



SOLINSA
Support of Learning and Innovation
Networks for Sustainable Agriculture

Agricultural Knowledge Systems In Transition:
Towards a more effective and efficient support of Learning
and Innovation Networks for Sustainable Agriculture

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COMPARATIVE ANALYSIS AND SYNTHESIS REPORT

WP3 UNDERSTANDING THE CONTEXT

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In collaboration with the national research teams

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EXECUTIVE SUMMARY

This report investigates and compares the organisation and functioning of the Agricultural Knowledge Systems in eight different European countries: England, France, Germany, Hungary, Italy, Latvia, the Netherlands and Switzerland. These countries have been studied in the framework of the EU research project SOLINSA (No. 266306), which stands for Support of Learning Innovation Networks for Sustainable Agriculture. Agricultural Knowledge System (AKS) is a term used to define a set of public and private organisations dedicated to research, education and extension, and their interaction with knowledge users (traditionally farmers). The changing political landscape in Europe after the fall of the iron curtain, the subsequent reform of the Common Agricultural Policy, and the decreasing economic importance of the agricultural sector in most European countries have led to a widely diversifying set of Knowledge Systems in Europe, not only between countries, but sometimes even within countries that have a highly federalised or regionalised political system. However, in many cases these changes have not occurred under the push of a clear strategy, but rather have been an adaptation to changing regulatory, social and economic environments. The report identifies eight of the most important trends that the agricultural sector and the AKS players must respond to in the future:

- Growing world population and issues of food security
- Globalisation and deregulation of markets
- Climate change
- Increasing claims on agricultural lands
- Governance
- Demographic changes
- New actors in the countryside
- New modes of production

These currently on-going trends have been influencing the different countries in different ways. However, they all report a fragmented AKS that includes a diversified landscape of both formal and newly emerging informal organisations that each cover an overlapping part of the AKS. The role of research institutes and universities as the dominant sources of knowledge and innovations is rapidly replaced as organisational boundaries become diffuse. Traditional categories between fundamental and applied research are disappearing as universities start to cooperate with (large) agri-businesses in research projects. Extension services show the highest diversity between countries. Some countries have completely privatised their extension services, while in other countries a publicly funded extension service still exists. However, the distinction between commercial and non-profit advisory systems is disappearing. NGOs, farmer funded organisations, cooperatives, commercial advisory agencies as well as some successful individual farmers are now recognised as potential suppliers of information in the agricultural sector. Depending on the formal position of government sponsored extension services, new actors have been allowed to establish within the AKS. From the traditional AKS-triangle of Research, Education and Extension, agricultural education is in the most difficult structural position. Many countries report either a lack of funds, a lack of interest from students, or a combination of the two. Compounding

these problems, the links of agricultural education and other sectors of the AKS are often not well established. Businesses and schools particularly have difficulty in finding each other.

New actors have emerged and new coalitions of actors have started to pursue different, sometimes competing goals. Networking, knowledge co-creation and collaboration between different partners is very popular across the different countries. The report shows a variety of LINSAs-type collaborations. Depending on the characteristics of the national AKS, the support of these Learning Innovation Networks for Sustainable Agriculture (LINSAs) takes different forms. In some countries the different types of LINSAs are even eligible for funding as governments see in them a good opportunity to work on public goods, like environmental and social concerns. Regional clusters have become a popular form to improve collaboration between different types of partners. These clusters have strong local ties and focus on the territorial presence of a specialised industry. Intersectoral collaborations, often organised as public-private cooperations, involve SMEs, high schools, suppliers, market partners, research institutes and local governments. Horizontal integration is promoted through a number of new types of network based institutions and 'platforms' that either function as communities of practice (CoPs), or Networks of Practice (NoPs). In countries where the traditional AKS actors still have a powerful position, typical bottom-up innovative projects have difficulty getting recognised and subsequently also funded. Here, LINSAs depend on either private funds or funds from the EU.

Their funding notwithstanding, the practical implementation of LINSAs is often fraught with difficulties. Using a system performance matrix, several different types of constraints have been identified and are discussed in the report.

- 'Hard institutional failure' refers to laws, regulations and any other formalised rules, or the lack of them, hampering innovation. Many countries report a lot of bureaucracy regarding the funding of innovation projects. Furthermore the funding criteria are often focussed on the short term and often do not take the soft outcomes of collaborative projects into account: improved stakeholder relations and the development of trust. Combined with a shift towards more attention to short term thinking this results in many countries in incoherent innovation policies that focus on short term results. At the same time however, there is a complete lack of monitoring and evaluation criteria for innovation projects and programmes once a programme has finished. Learning effects are not systematically documented and these feedback mechanisms are not formalised in many countries.
- 'Soft institutional failure' refers to unwritten rules, norms, values, culture, or 'the way business is done'. Some countries have a culture that favours consensus seeking and cooperation, while other countries report a national culture aversive to anything 'collective' as a result of the former communist doctrine.
- The way actors are connected to each other, their connectedness, or the characteristics of the social networks connecting them can also explain particular forms of failure. 'Strong network failure', refers to a (small) number of actors 'locked' into their relationship with each other without links to

outsiders, causing myopia and blocking new ideas from entering. This is especially the case in those countries where the formal AKS partners still have a powerful position. 'Weak network failure' refers to a situation where actors are not well connected and fruitful cycles of learning and innovation may be prevented because there is no creative recombination of knowledge and resources. Countries whose AKS is defined by a very competitive market often suffer from this type of network failure. A strong competition makes actors less likely to engage in cooperative projects that involve knowledge sharing.

- Capability failure is the lack of technical and organisational capacity of the actors to collaborate in LINSAs type of networks. Issues here are the level of entrepreneurship, adequately educated farmers and networking skills. Different actors within the AKS often need to work on their capabilities for networking and collaboration.
- Finally, market structure failures refer to the positions of and relations between market parties. With increasing knowledge supply by brokers, advisors and agricultural consultants, the AKS becomes much more complex and the overview of the different services on offer, not only from commercial actors, but sometimes also from (applied) knowledge institutes, becomes difficult to oversee. Even though bottom-up initiatives have easier access to research institutions, the steering of the AKS does not improve. Governments have a more difficult job to steer the AKS in a desirable direction as there is no consensus over the direction of the agricultural sector.

TABLE OF CONTENT

EXECUTIVE SUMMARY	3
ABBREVIATIONS AND ACRONYMS	8
1. INTRODUCTION	10
2. THE SYSTEMS APPROACH IN AGRICULTURAL INNOVATION. 13	
2.1 From linear approaches to systems approaches to innovation systems ..13	
2.2 A new position for AKS within AKIS	14
2.3 A comprehensive framework for analysis: innovation system performance analysis.....	15
3. METHODOLOGY	17
3.1 Data collection	17
3.2 Data handling and processing.....	19
4. RESULTS	22
4.1 General overview of agriculture in partner countries	22
4.1.1 France.....	23
4.1.2 Germany	23
4.1.3 Hungary	24
4.1.4 Italy	25
4.1.5 Latvia	26
4.1.6 The Netherlands	27
4.1.7 Switzerland	28
4.1.8 England	28
4.2 Comparison of innovation system components	29
4.2.1 Actors involved in the AKS	29
4.2.2 Infrastructure	35
4.2.3 Legislation, rules and regulations	35
4.2.4 Values, norms and culture	40
4.2.5 Interactions and network characteristics	45
4.2.6 Capabilities	50
4.2.7 Information market structure	53
4.3 Trends influencing agricultural and rural activities	57

4.3.1	Growing world population.....	57
4.3.2	Globalisation.....	58
4.3.3	Governance.....	58
4.3.4	Climate change and water.....	59
4.3.5	Competing claims on agricultural lands.....	59
4.3.6	New actors in the countryside.....	59
4.3.7	Demographic trends.....	60
4.3.8	New modes of production.....	61
5.	DISCUSSION OF RESULTS AND IMPLICATIONS FOR LINSAS.....	62
6.	CONCLUSIONS.....	66
	REFERENCES.....	68
	APPENDIX A: GUIDELINES FOR LITERATURE REVIEW AND INTERVIEWS IN WP3.....	71
	APPENDIX B. LIST OF INTERVIEWED PERSONS PER COUNTRY ..	73

LIST OF TABLES

Table 1: Overview of interviews.....	18
Table 2: Workshops and attendances	19
Table 3: Innovation System Performance Matrix.....	20
Table 4: Structural characteristics of agriculture and rural development	22
Table 5: Overview of infrastructure and actors in AKS per country	30
Table 6: Legislation, rules and regulations	36
Table 7: Values, norms and culture.....	41
Table 8: Interactions and network characteristics.....	47
Table 9: Capabilities.....	51
Table 10: Market structure	55
Table 11: Overview of identified trends in country reports.....	57
Table 12: Types of LINSAs and their support.....	64

ABBREVIATIONS AND ACRONYMS

A.EAP – Economically Active Population in Agriculture
AIS – Agricultural Innovation System
AKS – Agricultural Knowledge System
AKIS – Agricultural Knowledge and Innovation System
CAP – Common Agricultural Policy
CoP – Community of Practice
ETH – Eidgenössische Technische Hochschule (Zürich)
ETP - European Technology Platform
EU –European Union
FAS – Farming Advisory System
FIBL - Forschungsinstitut für biologischen Landbau
FP7 – 7 th Framework Programme
GDP - Gross Domestic Product
ICT – Innovation and Communication Technology
ISP – Innovation System Performance
LEADER - Liaisons Entre de Development de l'Economie Rurale
LINSA - Learning Innovation Network for Sustainable Agriculture

NoP – Network of Practice

PPP – Public Private Partnerships

SCAR – Standing Committee on Agricultural Research

SME – Small and Medium sized enterprise

SMR – Statutory Management Requirements

SOLINSA – Support of Learning Innovation Networks for Sustainable Agriculture

SWOT – Strength Weaknesses Opportunities and Threats

T.EAP – Total Economically Active Population

WUR – Wageningen University And Research Centre

1. INTRODUCTION

Agricultural Knowledge System (AKS) is a term used to define a set of public and private organisations dedicated to research, education and extension, and their interaction with knowledge users, traditionally farmers. In Europe, these organisations traditionally have been linked in a linear way, aligned with the common goal of increasing agricultural production. Knowledge was thought to flow from (agricultural) universities through specialised extension services to farmers. Traditional agrarian players such as agricultural chambers and farmers unions had a strong influence on the research agenda and were able to shape agricultural policy.

The changing political landscape in Europe after the fall of the iron curtain, the subsequent reform of the Common Agricultural Policy, and the decreasing economic importance of the agricultural sector in most European countries have led to a widely diversifying set of Agricultural Knowledge Systems in Europe. In many cases these changes have not occurred under the push of a clear strategy, but rather have been an adaptation to changing regulatory, social and economic environments.

For instance, the European political landscape changed profoundly after the fall of the iron curtain in 1989 affecting the eight countries under study. For instance, with the German re-unification with the former DDR, the German agricultural sector became even more diverse than it already was. Hungary and Latvia applied for membership of the EU and were obliged to reorganise their economic and political system in order to fulfil the membership criteria (a process somewhat euphemistically called ‘harmonisation’ of national and EU legislation). At the same time, the enlargement of the EU forced an acceleration of the reform of the Common Agricultural Policy (CAP). The reform took the CAP away from its sole focus on agricultural production and broadened the perspective on the functions of agriculture. It shifted away from subsidised production towards more regional development with more focus on the cross compliance of farmers with environmental production regulations.

The increased attention on environmental modes of production is also a sign of changes in the perception of the agricultural sector within society. The declining importance of agriculture as an economic activity contributed to an increasing pressure on the existing agricultural regime to incorporate new demands of the countryside. New actors emerged in many countries with a new stake in the organisation of the countryside: environmentalists, nature conservationists, tourism and recreation organisations and animal welfare activists brought new perspectives and challenged the existing consensus view of the agricultural modernisation process. As the downside of the post World War 2 agricultural modernisation became more and more clear, new demands on agricultural actors were formulated. All in all the top-down linear view of innovation in general became challenged, not only in agriculture but also in other sectors.

Knowledge development is no longer limited to research institutes and universities. Instead, many knowledge generating organisations have evolved,

providing a broadened and expanded knowledge supply in response to a diversifying demand. However, despite the numerous changes in the AKS, the flexibility and responsiveness needed to fully support innovative bottom-up initiatives for sustainable rural development is still lacking. These ‘Learning and Innovation Networks for Sustainable Agriculture’ (LINSAs) mostly operate on the principle of knowledge sharing and learning between farmers and other stakeholders and they can include farmers, consumers, NGOs, experts and local administrations, looking for alternative ways to produce food and contribute to rural sustainable development.

The SOLINSA project, (Support of Learning Innovation Networks for Sustainable Agriculture) aims to identify effective and efficient approaches for the support of successful LINSAs as drivers of transition towards Agricultural Innovation Systems for sustainable agriculture and rural development. How do such networks develop and operate in practice and how can policy instruments, financial arrangements, research, extension and education support them effectively?

Within the SOLINSA project, eleven partner organisations located in eight different European countries (England, France, Germany, Hungary, Italy, Latvia, the Netherlands and Switzerland) have taken up the challenge to find some of the answers to this question. As the next section will show, these countries differ substantially from each other in terms of the place and role agriculture and rural development play in the broader society. The question is now how to make a systematic comparison of the different countries. As a first step this report gives a comparative analysis of the current organisation and functioning of the Agricultural Knowledge Systems in the eight participating countries. It specifically aims to contribute to the insight in:

- Institutional determinants in the AKS that enable or constrain AKS in supporting effective LINSAs;
- Trends in national AKS policies for agriculture, rural development and innovation.
- The main agricultural/ rural development trends in their national contexts;
- Specific demands of AKS emerging in the national contexts (knowledge needs);
- Characteristics, incidence and main fields of action of LINSAs in the national context.

Even though EU policy has an important impact on the developments of the AKS in different countries, the role of EU policies has only been included in this report in as far their impact on the specific countries. A separate review has been done within the SOLINSA project that investigates how policies at the EU level supports innovation in general and learning innovation networks more

particularly¹.

This report starts with a short review of the main theoretical characteristics of the different concepts in use: Agricultural Knowledge System, Agricultural Innovation System, Learning Innovation Network for Sustainable Agriculture, and so on. After this we will discuss the methodology used to analyse and compare data. Subsequently we will present the results of our comparative analysis of institutional determinants that enable or constrain agricultural knowledge systems in supporting LINSAs, including some of the on-going trends that will likely impact the agricultural sector, rural development and innovation in the future. This reports ends with a short discussion on the place and characteristics of LINSAs in different countries. This report ends with the conclusions.

¹ Hermans, Klerkx and Roep (2011) Review of relevant EU policy documents on innovation, SOLINSA deliverable D3.1b

2. THE SYSTEMS APPROACH IN AGRICULTURAL INNOVATION

2.1 From linear approaches to systems approaches to innovation systems

In the agricultural and rural innovation literature, as elsewhere, the linear view of innovation (i.e., agricultural R&D generates technologies that agricultural extension transfers to agricultural producers for subsequent adoption) is being criticised as the thinking about innovation processes has become broadened from processes of knowledge diffusion and knowledge transfer to processes of knowledge co-creation and social learning (Leeuwis and Van den Ban 2004; Smits and Kuhlmann 2004; Knickel, Brunori et al. 2009).

As a result of these criticisms, the linear view is being replaced by systems approaches (Hall, Rasheed Sulaiman et al. 2003; Sumberg and Reece 2004; Knickel, Brunori et al. 2009). A national agricultural innovation system (AIS) is defined by Hall et al. (2006) as 'a network of organisations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organisation into economic use, together with the institutions and policies that affect the way different agents interact, share, access, exchange and use knowledge'. However, this definition appears to overemphasise the role of knowledge: in the systems perspective on innovation, production and exchange of (technical) knowledge and information are not the only prerequisites for innovation; several additional factors play a key role, such as policy, legislation, infrastructure, funding, and market developments (Klein Woolthuis, Lankhuizen et al. 2005; Hekkert, Suurs et al. 2007). Furthermore, innovation is not only about creating economic value, but also societal, ethical, environmental and other types of value.

