Innovation processes in agriculture and rural development

Results of a cross-national analysis of the situation in seven countries, research gaps and recommendations

Karlheinz Knickel, Talis Tisenkopfs and Sarah Peter (eds.)
Contents

List of figures .................................................................................................................................................. 5

List of tables .................................................................................................................................................. 6

1 Innovation processes in agriculture and rural development: the IN-SIGHT project .................................................. 7
   By Karlheinz Knickel, Talis Tisenkopfs and Gianluca Brunori .............................................................................. 7
   1.1 Point of departure ......................................................................................................................................... 7
   1.2 Changing understanding of innovation processes and of the role of innovation policy .......................... 10
   1.3 Two important recent references ............................................................................................................. 12
   1.4 Key questions addressed .......................................................................................................................... 14
   1.5 Conceptual framework ............................................................................................................................... 15
   1.6 Methodology ............................................................................................................................................... 19
   1.7 Content and structure of report ................................................................................................................ 20

2 Socio-technical context, framework conditions and drivers of rural innovation processes ...................................... 22
   By Sigrid Rand, Tommaso Neri and Karlheinz Knickel ...................................................................................... 22
   2.1 Country-level reviews as point of departure ............................................................................................ 22
   2.2 Socio-technical context of rural innovation systems .............................................................................. 23
   2.3 Drivers of change and innovative behaviour in rural innovation processes .............................................. 24
   2.4 Institutions involved in rural innovation processes and support frameworks ...................................... 25
   2.5 Diversity of innovation systems and innovation policy approaches ...................................................... 26
   2.6 Major innovations in direct marketing in agriculture, environmental technologies and new rural services ........................................................................................................................................... 28
       2.6.1 New forms of direct marketing in agriculture .................................................................................. 28
       2.6.2 New environmental technologies .................................................................................................. 31
       2.6.3 New rural services .......................................................................................................................... 35
   2.7 Conclusions .................................................................................................................................................. 38
3 Processes, organization and networks........................................................................ 39

By Anne-Charlotte Dockès, Manu Rantanen, David Bourdin, Talis Tisenkopfs and Francesca Guidi................................................................. 39

3.1 Problems and opportunities – the origin of innovation processes............................................. 39

3.1.1 Drivers of innovation in direct marketing and consumer groups ........................................ 40

3.1.2 Drivers of innovation in bioenergy ...................................................................................... 42

3.1.3 Drivers of innovation in new rural services ......................................................................... 43

3.2 Interplay of different types of innovation .................................................................................. 44

3.2.1 Different types of innovation............................................................................................... 46

3.2.2 Integration in innovation processes .................................................................................... 48

3.3 From inception to maturity: the dynamics of innovation .......................................................... 51

3.3.1 Scope and scale of innovations ............................................................................................ 52

3.3.2 Process and development dynamics in innovation ............................................................... 54

3.4 Actors and roles ....................................................................................................................... 59

3.4.1 Socio-economic actors ........................................................................................................ 62

3.4.2 End users ............................................................................................................................. 64

3.4.3 Public decision actors .......................................................................................................... 66

3.5 Summary ................................................................................................................................. 67

4 Knowledge and social capital .................................................................................................. 68

By Jet Proost, Gianluca Brunori, Michel Fischler, Adanella Rossi and Sandra Šūmane........... 68

4.1 Recognizing different forms of knowledge................................................................................ 68

4.2 The rural knowledge system .................................................................................................. 69

4.3 The role of the formal AKIS ................................................................................................... 71

4.3.1 Innovation consultant organizations ...................................................................................... 73

4.3.2 Support system networks .................................................................................................... 74

4.3.3 The importance of (informal) knowledge networks ............................................................... 75

4.4 Bringing actors together: the role of formal and informal networks in innovation ............... 76

4.5 Social dimension of innovation and importance of social capital .......................................... 85

4.5.1 Detection of innovation ........................................................................................................ 87

4.5.2 Establishment of innovative projects and making them work ........................................... 88

4.5.3 Facilitation of knowledge processes .................................................................................... 89

4.5.4 Dissemination of innovation ............................................................................................... 90

