The AKIS concept and its relevance in selected EU member states

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Abstract: Recently, Agricultural Knowledge and Innovation Systems (AKISs) have gained considerable attention in scientific and political forums in the European Union (EU). AKIS is considered a key concept in identifying, analysing and assessing the various actors in the agricultural sector as well as their communication and interaction for innovation processes. Using qualitative expert interviews and organizational mapping, the features of national AKISs were investigated in selected EU member states (Belgium, France, Ireland, Germany, Portugal and the UK). The authors present the different national AKISs and compare them qualitatively with regard to their institutional settings, their overall policy frameworks and their coordinating structures. Conclusions are drawn with regard to AKIS appraisal in general and the usefulness of the AKIS concept, particularly for the understanding and evaluation of policy-induced innovation in agriculture.

Keywords: agricultural knowledge and innovation system; CAP; AKIS diagram

The European Union (EU) is experiencing a time of drastic economic risks and huge challenges for social cohesion between member states. As a political mid-term goal for the 10-year period from 2010 to 2020, the declared ‘Strategy 2020’ (COM, 2010) prioritizes economic growth based on knowledge and innovation, resource efficiency, and social and territorial cohesion in all member states. In this context, the Common Agricultural Policy (CAP) plays a crucial role. Especially through rural development policies, both the agricultural sector and rural territories are to be supported in their development efforts towards competitiveness, environmental and social balance, resilience and innovativeness (EU, 2013). Here, several instruments aim to enhance the processes of knowledge exchange, information dissemination and innovation creation, namely knowledge transfer and information actions (ibid, Art 14), advisory services (ibid, Art 15) and cooperation in networks (ibid, Art 35). The underlying conceptual framework for this approach is that of the Agricultural Knowledge and Innovation System (AKIS), which is conceived as the purposeful network interaction for innovations of various actors either from within the agricultural sector or along an agricultural value chain (EU SCAR, 2012, 2013). In addition, the literature on
societal transition towards sustainability (for example, Grin et al, 2010) promotes a complex social systems concept in order to improve understanding of societal change and to enable the design and better targeting of this change process.

While the AKIS concept has been extensively debated in the literature (Klerkx et al, 2012), we explore here whether it can support policy making in rural development in the EU in practice. More specifically, we question whether and how policy makers may use the AKIS concept to obtain an overview of and sufficient insights into the institutional diversity of the agricultural sector, assuming they are searching for partners to design and implement instruments to enhance information transfer, knowledge exchange, advisory services and cooperation for innovation. The AKISs in the EU member states were studied as part of the EU FP7 project PRO AKIS (‘Prospects for Farmers’ Support: Advisory Services in the European AKIS’, www.proakis.eu). One goal was to test empirically the potential of the AKIS concept for guiding the development of public policies aimed at supporting farmers in Europe to obtain access to reliable and relevant knowledge. In this paper, we compare findings for those countries that the authors investigated (Belgium, Denmark, France, Ireland, Portugal and the UK). The paper starts with a brief presentation of how we conceptualize an AKIS, followed by a description of the methods applied. Results refer to the AKIS diagram as a tool for diagnosis and appraisal and to the insights that are gained from the comparative analysis of the national AKIS’s institutional settings, policy frameworks and coordinating structures. Conclusions are drawn with regard to the future use of the AKIS concept in research and agricultural policies.

The AKIS concept

Within agricultural sociology and extension sciences, system approaches to the complex processes of knowledge generation and exchange, learning and innovation practices among multiple actors have a long tradition (Nagel, 1979; Blum, 1991; Röling and Wagemakers, 1998; Klerkx et al, 2012). However, there is not a straight line of consecutive theory development for knowledge systems, but rather a creative but inconsistent multitude of approaches and concepts. One traceable strand differentiates the system through ‘subsystems’, which in an early paper were ‘research, education and extension’ forming the agricultural knowledge system (AKIS) (Blum, 1991). More recently, Rivera et al (2005) distinguished the subsystems as ‘agricultural producers, research, extension, education and support systems’ forming the agricultural knowledge and information system (AKIS). In one of its latest forms, the system is presented as agricultural knowledge and innovation system (AKIS) which, in addition to ‘farmers, extension, education and research’ also comprises ‘input suppliers, food processors, retailers, consumers’ and various supporting services such as ‘accountants, banks, media’, etc (EU SCAR, 2012, p 9, 2013, p 18). While these concepts mainly differ in what they consider to be the relevant elements of the system in terms of the diversity of actors involved and the degree of market integration (Hall et al, 2006), a second analytical approach was proposed by Klerkx et al (2012), who differentiate more fundamentally between the ‘infrastructural’, the ‘process’ and the ‘functional’ views of agricultural innovations systems. We are, of course, aware of the semantic shift from knowledge and information to an innovation system; however, as we are addressing both knowledge exchange and innovation-enhancing policies, we abstain from this differentiation and use the term AKIS in a comprehensive sense.