In the European context, AIS are often mentioned with a broadened interpretation of the AKIS concept. The AKIS acronym has changed from Agricultural Knowledge and *Information* System to a slightly new interpretation as Agricultural Knowledge and *Innovation* System. Actors in an AIS include all persons or organisations who develop or contribute otherwise to economic activities in the rural areas, such as rural (micro-)entrepreneurs such as farmers and others, as well as consultants, policy makers, supplier and processing industries, retail outlets, customers, NGOs, financial service providers, knowledge institutes and researchers.

The shift away from the dominance of traditional knowledge actors as 'sources of knowledge and innovation' is also a recognition of the bottom-up nature of many innovations, which emerge in a self-organising fashion (e.g. Aarts, Van Woerkum et al. 2007; Wiskerke and Roep 2007; Knickel, Brunori et al. 2009).

2.2 A new position for AKS within AKIS

The concepts of the AKS and Learning and Innovation Networks as a bottom-up mechanism in which a wide variety of actors participate and share work on innovation form the core concepts that this report deals with. With the recognition that other, non-traditional, knowledge actors can also play an important role in rural innovation, the image of innovation processes also changed. Innovations are no longer seen as the result of top-down knowledge transfer processes, from researchers, via professional extension workers to farmers. Instead it is recognised now that many innovations are the result of intersectoral collaborations between different types of actors. For specific innovation processes, flexible and dynamic innovation networks are formed from the network of actors present in national AKIS, or across different national AIS. These dynamic innovation networks go under different names in different publications. They have been referred to as ‘innovation coalitions’ by Biggs and Smith (1998), ‘innovation configurations’ by Engel (1995), or ‘public private partnerships (PPPs)’ (Spielman and Von Grebmer 2006; Klerkx 2008). In the context of our project, they are called Learning and Innovation Networks for Sustainable Agriculture (LINSAs). In these networks, joint (or social) learning and negotiation takes place to shape an innovation (Leeuwis and Van den Ban, 2004).

For the purpose of this report we have chosen a fairly broad definition of a LINSAs. As we are still in the early phases of the SOLINSAs project, we made the choice not to limit ourselves prematurely only to find out later, we excluded an important category. A Learning Innovation Network for Sustainable Agriculture can therefore be any knowledge network that exchanges or develops new knowledge or works on innovations. Typical examples of possible LINSAs thus include: communities of practice (CoPs), Networks of Practice (NoPs) (Oreszczyn, Lane et al. 2010) but also the idea of a technological niche operating outside the mainstream socio-technical regime (Geels 2002; Schot and Geels 2007). LINSAs often operate on the local or regional level, although in some countries some national platforms may also exist that fall within the broad characterisation of a LINSAs.

The formal agricultural knowledge system (AKS), has made great contributions to the development of food provision and rural development. However, in line with the critiques on linear approaches on innovation, despite its success in the past to support the European Common Agricultural Policy, the ability of AKS to adequately support sustainable rural development is increasingly questioned. The recent International Assessment of Agricultural Knowledge, Science and Technology for Development report (IAASTD 2009) indicates that AKS have contributed to increased yields and aggregated wealth, as well as to improved nutrition, yet the gains have been uneven and accompanied by negative environmental and social consequences. AKS developed in a time when the agricultural sector was very well defined, with very clear goals. AKS were one of the most important means by which to disseminate a policy of state intervention that was aimed at increasing agricultural productivity through the ‘transfer of knowledge’.

Recent work done in the European IN-SIGHT project and the SCAR collaborative workgroup have broadened the view of AKIS still further, adding 'support systems' to the traditional triangle of research, extension and education (Dockès, Tisenkopfs et al. 2010). AKS actors are not the dominant providers of knowledge and information, but co-produce knowledge with many other stakeholders (Bruckmeier and Tovey 2009; Rivera and Sulaiman 2009). A. The AKS actors should be able to create new spaces for innovation by bringing together different scientific disciplines, different worlds (for example, production and consumption) and different administrative and policy spheres, to foster synergies and processes of mutual learning. They should be able to anticipate change by implementing a capacity to self-innovate through experimentation of new methodologies and new approaches, and through intense discussion with multiple stakeholders. In many EU countries there have been reforms of the AKS through measures such as (partial) privatisation and decentralisation. As a result of this, in many countries opposed to a monopolistic public AKS, a pluralistic system of research, education and advisory service provision has been designed which should work as a market for innovation support services, making AKS organisations more responsive to users' needs, and hence more demand driven and effective in supporting LINSAs

2.3 A comprehensive framework for analysis: innovation system performance analysis

To enhance 'networking for innovation' and the formation of LINSAs, the AKIS literature emphasises the need to come to shared visions, well-established linkages and information flows amongst different public and private actors, conducive incentives that enhance cooperation, adequate market, legislative and policy environments, and well-developed human capital (Hall, Rasheed Sulaiman et al. 2003). A well-functioning AKIS is characterised by Spielman et al. (2008) as:

- Learning within and between firms and organisations to innovate
- Strengthening individual and collective capabilities to innovate
- Demand and supply-driven science and technology
- Innovation agents focusing on complex and dynamic interactions
- Network-based knowledge dissemination
- Both embedded and disembedded knowledge dissemination: in both tacit and codified forms
- Decentralised management of innovation processes

Often innovation systems do not act as systems and display imperfections or system failures that hinder learning and innovation. Creating and fostering effective linkages among heterogeneous sets of actors (i.e. the formation of adequate innovation configurations, coalitions, PPPs) is often hindered by different technological, social, economic and cultural divides (Hall 2006). Such divides may be caused, for example, by different incentive systems for public and private actors, differences between local indigenous knowledge systems

and formal scientific knowledge systems, social and cultural differences that cause exclusion of certain actors and ideological differences. Different categories of failures therefore exist: infrastructural failure, hard institutional failure, soft institutional failure, strong network failure, weak network failure and capabilities failure (Klein Woolthuis, Lankhuizen et al. 2005; Van Mierlo, Regeer et al. 2010). These failure categories, or conversely, merits, were used to assess the AKS and their position within AIS in the different countries that form the SOLINSA project.

3. METHODOLOGY

The AKIS forms the context in which LINSAs develop, work and which they sometimes challenge. Following our previous discussion, we have chosen a wide definition for the Agricultural Knowledge System, not limiting the concept to a small number of publicly financed knowledge institutes, but also including the private organisations dedicated to research, education and extension, and their interaction with knowledge users, traditionally farmers. An AKS thus consists of:

Those actors that are purposefully engaged in knowledge development and knowledge intensive service delivery in agriculture and rural development (it is part of their ‘core-business’)

These actors form the ‘knowledge infrastructure’ in the broader Agricultural Knowledge and Innovation System. The goal of this review is to investigate the current organisation and functioning of the AKS actors within the broader AKIS and the most important trends likely to affect the AKIS in the future.

3.1 Data collection

As a first step, every partner has written a country report detailing the current situation regarding the AKS. These country reports covered three specific topics:

1. How the current organisation of the AKS facilitates or impedes interactive innovation approaches aiming for sustainable agriculture²:
2. An overview of the state of the national AKS and how to assess its performance, from experts and stakeholders.
3. A discussion of the way the AKS currently supports innovative bottom-up

² As working definition to be used in the interviews we used the broad definition of sustainable agriculture provided by Veldkamp et al. (2010): “Sustainable development rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Definitions of “sustainable” agriculture are generally concerned with the need for agricultural practices to be economically viable, to meet human needs for food, to be environmentally positive, and to be concerned with quality of life. Sustainable development is characterised as the effort of finding a better balance between the Triple P (People, Planet and Prosperity) triangle of relevant values. Since this better balance can be achieved in a number of different ways, sustainable development is not automatically linked to any particular technological practice or vision. Rather, sustainable development in agriculture can be looked upon as adaptability and flexibility over time when it comes to responding to changing demands and perceptions. These changes are typically related to food and other commodities, but also to shifts in socio-economic demands’

approaches to knowledge co-creation and social/joint learning, for instance in learning networks, or communities of practice and so on.

Three different methods have been used by each participating partner to collect the necessary data for these country reports: 1) a desk research of existing literature, 2) interviews with key stakeholders and 3) interactive workshop which concluded the investigation.

A desk research was undertaken focussing on a national review for each country of recent transitions in the governance of innovation and learning in a diversifying agricultural sector, related support policies and what are seen as desirable system changes for the future. This included a description of how the AKS is set up and operates in the respective countries, with particular emphasis on the advisory systems in terms of actors, roles, governance, funding mechanisms and paradigms towards learning and innovation.

The desk research was enriched with a number of interviews performed with some of the key actors within each country, see Table 1. An interview guideline was provided (see appendix A) for the interviews. Interviews were done using semi-structured interviews, in which the questions were used as a checklist of possible relevant topics being covered in the interview. Not all questions were addressed in every interview as interviews were adapted to the specific position and expertise of the interviewee. The questions themselves and the wording were adapted to local circumstances as the questions were formulated in academic language, and some concepts might not be applicable in all circumstances.

Table 1: Overview of interviews

	Total interviews done	Farmers	Unions	Advice and Consultancy	Extension	Government and policy	Product chains/ agro-	Research	Education	Civil society and NGOs
Hungary	11					4		2		5
Italy	12		3	1	2	1	1	3		1
Latvia	11		3	1	2	1		4	2	
The Netherlands	11		1	4		2	1	3	1	
England	13	2	1	1		2	1		2	3
Switzerland	12			2	5	2	2		2	
France	3					1		2		
Germany	7									

**Number of interviews does not necessarily correspond to type of organisations, as some interviewees had double affiliations, or multiple persons from the same organisation were interviewed*

During the final workshop the results of the interviews and literature review was discussed in a broader audience of stakeholders and experts. The organisation and set-up of the workshops to best discuss these results in an interactive setting was left to the different participating countries. Some countries thus did

an interactive SWOT analysis (England), while other did other forms of workshop or a seminar (Hungary and Latvia). In Switzerland and the Netherlands, the Collective System Performance Analysis (Klein Woolthuis, Lankhuizen et al. 2005; Van Mierlo, Regeer et al. 2010) was used to fill in the session. The difference in the amount of people participating often also depends on the kind of workshop used, as some methods (seminars) allow for more people to partake in the discussion than other methods, see Table 2.

Table 2: Workshops and attendances

	England	France	Germany	Hungary	Italy	Latvia	Netherlands	Switzerland
Method used	Interactive SWOT	World café	-	Seminar/ Interactive discussion on results	-	Seminar	Collective System Performance Analysis	Collective System Performance Analysis
Persons attending	10	42	-	19	-	31	11	12

(including SOLINSA researchers and facilitators)

In Germany and Italy no workshops were organised because the researchers felt that the German and Italian situations were characterised by a great diversity in the 20 autonomous regions (in Italy) and the 16 Bundesländer in Germany. A workshop on the nationwide situation with the presence of all the actors interested would therefore be very difficult. Instead, results of the analysis in these two were validated by discussing them with a number of experts.

3.2 Data handling and processing

The information from the literature review, interviews and workshops combined were used to fill out a so-called SWOT matrix (Strengths – Weaknesses – Opportunities and Threats) and an Innovation System Performance (ISP) matrix detailing the main enablers and barriers of the different national innovation systems. The innovation system performance matrix (Klein Woolthuis et al., 2005; van Mierlo et al., 2010b) systemically categorizes some typical institutional characteristics of an innovation system, its main actors and their interactions with each other. A typical ISP matrix is shown in Table 3.

The columns of this matrix contain some of the most important actors that make up the agricultural knowledge system. Since these actors differ from country to country, we have used a number of common types of organisations to be included in the matrix. However, still not all categories are equally important in all countries. We will therefore focus our comparison on the different categories of failures depicted in the ISP matrix: the institutional context like infrastructure, laws, rules and regulations, values, norms and culture, the interactions and networks, capabilities of actors and the market structure.

Table 3: Innovation System Performance Matrix

	Research Institutes and Universities	Extension (public)	Advice and consultancy (private)	Government	Agro-food industry	Unions	Agricultural Chambers	Cooperations	Farmers and rural population	NGOs
Infrastructure										
Laws, rules and regulations										
Values, norms and culture										
Interactions and networks										
Capabilities										
Market structure										

- Infrastructural failures concern the physical infrastructure, such as roads, railroads and telecommunication. The absence of infrastructure results in constraints that require major investments that cannot be made by the actors of the system independently. With regard to the AKS, the infrastructure also concerns investments in knowledge infrastructure (R&D facilities) and financial infrastructure.
- ‘Hard institutional failure’ refers to laws, regulations and any other formalised rules, or the lack of them, hampering innovation. For example, lack of intellectual property regulation takes away incentives from innovators as they cannot protect their innovation. Absence of environmental regulation on radically different systems, having an institutional vacuum, may slow down certain developments. Incentive mechanisms for researchers which make them more or less inclined to work with farmers.
- ‘Soft institutional failure’ refers to unwritten rules, norms, values, culture, or ‘the way business is done’. They affect how actors interact, but also relate to their (in)ability to change their norms and values to enable innovation to take place, for example, different worldviews of researchers and farmers on what constitutes ‘good farming’ may affect how they cooperate in innovation processes.
- The way actors are connected to each other, their connectedness, or the characteristics of the social networks connecting them also can explain particular forms of failure. Strong network failure refers to a (small) number of actors ‘locked’ into their relationship with each other without links to outsiders, causing myopia and blocking new ideas from entering. ‘Weak network failure’ refers to a situation where actors are not well connected and fruitful cycles of learning and innovation may be prevented because there is no creative recombination of knowledge and resources. These two failures

indicate an apparent paradox in networking for innovation: a quest for a balance between openness and closure, informal or formalized interaction, trust relationships or contracts (Håkansson and Ford 2002)

- Capabilities failure points to the lack of technical and organizational capacity of the system to adapt to and manage new technology and organizational innovations, such as a certain level of entrepreneurship, adequately educated persons, time to dedicate to innovation, networking skills, also referred to as ‘absorptive capacity’ (Cohen and Levinthal 1990).
- Finally, market structure failures refer to the positions of and relations between market parties. Such as a monopoly or the lack of transparency in complex food supply, but also imperfections in the ‘knowledge market’ (Klerkx and Leeuwis 2008).

As a first step in establishing a comprehensive comparative analysis of the country reports, the different country reports were reworked into a single ISP matrix. Following a grounded theory approach (Glaser and Strauss 1967; Strauss 1987) the information in the different country reports was summarised and subsequently labelled. First broadly into the different categories of the ISP matrix (infrastructure, legislation and regulations, values norms and culture, interaction and networks, capabilities and market structure) and subsequently more refined into more detailed subcategories. The resulting ISP matrix was checked by the different countries in order to make sure the summaries and labels properly reflected the existing situation. Subsequently, the different subcategories of failures and successes within the ISP were systematically compared and evaluated.

4. RESULTS

In this chapter we will compare the information from the different country reports. The first part gives a short overview of the place of the agricultural sector and rural development within each of the eight countries studied in the SOLINSA project. In the next section we will use the format of the innovation system performance matrix to make a comparison of the different Agricultural Knowledge and Innovations Systems in the partner countries. This chapter ends with an overview of some of the most important trends that were reported in the country reports.

4.1 General overview of agriculture in partner countries

Table 4 gives an overview of some of the most important social, economic and geographical characteristics of the place of agriculture within the larger economy. It shows the percentages of the rural population compared to the total population, the economically active population in agriculture (A.EAP), compared to the Total Economically Active Population (T.EAP) within a country, the share of agricultural lands on the total surface area, and the ratio of agricultural imports and exports (in Euros).