4.5.5 Contribution to local development ...................................................................................... 90

4.6 Conclusions ............................................................................................................................ 92
5  Systemic, cross-sectoral and territorial aspects of innovation processes ............ 93

By Gianluca Brunori, Jet Proost, Leo Granberg, Talis Tisenkopfs, Karlheinz Knickel and
Christele Couzy .................................................................................................................. 93

5.1 Embeddedness in the territory ............................................................................. 93

5.2 From separation of knowledge, local resources and territorial capital to integration:
breaking down the barriers ......................................................................................... 97

5.3 From government to governance ......................................................................... 99

5.4 Specifics in the governance of rural innovations ................................................ 102

5.5 Territorial governance .......................................................................................... 104

5.5.1 What balance between central/decentralized, public/private structures? ....... 105

5.5.2 Who to involve in decision-making? ................................................................. 109

5.5.3 What are appropriate knowledge infrastructures? ............................................ 110

5.5.4 How to assess the effectiveness and efficiency of public policies and support? .. 111

5.6 Summary ................................................................................................................ 114

6  Support strategies and frameworks ....................................................................... 115

By David Bourdin, Dominique Barjolle, Michel Fischler, Sigrid Rand, Karlheinz Knickel,
Tālis Tisenkopfs and Jet Proost ....................................................................................... 115

6.1 Organizations, bottlenecks and delivery ............................................................... 116

6.1.1 Organizations and institutions ........................................................................ 116

6.1.2 Bottlenecks ....................................................................................................... 118

6.1.3 Delivery measures ............................................................................................. 119

6.2 Influence of ICT on innovation ............................................................................ 120

6.3 Policy instruments .................................................................................................. 120

6.3.1 Aim of policy instruments ................................................................................ 121

6.3.2 Diversity of instruments .................................................................................... 121

6.3.3 Instruments of financial support ......................................................................... 122

6.4 Policy coordination ............................................................................................... 123

6.5 Recommendations and research gaps ................................................................... 124

6.5.1 General recommendations ............................................................................... 124

6.5.2 Policy recommendations related to innovation and regulation ....................... 125

6.5.3 Practice recommendations related to knowledge, research and information .... 126

6.5.4 Recommendations related to the governance of innovation processes .......... 127
Co-production of rural innovation: towards an enriched theoretical model ...... 129

By Talis Tisenkopfs, Gianluca Brunori, Karlheinz Knickel and Sandra Šūmane .................. 129

7.1 Testing and developing the conceptual framework .......................................................... 129
7.2 Reference theories in the analysis of rural innovation ...................................................... 134
7.3 Key dimensions of rural innovations ............................................................................. 136
7.4 Co-production of innovations ....................................................................................... 141
   7.4.1 Creativity and initiative ......................................................................................... 141
   7.4.2 Establishing partnerships ..................................................................................... 143
   7.4.3 Unfolding innovation .......................................................................................... 147
   7.4.4 Stewardship and reflexivity .................................................................................. 149
7.5 Strategic potential of innovation .................................................................................. 152
7.6 Final reflection on approach used ............................................................................... 156
7.7 Questions remaining for further research .................................................................... 157

8 References ....................................................................................................................... 160