In the case presented here, the infrastructural view is of specific interest, as it has a focus on the ‘presence and interaction of actors […] and the infrastructures that govern the behaviour of actors in innovation processes’ (Klerkx et al, 2012, p 464) which corresponds well to the above-mentioned political context. In order to address the various AKIS actors in a systematic way, we slightly adjusted a typology proposed by Birner et al (2009) and distinguished five types of service-providing organizations: (i) public sector organizations (ministries and subordinated public administration), (ii) research and education (universities, research institutes, schools), (iii) private sector (industries, independent consultants and advice-providing companies), (iv) farmer-based organizations (chambers of agriculture, cooperatives) and (v) non-governmental organizations (for example, charity organizations, environmental groups). In line with the focus of the paper, specific attention is paid to agricultural advisory services providing organizations within the AKIS (Assefa et al, 2009) that ‘will enable farmers to co-produce farm-level solutions by establishing service relationships with advisors so as to produce knowledge and enhance skills’ (Labarthe et al, 2013, p 10).

Methods and materials

The findings presented here are based on the PRO AKIS inventory that was conducted in 27 EU member states.

<table>
<thead>
<tr>
<th>Organizational affiliation</th>
<th>France</th>
<th>Bulgaria</th>
<th>Germany</th>
<th>Ireland</th>
<th>Portugal</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector organization</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Research, education</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Private sector</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Farmer-based organization</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other non-governmental organization</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>10</td>
<td>11</td>
<td>5</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>

*A public sector organization that incorporates research and education functions.
The empirical work followed a common methodology including a guide for qualitative expert interviews and a questionnaire for a survey of advisory bodies that was applied across all member states (Knierim et al., 2013). Expert interviews were conducted with specialists in agricultural knowledge and information processes from a diversity of groups of interests: public decision, research and education, advisory services and farmer-based organizations, mainly at the national level, between May and September 2013. A total of 61 expert interviews were held across the six countries (Table 1).

The interview guide included questions regarding AKIS organizations and their linkages, knowledge creation and transformation processes, advisory services, the policy framework, trends for AKIS and advisory services and knowledge needs. In line with the conceptual understanding of AKIS as a predominantly infrastructural one and based on literature and grey documents, the authors developed a diagram for each national AKIS, which was used and refined during the expert interviews. The data were then coded according to themes and assessed following common research questions.

Results

The AKIS concept as perceived by national experts

The AKIS concept – the idea that knowledge and advisory services provided to farmers are a result of complex and systemic interactions of manifold actors – is not yet commonly familiar to the interviewees. In Bulgaria, Germany, France and the UK, most experts did not actively refer to the AKIS concept, while in Ireland and Portugal they were broadly familiar with it.

Although the concept is not commonly used among national stakeholders, the literature-based draft AKIS diagram was nevertheless useful in the interviews and fulfilled several purposes as a structuring tool (in Germany), for the identification of missing actors (in Bulgaria, France and Portugal) and for the assessment of the breadth of the organizational landscape (in the UK). In contrast, it was less appropriate to integrate and visualize different perspectives within one diagram or to qualify linkages and interactions. For example, the Irish case showed two conceptualizations that differed considerably in the structure and total number of actors – perceived as a formalized institutional overview by the interviewers (Figure 1, left panel) and as a representation reflecting the perspective of the dominant national AKIS organization (Figure 1, right panel).

Two other examples are presented: while the French schematic (Figure 2) highlights the institutional diversity and the multilevel governance structure of the AKIS, the Bulgarian example (Figure 3) illustrates an AKIS that is to a large extent vertically integrated. A particular situation occurs in the UK where a national AKIS exists only in theory, while in practice, the experts interviewed referred to four separate knowledge systems in England, Wales, Scotland and Northern Ireland.

Country-level AKIS – appraisal of organizational diversities

The objective of the country-level AKIS appraisal was to (i) provide a national-level AKIS characterization, (ii) identify and describe the various types of organizations involved and (iii) qualify their mutual linkages. As noted above, the construction of an overview for the national AKIS varied between ‘not possible at national level’ for the UK and ‘meaningful and expressive’, for example, in France. To illustrate this range, we present the main features for each country.

For Germany, recent observations on the challenges of the federalized system (Hoffmann et al., 2012) confirmed that the multifaceted organizational setting at national level had only limited impact on the Länder level (states). Interviewees mentioned especially public research bodies at state level as important knowledge sources. Similarly, the institutional setting of agricultural advisory services is governed by state authorities and varies considerably horizontally. Agricultural chambers play an important role in some states. At national level, both the Federation of Agricultural Chambers and the German Farmers’ Association are well connected with various other AKIS actors, and the former even manages a coordinating platform for knowledge exchange. However, this strong performance at national level does not balance the institutional heterogeneities and differences at state level, which reveal low AKIS presence in some states and little horizontal exchange.

