



agriLink

AGRICULTURAL KNOWLEDGE: LINKING FARMERS,
ADVISORS AND RESEARCHERS TO BOOST INNOVATION

AGRILINK'S MULTI-LEVEL CONCEPTUAL FRAMEWORK

THEORY PRIMER: 1) AGRICULTURAL KNOWLEDGE AND
INNOVATION/INFORMATION SYSTEMS

Coordinated by **The James Hutton Institute**
Authors: **Lee-Ann Sutherland, Pierre Labarthe**



This project has received funding from the European Union's
Horizon 2020 research and innovation programme under
grant agreement No. 727577.

AgriLink

Agricultural Knowledge: Linking farmers, advisors and researchers to boost innovation.

AgriLink's multi-level conceptual framework

Theory primer: 1) Agricultural Knowledge and Innovation/Information Systems

The elaboration of this Conceptual Framework has been coordinated by **The James Hutton Institute**, leader of AgriLink's WP2.

List of contributors:

- **Lee-Ann Sutherland** (WP lead), **Pierre Labarthe**, **Boelie Elzen**, **Anda Adamsone-Fiskovica**,
- with the support and contributions of Chris Blackmore, Marianne Cerf, Danielle Galliano, Alberto Lafarga, Andy Lane, Catherine Laurent, Livia Madureira, Carla Marques, Cristina Micheloni, Geneviève Nguyen, Katrin Prager, Jaroslav Prazan, Herman Schoorlemmer, Egil Straete, Sandra Sumane, Talis Tisenkopfs, Freddy van Hulst



This document presents the multi-level conceptual framework of the research and innovation project AgriLink. It is a living document.

- A first version was submitted as deliverable D1.1 of AgriLink, Month 6 of the project (November 2017).
- **This updated version has been issued on 01/05/2018.**

It has gone through a transdisciplinary process, with implication of both practitioners and researchers in writing, editing or reviewing the manuscript. This participation has been organised within AgriLink's consortium and beyond, with the involvement of members of the International Advisory Board of the project, including members of the Working Group on Agricultural Knowledge and Innovation System of the Standing Committee on Agricultural Research of the European Commission.





Theory Primers

The purpose of the primers is to provide AgriLink consortium members with an introduction to each topic, which outlines the key points and identifies options for further reading. The primers have also served to demonstrate the wide range of expertise in the consortium, and to highlight the specific research interests of consortium members. Primers are intended to act as a **foundation for academic journal articles, and an early opportunity for collaboration between consortium members.**

1) Agricultural Knowledge and Innovation/ Information Systems

Authors: Lee-Ann Sutherland, Pierre Labarthe

1.0 General Overview of the Theory or Approach

1.1 Summary of the Theory, Approach or Topic

An agricultural knowledge system refers to the collection of agricultural information providers, the flows of information between them, and the institutions regulating these relations. It traditionally referred to farmers, support systems, educators, researchers and advisors, but has been broadened to include other actors (e.g. input suppliers, retailers). The term has evolved from Agricultural Knowledge and Information System to Agricultural Knowledge and Innovation System with limited critique. Both are frameworks or constructs for identifying the different actors and their roles in innovation and knowledge exchange within the agricultural sector, rather than a theory or approach. Academics who use the term AKIS typically integrate it with another theory when undertaking empirical research, to increase its explanatory power.

1.2 Major authors and their disciplines

The AKIS construct was developed by academics specifically interested in agricultural knowledge and communication. It is rooted in extension studies, science communication, interdisciplinary research and a range of social science disciplines (Roling and Engel 1991, Hall et al. 2006). The term is widely used in European policy documents, in the agricultural extension literature, and by international institutions (OECD, World Bank)

Within the AgriLink consortium, the concept of AKIS has been assessed in relation to commercialisation and privatisation (Prager et al., 2016, Sutherland et al., 2013; Labarthe and Laurent, 2013) and learning and innovation networks (Tisenkopfs et al., 2015).

1.3 Key references

Dockès, A.-C., Tisenkopfs, T., Bock, B., 2011. Agricultural knowledge and innovation systems in transition - a reflection paper., Standing Committee on Agricultural Research (SCAR) Collaborative Working Group AKIS. Brussels.