Table 4: Structural characteristics of agriculture and rural development

	Rur.pop/ Tot.pop.	A.EAP/ T.EAP	Agr. land / Land area	Agr.imports/ Agr. exports
France	14.75%	2.02%	53.44%	0.781362
Germany	26.15%	1.57%	48.44%	1.171508
Hungary	31.90%	7.45%	63.88%	0.617552
Italy	31.64%	3.25%	47.28%	1.209352
Latvia	32.28%	9.22%	29.48%	1.398954
Netherlands	17.14%	2.45%	56.85%	0.626752
Switzerland	26.38%	3.18%	38.14%	1.511327
United Kingdom [*]	20.52%	1.47%	71.61%	2.33508
European Union	26.08%	4.44%	45.05%	1.030038

^{*} No separate data available for England (source: <http://faostat.fao.org/> accessed Nov. 2011)

It's clear that the structural characteristics of the agricultural sector differ from country to country. The place of agriculture within society therefore also differs, and the arrangement of the Agricultural Knowledge System will also be a reflection of historical developments and geographical contexts. We will therefore start this review with a short summary of the main characteristics of the AKS in each participating country.

4.1.1 France

Socio-economic importance of agriculture

In the wake of the Second World War, food security was the priority in French agriculture, and thus the agricultural sector became of prime importance for the French economy. Its economic importance steadily declined and the share of rural population compared to total population in France is the lowest compared to all other SOLINSA partner countries. However, agriculture still plays a significant role as socio-economic activity. France is a net exporter of agricultural products and agricultural land use is also still an important factor in the total land use.

Organisation of the Agricultural Knowledge System

The Agricultural Knowledge System is historically highly organised and structured in France, with many organisations in direct contact with farmers (even if their number is progressively decreasing, as a result of restructuring and concentration processes). Farmers fund and manage most of them through specific taxes under the control of the state. Nevertheless, individual advice, directly paid for by the farmers is more and more on the rise. Cooperatives and private agro-industry play an important role in applied research and advice to farmers. Rural development is mainly organised around territory projects, at a local level, with regional, national and European funding. Agriculture plays a small role in rural development activities in France and this could be caused by the fact that agriculture has its own structured innovation sector.

Research and innovation activities are more and more oriented by tenders and organised within clusters or networks between organisations from research and extension sectors. The French AKS is still mainly structured on a top-down view and focuses the main part of its activity into the productivist paradigm. The main farmers' unions share this view and steer the extension services. LINSAs have thus developed on alternative models, and often link with alternative farmers' unions. Their main fields are environmental approaches, organic production, grassland management, direct marketing and farm accommodations.

4.1.2 Germany

Socio-economic importance of agriculture

Developments after the Second World War were coined by the German separation that led to totally different structures and mainly separate knowledge and innovation systems. With the re-unification of Germany in 1990 the agricultural sector was only partly harmonised. However, new ways of production were introduced in the East (e.g. farm modes and sizes, private extension, etc.) leading to some very large scale production farms there. German farms are thus very heterogeneous in respect of their operational structures and their specializations. The proportion of full-time and part-time farmers was in 2010 balanced half and half. Agriculture is a sector with shrinking economic importance, both in numbers of active labour force as well as percentage of gross domestic products. As a result it suffers from reduced budgets for the supporting organisations. Although Germany is known as an exporter, it is a net importer of agricultural products.

Organisation of the Agricultural Knowledge System

The political system in Germany is characterised by a strong federalism and this also influences the organisation of the AKS. An individual, differing picture thus not only evolves between the old and new German states, but even for all 16 “Bundesländer”, the federal states, give completely different pictures when they are analysed and described side by side. Each Bundesland pursues its own policies making the plurality in AKS in Germany very high. Private advising is rising although this is not intrinsically a good thing as the quality of their services is sometimes lacking. Public extension is gradually eroding, sometimes zero.

Even with the declining economic importance of agriculture, Germany still knows a high degree of organisation of the sector, especially farmers have many organisations at all levels. LINSAs are not only newly emerging initiatives, but also well-established groupings with longer history. As we can actually observe a strong political shift of all parties in Germany towards a more sustainable energy system based on renewable energy, together with a raise of the “Green Party”, the general political climate is increasingly in favour of sustainability oriented changes. This could be used also to promote sustainable modes of agriculture.

4.1.3 Hungary

Socio-economic importance of agriculture

The agricultural sector in Hungary still has an important place within the general economy. Over 60% of the land area is devoted to agricultural uses and with a share of 7.45% of the economically active population working in agriculture, it also provides an important part of general employment. After the end of communism, the 1990s saw a complete restructuring of the agricultural sector, exemplified by a complete turnaround in the amount of state run agricultural holdings compared to private landownerships. From 1990 to 1996, private farms types increased from 7.5% to 47.5% at the cost of the cooperative farms that decreased from 60.9% to 22.8% in 1996.

Organisation of the Agricultural Knowledge System

The main goal of the Hungarian AKS is to increase the knowledge of farmers. The links between knowledge creators and users were broken with the downfall of socialist agriculture. Technological innovations, but also innovations regarding farm management and produce marketing only reach a small fraction of farms. A few old agricultural Universities have newly established departments on sustainable agriculture and are also involved in environmental issues. However, they mostly do the same research as before, under a new name. Theoretical education prevails, and links with the sector are sparse.

The agricultural extension systems are dating back to the nineties. Even though they do not have a lot of political support anymore, the coverage of services is still quite good as every 5-6 villages have one advisor. Chambers of agriculture also offer advisory services. In general there are a lot of free advisors available and as a consequence there is hardly any demand for commercial advice for which farmers have to pay. The quality of the (free) advice is often low.

Compared to the average EU level, the professional preparedness of Hungarian farmers is below average. It is perhaps more worrying, that the number of farmers with agricultural education decreased by 30% between 2001 and 2007, with the simultaneous increase of unskilled farmers by 8%. When training is a pre-requisite for receiving subsidies or other financial support, Hungarian farmers mostly opt for vocational or continuing training. The lengthy and bureaucratic application procedure for subsidized (FAS) advice, the low sums available and generally very late payment of the support (80% of advisory fee), are all factors negatively affecting farmers' willingness to seek advice.

4.1.4 Italy

Socio-economic importance of agriculture

Italian agriculture is characterized by a considerable orientation towards high quality / low quantity business models, favoured by cultural (a long standing tradition) and political-institutional frameworks (the availability of proper regulations and qualification tools, public funding). On the other hand, however, conventional agriculture, mainly centred upon intensive production patterns, still represents an important share of the Italian agriculture, which, by means of its links with agro-industry, considerably condition the knowledge and innovation system. Italy still has a (relatively) high percentage of the population living in rural areas with approximately 33% of land use being used for agricultural activities.

Organisation of the Agricultural Knowledge System

The Italian AKS is still in great part characterised by the dominant role of the mainstream actors (policy makers, research institutes, farmers organizations) and of the related approaches in knowledge creation-dissemination (linear and top-down). Public bodies and their narrow relationship with the most powerful players dominate the scene, giving no room to other voices and claims to put items on the political agenda.

However, despite some efforts of coordination, the Italian context still appears diversified due to a federal system of provincial autonomy. More recently, new driving forces seem to contribute to a further re-organisation of the system. In the last years, Italian and regional government policy, influenced by economic crisis, has led to a substantial cut of resources assigned to the knowledge system, that affected particularly the agricultural sector. Some of the regional agencies are being dismantled and this is progressively leading to a weakening of the AKS, with a radical decrease of regional activities, especially in the extension services.

Farmers and other actors or organizations involved in agricultural and rural issues have started organizing themselves spontaneously in order to solve their problems and those of rural communities. This has led to the birth of the innovative initiatives and projects concerning, for instance, food promotion, landscape improvement, biodiversity conservation, rural marketing, direct selling of local food and the provision of social services. At the basis of these experiences are innovative approaches to knowledge building, founded on inclusive and interactive learning processes.

4.1.5 Latvia

Socio-economic importance of agriculture

Latvia has both the highest rural population and the highest share of economically active people in agriculture of all countries studied in the SOLINSA project. Latvian identity and self-reference is closely related to agriculture as the well-known expression “Latvians – farmers’ nation” reflects both the main occupation and lifestyle of Latvians for centuries and the positive attitude towards agriculture and farmers in general.

Post-socialist agriculture in Latvia is characterised by many vulnerabilities and controversies: scattered farm structure, strive for modernization and competitiveness, unequal conditions with old-member states, weakness of co-operative structures and social capital. Rural development is marked by negative trends of outmigration and aging and economic and social desertification of the countryside.

Organisation of the Agricultural Knowledge System

The AKS in Latvia has evolved in the last 20 years. Post-socialist policies have resulted in privatization of farms and the creation of a market economy and the restructuring of agricultural production. The Latvian innovation policy is developed mainly in the framework of the conventional, linear innovation approach with a focus on stimulating technological development. Agricultural research, education and advisory are following the European and national agricultural policy priorities, focussing on both modernisation and multifunctionality.

On-going structural reforms in research, higher and vocational education aim to consolidate agricultural research and education institutions: establishing closer cooperation with farmers and agro-industry, create opportunities for invigorating the relations between AKS actors, knowledge ‘providers’ and ‘users’ and establishing initiatives and forms of knowledge and innovation ‘co-production’. AKS actors are increasingly active in searching for links and cooperation. There are also several systemic actors whose direct task is to stimulate knowledge interactions among AKS actors and within broader AIS. Some of them are: farmer organisations (NGOs, cooperatives), State Rural Network, state research centres, technology and a knowledge transfer centre at the University of Agriculture.

Farmers use both individual and collective strategies to meet their knowledge demands. Farmer organisations are more effective in formulating knowledge demand to researchers and advisors. Agricultural advisory mechanisms are comparatively more receptive to farmers’ needs than research and education institutes. However, the AKS remains fragmented, there is a weak coordination among its parts and organisations, very few actors perceive it as a united system. Instead, there are sporadic short- or long-term networks or coalitions emerging around specific interests who develop certain agricultural development patterns and respective knowledge.

4.1.6 The Netherlands

Socio-economic importance of agriculture

Agriculture in the Netherlands is geared towards export, with a focus on large volumes and cheap prices. The rural population only consists of 17% of the general population, however, there are only very few truly 'peripheral areas'. Some of the most productive agricultural areas are located in the polders, near some of the major cities in the Netherlands.

For decades after WW II, the Dutch AKS was hegemonised by an 'iron triangle' of the Ministry of Agriculture, the farmers unions and agricultural specialists in Dutch parliament. The common goal of this coalition was to increase production, secure food availability and finance some of the costs of rebuilding the country through exports of agricultural products. Over the years this coalition slowly dissolved and gave way to new actors with new visions for agriculture and the countryside emerged.

Organisation of the Agricultural Knowledge System

In the 1990s the extension services were gradually but completely privatised. The feeling in general is that the Dutch AKS is doing quite well, both in terms of facilities, funds and cooperation. Privatisation of knowledge institutes has led to a vibrant dynamic knowledge supply to farmers. Downside is that the overview of the availability of information becomes difficult. There is much information available and such a broad range of private and public bodies supplying this knowledge that an individual farmer might get easily lost.

Relations between different actors are (historically) tight and close, making it easy to reach each other. Secondly, cooperation and learning are also historically well developed in the Dutch agricultural sector. At this moment, the organisation of the agricultural knowledge system serves as an example for innovation policies aimed at other industrial sectors in the Netherlands.

There is a culture of cooperation and learning, also using a network approach. Farmers organise themselves around specific problems or issues, and in the recent past the government has actively financially supported some of these initiatives as an experiment. Specialised organisations and initiatives exist to stimulate the formation of LINSAs and enhance the collaboration with formal AKS. These experiments have sometimes resulted in some very good learning points or new innovative practices, however so far it has proven difficult to let some of these new practices land in the formal AKS. Paradoxically, it sometimes seems easier for the government to organise yet another new platform tasked with setting up new networks, without evaluating properly what the last platform has delivered in new ideas and results. So there appears to be a lack on learning capacity of experiences, and transformation capacity to induce structural change in the AKS in favour of LINSAs support. On the other hand, some bottlenecks may also belong to the normal 'transaction costs' of collaboration in innovation networks.

4.1.7 Switzerland

Socio-economic importance of agriculture

Swiss agricultural land use is characterised by a high percentage of grassland (for dairy farming) compared to a low percentage of crop lands: arable land including the permanent crops only takes up less than 11% of the total surface area. It results in one of the highest import export ratios for agricultural products of the SOLINSA partners. Another difference is that rural development is not seen as a part of the agricultural sector, and it therefore also resorts under the Ministry of Economic Affairs and not under the Ministry of Agriculture.

Organisation of the Agricultural Knowledge System

The AKS in Switzerland is decentralised because of the political structure of Switzerland and the responsibilities shared between the federal State and the cantons. Institutional structures and organisations differ a lot from one canton to another. One of the biggest constraints is the different languages, and the federalist political system that particularly affects extension and education.

As a consequence, the main traditional institutions of the AKS have very diverse modalities of governance and funding. Some pressures have increased this diversity. The fragmentation has increased due to the increased legal obligations addressed to the farms in collateral topics to agriculture: animal and human health, protection of the natural resources, etc. The resulting fragmentation of the knowledge system hinders innovation because of insufficient knowledge transfer and a lack of co-creation of knowledge. The lack of openness to external interaction is exacerbated by a lack of federal incentives to collaborate, which is in turn the result of a lack of federal recognition of the need to coordinate within the fragmented knowledge system. In general there is a feeling that efficiency of the support for innovation by the AKS could be improved through a better embeddedness of the private sector. Therefore, there is a need to re-think the governance of the AKS, and to broaden it to make it more efficient and more focused on a few priorities.

4.1.8 England

Organisation of the Agricultural Knowledge System

In the late 1980s the existing system was dismantled in England. The state funded advisory service ADAS was privatized and state funded research went through a period of review and consolidation. The relationship between the research institutes with their sponsoring research council and with government also changed as new rules of competition were introduced and the research institutes began to receive funding from private sector sources as well as several public sources.

In 1986 the MAFF (the Ministry at the time) started to make a phased withdrawal of funding for near market R&D, leaving the levy bodies to fund such research. A coincident change in agricultural and biological research funding by Research Councils and Government Departments also occurred. As a result the UK's research infrastructure has transformed in the last two decades, with radical re-organisations both of the landscape as a whole and at the level of

individual bodies, including a number of closures and mergers of applied research institutes, and the move of some public sector institutes into the university.

The demand for agricultural knowledge is constrained by farmers being mainly interested in more profit. Government has an appeasement interest in providing knowledge on sustainable agriculture – funding for sustainable knowledge is often short-termed and impermanence is a problem. Policy is fragmented: There is no clear national policy, but different ministries apply different instruments. New rural networks originate from both public and private organisations and operate on all scales from local to international and even virtual. A partnership approach is being increasingly used by governments to initiate change with stakeholders from the public sector, academics, NGOs and industry. However, their effectiveness for innovation and learning is unclear at this point in time.

The retreat of government from managing agricultural research and extension resulted in a diversification of the sources of agricultural research and extension and opened new opportunities for the private sector. The research priorities also changed with a substantial shift in publicly funded R&D away from production-oriented science and technology towards science designed to deal with environmental concerns, animal welfare and food safety. Vertically the AKS became fragmented as the change in status of ADAS meant that the government has struggled to find the mechanisms to connect research on environmental protection and sustainable agriculture to farmers, as the traditional research-extension links and advisory practices become less relevant to end users.

4.2 Comparison of innovation system components

4.2.1 Actors involved in the AKS

A short comparison across the columns of the ISP matrix (see Table 5) shows that the core functions of the traditional actors in the AKS have become broadened and here and there also diluted. The shift from the productivist outlook on agriculture has led to a diversified landscape of formal and newly emerging informal organisations. Each of these organisations covers an - often overlapping - part of the AKS. The existing boundaries between different types of organisations has started to become blurred as not only universities, government agencies and research institutes are now involved in developing new knowledge, but also farmer funded organisations and cooperatives, commercial advisory agencies and consultancy as well as some successful farmers themselves can now successfully act as new suppliers of information in the agricultural sector. The relationships between some of the existing traditional actors within the AKS has changed as well with new coalitions of actors pursuing different, sometimes competing goals.

