a lot to offer in terms of carbon accounting – Block chain technology may have a role to play here.

In conclusion, there was a very positive outlook about the potential that digital and data-driven tools had to offer. Trust amongst actors was deemed to be one of the most important ingredients if AKIS-wide solutions are to be developed. This could be achieved through better co-ordination and meaningful collaboration to ensure the development of tools that present real value to end users.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 5/6

DISCUSSION TOPIC 5:

"AKIS encourages ever greater innovation throughout the Food System. Innovation diffuses seamlessly, rapidly becoming practise and contributes to economic, social and environmental sustainability."

Introduction/Key points:

Innovations will prosper where a benefit is achieved. Benefits are often not exclusively monetary (price rise, cost reduction), as other benefits such as more efficiency, work/life balance, etc., are also important.

Impediments to innovation by farmers can be actual, or perceived.

Early support is important; waiting until an innovation is proven will mean many will be abandoned too soon. Innovations are learning opportunities even where they fail in the short term. This applies to originators and also first-time implementers.

Innovations should resonate right along the Food Innovation System chain. Currently there are innovation 'silos', with little communication to others in the chain. Fairness is important. Innovations should yield benefits for farmers, processors and consumers.

Actions:

- Government and EU could accelerate the use of new technologies: e.g. by paying for soil samples and interpretation of results.
- Increase the number of 'agents' supporting farmers. Improve the links between those who are conducting research and those implementing it. Research should take its first impetus from those who will ultimately apply the findings.

Who needs to be involved:

Farm families and consumers are key. Consumers are often unaware of good things happening on farms and are unaware of the value of quality food. Farmers and advisors are best placed to make decisions at farm level, particularly process/procedural innovations. The traditional top down approach less successful. A range of perspectives should be embraced, including sceptics. Support bodies, DAFM, Enterprise Ireland are important.

Implementing actions:

- Communication must be tailored to the audience.
- We need a system to capture good ideas – and disseminate these good stories.
- Adopt a flexible approach with different solutions to address any identified challenge...there cannot be just one answer.
- There is a difference between established and 'first time' innovators – by supporting first time innovators, they will get a taste for innovation and do more of it.
- Mentoring is important – e.g. Innovation agents etc.
- But, some innovators may fear loss of Intellectual property.

Potential Impact

- Innovation will convert ideas into products and jobs.
- Push/pull innovation – from both farmers and consumers – can generate social licence to continue with innovation.
- Greater focus within the food system and prioritisation of areas of expertise – where will we be in the future? What are the new areas we will win in?

Informed risk taking needs to be encouraged. For example farmers or contractors may have to invest in new/different equipment. This requires support for this type of investment, in addition to research.

Use new media channels. Farmers can be reached directly with new ideas innovations using Social Media. Farmers will act on these communications. Multiple approaches must be used. However, given that everyone is busy, so there is a need to be careful with people's time, highlighting the importance of the "quality rather than quantity" approach.

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OUTCOMES FOR EACH DISCUSSION TOPIC - 6/6

DISCUSSION TOPIC 6:

“By 2030 the AKIS should be fast and effective in transferring ideas, tools and technologies to end-users”

Actions:

- Create a central information hub that is easily accessible to farmers – so much information in many locations.
- Information has to be accurate, verified and independent.
- Collaboration from all actors needed – farmers, advisory, policy, industry, farm organisations, agricultural, education colleges.
- On extensive farms profit is not the total driver of farmers – great pride in farmers to leave the farm in a better place for the next generation – but there was unanimous agreement that CAP supports would have to be in place for a large group of part-time farmers.
- New technologies that are put in place to tackle biodiversity/climate change/water quality that have a capital cost should be supported financially.
- On intensive full time farms, profit is the main driver. New technologies will have to be supported by all stakeholders to communicate the environmental sustainability message to farmers.
- The ASSAP programme was referenced as a good example of successful collaboration between all stakeholders.
- Concerns were raised by Private consultants that they do not have the same access to up to date knowledge and information as Teagasc does. More formal structures (e.g. Memorandums of Understanding) are required to address this.
- Agreement within group that demonstration, discussion groups, farm walks should be further supported in new CAP Policy.
- Support for farmers to develop IT skills and purchase new technologies
- Methane reduction will be a key driver going forward – support for ruminant methane reduction research and rollout if successful.
- Research should be fast and reliable but filtered to communicate a straightforward practical message to farmers.
- AKIS will include blended learning – zoom and on-farm one-to-one.
- Farmers will put into practice new technologies if they understand the benefits of same to all stakeholders – they have the solutions and are not the problem.
- Interdisciplinary Research and more focused to communicate with the hard to reach farmers – the top 1/3 attend all meetings and don't need info – how do we engage the other 2/3 that don't attend/engage.

Implementing Actions

- Encourage all farmers to attend farm walks, demonstration events, open days, discussion groups – use agricultural advisory services (public & private)
- Exemplar farmers in local areas – local demonstration farms (every county), demonstrate science to farmers so they will understand better and put into practice.
- Group agreement to communicate with influencers of farmers (e.g. vets, agri-adviser, co-ops etc).
- Support individual farm sustainability plans and successful schemes need to be financially attractive to farmers to participate.

Impact:

- Currently farmers get 18% of dividend from the value chain – this is below EU average of 24% and needs to increase for Irish farm families.
- Environmental and financial sustainability – farmers must be financially supported to manage their farms (e.g. changes in practice to reduce N such as multi species/reseeding costs).
- Animal welfare - grass fed is positive communication.
- Clear messaging to farmers – prevention rather than cure (AMR).
- Positive perception of farmers – currently feeling everything is being laid at the farmer's door.
- Make farming attractive for next generation.

Supporting Changes

- Utilise easy to use technology.
- Prioritise multi-actor disciplinary research.
- Encourage more private consultants to join Agricultural Consultants Association (ACA).
- Communicate clearly with farmers.
- Clear policy direction and collaboration with all stakeholders.
- Clear local messages.

What are the challenges and how can we manage them?

- Methane from ruminant and increased research required
- Do farmers and advisors fully understand climate challenge?
- Getting engagement form hard to reach farmers
- Data governance
- Age and engaging younger farmers to adopt new technology
- Profitability of main enterprises
- Upskilling advisors
- Translating policy to practice
- Consumer perception
- Scheme administration

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AREAS OF DIVERGENCE

A number of areas of divergence were identified during the discussions, that are summarised in the following points:

- How to reach all farmers is a significant challenge. Many farmers are clients of public advisory services (i.e. Teagasc), while more are clients of private advisors, and more have little or no engagement with any advisor. More collaboration and coordination of the public and private advisory services is needed, as is more inclusivity of a wider pool of advisors. The potential role of other actors (e.g. veterinarians) in providing advice to farmers can also be overlooked and should be considered more within the challenge of how all farmers can be reached with information.
- Farmers can feel isolated/misunderstood within a perception of an 'us and them' divide.
- Competition between large food organisations and farmers, and value of 'real' food and processed food. Innovating can be hard while also meeting the market needs.
- Regulation/lack of funding can hinder innovation and adoption.
- Insufficient Entrepreneurial culture in some organisations.
- Intellectual property rights are important for some innovators.

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