EU SCAR 2013. Agricultural Knowledge and Innovation Systems Towards 2020 - an orientation paper on linking innovation and research. SCAR – Collaborative Working Group AKIS-2, 204 pp.

EU SCAR, 2012. Agricultural knowledge and innovation systems in transition – a reflection paper, Brussels. Accessible at: <file:///C:/Users/ls40359/Documents/Papers/Smallscalefarming/EUSCAR2012.pdf>

Klerkx, L., Van Mierlo, B., Leeuwis, C., 2012. Evolution of systems approaches to agricultural innovation: concepts, analysis and interventions, in: Darnhofer, I., Gibbon, D., Dedieu, B.



(Eds.), *Farming Systems Research into the 21st Century: The new dynamic*. Springer Science+Business Media Dordrecht, DOI 10.1007/978-94-007-4503-2_20, pp. 457-483.

1.4 Brief history of how the theory has developed and been applied

This concept of ‘agricultural knowledge and information systems’ (AKIS) advanced extension thinking from the 1950s and 1960s. This early work had emphasised linear knowledge flows from research to extension to farmers. The AKIS concept promoted the idea that farmers exchange and produce knowledge in conjunction with a number of sources, which include research, agricultural advisors, and education/training and support services (Röling, 1988; Röling and Wagemakers, 1998). Over the past two decades, the AKIS concept has been appropriated to address European policy concerns about innovation, and re-termed ‘agricultural knowledge and innovation systems’, reflecting an ideological shift towards innovation (Dockès et al., 2011). AKIS in reference to information systems has tended to emphasise ‘traditional’ participants in knowledge development (researchers, advisors, extensionists, educators) (Kania, 2015), whereas AKIS in reference to innovation includes a broader range of individuals and organisations (e.g. farmer organisations, charities, up and downstream supply chain members). In the current AKIS conceptualisation, refers to novelty: in products, processes or organisation (OECD, 2010).

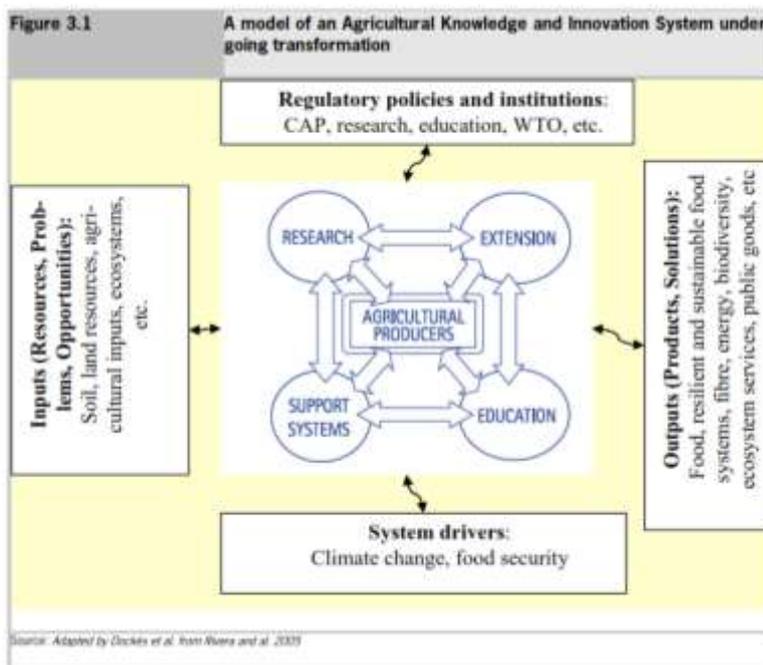
The AKIS construct is differentiated from AIS (Agricultural Innovation System) by Klerkx et al (2012) and Dockès et al (2011), amongst others. The AKIS and AIS approaches developed in parallel, with AKIS developed through application in agricultural extension, and AIS by researchers (Rivera et al 2006 in Klerkx et al., 2012). The AIS approach draws attention to the evolving nature of innovation systems, and the role of institutional actors (e.g market). There are a variety of conceptual approaches to AIS (Klerkx et al. 2012 identify: infrastructural, process, and functionalist perspectives). The process approach is connected to the multi-level perspective, also being explored in AgriLink.