Table 5: Overview of infrastructure and actors in AKS per country

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Research institutes	Strong concentration of research institutes over the last 30 years, from 30 -> 3	Universities are given incentives to collaborate or even merge; the number of agricultural colleges has thus halved.	Universities fall under the Bundesland they are located in. Some national research institutes at federal level. These are well established with some great research traditions and international connections. Agricultural faculties have difficulty. They struggle for survival	Universities do not do much research anymore; struggle for budgets also at research institutes	Well-developed agricultural research institutes and universities, penalized by the reduction of public funds. Involvement of several public or semi - public institutes without a central coordination working autonomously.	Research institutes focus on R&D in seeds and plants. Research: improved infrastructure and laboratory equipment; research facilities and laboratory conditions increasing	Dutch innovation paradox: scientific knowledge and universities are well developed, but this is not translated in practical business opportunities. Increasing competition between universities and vocational schools / universities of applied science; commercial advisory services incorporated at some applied universities	Research institutes are well resourced and that fact, especially in light of open competition on price and quality, encourages and allows them to engage motivated researchers with high work ethics
Education	Education for agriculture has shrunk because of lack of funds and declining interests Training is provided commercially. For instance for veterinarians	Many agricultural high schools, managed by the Ministry of agriculture, with connections with the Ministry of education. About 15 specific agricultural colleges at Master level (Grandes écoles). Many vocational schools.	Sufficiently tight net of professional schools and higher education providers for the agricultural and the food sector. However mass education and budget cuts weaken education capacity Decreasing attractiveness of vocational education programs (for students)	Education: 13 universities and or faculties related to agriculture; Some NGO's organise training on sustainable agriculture for small producers mainly Green education is in a bad shape; lost contact with 'real world': not enough students and ageing faculty members	Education is a government funded and regulated task In education there is more attention to technical learning and vocational education	Agricultural curricula have broadened to more popular topics: hospitality and tourism. Decline in student numbers; declining prestige and ageing of teaching staff diminishes quality. EU supported programmes work to reverse this trend	Education is mostly public, some private schools exist especially at MBA type level, but for primary and secondary schools the amount is small to negligible	The cantonal vocational schools have a generally good educational infrastructure, a well-developed educational system, and staff with a high level of training (dual educational system).

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Extension and advice	<p>Market oriented advice and environmentally oriented advice concerning public goods</p> <p>In the farm advisory/extension sector a diverse advisory community emerged to fill the gap left by ADAS and to provide advice</p> <p>The number of advisors within NGOs involved in conservation and environmentally responsible farming expanded</p>	<p>Strong extension system present everywhere: extension is aimed at all farmers , although small farmers are less involved and targeted by the extension organisations.</p> <p>Many advice organisations, somewhat in competition.</p> <p>Not a lot of private advice companies.</p>	<p>Good knowledge transfer institutions: rural adult education schools, public resort research on state and federal levels. Linkages between research and practice that transform knowledge into trainings, training materials and publications for practice.</p> <p>Technical- and economic extension through public extension service is insufficient and might be further downscaled, no public extension in eastern Bundesländer</p> <p>Great organizational diversity, growing number of private advisors</p>	<p>Village extension services active since 1990; they give advice on legislation and subsidies. They are public servants and also carry out a controlling task</p> <p>Commercial advisory services are small, because subsidised options are cheaper.</p> <p>Within the FAS, regional and micro-regional advisory centres are dispersed and unevenly distributed both geographically as in terms of quality of service. Reaches less than 10% of farming units</p> <p>NGOs, and advisor organisations try to survive from public bids and give their services for free</p>	<p>Extension is divided: 1) public side with broader development goals connected to regional agr. institutes in some cases also involving private firms providing services; 2) the private sector advice is mainly connected to the agro-food system</p> <p>Codified services are defined by regional law, with targets , delivering organisation and funding procedures.</p> <p>Non-codified services are rendered by a large variety of parties: rural groups; farmers’ consortia, partnership between local institutions and private organisations and so on. LEADER is an important funding scheme for this type</p>	<p>Largest consultancy firm (LRATC), is privatised, but still retains close relations to the Ministry of Agriculture</p> <p>Extension gets a lot of policy attention; rest of AKS functions get less attention</p> <p>Consultancy has good geographical coverage</p>	<p>FAS is organised 'commercially' : Farmers can hire a commercial advisor and they later get (part) of their costs reimbursed</p> <p>After privatisation in the 1990s, a wide array of brokers and intermediaries has become available on all levels of the AIS (from individual farmers to the national systemic level)</p>	<p>Extension shifts into private hands; public extension mainly deals with the direct payments and the conformation with existing rules and regulations;</p>

Table 5 (continued)

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Unions		<p>Strong farmer organisations and unions: 2 mainstream and 2 alternative ones, defending different visions of agriculture.</p> <p>Co-management (between the state and the unions) and farmer unions' influence become slowly less important as the share of agriculture in GDP decreases.</p>	<p>Strong, professional farmer's organisations (DBV, DLV, DLG, BÖLW, etc.)</p> <p>No professional organisation of the extensionists, no umbrella organisation</p>		<p>Unions play an important role in training and extension, as public bodies but also cooperating with public institutions; often have an official task appointed by law</p>	<p>Better organised farmer organisations are better in formulating knowledge questions</p>	<p>Unions are geographically distributed; have some difficulty in representing the interests of their members. Increasingly important in organising farmer networks</p> <p>Advisors have organised themselves in a professional organisation for agricultural advisors and consultants (VAB)</p>	<p>Sectoral interest groups are organised in relation to the value chain, which allows them to operate effectively, particularly given their physical proximity to agricultural production and markets.</p>
Agro-food and industry	<p>Commercial research is carried out within highly integrated food supply chains (poultry, wheat and horticulture). Outcomes are translated quickly to producers.</p> <p>In some sectors there is close working between universities and private bodies.</p>	<p>Each food chain has its own organisation from farm to fork. They are called "interprofession". They work on product promotion and on coordination among the food chain actors.</p> <p>Agro-food industry is very present in applied research and in advice to farmers.</p>	<p>Shift of certain topics from universities to private companies (gene technology, agricultural chemistry)</p>	<p>Private research is done by herbicide and fertilizer producers, seed and machinery producers and so on. Often located outside Hungary though</p> <p>Private sector actors are undergoing a massive concentration process university contracts with industry have vanished</p>	<p>Agro food industry and private sector are growing in importance.</p> <p>Cooperation with universities and research institutes in order to develop specific programmes of research and dissemination</p>		<p>Some agro-food industries have set-up their own research and innovation centres. Cooperation with universities more and more common</p> <p>Larger multinational cooperations have embraced 'sustainable agriculture'. Force their idea of sustainability top down to farmers</p>	<p>Farm supply companies in Switzerland are themselves active innovators with established and effective communication networks inside the value chain. Both major supermarket chains in Switzerland actively promote demand for sustainably produced produce in open competition with each other.</p>
Agricultural Chambers		<p>Agricultural chambers play a major role in advice about regulations and at key moments of farm life. However, less and less involved in technical advice.</p>	<p>Chambers of agriculture research and extension are organised geographically and under one roof. But role conflicts hamper relationships</p>	<p>They have a complex of advisory services with 200 advisors; funded under the CAP</p>				

Table 5 (continued)

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Agricultural cooperations		Strong cooperative system undergoing a concentration process; Some cooperatives have developed into multinationals. They have their own advisory systems and participate in cross-cutting themes under the second pillar of the CAP	Farmers cooperate also on local and regional levels in various ways (sharing of machinery, farm partnerships, cooperations with energy sector)				Concentration of cooperatives to form 'multinationals'; however also increase of smaller, regionalised 'environmental' cooperatives	
Farmers and rural population		Typology of French farmers: modernist farmers; traditional farmers; dependent farmers; farming entrepreneurs; entrepreneurial creators; farmers with personal life projects. Farmers are less and less important in the rural areas.	Rural depopulation endangers maintenance of rural infrastructure and with it agriculture as such Small farm systems prevail in the South; self-exploitation and equity wastage. Very large farm operations in the East	Most farms in Hungary are subsistence level Large shift after communism from public farms (state owned) to private farms		Large difference between subsistence farmers and small amount of commercial farmers. Commercial farmers do not feel taken care of in the official AKS	Professional farming community among the best educated in Europe. Ageing is a problem (Relatively) homogeneous farming population, differences are increasing slowly Farmers own 60% of the land putting them in a position of power regarding developments in the countryside.	Rural areas are divided into: urbanised rural areas; alpine tourism centres and peripheral urban areas; Peripheral rural areas suffer from decline and economic crisis The small size of Swiss farms means that, once money has been invested in an unsuccessful innovation, exit strategies are difficult.
Other actors in AKS	There are a number of farmers that are 'hard to reach' because they fall outside of the established organisations of unions levy boards and so on	Strong bank and insurance system for farmers.	Increasingly energy production		Vitality of actors outside the official discourse of innovation: capacity to undertake original paths, better meeting their needs, often through cooperation	Consumer organisations weak in agricultural knowledge processes. However demand for healthy, organic and home grown food is growing		

Table 5 (continued)

The most obvious difference between the countries studied pertains to the role and place of the public extension services, vis-a-vis privatised advisory and consultancy services. The Netherlands and England have completely privatised their public extension services and almost all advisory systems are operating on a commercial basis. Hungary forms the other end of the spectrum. Here the extension service is officially still a government job although the extension service itself is fragmented over many different organisations: the agricultural chambers, the Rural Development Training and Advisory Institute and the Central Agricultural Office. In fact these government funded actors provide their services almost free of charge, driving out any commercial consultancy agencies.

The Farm Advisory System (FAS) was a major component of the 2003 reform of the Common Agricultural Policy. This reform of the CAP made direct support of farmers dependent on compliance with requirements of public interest, the so called 'cross compliance' that dealt with issues related to the environmental quality, public and animal health, animal welfare included in the statutory management requirements (SMRs) and the maintenance of agricultural land in good agricultural and environmental condition (GEAC). Every EU member had to implement the FAS in its AKS, however the specifics of the organisation of the FAS were left open. As a result, there is a wide variety of its implementations that is often directly related to the general organisation of the AKS in a country. In England and the Netherlands, where extension is completely privatised, the FAS is also outsourced to private consultancy firms. Farmers were encouraged to make use of these advisory services using a voucher system. In other countries, like Italy, the FAS was used to streamline the existing regional extension services, sometimes replacing national funds for extension services with these new EU funds.

In most other countries, commercial advisory and consultancy services are closely related to the products of agro-businesses. These actors still operate predominantly supporting productivist objectives. Even though these companies often have strong ties to farmers, potential problems here are related to the fact that the provided information can become biased in favour of sales of certain agricultural inputs, such as pesticides or fertilisers. A tendency towards package deals whereby the delivery of different kinds of services by a single provider (who may also provide goods like fertiliser and pesticides) may thus endanger the provision of independent advice. However, these actors do have the funds to put into research and here and there, research institutes and universities are actively forming alliances to do research. Some authors have expressed concerns however, regarding the risk that the resulting knowledge or patents are not made public because of access restrictions (Heller and Eisenberg 1998) and that these collaborations may conflict with academic concerns that call for publication.

Agricultural education seems to be currently the weakest part of the traditional formal AKS triangle of research, extension and education. Problems facing agricultural education come in two, sometimes interrelated, categories. Some countries report problems with the quality of agricultural schools. In Latvia large

differences in the quality of schools exist. In Hungary agricultural education is characterised by out-dated methods and insights. The Netherlands on the other hand suffers from a lack of students. The agricultural sector has a bad image that a lot of potential students especially at the vocational level, do not find attractive. Agricultural education is especially vulnerable because of its lack of interaction with other parts of the AKS. Switzerland, the Netherlands and Hungary report that the interaction between businesses and schools is difficult to establish. An exception however can be found in the professional (adult) education sector. Both in Germany and France successful professional education programs for farmers are established, sometimes in close cooperation with unions, or cooperatives.

4.2.2 Infrastructure

The infrastructure consists of the knowledge infrastructure and the physical infrastructure. The arrangement of the infrastructure facilitates or obstructs the access and development of knowledge, but also the accessibility of the actors. At the research level, we see a difference between the Eastern European countries. Agricultural research is hardly being done at the university level in Hungary because of lack of funds. Research facilities in Latvia are not well developed, but improving. University facilities in other countries are doing better. Research facilities at ETH are reported to be excellent and also at WUR research facilities are quite good. In other countries there are more universities active within the AKS and sometimes the level of the research they perform and education they provide can vary between them. France and Germany also have some very well-known research institutes with a long history of agricultural research and a central position in the AKS.

The knowledge infrastructure for fundamental research is threatened by a decrease of research funds. The economic crisis in many countries (Germany, England, Latvia) has resulted in reduced research budgets. In England and France we see a concentration of research. Universities are given strong incentives to merge and this has resulted in a concentration process of research facilities. Fundamental research in the Netherlands sees a shift from fundamental research to more applied research an innovation in an attempt to improve the links between research and innovation.

Also the availability of supporting infrastructure, for instance ICT is important, as well as the support of specialised agricultural banks and insurers that facilitates innovations. The latter type of support is well established in France.

4.2.3 Legislation, rules and regulations

The shift from top-down, linear steering of innovation has not been equally experienced in all countries and especially all parts of the AKS, see Table 6. In some countries traditional partners are still very much in control of large parts of the formal AKS and its (public) resources, for instance in Hungary, France and Italy. In other countries the traditional actors have lost some of their former

Table 6: Legislation, rules and regulations

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Influence of EU policy	Regulation is kept to a minimum, but due to EU regulations still has been increasing on environmental standards			Advice is centred on EU payments, where the most money can be made, resulting in a 'project class' of experts, bureaucrats and administrators	Extension now has become integrated with the FAS (from the CAP); FAS funds have in some regions replaced regional funds	Lack of resources. European Union plays an important role in shaping the AKS, due to its funding mechanisms		
Direct steering and legislation	Steering is partly done using contracts (for the FAS); voluntary schemes (not very popular with farmers)		Freedom of research is governmentally strongly limited (gene technology, research on animals, stem cell research)	GMO is banned and this increases export option to such countries as Austria and Germany			Environmental standards and land use planning (zoning)	Government provides the funds for many institutes and therefore has a strong role in steering and agenda setting.
Overregulation and bureaucracy	Farmers feel overburdened with regulation and red tape and, at the same time, under-rewarded. This leads to declining trust in government	Lack of stable funding and development of tenders: More and more short projects targeted by the tender system	Excessive regulation of agricultural production implemented by public administrations Non-transparent, efficiency-oriented payment frustrates and does not motivate Too many requests for specific proposals in relation to free options for research Excess functionaries and bureaucrats fighting for survival	Lengthy and bureaucratic regulation governing FAS make farmers not seek advice Consultancy companies are active in writing investment projects because of the complex and ever changing application forms and procedures Political plays are seen in the execution of policy; changing rules and favouring certain socio-economic groups			Legislation and funding schemes, often short term focussed and application is very laborious. Too complex for agricultural entrepreneurs. Mixed public-private funding makes that R&D and extension providers also have to respond to different paymasters Proliferation of 'SMART' criteria that do not take 'process' dimension enough into account	The stable financial infrastructure, and governmental provision for direct payments, gives farmers ready access to financial resources to realise new ideas. Over-regulation leads to a high burden of legal and administrative tasks for all stakeholder groups Projects are often limited to research with little or no money allocated to dissemination of results.

