Agricultural Knowledge & Innovation System (AKIS)

May 2020
Agricultural Knowledge and Innovation Systems (AKIS) is the combined organisation, knowledge flows and interactions between persons, organisations and institutions that use and produce knowledge and innovation for agriculture and interrelated fields in rural areas.

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AKIS - CAP Legal Basis

CAP Legal basis

As set out in the proposal for a Regulation COM(2018) 392 final and specifically in Art 5, support from CAP funding sets out to further improve the sustainable development of farming, food and rural areas and to achieve a set of general objectives. These general objectives are to be complemented by the cross-cutting objective of modernising the sector by fostering and sharing of knowledge, innovation and digitalisation in agriculture and rural areas, and encouraging their uptake.

Article 102
Modernisation

The description of the elements that ensure modernisation of the CAP referred to in point (g) of Article 95(1) shall highlight the elements of the CAP Strategic Plan that support the modernisation of the agricultural sector and the CAP and shall contain in particular:

• an overview of how the CAP Strategic Plan will contribute to the cross-cutting general objective related to fostering and sharing of knowledge, innovation and digitalisation and encouraging their uptake set out in the second subparagraph of Article 5, notably through:
  (i) a description of the organisational set-up of the AKIS and how advisory services as referred to in Article 13, research and CAP networks will provide advice, knowledge flows and innovation services;
  (ii) a description of the organisational set-up of the AKIS designed as the combined organisation and knowledge flows between persons, organisations and institutions who use and produce knowledge for agriculture and interrelated fields;

• a description of the strategy for the development of digital technologies in agriculture and rural areas and for the use of these how digital technologies will be used in agriculture and rural areas to improve the effectiveness and efficiency of the CAP Strategic Plan interventions.
Integrated approach for modernisation, innovation and knowledge flows: Overview of relevant AKIS provisions (see detailed doc in EIP Seminar 17 Oct 2018)

**Art 5**
Cross-cutting objective of modernisation, knowledge sharing, innovation and digitalisation

**Strategic approach to plan CAP interventions**

**Art 102** Modernisation in CAP Strategic Plans:
Well-functioning AKIS: research + advisors + CAP networks +... working together ....and digitalisation

**Tools = targeted CAP interventions to support the CAP strategy:**

**Art 72**
Funding for knowledge exchange, advice and information

**Art 71**
Cooperation: Funding for preparing and implementing EIP OG projects

**Art 13**
Details on Advice and Innovation support to be given

**Art 114**
Details on EIP and OGs, Interactive innovation model

**Art 113**
CAP networks: Fostering innovation and knowledge exchange

DAFM - AKIS Strategic Development Process

Description of AKIS & Agri-Digitalisation

Draft CAP AKIS SWOT

Consultation with stakeholders
Identify Gaps & Opportunities

Develop AKIS & Agri-Digitalisation Policy & Action Plan for Approval / Agreement

Rialtas na hÉireann
Government of Ireland
Contents

a) CURRENT AKIS PUBLIC POLICY, STRATEGIC AGENDAS & ROADMAPS  
b) CURRENT AKIS RELATED INVESTMENT & INFRASTRUCTURE  
c) INTERNATIONAL CONSIDERATIONS ON DEVELOPING AKIS POLICY  
d) DEFINING FUTURE AKIS POLICY  
e) SWOT ANALYSIS  
f) ANNEXES
EDUCATION

Teagasc Education Vision - high level recommendations:

• Attracting new entrants and addressing gender gaps

• Development of entrepreneurial and transversal skills - problem solving, goal setting, critical and reflective thinking, teamwork, communication

• Develop capability requirements at farm level regarding sustainable farming and environmental management, governance, health and safety; market requirements; and smart farming applications

• Education pathways required to enable learners to gain requisite capabilities for the future.