9 Main reports produced in the IN-SIGHT project ............................................................. 169
## List of figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Innovation as a learning process</td>
<td>15</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Social learning</td>
<td>16</td>
</tr>
<tr>
<td>Figure 3</td>
<td>The dynamic of second-order innovation</td>
<td>18</td>
</tr>
<tr>
<td>Figure 4</td>
<td>The main dimensions of innovation in agricultural direct marketing</td>
<td>48</td>
</tr>
<tr>
<td>Figure 5</td>
<td>The interplay of technical, social, organizational and economic innovations</td>
<td>50</td>
</tr>
<tr>
<td>Figure 6</td>
<td>The scale of innovations, their degree of structuration and their evolution</td>
<td>53</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Four groups of actors interact in a typical innovation process</td>
<td>60</td>
</tr>
<tr>
<td>Figure 8</td>
<td>An Agricultural Knowledge System model</td>
<td>70</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Typology of innovation actors</td>
<td>78</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Innovation filters at novelty stage</td>
<td>79</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Structuring of the socio-technical system during the development of innovations</td>
<td>80</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Actor involvement in innovation processes</td>
<td>82</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Actors involved in the introduction of a biomass heating plant in Camporgiano, Italy</td>
<td>94</td>
</tr>
<tr>
<td>Figure 14</td>
<td>Innovation as a learning process</td>
<td>98</td>
</tr>
<tr>
<td>Figure 15</td>
<td>Facilitating and hindering factors in innovation processes</td>
<td>119</td>
</tr>
<tr>
<td>Figure 16</td>
<td>Innovation support instruments</td>
<td>122</td>
</tr>
<tr>
<td>Figure 17</td>
<td>Enriched theoretical model of innovation</td>
<td>131</td>
</tr>
<tr>
<td>Figure 18</td>
<td>Starting an innovation</td>
<td>142</td>
</tr>
<tr>
<td>Figure 19</td>
<td>Partnering for innovation</td>
<td>144</td>
</tr>
<tr>
<td>Figure 20</td>
<td>Unfolding innovation</td>
<td>147</td>
</tr>
<tr>
<td>Figure 21</td>
<td>Consolidating innovation</td>
<td>150</td>
</tr>
<tr>
<td>Figure 22</td>
<td>Innovation values in the context of a changing economy</td>
<td>155</td>
</tr>
</tbody>
</table>
List of tables

Table 1. Different orientations for rural innovation policy goals: a structured overview .......................... 11
Table 2. The main innovations studied ...................................................................................................... 28
Table 3. Biomass utilization paths in the countries studied ........................................................................ 32
Table 4. Socio-technical context of innovation processes ........................................................................ 38
Table 5. Main problems and opportunities behind innovations in the three fields studied ...................... 40
Table 6. Types of innovations .................................................................................................................. 45
Table 7. Innovation dynamics .................................................................................................................. 55
Table 8. Types of Innovation Consultant Organizations in different national contexts .......................... 74
Table 9. Main actors and the role of AKIS ................................................................................................. 83
Table 10. Classification of services according to goals and effects .......................................................... 112
Table 11. Innovation strategies in the era of turbulence ......................................................................... 153
1 Innovation processes in agriculture and rural development: the IN-SIGHT project

By Karlheinz Knickel, Talis Tisenkopfs and Gianluca Brunori

In this report, we present the main results of the EU-funded IN-SIGHT project ‘Strengthening Innovation Processes for Growth and Development’. We are sketching out a conceptual framework and knowledge base for a more effective European policy on innovation in agriculture and rural areas. Both conceptual framework and knowledge base are consistent with the new European agenda for agricultural and rural policy and sensitive to the diversity of the European agricultural and rural systems.

1.1 Point of departure

From the Maastricht Memorandum (Soete and Arudnel, 1993) on, the European Union has developed an innovation policy framework based on a ‘system approach’, whereby innovation is conceptualized not as a linear and unidirectional flow of knowledge from research to practice, but as a highly diffused process based on learning taking place within complex and hybrid relational networks. Under this perspective, the European Union has strongly favoured public-private (research) partnerships, transnational networks, innovation-oriented procurement policies and innovation incubators. Linked with that is a more active involvement in the building of more effective relations between innovation agencies, private enterprises, research organizations and public institutions (see, for example, European Commission, 2006, 2007).

Agriculture is one of the industries where a system approach to innovation has been least applied, for several reasons. Institutional barriers and the ‘distance’ between research and practice meant that, in many countries, farmers’ knowledge has only insufficiently been taken into consideration as a possible source of innovation (Scoones and Thompson, 2009). The support frameworks that predominated before the reforms of the Common Agricultural Policy (CAP) during the past 15 years had encouraged a pattern of innovation and innovation systems that focused above all on an efficient production of primary agricultural commodities and on commercial inputs subject to patent laws; all of this was guided primarily by economic considerations and a particular image of a ‘modern’ agricultural sector.
The reorientation of the CAP and the increasing importance of a wider rural policy agenda have significantly altered the overall context (OECD, 2006). The diversification of agricultural and rural activities has become a more important goal that is embodied in the notion of the European model of agriculture and supported by the recent CAP reforms. In the Rural Development Regulation for the period 2007-2013 adopted by the Council of Ministers in September 2005, three clearly defined economic, environmental and territorial objectives of the CAP are formulated: agricultural restructuring, environmental concerns and the wider needs of rural areas (see also European Council, 2008).