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Lack of funds / decreasing funds	Lack of investment in agricultural research and knowledge transfer in both public and private sectors is the main barrier to innovation.	Public funding is decreasing	Education capacity threatened by reduced funding	resources are wasted on out-dated, badly organised systems due to clientalism and political basis.	Continuous decrease of resources allocated on the different public services of the three components of AKS (in many cases, their functioning is ensured essentially by European funds)	Lack of funds leads to: poor infrastructure; instability; brain drain; lack of long term priorities; incoherence; possible depletion of expertise in key areas	Relatively low public and private investments in R&D compared to other industrialised countries. Private innovation, both in sources of funds and research carried consists of approx. 50%	Research has suffered big budget cuts
			Weakened public extension and decreasing budgets for extension in general	Because of funds drying up there is a struggle for survival and competition of scarce resources. Cooperation is rare	However, more attention for linkages between education and research through funds for PhDs and post-graduate courses			
			Efficiency-oriented payment along with budget cuts makes it more and more unattractive to be a university based scientist					

Table 6 (continued)

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Monitoring and assessment		Lack of common assessment system	Wrong incentives set for research and financing of research		Lack of evaluation culture to sustain the policy making process: lack of mechanisms for monitoring the results and providing feedback		Learning from experiences is difficult; interest in programmes once they've ended is limited. Evaluation instruments often not suited for intersectoral collaborations Successful pioneers are flooded with requests for cooperation / presentations/ participation in meetings and research. But there is no structural evaluation of programmes and learning from successes	The feedback system from stakeholders in the value chain to researchers is ineffective.
Private funds for public research	The levy boards fund 'near market' research	The levies once were also co-managed by the unions, but nowadays managed directly by the Ministry of Agriculture: considered as public funding collective training fund paid for by farmers; providing training for 100k 120k farmers per year Farmers pay the CASDAR fund from which prof applied research institutes are paid as well as professional extension and training services	Through projects, foundations, benefactors/sponsors - but often complicated through bureaucratic difficulties to prevent corruption		Some projects conducted by universities and research institutes are funded by banks (Foundations)		Levy system to fund production oriented research (i.e. paid for by farmers)	

Table 6 (continued)

Influences and new actors have come up that are also recognised as having a deserved stake in the policy making process. Governments in the Netherlands and England still make use of their top-down regulatory power but it is mostly limited to specific public policy such as environmental issues. Switzerland and Latvia have heavily institutionalised deliberation schemes in the agricultural sector: Switzerland knows several formal committees for which participants and agendas are stipulated, while in Latvia, the social partners have to be consulted by law.

A special case is formed by those countries that have a federal structure, such as Germany and Switzerland. In these countries the organisation of the AKS is left up to the Länder or Cantons leading to large differences between regions. Also in Italy the regions hold a high degree of autonomy in coordinating the functioning of the AKS within their jurisdiction. In these countries the coordination between the national level and the federal level adds an extra layer of complexity. However, the coordination at the federal level is reported to be not very strong and the federal structure in Germany is an important source of the observed fragmentation of the AKS. However, the reported success in Switzerland making a nationwide transition to integrated pest management within a couple of years, shows that a federal system can still be effectively managed, even at the national level.

With regard to innovation policy it is remarkable to notice that many countries report difficulties with the coherence of the existing innovation policy. At the same time, the bureaucracy of many innovation programmes is a common complaint of the countries. EU subsidies, for instance for research, are notoriously difficult to administrate. In Hungary the only successful commercial advisory business is specialised in European projects. According to the country report, a 'project class' has been developing there. However also on the national level innovation policy is characterised by 'red tape' and overregulation (Germany, Switzerland, Netherlands and Hungary). In order to get innovation or research projects funded a detailed description of the expected results must be provided beforehand. Often these criteria pay insufficient attention towards 'soft goals' as improved stakeholder relations and joint/social learning. Sometimes the situation is worsened by an excess of civil servants like in Germany and Hungary leading to bureaucratic infighting and rivalry between ministries. A common complaint is the lack of stability in funding criteria and innovation tenders. Public financing rules are not well thought out or focussed, and shifts in political coalitions will also result in political attention for certain areas to suddenly come up, or conversely disappear. As a result there is an increase in discontinuity and a lack of concerted action by the various interested players in the knowledge system. For example, the competition that arises between different innovation support service providers in the AKS makes them act strategically with regard to the sharing of knowledge and information.

This leads to a remarkable paradox though, because on the other hand many countries also report a lack of monitoring and evaluation tools to be available for assessing innovative capacity. In countries like Italy and Hungary innovation policy and projects are not properly evaluated and also in Switzerland a feedback mechanism of lessons learned seems to be missing. The same is reported in the Netherlands where the government's interest in innovation

projects runs out as soon as the official duration of the project or programme has ended. However, this is not only the government's problem. In France the lack of reflexivity about the functioning of the AKS is extended to the other actors within the AKS as well.

The influence of EU policy is quite large in all countries, with the notable exception of Switzerland that is not an EU member. Coincidentally or not, Switzerland is also one of the countries where the issue of rural development is not automatically linked to the agricultural sector. Instead rural development falls under the auspices of the Ministry of Economic Affairs. The European policy context of the SOLINSA project has been reviewed in a separate document³, therefore we will only limit the discussion here to some of the observations made in the country reports.

For instance, the design and set-up of the Italian AKS in the 1980 and 1990s, was heavily influenced by EU policies which promoted new procedures for running advisory services addressed to connect innovation and knowledge resources with local needs for consulting services and training. The financial sources provided by the 'Structural Funds' at the European level, fostered the development of the Italian AKS on a regional basis. Since the EU accession of Latvia, the Latvian agricultural sector nowadays seems to be far more influenced by external factors than by local ones. In Latvia, but also in Hungary, the EU LEADER programme is very important for the organisation and support of local action groups for the management of a variety of 'public goods': environmental protection and nature conservation. However, the EU policies are not only important in the new member states. Even the English government is influenced to a certain extent by the policies of the European Union, as it feels the need to regulate the agricultural sector more (especially regarding environmental regulations) than it otherwise might care to do.

4.2.4 Values, norms and culture

A wide variety of observations can be classified under this heading. Usually the soft institutions consist of the rules and context of political culture and social values, that not only shape public policy, but also influence the way business is conducted, and the actors relate to each other, see Table 7.

³ Hermans, Klerkx and Roep (2011) Review of relevant EU policy documents on innovation, SOLINSA document D3.1

Table 7: Values, norms and culture

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
<i>Political attention / societal importance of agricultural sector</i>	Agricultural 'exceptionalism' has been largely rejected by society	Agricultural 'exceptionalism' is still stronger than in other countries but decreasing.	Marginalization of agricultural topics in politics, focus is on other policy fields. Public focus on organic food and environmentally friendly production (however with selective perception and overvaluation of organic or "quasi-natural" agriculture)	Government steering lacks a long term strategy and even the recognition that a well-functioning AKS is worth something is lacking.	There is an increasing attention to agriculture by public opinion and political world. Especially food-related issues and the issue of fairness of relationships within food chains have become of central interest.	Latvia is a country of farmers with a strong cultural connection to farming and farmers	Agricultural sector has a bad image leading to expected shortages of qualified personnel in the near future	
Stakeholder involvement in policy making	Popular (with the government) are voluntary arrangements such as road maps and partnerships as alternatives for regulation.		Lots of „posts of honour“ and civil society involvement		Stakeholders consultation of limited impact on policy making, still dominated by the main actors), essentially top-down information flow.	Stakeholder involvement in policy making	Popular (with the government) are voluntary arrangements such as road maps and partnerships as alternatives for regulation.	
Risk / consensus / collectivism			farming society relatively conservative, but pragmatic if necessary	Aversion for 'collectiveness' due to communism. This hampers collaboration			Culture is consensus oriented; risk averse;	Switzerland's political system is based on consensus, which forces different actors to interact to solve problems. The aversion to risk and tendency to be defensive evident in unions and sectorial interest groups since it is safer and enhances the chances of survival.

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Social capital / trust	Farmers feel undervalued	Some solidarity between productions and regions. Farmer feel underestimated by the general public ... but the general public still shows interest in agriculture.	German virtues: reliability, punctuality, meticulousness Declining trust into politics In general population has a friendly image of farming and farmers, but conflicts between farmers and local population become more frequent, esp. regarding animal keeping and bioenergy	Trust is missing and this makes cooperation difficult; rivalry and power struggles between government branches are frequent Towards the field trust is also missing; leading to overly regulated subsidies; avoidance of risks and normative control	The most positive attitude towards interaction and cooperation in order to reach common goals comes by new actors and organizations Increasing importance of trust relations between farmers and consumers within short food chains	Lack of trust between farmers and scientists. Blame each other for gaps in AKS		Farmers confidence in the system was high, at least until recently; however the transition to IPM was perceived as being top down implemented
New actors entering AKIS	The opening up of the AKS has let new actors with new visions enter the country side. There is a growing interest in doing things differently and as NGOs and farmers interact they shape each other's ideas						Due to high investment cost, farming is only an option for farming families: most changes are made when a son or daughter takes over a farm. "Farming culture"	Entry costs are high which results in few 'entry level' farmers with different backgrounds who might bring new ideas and approaches to sustainable agriculture.

Table 7 (continued)

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Contested vision of the future	The 'open' AKIS can support the competence building on environmental issues. New actors become involved and farmers can learn from them and the other way around, the NGOs can learn from farmers	The concepts of innovation, and of sustainable development are not clearly defined, nor shared among the players of the system. But these concepts are widely used by all the stakeholders and the AKS members. AKS and main Farming Unions are more devoted to « productivist » models than to « alternative » ones. But many "alternative groups or LINSAs exist.	Increasing numbers of conflicts with large animal keeping farms (animal rights)		There is an increasing awareness by a part of civil society about critical features of current food system and demand for change	no single vision	Fragmented vision leading to a 'contested countryside', Competing interests and discourses on rurality: scale increase, specialisation, vs. multifunctional agriculture, organic agriculture. Farming unions have trouble representing all the diverse interests and viewpoints of their members and this slowly weakens their position in the field.	
Sustainable agriculture/ development	farmers do not see the importance of sustainable agriculture; the ' why question' is unclear and there is a need for demonstrable results	Increasing interest in sustainable development.	High environmental consciousness on all levels of society Sensitivity for environmental protection in the agricultural sector Increasing political support for the ' greens'		New general orientation in policy making towards a model of development based on quality and sustainability, meeting the new needs of society			There is a general and active interest in politics and in the concept of sustainability in the Swiss population that also translates in demand for sustainable production. Sustainability is strongly anchored in the mentality of Swiss farmers. The long-term perspective can counteract the barrier effect of orientation towards profit to seek innovative ways to engage in profitable and sustainable agriculture.

Table 7 (continued)

With regard to general cultural characteristics an important cultural difference can be seen between countries like Switzerland and the Netherlands, that generally love collaboration and consensus and countries like Hungary and Latvia, where many farmers do not like anything 'collective' as a result of the years of forced collectivism in agriculture under communist rule. Networks that depend on collaboration therefore can be expected to fit more easily within the Dutch and Swiss culture, however the downside of the Swiss and Dutch preference of consensus is that risk taking is not well established culturally and changes can only occur at a slow pace as all parties involved have to concur to the changes made.

For the effective support of LINSAs the involvement of civil society in agriculture is an important aspect. The way civil society is involved in collective policy making is therefore an indication of how well LINSAs might be supported. In countries like the Netherlands and Switzerland this type of collective policy making is well established and also in Germany there is a high involvement of the general public with the civil society. Sometimes the consultation of social partners is even prescribed by law, for instance in Latvia. However, in other countries the involvement of civil society in policy making are more problematic. In Hungary, non-governmental organisations are not well established and as a result many depend on the government for financial support. In this case their lobby power and independence is greatly diminished. In Italy there are some issues regarding the representativeness of the social partners that help to shape agricultural policy. With the gradual decrease of economic importance of the agricultural sector, the traditional partners are not very representative anymore for the wider developments within the AKS. They only represent a small segment of the population and newer, or more alternative actors have difficulty in gaining access to the policy making process and getting their voices heard.

In this regard, farmer unions take a special place within the AKS. The membership and involvement of farmers in different types of interest groups is in many countries high. In Switzerland, sectoral interest groups are organised in relation to their specific product chain which allows them to operate effectively as it allows them to anticipate and capitalise on the expected changes in market conditions. Also in France and Germany strong professional farmer organisations play an important role. However, even though these organisations are well established and professionally run, they sometimes have difficulty in adapting their roles to changing circumstances. The Italian situation was already mentioned, however some other countries like Latvia also report this problem. In France two traditional unions exist and more recently two other more 'alternative' unions have been established as a reaction to the increasing attention for multifunctional types of agriculture. In the Netherlands another type of problem can be observed, here the farmer unions are struggling to deal with the fragmentation of the vision of their members. Some of them chose to develop a new guiding vision to operate on focussing on sustainability and family farms, however they have lost some of their more traditional members as a result and similarly more and more large farmers do not feel well-represented by the existing vision focussing on family farms and they chose more and more to cancel their membership.

This lack of a shared vision for the agricultural sector is reported by many

countries and this may well be one of the most important challenges for agricultural innovation. Even though the interest in sustainable agriculture is on the increase in some countries (Switzerland and Italy), so far the concept of sustainable agriculture has not functioned as an overarching concept that all actors can agree on. The emergence of new actors in the countryside has also resulted in different, sometimes opposing visions on sustainable agriculture (Hermans, Horlings et al. 2009). In England the main problem with sustainable agriculture is that there are not enough practical examples present that are convincing to farmers.

4.2.5 Interactions and network characteristics

The links, interactions and cooperative relationships between the actors within the AKS are also an important element. These interactions involve all types of relationships between actors: firms with other firms, but also the interaction with the government, public knowledge institutes, and specialised consultants. According to Klein Woolthuis et al. (2005), interaction failures can evolve in two ways: there can either be too much or too little interaction, leading to the same sort of systemic failure in the sense that new ideas have difficulty to diffuse. Table 8 contains examples of both.

Strong networks failures are often due to missing connections to outside groups, leading to group think and the dismissal of new information and actors. An example of this type of network characteristics can be found in France, where extension services show a remarkable lack of diversity: farmers and advisors have the same origin: same type of education, same type of training and so on. This makes it likely that it will be more difficult for them to generate new ideas within their group. The same problems can be observed in Italy as a whole, where the existing network has difficulty in allowing new actors with alternative ideas to enter the formal network. However, sometimes the tendency of a network to select the same type of people works more subtle. Switzerland, Germany and the Netherlands report a problem with ‘farming culture’, that is: for several practical reasons it is impossible for an outsider to become a farmer. Because of the high investment costs in land and machinery, a job as a farmer is only possible for those persons who come from a farming family where these economic assets are already present. This makes farming different from other economic activities where ‘outsiders’ are often the source of innovations (Van de Poel 2000).

Weak network failures are the result of a lack of connectivity between different, complementary types of organisations. Many countries report a fragmentation of the AKS landscape. Different organisations are pursuing different, sometimes conflicting, aims. The question of the integration of the AKS is therefore particularly a question of how public concerns are translated and taken up by the different organisation within the AKS. All countries report a problem with the vertical integration of the formal knowledge system: research, education and entrepreneurs. There are insufficient links and coordination between these actors and they have difficulty communicating with each other, often leading to distrust.

The tuning between knowledge demand and knowledge provision is sometimes not very balanced. In this regard the connections between university researchers and farmers sometimes pose a problem (Italy and Latvia for instance). Similarly it seems very difficult to connect agricultural education directly to businesses in the Netherlands and Switzerland. Cultural differences and differences in institutional logic and the way performance is measured and evaluated are often the root of this kind of difficulty connecting different types of organisation. Depending on the specific country, the main problems for the fragmentation lies with the knowledge providers (scientists only want to publish peer reviewed articles, the knowledge demanders (farmers) are not very good in articulating their needs) or a failure of the knowledge market to cater for concerns for typical public goods. A good example of the latter would be the translation of environmentally friendly production techniques, for which two completely different experiences have been reported. In the UK the government is struggling how to connect the results of research on environmental protection and sustainable agriculture to farmers. Scientific results on these issues hold too little concern for the commercial application, thereby losing the sectors interest. Switzerland however, has completely different experiences as the direct payments scheme for landscape and nature conservation have proven to hold a strong incentive for farmers to shift their production to more environmentally friendly ways of production. The federal government structure notwithstanding, over 90% of the farmers introduced a form of integrated pest management, all within a couple of years.