• Recognised professional development routes for experienced farmers and online learning platforms and digital technologies need to be further developed

Further Education

• Teagasc - leading provider - accredited further (vocational) education for the land sector. In 2017, >7,000 learners - school leaver, adult vocational & higher level education and training programmes

Higher Level Education

• UCD, UCC and Teagasc in partnership with CIT, DKIT, GMIT, LIT, IT Tralee, WIT, IT Carlow
RESEARCH & INNOVATION

Irish Public Sector R&I investment - Agri-Food Sector - e.g. €157 million in 2018 – Range of Funders (DAFM, EI, SFI, SEAI, EPA, IRC)

Teagasc key role in postgraduate education - 250 students at Teagasc Research Centres - majority engaged in PhD programmes.

High performing Research Producing Organisations - e.g. UCD, UCC, TSSG-WIT

EU’s R&I Framework Programme:
• Horizon 2020 - €85m drawdown by Ireland
• Horizon Europe - €10 billion proposed for Food, Bioeconomy, Natural Resources, Agriculture and Environment (2021-2027)
• Will provide Irish AKIS actors with interactive innovation opportunities – the “Multi-Actor Approach”, “Thematic Networks”
CONTINUOUS PROFESSIONAL DEVELOPMENT

**Rural Development Programme (RDP) 2014-2020:** A CPD Programme - up-skill knowledge transfer facilitators and veterinary practitioners to facilitate learning on the RDP knowledge transfer programme.

**Teagasc ConnectEd programme:** education, knowledge, professional development and networking opportunities - structured access to Teagasc research, education, knowledge resources and online tools.

**Skillnet:** IFA, ICOS, Macra na Feirme, XL Vets - competitiveness, productivity and innovation of Irish businesses through enterprise-led workforce development.
KNOWLEDGE TRANSFER

**Rural Development Programme (RDP) 2014-2020**: €100m allocated to a range of knowledge transfer groups in the beef, dairy, sheep, equine, tillage and poultry sectors.


**Teagasc** - network of discussion groups across enterprise sectors — beef, dairy, sheep, equine, tillage and poultry sectors.

**Origin Green Farm Assurance Schemes (Bord Bia)** - auditing Irish Farms every 18 months - extended grazing, calving rate, daily live weight gain, improved economic breeding index (EBI), nitrogen efficiency, slurry management, energy efficiency - process of measurement, feedback, and continuous improvement.

**Forestry Knowledge Transfer Groups** - focusing on the mobilisation of timber and biomass.
FARM ADVISORY SERVICE

**DAFM:** List of 801 FAS (& GLAS) Advisors - available to farmers - schedule of Farm Advisory System (FAS) Training and FAS training presentations.

**Teagasc Advisory Service:** 51 specialists and specialist advisers - 250 Teagasc field advisors - network of 12 regional units - educational courses, public events, specific programmes on: Business and Technology; Environment; Rural Development; and Adult Education and Training.

**Agricultural Consultants Association:** 159 professional members - 400 professional, technical and administration staff employed throughout Ireland. Estimated client base in the region of 55,000 farmers

**Veterinary advice** has tended to be shared in a diffuse and direct person-person fashion, and in most cases does not have a formal advisory and communication structure.

**Commercial advisors** of input supply (feedingstuffs, pesticides, veterinary medicines, fertilizer), for profit solutions and service
European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI): Evolution of the extension approach building on: research, education, continuous professional development, knowledge transfer and farm advisory service

**Specific actors** (e.g. farmers, advisors, researchers, businesses, etc) working together in multi-actor projects
- 23 national Operational Groups
- 43 EU Focus Groups
- Horizon 2020 Thematic Networks

**Based on two principles:** to involve multiple users in the creation process; and to use the real-world to test ideas.

**Other activities:** Producer Organisations; ICBF; Animal Health Ireland; Sheep Ireland; IFA/EPA Smart Farming; LEADER; Twenty20 Beef Club.
CAP NETWORKS

**National Rural Network:** membership network for farmers, agricultural advisors, rural communities and others interested in rural development

**Range of DAFM related networks:**
- Beef Taskforce
- Dairy Forum
- Tillage Forum
- iNAP Animal Health Implementation Committee
- Horticulture Industry Forum
- Organic Strategy Implementation Group:
- Animal Feed Stakeholder Forum
- Bioeconomy Forum
- Research & Innovation Forum