This reorientation reflects the conclusions of the Salzburg conference on rural development (RD) (November 2003) and the strategic orientations of the Lisbon and Gothenburg European Councils emphasizing the economic, environmental, and social dimensions of sustainability. Already the conclusions of the Gothenburg European Council of June 2001 clearly state: ‘During recent years, European agricultural policy has given less emphasis to market mechanisms and through targeted support measures become more oriented towards satisfying the general public’s growing demands regarding food safety, food quality, product differentiation, animal welfare, environmental quality and the conservation of nature and the countryside’.

The reorientation also corresponds with the situation and trends in rural areas. Over half of the population in the EU-25 live in rural areas, which cover 90% of the territory (not included are Bulgaria and Romania). RD has become a vitally important policy area, while farming and forestry remain crucial for land use and the management of natural resources.

Rural areas and rural communities are more and more seen as a platform and starting point for economic diversification and sustainable development. Farmers still are important social, cultural and economic actors in rural areas, while the non-agricultural population generally represents the majority of inhabitants. The broader integrated and multi-sectoral view is embodied in the concept of the ‘living countryside’ (Wilson and Rigg, 2003; Van der Ploeg et al., 2000; Knickel et al., 2004). An important facet of this development is the emerging ‘turn to quality’ in the agro-food system and the new alternative agro-food networks that are linked with it. Cloke and Little (1997) stress the role that cultural studies have played for the new understanding of rurality and rural policies. Bartunek and Moch (1987) and Brunori, Guidi and Rossi (2008) argue that the pace and intensity of changes in agriculture and rural areas signal a ‘second-order change’ which this more fundamental and is challenging widely shared assumptions; it is in fact reframing agricultural and rural relations (first-order change is, in this regard, taking place within a system, normally in the form of adaptation processes).
The current transformation of the European agriculture and farming sector towards multifunctionality (Van Huylenbroeck and Durand, 2003), the growing importance of sustainable technologies that rely on a more efficient use of natural resources, and the reorientation of agricultural production towards non-food markets (such as energy crops) and service provision (Mahroum et al., 2007) involve ‘vision creation’ and strategic choices on the part of farmers and rural actors at large. These choices are made in the context of societal transformations that restructure rural areas. Socio-demographic changes, the counter-urbanization movement, the flowing off of certain knowledge-based industries from cities to rural areas (for example, increasing placement of creative industries and new technology companies in the country), the construction of new spaces between towns and country (e.g. city regions, metropolitan countryside) (Muenchhausen, 2008) and the increased demand for quality of life based on rural amenities are driving such transformations (Knickel et al., 2008; Van der Ploeg et al., 2008). However, there are global trends as well that affect European farmers and rural communities at micro and meso levels. Examples are migration, climate change, and an increasing scarcity of fossil fuels, the instability of financial markets and the influence of distant regional conflicts. The complexity around strategic choices towards economic and social sustainability requires common vision creation. Innovation is a part of visioning and of the collective capacity to imagine and choose new development trajectories for rural areas – farms, businesses, communities and territories (see also Downey and Purvis, 2005).

