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

AGRILINK'S MULTI-LEVEL CONCEPTUAL FRAMEWORK

THEORY PRIMER: 7) GEOGRAPHY OF INNOVATION AND FARMERS' ADOPTION BEHAVIOUR

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AgriLink

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

AgriLink's multi-level conceptual framework

Theory primer: 7) Geography of innovation and farmers' adoption behaviour

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

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

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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**.

7) Geography of innovation and farmers' adoption behaviour

Author: Danielle Galliano

1.0 General Overview of the Theory or Approach

1.1 Summary of the Theory, Approach or Topic: The contributions of the geography of innovation.

The geography of innovation is an interdisciplinary scientific field - at the intersection of the innovation economy and regional science - which studies the spatial dimension of innovation and the related dynamics of technological, institutional and geographical change. In this context, numerous studies have shown the role of geographical proximity and the importance of spatial externalities in the process of information and knowledge transfer, and in the diffusion of innovations ((Audretsch et Feldman, 2004, Boshma and Frenken 2011 Cooke et al. 2011, Camagni Capello 2013, Capello 2014). They show that location plays a strategic role in actors' and organizations' capacity to capture and absorb external knowledge. Although this spatial dimension has been modified by the digital revolution, many authors show that geographical proximity and territorial resources related processes remain fundamental factors in innovation and, in particular, in processes of transition towards sustainable development (circular economy, the role of place-based factors etc.). This is particularly true for innovation processes in rural areas, characterized by low flows of information and knowledge that can hamper the processes of change and innovation (Esparcia 2014, Galliano et al., 2012, 2017).

1.3 Key references

AUDRETSCH, D. B., FELDMAN, M. P. (2004), Knowledge spillovers and the geography of innovation, in Henderson, J. V., Thisse, J. E., *Handbook of Regional and Urban Economics*, Volume 4, Elsevier, 2713–2739.

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

2.1 How this can be applied/developed in AgriLink: Characteristics of the spatial environment of farming operations and its role in innovation and agro-ecological transition processes

The processes of technical or organizational innovation and of adoption of practices can be linked to different processes of knowledge dissemination and interaction between actors in which the spatial dimension plays an important role. DiMaggio and Powell (1983) point to a phenomenon of "institutional isomorphism" which refers to a convergence and homogenization of actors' behaviors in the same sector or territory. They highlight that this homogenization of behaviors stems from three mechanisms. The first is a coercive mechanism ("coercive isomorphism") which refers to the existence of rules, norms, regulations that affect actors belonging to the same sector. The second mechanism is the "mimetic processes", particularly active at local level. Uncertainty and risk are conducive to behavioral imitation among farmers, particularly in terms of adoption of innovative practices. The third is a normative mechanism (normative pressures) related to regulation and standards (Di Maggio and Powell, 1983).

In line with this, and beyond the coercive and regulatory aspects, various studies show the importance of these **normative mechanisms** linked to informal institutions (associations, training, specialized press, etc.) and of **mimetic mechanisms**, which refer to processes of imitation or contagion between actors (Vicente and Suire, 2007, Lapple and Kelley, 2015, Lewis et al. 2011). Consulting organizations are, in this context, a particularly important driving force in the knowledge dissemination process, particularly in terms of knowledge sharing among agricultural stakeholders. These processes are particularly active within the same sector (the sharing of knowledge and experience on specific farming practices, etc.) and within the same territory (geographical proximity). The two dimensions reinforce each other.

In the empirical literature on agriculture, the study conducted by Lapple and Kelley (2015) and based on a local sample of Irish breeders, shows that spatial proximity is conducive to farmers making similar adoption choices, and more specifically that interactions between farmers and the frequency of use of agricultural consulting or training services are strongly correlated with the adoption of organic farming. These neighborhood effects are confirmed by different studies involving direct variables such as social capital, network analysis, etc. (Wollni et Andersson, 2014 ; Lewis et al 2011, Wei et al., 2016, Crespo et al. 2014) or indirect variables, through their effects on farmers' perception. Thus, these studies emphasize the important effect of farmers' perceptions on the difficulties (or ease) associated with the adoption of an innovation and its expected benefits (Greiner et Gregg, 2011 ; Zeweld et al 2017) or the sharing of the value added (Tregear et al., 2007 ; Crespo et al. 2014).