In Bulgaria, the main knowledge and information sources are the Ministry of Agriculture and Food (MAF) and the National Agricultural Advisory Service (NAAS). Its subordinate offices at the regional and municipal levels have support and consultancy functions and work closely with farmers. MAF cooperates closely and exchanges information with research institutes and universities. The universities and NAAS jointly provide training and seminars to small-scale farmers, while private advisory companies often cooperate with professional farm organizations to offer specific advice (that is, preparing applications for rural development measures). NGOs and foundations have strong linkages with some large private advisory companies and provide information to their members. There is no cooperation between NAAS and private advisory services and professional farm associations (Labar et al., 2012).

The AKIS in Portugal is fragmented, involving a large number of organizations that are mostly farmer-based and poorly articulated, which makes it difficult to produce synergies. Overall, social and economic changes can be detected in the AKIS description: there are farmer-based organizations, governmental research centres and remnants of the public agricultural services, while the university agricultural research and educational institutions have an even weaker role nationally. The public agricultural services are now more involved with subsidy payments, and the universities support the Ministry and farmer-based organizations in an ad hoc manner, particularly through research and field experiments, training and information exchange.

Ireland is unique in having a substantial component of its AKIS within a single organization: ‘Teagasc’
Figure 1. Two representations of AKIS in Ireland
Sources: (left) adapted from Prager and Thomson, 2014; (right) ‘Impressionistic view of the linkages between the Irish AKIS’ (Boyle, 2012).
Agri-Science (Agriculture and Food Development Authority), which is a government agency. It undertakes activities in research, extension services and education, as well as offering support structures, thereby spanning the various elements of an AKIS. Public advisory services are complemented by about 250 independent private advisers. The survey showed that there is serious competition for public funds between these two groups of actors.

The UK may be described as having four independent AKISs, with only a limited number of organizations linking across two or more UK countries in terms of work and subsequently knowledge flows. They are hybrids, with public, private, commercial and non-governmental charitable advisory services coexisting. AKIS structures are determined by specific sets of policy, government departments and agencies, and to a large degree also by discrete sets of NGOs, farmer organizations and private commercial actors in each of the UK countries.

In France, there is a progressive shift from a co-management of AKIS organizations towards a situation of subcontracts and delegation of services. The French system used to be characterized by a centralized institutionalized arrangement between the state and the dominant farmers’ union to decide how to spend public money (a tax on agricultural products) to the benefit of farmer-based organizations (chambers of agriculture and applied research institutes). The system is now characterized by a complex set of contracts between the state and a growing diversity of AKIS actors. Parts of these contracts are based on competitive calls. Although public research institutes and farmer-based organizations are still important sources of knowledge within the system, industries (upstream and downstream) and R&D firms owned by cooperatives play a growing role in that respect (Labarthe, 2009).

Looking across the cases, we encountered a number of difficulties in applying the classification of service-providing organizations according to Birner et al. (2009). In Ireland, for example, cooperatives would intuitively be classified as farmer-based organizations, but due to their commercial nature they are mostly private sector organizations. Private colleges could have been classified as private organizations but, because their main remit is education, they were considered as research and education organizations. ‘Monitor farms’ and farmers’ discussion groups were listed as farmer-based organizations, although they were set up and facilitated by Teagasc. Similar observations were made for France: some farmers’ associations that were supported by the state to provide specific services to farmers (such as the control of milk production performance in dairy farms) now use their databases or competencies to provide commercial advice to farmers. The distribution of roles between organizations was quite clear in the past and was the result of negotiations between the state and farmers’ unions; however, this is no longer the case (Compagnone et al., 2010), as organizations tend to broaden their scope of activities in a context of increased competition to attract both farmers’ contributions and public subsidies. We conclude that the five categories used to describe the diversity of actors involved in the AKISs reveal severe limitations, as the categories are not exclusive.

All AKISs examined show evidence of increasing pluralism in the field of agricultural knowledge provision.

Figure 2. AKIS in France.
Source: Labarthe, 2014.
(Kidd et al, 2000), although they differ considerably regarding their institutional diversity and the dominance of public (Bulgaria, Ireland), farmer-based (Germany, France, Portugal) or private and mixed bodies (UK). With regard to the perceived horizontal and vertical linkages between the various actors, we propose to differentiate ‘integrated’ AKISs (in France, Ireland, Bulgaria) (Garforth et al, 2003) with at least one dominant actor, and ‘fragmented’ AKISs (in Germany, the UK, Portugal) where manifold actors operate more or less successfully in parallel.

National AKIS policies and coordinating structures

Acknowledging this institutional diversity of AKIS, the question of whether and how integration and coordination take place is a key concern. The presence and importance of national-level AKIS policies and coordinating structures vary considerably among the countries investigated (Table 2).