Value creation, an approach to agricultural business largely consolidated outside the conventional knowledge systems, has been adopted by an increasing number of farmers in the last years. It is based on the ability to innovate by embodying sustainability into farm products and linking up to consumers willing to pay a higher price for environmental, ethical and taste quality. The new agricultural policy agenda that was reinforced with the mid-term reform opens up new spaces for strategies related to value creation approaches. It recognizes that European agriculture can compete on global commodity markets only to a certain extent. More importantly, it acknowledges that endogenous resources – human, natural and social capital – are a key to an increased competitiveness in a phase where markets are much less protected and levels of subsidies much lower. Furthermore, it opens the way to a broader and integrated approach to farming, understanding it as one among a number of activities that rural actors can carry out in order to pursue sustainable rural livelihoods.
The reorientations referred to have implications for the kinds of innovation required as well as for entire innovation systems and processes. They imply significant transition processes in agriculture and the rural sphere. Farmers and rural actors have always been part of a continuous process of restructuring. More recently this changes their role in rural areas and it is linked with changes in urban-rural relations. The changes redefine the job of farmers and other rural entrepreneurs. In many regions farmers can increase their income basis as rural entrepreneurs, developing new services and exploring markets. Often, however, there is a gap between the need for change and farmers’ willingness to adjust on the one hand, and the insufficient capacities of innovation agencies and advisory services to effectively support changes on the other.

### 1.2 Changing understanding of innovation processes and of the role of innovation policy

The changes described above ought to be reflected in the way rural innovation is perceived as well as in the principles underlying innovation strategies and innovation policies. Demand-driven approaches primarily follow the market to identify or prioritize those problems that are to be addressed. As soon as we acknowledge, however, that private interests and societal interests may diverge, we must pose the question whether and how innovation policies ought to accommodate both in a balanced way. Societal interests (or public goods related demands) tend to be – by definition – insufficiently satisfied through market demand and demand-driven approaches.

**Innovation systems** are to facilitate change and adjustment. When, as discussed in the introductory sections, the role of agriculture changes with societal expectations and an increasing recognition of the multifunctionality of agriculture and rural areas, it is critically important to provide farmers and rural entrepreneurs with the support they need to achieve the related adjustments. Actors directly linked with the market, like farmers, are inclined to develop demand-driven innovations. A key challenge to agricultural knowledge and innovation systems is to support improvements in the processing, marketing and value adding capacity of agriculture and forestry as well as the exploration of new opportunities in new rural and environmental services and non-food production. To address the role of farming in the knowledge-based bio-economy must include attending to the questions related to the establishment of supply chains and a just distribution of value added. Practitioners need to be supported in their capacity to valorize the emerging of niches ‘from below’. From a societal point of view more emphasis ought to be given to the resilience of production systems, the provision of rural amenities, an enhanced environmental protection, occupational safety, hygiene and animal welfare. Making rural areas more attractive requires promoting sustainable growth and generating new employment opportunities as well as facilitating the access to up-to-date information and communication technologies (ICTs).
In the examples of innovation in the field of agriculture and marketing, environmental technologies, and rural services presented in this report, successful innovations prove to be those where demand meets supply in the best possible way. Where innovations evolve as co-production of knowledge, economic, social, organizational and technological solutions on the basis of common interests and networks, there tends to be a higher rate of success. Typically such networks involve a diverse range of actors and interests: farmers, consumers, rural entrepreneurs and small- and medium-sized enterprises (SMEs), regional governments, universities, research and innovation support agencies, intermediaries and knowledge brokers, etc. Efficient innovation systems therefore are reflected in conducive institutional arrangements and based on collaboration in the form of partnerships among diverse groups of public and private actors, regional innovation platforms, alliances and business clusters (Knickel and Peter, 2009; Knickel et al., 2008b).

Clearly there is the need to make a distinction between private interests and public interests (table 1). Subsequently we classify them on the basis of public/private interests and the predominant paradigm.

### Table 1. Different orientations for rural innovation policy goals: a structured overview

<table>
<thead>
<tr>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivist paradigm</strong></td>
<td><strong>Productivist paradigm</strong></td>
</tr>
<tr>
<td>• Reduction of negative externalities</td>
<td>• Growth and productivity</td>
</tr>
<tr>
<td>• Non trade-distorting support</td>
<td>• Compliance with public standards</td>
</tr>
<tr>
<td>• Efficiency of public spending</td>
<td>• Fulfilment of customers’ requirements</td>
</tr>
<tr>
<td>• Food hygiene</td>
<td>• Orientation towards larger markets</td>
</tr>
</tbody>
</table>

(Source: Own compilation based on Brunori, Rand and Proost, 2007)