The question of **spatial externalities refers more broadly to the effects of networks and of the spatial conditions of innovation diffusion**. Regarding networks, research has emphasized the importance of personal networks and key actors involved in the governance of innovation projects in rural areas (Esparcia, 2014). It has also shown the importance of institutional mechanisms to complement personal networks and their contribution to a project (Doloreux et al. , 2011). These studies stress the key role of sectoral and cross-sectoral links between actors in the agro-food chain as well as the key role played by local public authorities during the different stages of innovation projects, particularly in rural areas (Esparcia, 2014, Galliano, Gonçalves et Triboulet, 2017). The analysis of networks and interactions among public and private actors throughout the various stages is often essential to understanding the adoption process of eco-innovation. This implies that research must consider the geographical dimension of the learning process, the successive choices made by actors, and its influence on the progressive construction of the specific material or non-material assets that support the eco-innovation process (Galliano et al. 2017). As a consequence, our analysis must clearly examine the relational and geographical dynamics of these processes.

Mention must be made, finally, of the **biophysical environment** and its pedo-climatic conditions, which must be taken into account insofar as they play an important role in how available natural resources are used and in the choices of adoption of practices (Ostrom, 1990 ; Hagedorn, 2008 ; Allen et Lueck, 2003). Because of their complex interactions with ecosystems, farms are much more sensitive to uncertainties related to the functioning of these ecosystems and to natural events (Hagedorn, 2008, Renting et al., 2009, Darnhofer, 2014). The local biophysical environment is an important control variable in the analysis of the environmental profile of farming operations and of their transition processes.

2.1 Research questions relevant to AgriLink:

- What is the role of spatial proximity in farmers' uptake of innovations?
- Quels sont les réseaux d'acteurs mobilisés par les farmers et leur localisation?
- What networks of actors do farmers utilize and their location ?
- What role does geographical proximity play in knowledge transfer and appropriation?
- Does the nature of knowledge (tacit, codified, etc) affect the way in which knowledge is appropriated. More specifically, does spatial proximity facilitate the sharing of experience and the transfer of tacit knowledge (vs codified)?
- What role do the adoption and use of IT play in the transfer of knowledge and the adoption of specific innovation by farmers?
- What role does the location of the different types of advisors play in farmers' uptake of innovations?
- It raises a more general research question: is the location of the sources of information (and advice) always a key factor in farmers' decision making processes?

2.3 Methodological implications

In order to better understand the effectiveness of adoption processes and the role of the different type of advisors, it is important to take into account the spatial dimension of the processes of knowledge dissemination and of the ways in which farmers use resources. It will be appropriate to examine and assess :

- the role of knowledge sharing via localized networks of actors,
- the mimetic phenomenon in the adoption process (my neighbor has adopted such or such a practice, so I do it too),
- the role of advisors in the linking and coordinating of farmers on a territory, in experience and knowledge sharing between farmers.

For micro-AKIS, this topic of geographical proximity raises the question of identifying, in surveys, the sources of information and service and their location

In AgriLink WP2, we will be interviewing farmers who have adopted specific innovations on :

- The location of the actors in the personal and professional networks used
- The location of the physical, cognitive and relational resources used by farmers to innovate.
- Distinguish the sources of information and services mobilized according to the stage of the innovation process: emergence, realization, stabilization - and their location (what kind of resources are mobilized locally or extra locally ? especially via ICTs ? etc…)

2.2 Relevance to AgriLink Objectives

[tick relevant]	AgriLink Objectives
✓	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];
✓	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];
✓	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];
✓	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];
	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:
✓	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].

2.3 References

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