However it is not all bad. A strong network can also hold an advantage. One positive example of a strong network is provided by Switzerland where the strong informal ties between many actors operating in the AKS, keep developments within the AKS for everyone easily surveyable. This makes Switzerland a positive exception to the fragmentation that is the result of the federal organisation of the AKS in Germany and the strong regional organisation in Italy. A potential explanation is that Switzerland is quite small, so people can travel easily therefore meeting each other all across the country more easily. Also with only one central university for agricultural science, many actors involved in the AKS know each other from there.

An important new category of actors are those actors who seek to perform a specific systemic function: the bridging or brokering between different actors within the AKS. In Germany, the “German Agricultural Society (DLG)” overrides political/scientific fragmentation as a powerful, nationwide knowledge broker and farmer managed coordination platform at the national level. In the Netherlands, these types of actors also work on a commercial basis, although much of their income is often still derived from government funded projects. These actors no longer ‘push’ specific technologies or practices, but function as mediators between farmers with a specific knowledge demand and the many sources of information suppliers. However, in the Netherlands and England, problems are reported with an excessive number of support organisations (innovation intermediaries). They start to pose a problem, as they create confusion, add to the bureaucratic burden and do not streamline the process anymore. This is especially the case when the innovation intermediaries start to pursue their own goals.

Table 8: Interactions and network characteristics

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Vertical fragmentation / between levels	The relationship between the different levels in the English AKS became weak and fragmented after privatisation and the subsequent increase in knowledge producers and providers	Segmentation between Research / Education / Extension but many common networks, projects and activities.	Lack of communication and cooperation between actors from ministries down to individuals Few national platforms where actors can meet, with the "green week" as the only notable exception	Vertical integration is weak; the ministry has an official role but hardly coordinates for advisory services Links between users and creators were severed after the downfall of socialism	Insufficient links and coordination between the main components of the system (research, education, training, extension) Lack of coordination between research institutes and resources wasted because of double research being done	Lack of coordination in AKS; high fragmentation Scientists and researchers are well integrated on the works of the advisory services Poor coordination between agricultural business and education. Students have to be 're-educated' after getting their diploma by working in a company.	Links between different actors have become weaker with privatisation There is little synergy between education and research.	The system, although complex with cantonal system of government, remains clear and many of the actors know each other and have strong informal contacts. The ETH has a culture of innovation and cooperation with other sectors and knowledge systems and are characterised by strong interaction with each other. Coordination of linkages is mainly done by governmental 'platforms' that bring together the heads of each canton No decisions are taken. Platforms do rarely contain farmers
Horizontal fragmentation / between similar types of organisations			Organisational fragmentation, to many and too small research institutes, lack of coordination	Advice , extension and consultancy suffer from a lack of coordination	Excessive number of support organisations, not well coordinated and managed: Risk of confusion among the end users, not rational use of resources, increasing bureaucratic burden	Horizontal integration is uneven among agricultural sectors	Agricultural education system is closely working together (especially compared to 'normal' schools).	No competitive grants exist and collaboration is not well established between institutes Communication within public authorities is seen to be insufficient.

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Farmer to farmer links	Local farmer collaboration is on the increase, however initiatives are driven by individuals rather than policy or funding	Semi-informal farmer groups are organised. Often by innovative farmers.		Some initiatives for cooperation between LAGs have been set up. Horizontal integration is weak but improving				
Links between agro-food industry and universities / (public) research institutes	In some sectors there is close working between universities and private bodies.	Relationships between academia (research and higher education) and the others players in AKS (applied research, extension) is still too weak. Academia is often perceived as the custodian of public good whereas applied research is seen as linked to the interests of the industry or the farmer Unions.	Shift of certain topics from universities to private companies (gene technology, agricultural chemistry)	University contracts with industry have vanished	Agro food industry and private sector are growing in importance. Also starting up joint research with universities		Some agro-food industries have set-up their own research and innovation centres. Cooperation with universities more and more common. However, businesses have trouble with interacting directly with schools and colleges	There are too few distributors of sustainably produced products and too little interaction between production and knowledge systems.
Open / closed networks		Advisors and farmers have the same origins, the same education, the same training.	Leading fairs in Europe (Agritechnica, Eurotier, Biofach) providing a link to other sectors in Europe Large networks start from member initiatives, but may then become public goods if size exceeds certain levels Farmers may be members in several, partly overlapping networks		A system mainly centred upon farmers, not able to open to the new actors and the related needs; at the same time, lack of recognition of farmers' potential role in creating and sharing knowledge Insufficient links and coordination with the other systems of knowledge and innovation creation,			Links with the wider AKS (regional development) are sparse. Moreover the Swiss knowledge system is quite closed to interaction outside existing networks and, in particular, internationally.

Table 8 (continued)

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Barriers for interaction in different types of logic and incentives	<p>Communication within the research community in terms of partnerships is difficult because of different funding streams, complex nature of the knowledge landscape, and the difficulty of identifying the motivations and associated resources that might promote more partnership within such a complex picture.</p> <p>Different parts of the public sector operate too separately, because of their distinct forms of core funding.</p>	Too academic orientation of public research and of scientists evaluation.	<p>Problem circle exchange university research and practice, little incentive for practitioners to get involved/publish, scientific conferences are unattractive for practitioners</p> <p>High competency barriers between the subsystems</p>		Persistence of difficulties (cultural barriers) in public-private cooperation: public and private research systems are in the most of the cases detached from one another	Research and education: Incompatibility between scientific knowledge and farmers needs	Conflicting organisational logics and evaluation schemes, limit the possibilities for successful cooperation between different types of actors	<p>There are significant communication barriers between researchers and farmers.</p> <p>The advisory branch in Switzerland provides strong links between science and practice, with consultants having gained significant expertise in training farmers.</p>

Table 8 (continued)

4.2.6 Capabilities

To be able to make a leap to a new production method, actors need capabilities such as flexibility, learning potential, and resources to adapt to new market demands and be able to survive. When actors can lack the competences, capacity, or resources to innovate and adapt to changing circumstances this will pose a barrier to innovation, see Table 9.

Users of knowledge may find it difficult to identify what their specific knowledge needs are, because this may necessitate considerable effort to predict their future direction. These difficulties are encountered whatever the economic sector of activity, but are particularly high in the case of agricultural and other small-scale rural enterprises, which are numerous and dispersed. There may be a lack of awareness of, and/or failure to, access appropriate sources of knowledge and information on the demand side. Actors are imperfectly informed about possible cooperation partners and what these can offer, i.e. there exists information asymmetry and high search and transaction costs. Changing systems of public financing of AKS service provision (from input financing to output financing, introduction of competitive grant systems, and the need to find matching funds) cause uncertainty and raise transaction costs on the supply side (Huffman and Just 1999; Echeverría and Elliott 2002). Moreover, farmers are often unwilling to financially support public interest issues when they do not result in a direct and private benefit. Farmers, generally, are only willing to pay for services they feel add to their profitability (Katz and Barandung 2002; Ingram 2008). For example, while they are willing to pay for advice regarding how to reduce the amount of their taxes, they are less inclined to pay for a programme intent on increasing biodiversity.

An important element here is the education of farmers. The countries studied in SOLINSA show a great difference in farmers' educations. Small subsistence farmers in Latvia and Hungary often hardly have any formal agricultural training, while farmers in Switzerland and The Netherlands are among the highest educated of Europe, many of them have followed a form of higher agricultural education. However, this doesn't mean that farmers in the Netherlands and Switzerland have no difficulties in making changes. The shift to more entrepreneurial types of farming styles in Switzerland is for many farmers difficult. Similarly, in the Netherlands and England do not all farmers possess the necessary qualifications in information acquisition services or formulate their specific knowledge demands.

Regarding the capabilities of researchers, applied researchers often have more skills in translating their work to the practical use of farmers. For fundamental researchers this is often more difficult as the academic world values peer reviewed publications first and foremost. These academic incentives in turn may hinder interactive research together with stakeholders of research, because interactive research may make it harder to produce monodisciplinary academic output and thus provide a disincentive for some researchers to engage in interactive processes (Hoffmann et al. 2009).

Table 9: Capabilities

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Capacity for feedback and learning from experiences		Little reflexivity on the AKS by its members	Learning takes place especially in practical farm management, communication...	Saving experience is difficult: high turnover in Ministries; mostly young people with short terms contracts and after elections the high and low level officers are replaced	Small and medium enterprises show a considerable propensity to learn by interacting and doing			The Swiss mentality is open to adopting examples from other sectors and is politically open to competition.
Information skills	There is a degree of animosity amongst knowledge consumers. They are less clear about where to go in search of knowledge and information, less able to afford it, less sure about which information is of greatest importance and unclear about the quality of advice						Information acquisitions skills have not been developed by all farmers	Swiss farmers tend to be curious and predisposed to new ideas and innovation, particularly with regard to technical innovation and diversification.
Capabilities of farmers		Not much activity on innovation and change management.	Best agricultural practices widely adopted	Large segment of small scale subsistence farmers with low education		Farmers: low level of formal agricultural education, lack of knowledge demand capacity. Low professional qualifications one of the key-problems	Dutch farmers are among the best trained farmers in Europe, with regard to formal education	Farmers in Switzerland receive a high degree of training, which gives them the knowledge base to assess whether to embark on an innovative strategy or action,

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Capabilities of advisors	Inadequate mechanisms for the delivery of research outputs (either as new knowledge or new technologies) to farmers through demonstration or via advisors, trainers and educationalists.	High education level and skills of scientists, applied researchers and advisors Advisers strongly motivated and embedded in their territories	Uncoordinated private extension providers without basic education on advisory techniques, communication skills etc., and quality management, confusing market structure Advice through banks of increasingly poor quality and decreasing customer orientation (sales of finance products)			Better organised farmer organisations are better in formulating knowledge questions	Increasing attention to training and education of intermediaries and consultants Leadership is missing for all actors	Farmers receive little training in entrepreneurship. There are too few agronomists in agricultural research in Switzerland with a relationship to practitioners.
Miscellaneous			Mighty journalists and media without sufficient agricultural subject knowledge			Brain drain out of agricultural sector		Farmers' unions are often reluctant to change and remain entrenched in traditions and habits.
Universities and researchers			Universities have nearly no practical orientation, farmers usually attend universities of applied science, degree is necessary			Research: Accumulated expertise of institutes, competence of individual scientists		Teachers in agricultural education have practical experience in all facets of farming. The polytechnics produce a large number of well-trained specialists and generalists in every field, which allows a broad knowledge base that can transfer innovation.

Table 9 (continued)

The liberalisation of the extension services has led to an increase in the advice and information on offer. However, the quality of advice –for instance in Germany- is not known. Often advice focuses on technology transfer that offers a clear and straightforward solution recipe, instead of long-term support and instruction on improved agricultural practices through knowledge co-development. In addition, services such as the facilitation of group learning through approaches such as peer-to-peer learning and Farmer Fields Schools are not yet well developed among advisors. Advisors still often take the role of mere technical experts, instead of coach, sparring partner, or of a reflexive facilitator who takes into account the specificities of the client in terms of education level, attitude towards change, asset position, and gender (Leeuwis and Van den Ban 2004; Ingram 2008; Trauger, Sachs et al. 2008)

4.2.7 Information market structure

Market structure for innovations refers to the positions of and relations between market parties, see Table 10. In this regard, the first element here is that of the producers: the farmers themselves. The new member states of Latvia and Hungary, and to a certain extent even Germany after the reunification see a structural difference between in the type of farms and farmers, from a small number of very large, technology intensive and international operating farms to a much larger number of small scale, sometimes even subsistence farmers. This structural divide means that there are very large differences between types of farms, with a small number of extremely large farms competing on the international markets and a much larger amount of very small to subsistence farms. This makes the interests of the farmers to diverge widely and also makes it more difficult to come up with policy measures that benefit both these categories. Other countries, like the Netherlands and also France see a smaller variance in farms, but also here different types of farmers exist. In France, five types of farmers are thus distinguished: modernist farmers, traditional farmers, dependent farmers, farming entrepreneurs, entrepreneurial creators and farmers with personal life projects. Each of these farmers have their own vision of development, innovation and values.

With regard to the production chains, it has been remarked in some country reports that there are several market actors active in the product chain that have a disproportionate influence on the development of the other actors within the product chain. The powerful position of supermarkets, but also multinational companies such as Unilever can have both positive and negative effects. For instance, for a long time these corporations were able to actively frustrate a demand for more sustainable products. However, in Switzerland but also in the Netherlands and Germany, some supermarkets have made a turn towards selling more sustainable, fair trade and organic products. Because of their purchasing power they are able to pull these products now through the product chain. Similarly, the attention for healthy foods and the quality of production has given large incentives for investments in quality control programmes in a variety of production chains. However, disadvantages are also present. These large corporations can dictate production conditions all the way down the production chain, using a top-down mechanism of enforcing their rules and quality

regulation and leaving farmers not much choice but to comply. Bottom-up initiatives and innovations are not recognised by these corporations making it more difficult for farmers to develop alternative sustainable production techniques.

Regarding the functioning of the knowledge market for advice, experiences vary across countries. In England and the Netherlands, the idea of paying for advice is well established among farmers. However, in Hungary this idea is very weak developed. Several countries observe that the information market also has some disadvantages because it leads to more competition for contracts and financial sources within the AKS, which in turn leads to less collaboration and less sharing of information sources. This hinders the diffusion of beneficial innovative practices. This competition does not only play out between consultants, but also between the other actors in the AKS: research institutes and universities.

Table 10: Market structure

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Monopolies / preferential positions				The information market is distorted with some organisations (chamber of agriculture) having a very big advantage	In the south of Italy (codified services) are mainly public (however leads to great dissatisfaction); Central and North Italy have more privatised systems; this also in an attempt to break the monopoly of farmer's organisations		Wageningen UR still has a dominant position in the AKS, both in fundamental and applied research	ETH has central position in fundamental research
Increasing competition between knowledge providers	In the arable sector there is a perceived shortage of advisors in several specialist areas, on the other hand some people argue for more generalists	Competition among advisory organisations.	Growing numbers of private advisors	Only very few advisors can live of the FAS		Increasing competition between knowledge providers in a small market (10,000 commercial farmers)	Competition between institutes and sometimes within (large) institutes results in a failure to share potentially commercial information More and more supply of knowledge, research and advice	The negative side of strong competition in education and advice to farmers is that consultants are motivated by financial survival, which makes them risk averse. Competition for financial resources can result in a lack of cooperative projects between institutions and insufficient cooperation between research, education and advice.

	ENGLAND	FRANCE	GERMANY	HUNGARY	ITALY	LATVIA	THE NETHERLANDS	SWITZERLAND
Lack of demand for information services		Some of the farmers don't feel concerned by the advisory system and ask for little information	Weak economic power of the clients, especially in the South, hinder purchases of extension services	No demand / willingness to pay for information services.			Limited willingness to pay for independent advisory services, focus on 'free' advice embedded in other products and services (e.g. feed, fertilizer, accountancy).	
Confusion of knowledge consumers	There is a degree of animosity amongst knowledge consumers. They are less clear about where to go in search of knowledge and information, less able to afford it, less sure about which information is of greatest importance and unclear about the quality of advice				Presence of different interpretations of important issues (e.g. quality of food, its health, sustainability of production methods) that do not provide consumers with correct information		An overload of information, and an overabundance of knowledge and information sources, resulting in an 'information smog'.	

Table 10 (continued)

4.3 Trends influencing agricultural and rural activities

For the third part of this chapter we will look at the trends that will likely affect the agricultural sector in the years to come. The Agricultural Knowledge System will need to address these future challenges. However, different countries report different trends, sometimes reflecting the input of the stakeholders they interviewed or that took part in the workshops. These different trends of the different country reports have been grouped together and Table 11 gives an overview of the trends mentioned in the country reports. We did not want to make a ranking of the ‘most important trends’ as this can differ from country to country. Many of these trends are not operating independently, on the contrary many trends reinforce each other and we will therefore discuss all these trends below.