A lot of the recent literature on AKIS draws attention to privatisation and commercialisation (see Section 1.2). There is also a research focus on network, interactive innovation and knowledge flows. Although the AIS approach appears more theoretically nuanced, the term AKIS is more commonly used in policy documents (e.g. SWG AKIS) etc.

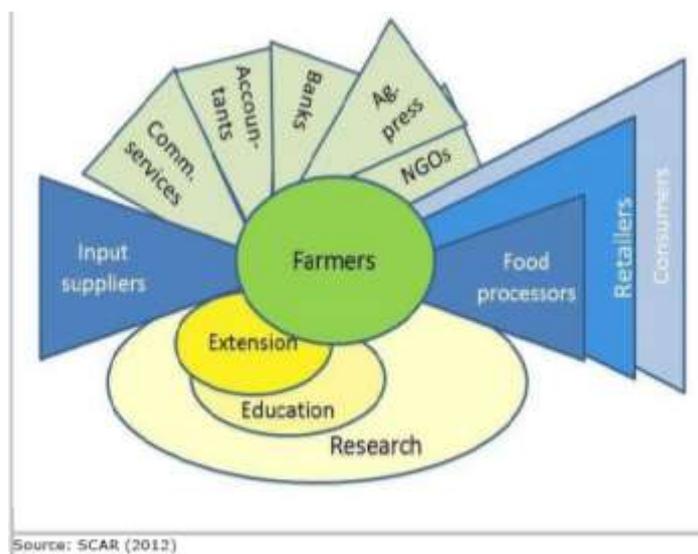
AKIS was deemed more useful for the PRO AKIS FP7 project, which conducted an inventory of AKIS across Europe, but as AIS follows processes of specific innovations, it may be better for AgriLink (particularly WP2).

1.5 Basic concepts

Diagram



Source: Dockès et al, 2011 (who adapted it from Rivera et al., 2005)



AKIS: Multiple SCAR SWG reports (e.g. 2012, probably 2016) use the Røling and Engel (1991) definition of AKIS: “a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergistically to support decision making, problem solving and innovation in agriculture” (Røling and Engel, 1991). Dockès et al (2011) note that although this definition is still in place, usage has evolved to include innovation i.e. Agricultural Knowledge and Innovation Systems.

AIS: Dockès et al. (2011) distinguish AIS – Agricultural Innovation Systems – from AKIS. They define AIS as “a network of organizations, enterprises, and individuals focused on



bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect the way different agents interact, share, access, exchange and use knowledge”, based on (Leeuwis and Ban, 2004). As such, the AIS is more process oriented, focuses on what is changing, rather than the specific members of the system.

Innovation: SWG AKIS reports draw on OECD definitions of innovation: “An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. Innovation activities are all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. These activities themselves need not to be novel, but are necessary for the implementation of innovations”.

2.0 Application to the analysing the role of farm advisory services in innovation

2.1 Relevance to AgriLink Objectives

[tick relevant]	AgriLink Objectives
X	Develop a theoretical framework utilising a multi-level perspective to integrate sociological and economic theories with inputs from psychology and learning studies; and assess the functions played by advisory organisations in innovation dynamics at multiple levels (micro-, meso-, macro-levels) [WP1] ;
X	Assess the diversity of farmers’ use of knowledge and services from both formal and informal sources (micro-AKIS), and how they translate this into changes on their own farms [WP2] ;
	Develop and utilise cutting edge research methods to assess new advisory service models and their innovation potential [WP2] ;
X	Identify thoroughly the roles of the R-FAS (regional FAS) in innovation development, evaluation, adoption and dissemination in various EU rural and agricultural contexts [WP2] ;
X	Test how various forms of (national and regional) governance and funding schemes of farm advice i) support (or not) farmers’ micro-AKIS, ii) sustain the relation between research, advice, farmers and facilitate knowledge assemblage iii) enable evaluation of the (positive and negative) effects of innovation for sustainable development of agriculture [WP4] ;
X	Assess the effectiveness of formal support to agricultural advisory organisations forming the R-FAS by combining quantitative and qualitative methods, with a focus on the EU-FAS policy instrument (the first and second version of the regulation) and by relating them to other findings of AgriLink. [WP4] .
	At the applied level, the objectives of AgriLink are to:
X	Develop recommendations to enhance farm advisory systems from a multi-level perspective, from the viewpoint of farmers’ access to knowledge and services (micro-AKIS) up to the question of governance, also recommending supports to encourage advisors to utilise specific tools,