---

1 The report is based on the collaborative work of all partners involved in the project: Institute for Rural Development Research at Johann Wolfgang Goethe University, Frankfurt/Main (DE) (project coordination), the Swiss Centre for Agricultural and Rural Development, Lausanne (CH), University of Pisa, Dipartimento di Economia dell’ Agricoltura, dell’Ambiente Agro- Forestale e del Territorio (I), Baltic Studies Centre, Riga (LV), Wageningen University, Communication Science (NL), the Institut de l’Elevage, Paris (F), and the Ruralia Institute, University of Helsinki (FIN). The original work can be found in project reports at [www.insightproject.net](http://www.insightproject.net).
Innovation policy can effectively support the exploration of ‘new’ ways, the related adjustment processes in socio-technical constellations and the necessary collaboration. It is a key to competitiveness, a sustainable use of natural resources and integrated development of rural areas, and, more specifically, the structural changes required for the development of a low-carbon bio-economy and the adaptation of (agricultural) production systems to the foreseeable changes in climatic conditions. In order to successfully implement an effective innovation policy, existing knowledge systems and knowledge brokerage processes have to be renewed and more effective, novel approaches institutionalized. Innovation services and agencies need to be able to encourage the active development of new value added markets, products and services. Innovation brokers need to have the skills necessary to facilitate effective processes of learning among farmers as well as other rural actors and entrepreneurs. In the IN-SIGHT project and in this publication we use a set of case studies in order to illustrate in more detail best practices as well as the kind of institutional changes needed.

1.3 Two important recent references

This publication is launched in a phase when, at a global level, questions related to agriculture and food security, bioenergy, the deterioration of natural systems, climate change and the related mitigation and adaptation options as well as the functioning of (global) economic systems have become major political issues. The report can in many respects be related to the debates that followed the publication of the results of the International Assessment of Agricultural Science and Technology for Development (IAASTD). The assessment had been sponsored by a range of international organizations among which FAO, GEF, UNDP, UNEP, WHO and UNESCO, and its results have been approved by 64 governments in an intergovernmental plenary in Johannesburg, April 2008.

The IAASTD examines hunger, poverty, the environment and equity, and the interrelations between these issues, adopting a systemic perspective. According to the IAASTD, modern agriculture has spread its benefits unevenly and has made smaller farms, farm workers, rural communities and the environment pay an intolerably high price. The report states that the way to meet the challenges lies in putting in place institutional, economic and legal frameworks that combine productivity with the protection and conservation of natural resources like soils, water, forests, and biodiversity while meeting production needs. In order to fulfil this goal, a key role is attributed to knowledge and the way it is produced and circulated (IAASTD, 2008).

In this IN-SIGHT report, as in the IAASTD, it is emphasized that
- participatory collaboration in knowledge generation, technology development and innovation can very significantly add value to science-based technology development and the achievement of sustainability goals,

- indigenous and local knowledge and practice play a central role in technology generation, access and use, and that the innumerable innovations resulting from local and traditional knowledge typically are overlooked, undervalued and excluded from official innovation support systems,

- modern ICTs are critical in achieving effective collaboration and that it merits larger investments and support,

- the complex role of institutions and governance practice ought to be looked at more closely because it is them who enable or constrain the realization of development and sustainability,

- the predominant focus on public and private research as the site for R&D is linked with an overlooking of the important role of multiagent involvement in knowledge production,

- more emphasis ought to be given to a sustainable use of natural resources in agriculture, to establishing decentralized, locally based, highly efficient energy systems and an energy-efficient agriculture, and to the promotion of local-global partnerships.

The above list indicates that, to a very considerable extent, the results obtained in the empirical analyses carried out in IN-SIGHT are in line with the main points raised in the IAASTD.

The second important reference is the more recent work of The Standing Committee on Agricultural Research (SCAR). Particular reference can be made to the comprehensive foresight process launched by SCAR aimed at identifying possible scenarios for European agriculture in a 20-year perspective. The issues that had been driving this foresight initiative – the human impacts on the environment that have emerged in the past decades as a serious concern, the major challenges related to climate change and its potential impacts on agriculture, forests and fisheries, and the aim to enable agriculture to cope more effectively with the complex and interlinked challenges related to the rapidly increasing globalization – have also been driving the IN-SIGHT project and its analyses. In the foresight analysis the need for a new strategic framework for the planning and delivery of research is stressed (Foresight Expert Group, 2007).