**Other networks:**
- Media: newspapers, radio, social media
- Farming Organisations, ICOS, Processors, Representative Groups (e.g. Env. Pillar, APHA, IBEC, IGFA)
- Service providers e.g. IFAC, FRS, MRO & AI, commercial finance
INTERNATIONAL & NATIONAL CONSIDERATIONS

**OECD: What can policy makers do?** E.g. whole of innovation system approach – focus on education / CPD - more collaborative and responsive AKIS – governance – strategic objectives in consultation with stakeholders – evaluation - adoption, including skills improvements

**OECD: What can the private sector do?** E.g. clear role established for the private sector as part of the AKIS – part of governance structure – decision making, priority setting – farm to fork business case for AKIS - reinforcing linkages in AKIS

**EU Commission**: CAP proposal and the EU R&I proposal each MS AKIS needs to be further strengthened to structure AKIS and further foster interactive innovation processes - focusing on addressing problem-specific societal challenges

**EU Member States**: SCAR AKIS strategic working group 4th Report - Preparing for Future AKIS to guide future developments

**Just Transition**: NESC report - vision for a resilient, sustainable, thriving net zero economy, environment and society - innovation and collective preparedness to shape the future - three top level goals: continuous, pre-emptive workforce development; building resilient enterprises; and delivering high-impact targeted funding to support transition.
DEFINING FUTURE AKIS (& AGRI-DIGITALISATION) POLICY

1. THE ORGANISATIONAL SET-UP OF AKIS (& AGRI-DIGITALISATION)) IN IRELAND CURRENTLY INVOLVES NUMEROUS DIFFERENT POLICY AREAS, ACTIVITIES AND INSTRUMENTS AND WOULD BENEFIT FROM A FRAMEWORK APPROACH

2. IMPROVING THE RELEVANCE OF RESEARCH AND INNOVATION HAS THE HIGH POTENTIAL TO INCREASE ADOPTION IN THE AGRICULTURE AND AGRI-FOOD & BIOBASED SECTOR AND ACCEPTANCE BY SOCIETY

3. EDUCATION AND TRAINING SERVICES PROVIDED IN A FLEXIBLE, ADAPTIVE AND INNOVATIVE WAY, SO AS TO PREPARE PEOPLE FOR THE FUTURE

4. CONTINUOUS SKILLS DEVELOPMENT (TRAINING, RE-TRAINING) AND COOPERATION IS ESSENTIAL TO IMPROVE THE MATCHING OF NEEDS, SKILLS DEMAND AND CHALLENGES IN AN EVOLVING AGRI-FOOD & BIOBASED SECTOR

5. NETWORKING & COLLABORATION TO DEVELOP SYSTEMS OF INNOVATION FOR BROAD DIFFUSION OF KNOWLEDGE AND INNOVATION
What is Agri-Digitalisation?

Increased agricultural data, advances in data processing, artificial intelligence, computing power, analysis & insight, encryption and data protection technologies, data sharing, preserving confidentiality etc.

Agri-Digitalisation is about transitioning agriculture (and agri-food & biobased systems) to a digitalised sector - i.e. connecting, digitising, processing, and reacting to data

Relates to not only technology but also governance, strategic development to address key challenges, business models, skills and jobs development, connectivity, inclusion, cyber security and economic and societal opportunities.

Useful for policy makers as well as for primary producers and other actors in agriculture, food & biobased systems.

Agri-digitalisation will in the future accompany many different types of ecosystem, agriculture, agri-food & biobased sector physical, biological, technological and innovative development