	methods to better link science and practice, encourage life-long learning and interactivity between advisors [WP5] ;
	Build socio-technical transition scenarios for improving the performance of advisory systems and achieving more sustainable systems - through interactive sessions with policy makers and advisory organisations; explore the practical relevance of AgriLink's recommendations in this process [WP5] ;
	Test and validate innovative advisory tools and services to better connect research and practice [WP3] ;
	Develop new learning and interaction methods for fruitful exchanges between farmers, researchers and advisors, with a focus on advisors' needs for new skills and new roles [WP3] ;
	Guarantee the quality of practitioners' involvement throughout the project to support the identification of best fit practices for various types of farm advisory services (use of new technologies, methods, tools) in different European contexts, and for the governance of their public supports [WP6] .

2.2 How this can be applied/developed in AgriLink

Agricultural knowledge systems are central to AgriLink – identifying and defining the organisations involved in knowledge production and exchange in the agricultural sector is a major activity. The term AKIS will inevitably be utilised in project reports. It appears beneficial to go beyond the functionalism of AKIS and into process-oriented approaches to AIS, in order to assess the evolution of the relationships between AKIS actors and how innovations emerge, evolve and are taken up. Alternatively, it may be better to keep AKIS as a term, and integrate it with other theories to form the overall framework, rather than venturing into AIS.

AIS raises the questions

- How have knowledge structures come to be in their current form? (i.e. what processes are involved)
- How are the functions of farm advisory services influenced by the institutional settings of advisory systems?

2.3 Research questions relevant to AgriLink

What are the main sources of informal and formal knowledge about innovations for farmers?

1. How do farmers make decisions in their daily farming activities? Who influences them most in their decision-making? Differentiate between main 'types' of farmers, e.g. innovators, followers, laggards
2. What is the specific role/functions of advisory services in farmer decision-making on their farming practices? (consulting/facilitation/brokering/knowledge processing...)
3. What is the role of the prevailing (regional/national, EU) AKIS on farmers' decisions to change their practices and what is the role of farming advisory services therein?
4. How are the functions of farm advisory services influenced by the institutional settings of advisory systems (who are the providers? What are their business models? Their relations?) at regional level or within innovation areas?



5. How can advisors enhance knowledge flows and accumulation and boost the innovativeness of farms?
6. What are the factors facilitating and hindering farmer-advisor-researcher collaboration?
7. How do governance structures of (regional or national) farm advisory systems in Europe empower (or not) multi-functional advisory services, and facilitate an accumulation and open access to knowledge?
8. What is the impact of advice/advisory services on the sustainability of agricultural practices?

2.4 Methodological implications

AKIS does not engender particular methods. The identity and function of AKIS actors can be ascertained by qualitative interviewing and document review. Klerkx et al. (2012, p. 471) identify these options for undertaking AIS research: institutional analysis, social network analysis, innovation journeys or histories, game-theory modelling, benchmark analysis, innovation systems analysis, functions of innovation systems approach.

2.5 Strengths and weaknesses/Sensitivities regarding use

The term AKIS is well recognised amongst policy makers and academics. It allows for a systematic identification of the major actors in agricultural knowledge provision. It appears under-theorised – quite functionalist by default. Although the academics involved recognise that there is no single ideal AKIS, the mantra seems to be that identifying and addressing disconnections within the system are what is necessary to 'fix' and AKIS (e.g. Knierim et al., 2016). AIS appears to be more promising academically, but also relies on systems thinking and the integration of other theories to give it analytical power.

2.6 Potential operational problems

Use of the term AKIS is straightforward, but implies functionalism. With AIS, it may be difficult to know when to stop, in terms of identifying information sources (i.e. what is in and outside of the scope of the AKIS, given the vast array of information access options).