Table 11: Overview of identified trends in country reports

	<i>England</i>	<i>France</i>	<i>Germany</i>	<i>Hungary</i>	<i>Italy</i>	<i>Latvia</i>	<i>Nether-lands</i>	<i>Switzer-land</i>
1. Food Security / Growing World								
Population	X		X				X	X
2. Globalisation of markets	X	X				X	X	
Price fluctuations			0				X	X
3. Climate Change		X		0			X	X
Water issues (quality and quantity)		X					X	
4. Governance	X	X						
5. Competing claims on agricultural lands		X		X	X	X		X
Energy production	X		X			X		
6. Demography			X		X	X		X
Labour	X				X		X	
Health / food safety	X		X				X	X
7. New actors with new values	X				X	X	X	X
Fragmenting visions					X		X	
Animal Welfare	X		X					
Sustainable agriculture		X	X					X
8. New modes of production			X	X		X		
Multifunctionality						X		
Diversification					X	X		
Regional branding / labelling		X			X			X
Technology Development (G.R.I.N)	X	X		X		X	X	
Modernisation and scale increases	X	X				X		

Captions: An ‘X’ means that a trend has been mentioned in a country report; an 0 means that a trend has been mentioned, but has been valued as insignificant.

4.3.1 Growing world population

The growth of the world population is expected to increase up to at least the mid-21st century, and absolute demand for food will rise. Estimates of population increases over the coming decades vary, for example, depending on

the expected average number of children per woman (IAASTD, 2009); but the latest predictions from the UN put the world population at approximately 9 billion people by about 2050. Predictions of future food demand also differ, but even the most optimistic scenarios require increases in food production of at least 50% (Horlings and Marsden 2011). Even though the agricultural production for many products has actually grown faster than the increases in population, there is a fear that in the near future this will no longer be the case if no adequate measures are taken at this moment. Food security is therefore an important issue in many countries. In a country like Switzerland, that depends on a lot of agricultural imports, the issue of food security is likely to rise further.

4.3.2 Globalisation

Increasing international competition and the new geopolitical relations can lead to shifts in the economic and political centres of the world. The rise of the so-called BRIC countries (Brazil, Russia, India and China) leads to an increasing competition for scarce resources. The increasing wealth in some of the emerging economies will be accompanied by changes in consumption patterns. This combined with the general growth of the world population not only leads to an increase in food demands, it will likely change diets in these countries (more meat consumption) but also a demand for other types of products. Demands for strategic resources like copper, phosphate and fossil fuels will further intensify.

The economies of the major economic blocks also become more and more integrated and economic crises in one part of the world tend to spread quickly and affect other economies. Agricultural resources are traded increasingly between countries and continents leading to an increased risk of the spread of contagious diseases, both for animals and humans. Increasing demand, and the liberalisation of agricultural markets can easily lead to fluctuating prices for agricultural products. The high fluctuations in prices lead to an uncertain environment that is not conducive to investment in innovations, although higher agricultural prices might make the sector become more attractive for investments. An on-going discussion is what role governments should play in regulating these international markets.

4.3.3 Governance

The influence of the European Union on agricultural and innovation policy cannot be underestimated. The European common agricultural policy is still reducing its production subsidies, which have been driving agricultural (over)production. This process is still on-going as, the milk quota will soon be abolished and this forces farmers to become more entrepreneurial: they have to learn managing their farms commercially, deal with personnel and decide on what they want to 'outsource'. At this moment the discussions are starting on the reformulation of the Common Agricultural Policy of the next period (2013-2019). The new CAP will strongly influence innovation and agricultural production in Europe. More information on the effects of European policy on agricultural innovation can be found in appendix C of this report.

4.3.4 Climate change and water

Climate change will continue in the coming decennia and is affecting the precipitation patterns. These changes will likely affect both natural systems, biodiversity but also human managed systems and agricultural production systems. However, these changes will be different for different parts of the world. Increasing occurrences of weather extremes like droughts, floods and storms will negatively affect productivity of agriculture. Climate change is therefore a trend that was repeatedly mentioned in the country reports although the effects so far have not been noticed everywhere (Hungary for instance). However, other countries like the Netherlands (water) and Switzerland (melting of glaciers), the potential effects of climate change are well established on the political agenda.

4.3.5 Competing claims on agricultural lands

These competing claims come from both within the agricultural sector itself, but also from outside. The growing attention for biofuels and other non-food products leads to increasing competition for land that would otherwise be used for the production of food stuffs. This competition is further increased by new economic activities that claim agricultural lands. Several countries report problems with 'urban sprawl', which reduces the amount of agricultural land available for production. In the Netherlands, agricultural lands are sometimes used to be turned into nature reserves to compensate for other activities that result in pressures on the environment. Latvia reports an additional problem with agricultural lands being increasingly used for land speculation and taken out of active production.

The countryside therefore experience pressure from many directions, although it is important to differentiate also between different types of countryside. France for instance has three different types of agriculture: 1) agricultural in suburban areas, with a strong competition between land use between farming and for urban uses, 2) farming in dynamic and productive areas devoted to competition on international markets, and 3) extensive farming in low density areas where there are few other economic activities and focus is on extensive systems and sustainable development. Different types of competing claims occur within these three different types.

4.3.6 New actors in the countryside

At the same time new actors are entering the countryside. These new actors do not share the same ideas about conventional agricultural production. The urban population seeking refuge in the countryside for rest and recreation have a completely different vision on the future of the countryside compared to some of the more conventional agricultural actors. With the inflow of new actors in the countryside the new perspectives on agricultural production gained increasing importance. This has led to a fragmentation of the common vision on

agriculture. This process has been named the ‘contested redefinition of the countryside’ (Frouws 1998) and can be observed in many places. This has also led to a variety of discourses on sustainable agriculture to emerge (Hermans, Horlings et al. 2009). One of the most contested elements of these visions concerns the aspect of animal welfare. An increasing amount of people express their concerns about the treatment of animals in the intensive animal husbandry sector and this trend is likely to increase in the future.

4.3.7 Demographic trends

The spatial pressure on the countryside is also a result of slow demographic changes. The increasing mobility of both city dwellers and farmers and the changing position of the countryside in spatial planning has resulted in more and more farmers finding jobs in cities, and people from the cities increasingly settled in the countryside. However, the most important demographic trends, especially in the agricultural sector in Europe is the ageing of the population. Ageing and outmigration lead in Latvia, but also Germany and Italy to a depopulation of remote rural areas and an increasing negative effect of the social life of farmers in those areas, as for instance reported in Switzerland.

With an ageing population, the labour force is experiencing the same effect. In some countries problems are expected with shortages in the amount of people willing to work in the agricultural sector. The agricultural sector is likely to suffer especially in the future, because of its negative image among young people. Italy and the Netherlands both mention the potential negative side effects of the increased use of cheap labourers from Eastern European countries to perform menial tasks on farms and in glass houses. In Italy the effect of this inflow of cheap labour might be the decreased necessity to invest in innovations and more capital intensive production techniques. In the Netherlands the protection of the workers’ rights for these Eastern European workers has become problematic and examples of worker exploitation keep appearing in the popular press, further increasing the negative image of working condition in the agricultural sector.

There is an increasing awareness of health related aspects of food production and food consumption in many countries. Several factors contribute to this deterioration: unhealthy life styles lead to increasing problems with obesity and diabetes. On the other hand, with the generation of the ‘baby boomers’ reaching their pensions, the average age of the population also increases and this ageing population has also more problems with health in general. On the other hand healthy products are an increased selling point for producers. Increasing attention to food security is having its effects in the organisation of many agricultural product chains. Supermarkets and other powerful actors in the product chain have started to regulate their suppliers through intensification of certification programmes.

4.3.8 New modes of production

Finally, there are the on-going trends on the level of farmers themselves. In general we can identify two major trends at the farm level concerning the way of agricultural production. The first trend is in many places still the dominant trend of scale increases and the further modernisation of the agricultural sector. Especially in countries like Hungary and Latvia, there is a feeling that the sector itself is in a need to modernise. The high percentage of subsistence farming and small scale farming is threatened by on-going trade liberalisation and cheap imports of agricultural products. The implementation of new agricultural production techniques is necessary. However, also in other countries the conventional agriculture is still strongly investing in new technologies: Genomics, Robotics, GPS (precision agriculture) ICT and Nanotechnology (summarised in the handy acronym GRIN-technologies) are affecting the way food and other agricultural products are produced and processed. These technologies have the potential to significantly increase agricultural production in the future, although the perception of the associated risks leads to heated societal debates on their suitability and their potential associated risks. The risk perception of GMO technologies differs from country to country. In Hungary GMO is not allowed and this prohibition has increased its export of agricultural products to Germany.

A countervailing trend can also be discerned. This trend is associated with an alternative track of agricultural development. Many environmental problems are associated with the prevailing modernisation and restructuring of agricultural production. To combat this type of problems, new ways of production have also gained importance and will likely be growing in the near future. More attention for environmentally friendly modes of production (organic agriculture), is combined with more attention for animal welfare, multifunctional production and slow food are associated with this trend. In this alternative paradigm food production is based upon the specific qualities and distinctive features of the region (Wiskerke 2009).

5. DISCUSSION OF RESULTS AND IMPLICATIONS FOR LINSAS

From the different country reports it can be concluded that cooperation and networking are 'hot'. Several countries report new forms of cooperation in which different actors work together, see Table 12. For instance horizontal integration is promoted through a number of new types of network based institutions: for instance the Knowledge Exchange Platform for Regional Policy in Switzerland, or the State Rural Network in Latvia, a virtual networking platform initiated by the Ministry of Agriculture. Clusters are also a popular form to improve collaboration between different partners. These clusters have a strong geographical basis and focus on the territorial presence of specialised industry and can be found in France (competitiveness clusters) and Latvia (industry innovation clusters). The last type is defined as a public-private cooperation that involves SMEs, high schools, suppliers and market partners research institutes and local governments. In Switzerland a special fund has been set-up to stimulate public-private co operations, however only 1% of the funds actually are utilised for agricultural and rural development projects.

The question is , how LINSAs fit within the Agricultural Knowledge and Innovation System and their relationship with the AKS. At this point in time we did not do an exhaustive investigation into the occurrences and operations of LINSAs since that is the aim of the whole SOLINSA project. Another limitation of this report is that we have kept the definition of a LINSA very broad, as explained earlier in section 2.2. However, it is possible to reflect the results on the different categories of the innovation system matrix. It is clear that certain conditions have a particular set of advantages and disadvantages for the potential of collaborative innovation projects and social learning typically done in a LINSA.

Regarding the structural characteristics, a general threat for bottom-up innovation and collaborative learning are the reductions of the budget of these types of collaborative innovation networks. Linear innovation thinking still dominates in large parts of the AKS and in times of economic distress, it is easier to support these types of innovation and cut back on the fuzzy, soft bottom-up initiatives. Increased competition for resources in many countries is not very conducive for collaborations and information sharing between competing organisations.

Rules and regulations are often not very well suited to support LINSAs. Funding for these types of bottom up networks is hindered by the inability of funding agencies to deal with the unique properties of social learning, where sometimes the social outcomes and improved stakeholder relations are very important. However these types of results are notoriously difficult to monitor and evaluate (Burgess and Chilvers 2006; Head 2008).

As mentioned earlier, the cultural characteristics of a country also determine the potential success of collaborative networks pursuing processes of social learning. An important cultural difference can be seen between countries like Switzerland and the Netherlands, that generally love collaboration and consensus and a country like Hungary or Latvia, where many farmers do not like anything 'collective' as a result of the years of forced collectivism in agriculture under communist rule.

Regarding competences, in some countries there is a need to develop at the farmer level the skills necessary for self-organisation and collaboration. However they are not the only ones who need some additional set of skills. Advisors and consultants also often see themselves as technical advisors focussing on knowledge transfer and not so much on knowledge co-creation. Similarly researchers often also require a different set of skills to communicate effectively with farmers, but sometimes even with colleagues from other scientific disciplines. The lack of these skills will limit the possibilities for LINSAs to be established and function successfully.

The network characteristics determine the ability of a LINSAs to gain access to the existing policy network. Most of these issues that have already been discussed under the 'paradoxes' fall in the category of the strong network failures, difficulty in letting new actors in the network. From the country reports we can make a distinction between Italy, with a fairly closed AKS dominated by the traditional actors: LINSAs are operating outside the formally established networks. In the more, liberalised open systems, the more traditional AKS actors are also actively involved in different types of LINSAs, sometimes even funded by governmental funds. In these countries, these types of self-organising LINSAs are viewed by governments as an alternative way to realise public services and therefore they are also eligible to public funds.

However for collaborative processes that define a LINSAs, other types of linkages are also important. Social learning depends on the exchange of information from a different background and therefore the combination of different types of organisations within the LINSAs is also important. Weak network failures make it difficult to connect different types of organisations. Innovation brokers can play an important role establishing the link between different types of organisations, but except for the Netherlands, the category of the innovation brokers does not yet seem to have caught on in other countries.

Many of these issues can be summarised under the heading of the existence of trust and 'social capital' between the different actors of the AKS. Social capital is an important prerequisite for collective action and a lack of social capital and trust can hinder innovative collaborations to take off. The trust in the role of government is especially important and the trust of farmers in government is largely absent in England and also somewhat decreasing in Germany. Also Latvia reports a weakening of the human and social capital. In France this trust is still more present and there is even some measure of solidarity between different regions and production sectors.

Table 12: Types of LINSAs and their support

	England	France	Germany	Hungary	Italy	Latvia	Netherlands	Switzerland
LINSAs	All kinds of new rural networks are emerging, including: commercialisation of a particular product; non-commercial knowledge and advice (environmental), to inform about policy developments and regulations; mutual learning	Innovative farms, networks, practices, more and more recognized. Many LINSAs (even if often linked to the minors farming Unions). Usually working on alternative production systems. Increasing territorial approaches for AKS players: Clusters at regional level for joint applied research by industry, research labs and education organisations		LEADER Local Action Groups LAGs were aimed at creating micro-level institutions for the LEADER programme Some of the LAGs are becoming important parts of the AKS; they often have a good network of entrepreneurs, management authorities which are unapproachable for normal applicants of subsidies	Clear separation between a public and a private innovation and knowledge system; however, new organisations emerging outside the formal system Informal network coming up consisting of producers associations, and cooperatives, PDO and PGI consortia and wine tourism movement, slow food and related associated farms, new partnerships between organic farmers and technicians emerging outside the formal AKS	Local and international cooperation networks present; LINSAs often depend on private actors	Networking and intersectoral collaborations are popular and increasing; leading to many different types of networks: from study clubs, to multisectoral collaborations	There are numerous and active platforms, in the field of milk production with partners from research, consulting and practice. Swiss farmers are often members of interest groups and are often involved in collaborative enterprises, of which both activities increase the exposure of farmers to broader networks and the inherent source of ideas that can potentially lead to innovation.