Agri-FoodTech Category Definitions

- **Ag Biotechnology**: On-farm inputs for crop & animal ag including genetics, microbiome, breeding, animal health.
- **Innovative Food**: Cultured meat, novel ingredients, plant-based proteins.
- **Agricultural Marketplaces**: Commodities trading platforms, online input procurement, equipment leasing.
- **In-Store Retail & Restaurant Tech**: Shelf-tracking robots, 3D food printers, POS systems, food waste monitoring IoT.
- **Bioenergy & Biomaterials**: Non-food extraction & processing, feedstock technology, cannabis pharmaceuticals.
- **Restaurant Marketplaces**: Online tech platforms delivering food from a wide range of vendors.
- **Farm Management Software, Sensing & IoT**: Ag data capturing devices, decision support software, big data analytics.
- **eGrocery**: Online stores and marketplaces for sale & delivery of processed & unprocessed ag products to consumer.
- **Farm Robotics, Mechanization & Equipment**: On-farm machinery, automation, drone manufacturers, grow equipment.
- **Home & Cooking Tech**: Smart kitchen appliances, nutrition technologies, food testing devices.
- **Midstream Technologies**: Food safety & traceability tech, logistics & transport, processing tech.
- **Online Restaurants and Meal Kits**: Startups offering culinary meals and sending pre-portioned ingredients to cook at home.
- **Novel Farming Systems**: Indoor farms, aquaculture, insect, algae production.
- **Cloud Retail Infrastructure**: On-demand enabling tech, ghost kitchens, last mile delivery robots & services.
- **Miscellaneous**: e.g. fintech for farmers.
Unlocking the potential of Agri-Digitalisation - Irish activities to date

Strategy, Research, Innovation & Finance

Uptake of Digital Technologies

National Agri-Digital Strategic Approach

Future Context
AgClimatise
Circular Bioeconomy

Unlocking the potential of Agri-Digitalisation in Ireland: A summary of ongoing and planned activities in the areas of strategy, research, innovation, finance, digital uptake, national agri-digital strategic approach, and the future context, focusing on AgClimatise and Circular Bioeconomy.
Development of digital technologies in agriculture and rural areas?

Capitalise on the potential of the Agri-Digitalisation

Identify fundamental challenges to data usage, commercial success, technology uptake and social development of Agri-Digitalisation.

CAP Article 102: (…) b. **a description of** (the strategy for the development of digital technologies in agriculture and rural areas and for the use of these) **how digital technologies will be used in agriculture and rural areas to improve the effectiveness and efficiency of the CAP Strategic Plan interventions.**
Some $1 billion (€920 million) has been invested in Irish agri-food-tech companies since 2012 with Ireland being one of only a few countries worldwide to see a rise in deal activity last year.

EI - NovaUCD secures €3m to develop AgTech hub at UCD Lyons Farm

EI- Agri-Tech Centre of Excellence, Tralee
On 9 April 2019, 24 European countries signed a Declaration of cooperation on ‘A smart and sustainable digital future for European agriculture and rural areas’ to take a number of actions to support a successful digitalisation of agriculture and rural areas in Europe. It recognises the potential of digital technologies to help tackle important and urgent economic, social, climate and environmental challenges facing the EU’s agri-food sector and rural areas.


**Key Challenges** - resource efficiency, climate change & biodiversity, traceable & quality products, farm revenue, bioeconomy

**Technologies** - AI, Robotics, blockchain, HPC, IoT, 5G, EO

**Adoption** - digital information & skills, costs & socio-economic, agronomic & environmental benefits

**Facilitated Deployment** – EU R&I, Rural Development, Digital Europe

**Infrastructure** – Large scale reference experimentation & testing facilities, DIH, SMART-AGRI Hubs, AKIS 2.0, AI4EU platform, EIP Agri, Large Scale Pilots
Irish Engagement with EU agri-digitalisation policy developments

Creating a Digital Single Market

Designing the path towards EU agricultural research and innovation

Shaping the digital (r)evolution in agriculture

H2020 - 17 projects - €163million

Technology: Robotics, IoT, Sustainability, Precision Agriculture

eCAP & Agri-Digitalisation

- Modernised Integrated Administration and Control System

- NIVA project – EU paying agencies incl. DAFM (with TSSG-WIT, Teagasc) – LPIS upgrade, Environment & Climate outlook
Key EU Funded Projects & Further Opportunities

- **TSSG-WIT**
  - Cascade Funding

- **Teagasc**
  - EU project exploring farm advisory services & digital technologies

- **IACS digitisation - NIVA**
  - Digital Platforms – Agriculture & Rural Economy