Optional Section 3: Practical example

The PRO AKIS FP7 project (www.proakis.eu) undertook an inventory of AKIS across Europe. The web-site contains numerous examples of AKIS structures.

Optional Section 4: Recommended further reading

- Hall, A., Janssen, W., Pehu, E., Rajalahti, R. (2006). Enhancing agricultural innovation: How to go beyond the strengthening of research systems . Washington, DC: World Bank.
- Rivera, W.M., 2000. The changing nature of agricultural information and the conflictive global developments shaping extension. *Journal of Agricultural Education and Extension* 7.
- Röling, N., 1992. The emergence of knowledge systems thinking: A changing perception of relationships among innovation, knowledge process and configuration. *Knowledge and Policy* 5 (1):42-64.

**References (to documents referenced in this template only)**

- Dockès, A-C., Tisenkopfs, T., Bock, B. 2011. Reflection paper on AKIS. Accessible at: <http://ec.europa.eu/research/agriculture/scar>
- Kania, J., 2015. Agricultural Knowledge and Information Systems in European Bioeconomy. *Econ. Reg. Stud.* 8, 5-11.
- Klerkx, L., Van Mierlo, B., Leeuwis, C., 2012. Evolution of systems approaches to agricultural innovation: concepts, analysis and interventions, in: Darnhofer, I., Gibbon, D., Dedieu, B. (Eds.), *Farming Systems Research into the 21st Century: The new dynamic*. Springer Science+Business Media Dordrecht, DOI 10.1007/978-94-007-4503-2_20, pp. 457-483.
- Knickel, K., Brunori, G., Rand, S., Proost, J. 2008. Towards a better conceptual framework for innovation processes in agriculture and rural development: from linear models to systemic approaches. 8Th European International Farming Systems Conference Proceedings, Clermont-Ferrand, France.
- Labarthe, P., Laurent, C., 2013. Privatization of agricultural extension services in the EU: Towards a lack of adequate knowledge for small-scale farms? *Food Policy* 38, 240-252.
- Laurent, C., Cerf, M., Labarthe, P., 2006. Agricultural Extension Services and Market Regulation: Learning from a Comparison of Six EU Countries. *The Journal of Agricultural Education and Extension* 12, 5-16.
- Madureira, L., Koehnen, T., Pires, M., Ferreira, D., Cristóvão, A., Baptista, A. 2015. Advisory services for small-scale farmers: how effective are their responses to farmer needs and demands? WP 4 – AKIS on the ground: focusing knowledge flow systems. Topic 1 Synthesis Report. www.proakis.eu
- OECD, 2010. Ministerial report on the OECD Innovation Strategy. Innovation to strengthen growth and address global and social challenges. Key findings. Accessible at: <http://www.oecd.org/sti/45326349.pdf>
- Prager, K., Labarthe, P., Caggiano, M., Lorenzo-Arribas, A., 2016. How does commercialisation impact on the provision of farm advisory services? Evidence from Belgium, Italy, Ireland and the UK. *Land Use Policy* 52, 329-344.
- Röling, N.G., 1988. *Extension science: information systems in agricultural development*. Cambridge University Press, Cambridge, UK.
- Röling N.G., Engel P., 1991. IT from a knowledge system perspective: concepts and issues. The Edited Proceedings of the European Seminar on Knowledge Management and Information Technology. Kuiper, D, Röling, N. (eds) Department of Extension Science, University of Wageningen, The Netherlands, pp. 10.
- Sutherland, L-A., Mills, J., Ingram, J., Burton, R. J. F., Dwyer, J., Blackstock, K., 2013. Considering the source: Commercialisation and trust in agri-environmental information and advisory services in England. *J. Env. Man* 118, 96-105.
- Tisenkopfs, T., Kunda, I., šūmane, S., Brunori, G., Klerkx, L., Moschitz, H., 2015. Learning and Innovation in Agriculture and Rural Development: The Use of the Concepts of Boundary Work and Boundary Objects. *The Journal of Agricultural Education and Extension* 21, 13-33.