According to the views expressed by the Foresight Expert Group, this new strategic framework should cater for several lines of action related to:

- the sustainability challenge, facing climate change in the knowledge-based bio-economy,

- the security challenge, safeguarding European food, rural, energy, biodiversity and agri-futures,
- **the knowledge challenge**, user-oriented knowledge development and exchange strategies,
- **the competitiveness challenge**, positioning Europe in relevant markets, and
- **the policy and institutional challenge** faced by policy-makers in synchronizing multi-level policies.

Key aspects referred to in the corresponding report have been addressed in the IN-SIGHT project as well. One such aspect is the need for a *'regionally focused demand driven approach to research and innovation'* to be developed in order to *'increase the capacity of rural regions to generate, absorb and integrate research developments into economic growth.'* (Foresight Expert Group, 2007)

### 1.4 Key questions addressed

The main questions addressed in subsequent chapters relate to the kind of knowledge and innovation infrastructure that is required to support the future needs of rural economies, and the nature and functioning of effective innovation networks. Success factors and best practice examples have been identified and explored in a series of country-level appraisals of innovation systems and processes, in-depth reviews and case studies. More specifically we try to

- improve our **understanding of innovation systems and processes** in European agriculture and rural areas through an analysis and assessment of the related socio-technical structures, factors and interrelations;
- provide an **in-depth analysis for three fields**: agriculture and marketing, environmental technologies and rural services. On the basis of the in-depth analysis: to identify weaknesses and factors that lead to failure, to identify successful innovation systems and processes, including strategic directions, capacities, and organizational/delivery structures, and to learn from best practice examples;
- review the **knowledge available** on the most effective approaches and intervention tools in support of innovations in agriculture and the rural sphere; and to identify the related research gaps;
- evaluate the **adequacy of public innovation policies** at European and member states level in relation to (a) the new agricultural policy agenda and (b) the improved understanding of effective innovation systems and processes gained in this project.
In this final IN-SIGHT report we refer to innovation systems and networks, factors facilitating and hampering innovation processes, we emphasize the question of strategic choices and technological directions, the importance of economic incentives and financing, and the role of innovation services and information brokers. On the basis of the conclusions derived from our analysis we formulate recommendations for a European policy framework for innovations in agriculture and rural areas. The questions addressed are relevant to European and member states level research programmes, measures in support of innovation, and rural development policy.

1.5 Conceptual framework

The approach followed in the project sees learning as the core of innovation processes, as any change in social or economic organization or technology improving a certain state of the matters brings with it a change in available knowledge. Moreover, it highlights a specific type of learning – social learning – which affects shared cognitive frames at the basis of coordination into a network. Following this approach, the process of innovation can be presented as shown in figure 1.

![Figure 1. Innovation as a learning process](image)

Final Report – Comparative Analysis and Synthesis
Cognitive frames are both resources for and constraints on effective action. They are resources as they reduce the time and effort necessary to make decisions and to act; when similar situations repeat many times, action becomes routine, and it does not need any effort to decide. Cognitive frames are also constraints on action because they make it much more difficult to deviate from consolidated patterns of decision-making and behaviour. According to Hämäläinen (2004), ‘... established cognitive frames focus attention on traditional variables and explanations that may no longer be relevant in the changed environment and therefore result in “mental rigidities”’. If there is no or very little change in established practice and cognitive frames, it may thus hamper innovativeness. To build new cognitive frameworks can be very costly, both to be able to move beyond long-established old frames and to invest in extra learning activity (figure 2).

All actors participating in a network contribute to the building of cognitive frameworks, thus making them a common resource within their network.

![Figure 2. Social learning](image)
Different types of knowledge can play an important role. Tacit knowledge is built through direct experience (learning by doing\(^2\)), so that its transfer requires physical presence and face-to-face interaction; codified knowledge translates mental frameworks into symbols, and this allows an easier transfer through non-personal communication.