- **agROBOfood**
  - Cascade Funding

**Digital 2021-27**

- **Objectives:** Digital capacities, diffusion, next gen technologies, connectivity
- **Programmes:**
  - Digital Europe (€9.2 billion), Horizon Europe (>€12 billion), Connecting Europe (€3 billion)
EU Code of conduct on agricultural data sharing by contractual agreement

Research for EP AGRI Committee - Impacts of the digital economy on the food chain and the CAP

Agriculture and Rural Development

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Key Considerations on Governance, Data Sharing & Business Models and Socio-Economic Impact

**Research for EP AGRI Committee - Impacts of the digital economy on the food chain and the CAP**

Big Data is expected to have a large impact on Smart Farming and involves the whole supply chain.

Smart sensors and devices produce big amounts of data that provide unprecedented decision-making capabilities.

Big Data is expected to cause major shifts in roles and power relations among traditional and non-traditional players.

Governance (incl. data ownership, privacy, security) and business models are key issues to be addressed in future research.

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Highlights

- Big Data is expected to have a large impact on Smart Farming and involves the whole supply chain.
- Smart sensors and devices produce big amounts of data that provide unprecedented decision-making capabilities.
- Big Data is expected to cause major shifts in roles and power relations among traditional and non-traditional players.
- Governance (incl. data ownership, privacy, security) and business models are key issues to be addressed in future research.

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25 An Roinn Talmhaíochta, Bia agus Mara | Department of Agriculture, Food and the Marine
High-tech innovation is being promoted under EU policy and private investment, however, introduction of technology and use of data needs to be directed to address multiple policy goals, e.g., environment, economic, and social sustainability.
INTERNATIONAL & NATIONAL CONSIDERATIONS

OECD:
Digital technologies provide new opportunities for the agriculture sector and the global food system, offering new solutions to meet old and new challenges.

Policy makers can benefit from digital technologies, which can support the design and implementation of agriculture policies, supporting better targeting and efficiency.

Policy makers must consider both the characteristics and needs of the agriculture sector in broader digital strategies.

EU Commission:
Building a European Data Economy – CAP, EU R&I proposal

Combine investments in knowledge, in the enabling environment and in the uptake of digital tools

EU Member States:
SCAR AKIS strategic working group 4th Report - Preparing for Future AKIS to guide future developments

Just Transition:
NESC report - vision for a resilient, sustainable, digital, thriving net zero economy, environment and society - innovation and collective preparedness to shape the future - three top level goals: continuous, pre-emptive workforce development; building resilient enterprises; and delivering high-impact targeted funding to support transition.
EU Policy
- CAP
- Horizon Europe
- Digital Europe
- Cohesion

Agri-strategic actions
- CAP Strategic Plan
- AKIS 2.0
- National Digital Strategy
- National AI Strategy
- Agri-Food Strategy 2030

Agri-measures
- Digital Innovation Hubs e.g. SMART AGRI Hubs (PACE), ACE, NOVA UCD
- Public-Private Partnerships – VistaMilk, CONSUS
- Agri-Digital Integrated Platforms – DEMETER
- E-Governance: IACS, LPIS, Environment & Climate

National Digital Actions
- Rural Broadband
- Regional Strategies
- LEADER
- Future EIP AGRI operational groups

Enabling environment - Agri-Digitalisation - Multi-Level Strategic Activities
DEFINING FUTURE AGRI-DIGITALISATION (& AKIS) POLICY

1. SUPPORTING DIGITALISED AND DATA-EMPOWERED AGRICULTURE AND RURAL AREAS UNDER A FRAMEWORK APPROACH

2. DIGITALISATION FOR AGRICULTURAL PRODUCTIVITY AND SUSTAINABILITY

3. ENCOURAGING THE USE & UPTAKE OF DIGITAL TECHNOLOGIES

4. DEVELOPING DIGITAL TECHNOLOGIES AND SERVICES FOR NEW BUSINESS MODELS

5. DEALING WITH IMPACT ON SOCIETY AND THE ECONOMY
Thank you for your attention

Questions

May 2020