In France, despite the existence of both policies and institutional settings for AKIS coordination and research planning, the system is characterized by a growing complexity of the relations between public administration (mainly the Ministry of Agriculture) and diverse AKIS actors benefiting from public financial support. Two problems emerge from this situation: (i) the difficulty of integrating and coordinating the various available public instruments; and (ii) the lack of evaluation of the effectiveness of the systems coupled with an absence of debate about which farm types and production systems should benefit from public investments in AKIS. There has so far been little impact of EU innovation policies on the French AKIS.

In Bulgaria, a strong top-down integration of the knowledge system can be observed with a centralized governance structure and good coordination, at least among the public bodies; however, private actors are not included in official exchanges. In Germany, some coordination among the federal states and the national level takes place through the ‘Joint Task for the Improvement of Agricultural Structures and Coastal Protection’ (GAK), which provides the framework for many funding mechanisms for farmers and rural areas. National governance is also implemented through R&D programmes, which are open to public research and private consultancies. Limited horizontal coordination takes place in...
Table 2. Overview of policy frameworks and coordinating structures.

<table>
<thead>
<tr>
<th>National AKIS policies</th>
<th>Coordinating structure(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France: Several policies on: farm advice; basic and applied research; education; and connecting research, advice and practice</td>
<td>Institutions for research planning; institutions for the coordination of R&amp;D programmes</td>
</tr>
<tr>
<td>Bulgaria: National programmes for supporting farmers; RDP (2014–2020) for establishing and developing agricultural advisory services</td>
<td>National structures: Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAK); 18 working panels to integrate states’ interests; German national network unit in the national rural network</td>
</tr>
<tr>
<td>Germany: Incentives through research programmes: innovation in agriculture; and research in organic and sustainable farming</td>
<td>MAF and its secondary administrators (State Fund for Agriculture and NAAS)</td>
</tr>
<tr>
<td>Ireland: Strategies and policies on: ‘Stimulating Sustainable Agricultural Production through R&amp;I’; beef and dairy production; ‘Food Harvest 2020’</td>
<td>Teagasc unites public advisory services, research and education; coordination with private providers needs improvement</td>
</tr>
<tr>
<td>Portugal: Lack of policy on: agricultural advisory service; and research. FAS implemented by farmers’ organizations on a limited scale</td>
<td>Rarely visible coordinating structure</td>
</tr>
<tr>
<td>UK: No ‘national’ programme, but a ‘cross-government agri-tech strategy’ seeks to increase industry engagement</td>
<td>No national coordinating structure</td>
</tr>
</tbody>
</table>

Note: RDP – rural development programme; R&I – research and innovation.

Discussion and conclusions

The AKIS concept as proposed here is useful for the exchange and construction of national overviews of relevant organizations and their linkages. The adopted classification of service-providing organizations (Birner et al., 2009) is appropriate to reflect the infrastructural diversity in all countries, and produced evidence for the shift towards institutional pluralism of AKIS in the EU. Furthermore, the concept helps to identify the linkages between different types of actors. As a consequence, it can be used by policy makers to systematize and visualize a country’s infrastructural setting for knowledge and innovation policies. By means of its heuristic concepts and semantic order, this approach follows the tradition of a qualitative comparative knowledge system assessment (Blum, 1991), which is especially instructive at the interface between science and policy makers (EU SCAR, 2012, 2013).

Nevertheless, the infrastructural diversity encountered in a real-world context is too great to be unambiguously captured with the current analytical level of the AKIS concept. Hence, it does not yet allow for a comprehensive comparative view, but only for the identification of similar emerging issues such as, for example, new roles of public organizations when governing the AKIS through contracting or tailoring specific research programmes for innovation in agriculture. Further research on the infrastructural AKIS concept will be necessary if it is to be used for more quantitative comparative analyses throughout Europe, and about the resources (human, cognitive, financial) of the various organizations (public, private, third-sector) involved in these systems. Such knowledge is necessary to discuss the potential of funding schemes delegating new organizations to these functions.

Finally, we want to point to the surprisingly low resonance of the AKIS concept among the interviewees, which shows that the European-level concept has not yet broadly reached national political discussions in most of the countries investigated. With regard to the upcoming AKIS policy that is manifest in the European Innovation Partnership (EIP)’s ‘Agricultural productivity and sustainability’ (EU SCAR, 2013; COM, 2012), this gap may constitute a serious disadvantage in countries such as Germany, the UK or Portugal where the AKIS is fragmented and the various actors are not (well) aware of systemic approaches to knowledge exchange and cooperation for innovation. Increased efforts from both European and national governments are necessary to spread the AKIS concept in order to enhance knowledge exchange, information flows and innovation generation among the various agricultural actors through future rural development policies.
References


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