	England	France	Germany	Hungary	Italy	Latvia	Netherlands	Switzerland
Support of learning and collaboration in LINSAs	<p>Currently there is no BBSRC funding to promote institutional collaboration across the rural knowledge/R&D supply chain</p> <p>There are cross research council linkages and the research councils are working together through cross-government programmes focused on major global challenges, such as food security and climate change.</p>	AKS is not well organised to foster innovative groups or networks (LINSAs).		<p>Because of funds drying up there is a struggle for survival and competition of scarce resources. Cooperation is rare</p> <p>The only exception are programmes that heavily depend on LEADER programmes. Social learning and collaboration is so ingrained in the LEADER working method that a hostile environment cannot undo it.</p>	Some trends in governance mechanisms towards the adoption of bottom-up approaches (increase of stakeholders consultation), even if not generalised and really effective		<p>positive experiences with networking, funding schemes are increasing and broadened</p> <p>Strong focus on learning in peer-to-peer networks, study clubs are unabatedly popular</p>	Crosscutting topics are not supported well (not even by AGRIDEA)

Table 12 (continued)

6. CONCLUSIONS

There is a large difference in reported characteristics of AKS not only between different countries, but also within some countries themselves. If there is one thing that most countries have in common, than it is that they all report a fragmented AKIS. However, the reasons for this fragmentation differ from country to country. For some countries the reported fragmentation is the result of a process in which the traditional roles of the AKS actors (research, extension and education) have slowly dissolved and became more entangled. These countries, of which the Netherlands and England are the most extreme examples, have moved towards a diversified landscape of formal and newly emerging informal organisations that each cover an overlapping part of these traditional roles. NGOs, government agencies and research institutes, farmer funded organisations and cooperatives, commercial advisory agencies and consultancy as well as some successful farmers themselves are now new suppliers of information in the agricultural sector and traditional categories between fundamental and applied research or between commercial and non-profit advisory systems are disappearing. In these countries, government intentionally gave away most of its instruments to steer developments of the AKIS directly and the reported fragmentation is therefore an expression of the lack of vertical steering mechanisms.

The opposite situation can still be found in Hungary and Latvia where the organisation of the AKIS is still aiming at directly improving the productivity of the subsistence farmers. Publicly funded extension services still hold an important position in the AKIS to perform this task. The reported fragmentation in these countries is not so much the lack of steering mechanisms, but it is more the result of a lack of political interest combined with limited funds. Finally, the third category of fragmentation can be found in Germany and Italy where the reported fragmentation is the direct result of the organisation of the state. Because of their strong federal and regional forms of government, there is also a wide variety of rules, regulations and institutional interactions from region to region. As a result the national AKIS has very high horizontal fragmentation which may be accompanied by a vertical type of fragmentation (depending on the specific region). However, a notable exception here is Switzerland, that also has a federal system but where the actors within the AKIS have remained closely tied together and where it has been possible to change farming practices in the whole country in a relatively short time.

With regard to the traditional AKS actors of research, extension and education, the difficult position of agricultural education seen in many countries is a cause for some worry. Many countries report either a lack of funds, a lack of interest from students or a combination of the two. This difficult situation is further exacerbated by the absence of links between businesses and agricultural schools. It seems that cooperation between these two types of organisations is not easy and as a result businesses complain that the agricultural curriculum that is being taught, does not match agricultural practices.

With regard to the support of LINSAs, it can be concluded that networking, knowledge co-creation and collaboration between different partners is very popular across the different countries, although its practical implementation is fraught with difficulties. Some of these difficulties are related to differences in organisational culture that make the collaborative process itself problematic, while other problems are rooted in the (lack) of institutional support or the organisation of the knowledge market or the type of links between the different parts of the AKS. Some initiatives are developing in the absence of the policy and depend more on the enthusiasm of the people involved.

The comparison of the country reports reveals some remarkable paradoxes. The first paradox is somewhat related to the network characteristics of the AKIS. An AKIS where the actors form a more or less closed network enjoy the advantage that their AKIS is more manageable. Lines of communication are short and there is a shared discourse and vision on the future of the sector present. The downside of this situation however, is formed by the difficulty a closed AKIS has in incorporating new actors and opposing views. New information does not easily enter such an AKS, and new bottom-up initiatives and innovative practices are not necessarily recognised as such.

However, the opposite situation an AKS that is characterised as an extremely open network, has its own disadvantages. With increasing knowledge supply by brokers, advisors and agricultural consultants, the AKS becomes much more complex and the overview of the different services on offer, not only from commercial actors, but sometimes also from (applied) research institutes, becomes difficult to oversee. For instance, in Germany there is some question regarding the quality of the advice on offer, while in England and the Netherlands end-users sometimes get lost in the abundance of possibilities and knowledge providers. Even though bottom-up initiatives have easier access to the more formal research institutions, the steering of the AKS does not necessarily improve. Government has a more difficult job to steer the AKS in a desirable direction as there is no consensus over the direction of the agricultural sector.

The second paradox that can be distilled out of the comparison of the country reports has to do with a trend of accountability of politics and public policy. This trend increases the pressure on politicians and civil servants to show 'results'. Combined with a shift towards more attention to short term thinking this results in many countries in incoherent innovation policies that focus on short term results. In order to be eligible for funding an innovation project is required to provide detailed information on the expected results, focusing often on hard measurable criteria and ignoring the softer outcomes of a collaborative innovation process. At the same time however, there is often a lack of monitoring and evaluation criteria for innovation projects and programmes once a programme has finished. Learning effects are not systematically documented and these feedback mechanisms are not formalised in many countries.

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APPENDIX A: GUIDELINES FOR LITERATURE REVIEW AND INTERVIEWS IN WP3

The first step of SOLINSA and WP 3 to be done before the kick-off meeting in Brussels aims to get an general overview of the current state and functioning of the national AKIS and the most important differences between the different countries, especially with regard to the place of innovative approaches to knowledge co-creation within the national AKIS that aim for sustainable agriculture. The idea is to do a general literature review and in addition interview three or four experts per country that have a good general perspective of AKS. For the Brussels meeting we believe it is important for all participants to have a presentable framework for their respective countries that includes the most relevant issues within AKS organization, societal trends, support of AKS and the role and place of knowledge co-creation within the AKS. However, since we expect to encounter a wide variety of particular forms of AKSs across different countries, the guidelines for the interviews should not be considered as a strict protocol, but more as a suggestion about the possible characteristics of the AKS. The questions themselves and the wording have to be adapted to local circumstances. During the kick-off meeting in Brussels we can refine the interview guidelines based on our discussions there.

Goal of the interviews / literature review

To investigate how the current organisation of the AKS facilitates or impedes interactive innovation approaches aiming for sustainable agriculture

- a. To get a general overview of the state and performance of the national AKIS and refine our understanding of its composition and performance
- b. To discuss the way the AKIS currently supports innovative bottom-up approaches to knowledge co-creation and social/joint learning, for instance in learning networks, or communities of practice and so on.

General characterisation of AKS

How would you characterise the current state and functioning of the AKS ?

- In terms of steering mechanisms and centralisation or decentralisation (top down steering, or market mechanisms)
- In terms of coherence versus fragmentation, not only of the general goals that are pursued by actors in the AKS, but also in terms of the coordination of policies and innovative activities.
- In terms of changes in the composition of the AKS (closed networks of established/traditional players with a fixed role, or open networks of many new groups entering with diffuse roles)?
- What are the major trends/driving forces that have influenced the AKS in the past (national, international)
- What are the major trends/driving forces that will likely impact the functioning of the AKS in the future?

Main issues regarding innovation and knowledge co-creation

What role do bottom up approaches as social/joint learning currently have in the AKS?

- How does the current organisation of the AKS support practical learning and innovation for sustainable agriculture?
- What is (and what should be) the role of the government, private sector actors and civil society in general in these kind of practical learning and innovation networks?
- Do you agree that there exists a mismatch between the knowledge and information needs of actors in practical innovation projects and the suppliers of knowledge in the formal AKS (universities and research institutes?)
 - If no, why not?
 - If yes, what do you think is needed for this mismatch to be resolved?
From the knowledge consumers and from knowledge providers?
- What role can cooperation and coordination play in the AKS, (linkage mechanisms to stimulate interaction between AKS actors, and linkage mechanisms with other actors (private sector, NGOs), grassroots actors. Who should take the lead here? What are emerging practices?

APPENDIX B. LIST OF INTERVIEWED PERSONS PER COUNTRY

England

Interviewee and position	Organisation	Organisation type
Simon King, Director	Business Development Centre, Royal Agricultural College, RAC	Higher education knowledge and information provider
Ceris Jones, Climate change policy advisor	National Farmers' Union, NFU	Farmer representative
Elizabeth Berry, R&D Manager, Duncan Pullar, Director of DairyCo (email respondent)	DairyCo, DC	Industry representative/levy
Karen Murray, Manager	Rural Enterprise Solutions c/o Plymouth University, RES	Farmer group/broker
Robert Hassall, General Manager	Pasture to Profit, P2P	Farmer group – commercial
Mike Wilkinson, Manager Sustainable Farming and Food Science LINK	Department of Environment, Food and Rural Affairs (Defra)	Government (food production)
Diane Spence, Delivery Manager Land Management Training and Development	Natural England, NE	Government (environment)
Sophie Throup, FarmSkills Manager	Farm Skills, FS	Education/skills
Richard Winspear, Senior Agricultural Advisor	RSPB	NGOs/voluntary sector -wildlife
Rob Macklin, National Agriculture and Food Advisor	National Trust, NT	Land Owner/Landlord
Kath Dalmeny, Policy Director	Sustain	NGOs/voluntary sector –food network
Clare Devereux	Food Matters, FM	NGOs/voluntary sector –food network
Simon Mallet, Regional Skills Manager	South West Food and Drink, SW	NGOs/voluntary sector – food network

France

Interviewee and position	Organisation
Pascal Bergeret	Ministry of Agriculture
Yves Madeline	French Livestock Institute
Sonia Ramonteu	ACTUA

Germany

Interviewee and position	Organisation
Dr. Thomas Aenis	University of Berlin - feedback via email
Prof. Hermann Boland and Henrike Rieken (University professor for agric. communication and extension)	University of Giessen Feedback via email and phone
Prof.Dr.Halvor Jochimsen	Ex-chamber of agriculture farm management and extension - written comment
Michael Kügler	Chambers of agriculture extension, feedback via email
Heinrich Maurer	Journalist / agric. journalism, feedback via email
Caroline Dangel-Vornbäumen	German Rural Woman Organisation - feedback via email and phone
Martin Heil	Journalist, AID = information services for food, agriculture and consumer protection / agric. journalism, feedback via phone

Hungary

Name	Affiliation and other information about the participant
Dóra Karsa	Pro-Vértes (environmental NGO) project manager
Erika Szekely	Agricultural Economics, Agricultural Economics Research Institute, Department of Rural Policy – researcher
Ferenc Juhasz	Agricultural and Rural Development Agency (the Paying Agency) Head of III. and IV axis payments
Judit Rácz	Rural development manager at – Felső Homokhátság LEADER Local Action Group
László Kárpáti	Rural Development Training and Advisory Institute - Head of Advisory Unit
Laszlo Podmaniczky	Szent István University, Gödöllő, university professor, researcher, agricultural engineer, interested in knowledge transfer
Miklós Maác	Ministry of Rural Development, Head of Department of Rural

	Development Department - Agricultural Engineer
Péter Roszik	Director Biokontroll Hungária Inspection and Certification Nonprofit Ltd. And Hungarian Biokultúra Federation (http://www.biokontroll.hu/cms/index.php?lang=en)
Peter Toth	Ministry of Rural Development, Biodiversity Unit leader - environmental engineer, agricultural engineer
Tamás Lantos	Mayor, Ormánság Foundation - one of the partner head LINSAs sociologists, agricultural engineer, ecologists and
Vári Attila	Agricultural Co-operatives and Farmers Association – leader of advisory service unit, agricultural engineer, economist,
Viszló Levente	Pro-Vértes (environmental NGO) president
Wayda Imre	Chief counselor, advisory officer, NHRDP training, „Rural Development Department, Ministry of Rural Development

Italy

Interviewed	Organization	Role
Carlo Chiostrì	Network of Italian Regions for research and innovation	Coordinator
	Tuscany Regional Administration –Tuscan RAADI (integrated since 2010)	Director of ‘Promotion of innovation and knowledge systems’ sector
Anna Vagnozzi	INEA (National Institute of Agricultural Economics)	Chief of ‘Knowledge systems’ sector (within the ‘Structural and territorial researches and services for agriculture development’ sector)
Stefania Nuvoli	Tuscany Regional Administration –Tuscan RAADI (integrated since 2010)	Member of the agronomic research sector, she is an expert in sustainable management and use of water in agriculture
Adelfo Magnavacchi	CRPA (Research Centre for Animal Production) Emilia Romagna	Director
Riccardo Bocci	Rural Seeds network;	Director
	Italian Association for Organic Farming	Member of steering committee
Luca Colombo	FIRAB (Italian Foundation for Research for Organic and Biodynamic Farming)	Director
Luciano Rossi	Toscana Cereali (Farmers’ Product Association – cereals)	Director
Renzo Malvezzi	Regional Breeders Association – Tuscany	Director of advisory services
Franco Giangrandi	Crisoperla Association	Member of steering committee
Giampiero Patalano	Cerealtoscana (Private Agro industrial organization)	Chief of technical and marketing office

Montesi Lorenzo	Confagricoltura (one of the three Italian Farmers' Unions)	Member of steering committee
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Latvia

Name	Institution	Role
Sandra Muižniece – Brasava Zinta Gaile	-Technology transfer centre, Faculty of Agriculture, both Latvia University of Agriculture	Education, research, advisory, knowledge transfer
Edīte Kaufmane Dalija Segliņa	Latvia State Institute of Fruit-Growing	Research, advisory
Aleksandrs Jemeljanovs	Research institute of Biotechnology and Veterinary Medicine, Latvia University of Agriculture	Research, education
Andris Miglavs	Latvian State Institute of Agrarian Economics	Research
Liene Jansone Ilze Slokenberga	Ministry of Agriculture	Policy
Maira Dzelzkalēja	Zemnieku Saeima	Farmer organization
Ginta Jākobsone Agita Hauka	-LOSP -Latvian Farmers Federation	Farmer organizations

The Netherlands

Name	Organisation	Function
Cees Leeuwis	• Wageningen University – Communication and Innovation Studies	Professor
Krijn Poppe	• Ministry of Economic Affairs, Agriculture and Innovation • LEI – Agricultural Economic Institute	CSO: Chief Scientific Officer – liaison between science and policy
Henk van Latesteijn	• TransForum – innovation programme for agricultural sector	Director

Albert Zwijgers	<ul style="list-style-type: none"> • HAS Hogeschool - Higher Agrarian Education • Unilever 	Lector / professor
Lobke van Oorschot	<ul style="list-style-type: none"> • ZLTO – Southern Farmer Union 	Advisor Innovation and knowledge
Gerlinde van Vilsteren	<ul style="list-style-type: none"> • Groene Kennis Cooperatie – organisation for green & agrarian education 	Director
Paulien Boverhof	<ul style="list-style-type: none"> • VAB: Vereniging Agrarische Bedrijfsadviseurs Organisation for independent agrarian consultants 	Vice chairman VAB
Marien Sonneveld	<ul style="list-style-type: none"> • Stichting Regiowaarde – Foundation for regional development 	Innovation and knowledge broker
Frank Verhoeven	<ul style="list-style-type: none"> • BoerenVerstand 	Innovation and knowledge broker
Jose Vogelezang	<ul style="list-style-type: none"> • Wageningen UR Plant Sciences groups (Applied Research) 	Manager New Business Development
Maarten Vrolijk	<ul style="list-style-type: none"> • Netwerken in de Veehouderij: Networks in Dairy Farming –WUR Livestock Research 	Project leader

Switzerland

Name	Organisation
Anton Stöckli	FOAG section „research and extension“ (Federal Level)
Martin Stockhard	SECO (Regional policy implementation and funding of an knowledge exchange platform,) (Federal Level)
Martin Lobsiger	Agroscope: PROFILAIT (Research)
Anna Crole-Rees)	Agroscope: PROFICROPS (Research)
Philippe Droz	Agroscope: AGRIDEA (extension)
Johannes Heeb	Regiosuisse (platform for knowledge management in regional development, permanent education for rural development)
Bruno Haeller	Forum vulg suisse (national forum composed by all the regional centers for education and extension)
Olivier Girardin	Fondation rurale inter-jurassienne Membre du comité d'AGRIDEA en charge du dicastère FORUM

G. Gassmann, directrice	IAG (education and extension at cantonal level)
Conrad Briguet, directeur El Changins	HES-SO (education and extension at cantonal level)
M. Weber	Private consultant
P. Bauer	AgroFutura, Private consultant