Our approach also gives much attention to the relation between knowledge and material elements. Knowledge is incorporated into tools, infrastructures, and artefacts. A tool (be it a software, a processing machine, a harvester) transfers the knowledge of those who have invented it and of the context where the tool has been conceived. At the same time, once it is introduced into a new context, a machine changes the production process as it requires a different organization of labour and new production inputs, and therefore produces a new mix of knowledge.

Actors, rules/regimes and artefacts are interdependent. For example, to operate a given energy infrastructure requires specific actors, skills, organization, coordination rules, and influences energy consumption and production patterns. Likewise, in the food system, consumers’ lifestyles and the structure of the retail sector heavily affect the way food is perceived and consumed.

To catch this interdependence in a framework, Rip and Kemp (1998) suggest the concept of the socio-technical system, defining it as a ‘relatively stable configuration of institutions, techniques and artefacts, as well as rules, practices and networks that determine the “normal” development and use of technologies’.

In order to design appropriate innovation policies, we need to understand the dynamic of innovation, that is, how micro-level innovation can generate change at higher levels of structuring. The dynamic of socio-technical transitions is illustrated in figure 3.

\(^2\) The concept of learning by doing has been used by Kenneth Arrow (1962) in his design of endogenous growth theory to explain effects of innovation and technical change. The concept was later on adopted to explain increasing returns to embodied human capital. Yang and Borland (1991) have shown that learning by doing plays a role in the evolution of countries to greater specialization in production. In both of these cases, learning by doing and increasing returns provide an engine for long-run growth. Recently, it has become a popular explaining concept in the evolutionary economics and Resource-Based View (RBV) of the firm.
The above model, adapted from the transition school (see for example Geels, 2004) suggests that radical innovation may proceed as a progressive embodiment of new ways of doing and thinking into higher levels of structuring. The term novelties, in this context, refers to localized ‘breaks of the routines’. Novelties reconfigure the socio-technical networks wherein they operate. Their further development, however, is limited by their compatibility with external factors, that is, with actors, rules and artefacts. Development of biofuels, for example, needs refineries, adapted engines, appropriate incentive or taxation systems, appropriate cultivation techniques and logistics, consumers willing to switch from petrol to biofuels.

Networks are gradually becoming steady systems when actors’ identities are part of common cognitive frameworks and when their action is largely coincident with their expectations. In a farmers’ market, for example, producers may expect from consumers a more empathic, less bargain-oriented approach than in conventional supermarkets. The development of steady systems is much easier at smaller scales.

Rip and Kemp (1998) call these small units of innovation niches. Niches can be defined as socio-technical networks governed by paradigms different from those prevailing in the dominant socio-technical systems. Niches are not only characterized by their dimensions. Their main characteristic is that they are spaces where norms, rules, routines of production, distribution and consumption are less restrictive and are subject to rapid evolution. According to this concept, in niches there are much less ‘black boxes’ than in the dominant socio-technical systems. Niches are the places where new paradigms emerge as an effect of learning processes. In niches there is a large share of ‘tacit knowledge’. Niches are networks wherein learning and societal embedding processes are activated.
A regime can be defined as a mode of ordering, a system of rules that coordinate networks of actors and things. Regimes are characterized by the incorporation of given paradigms into concrete socio-technical systems. When a regime emerges, rules of different form and type concur towards the same objectives. The concept of regime helps to understand the forces that resist change, even when policy and support measures have been reoriented. Regimes, in fact, range from daily routines to moral norms. A change of regime requires a strong motivation and a great deal of resources. However, resistance to radical innovation should not be seen only in negative terms. Innovation trajectories allow firms to build upon accumulated frames, rules and infrastructures. Periods of accelerated innovation become possible along the same trajectory.

The highest level of structuring is the one labelled by Rip and Kemp (1998) as ‘socio-technical landscapes’. We may include into this category situations and events beyond the reach of national policies: global climate change, north-south divides, etc. A landscape can be changed as an effect of supranational policies or a scaling-up of radical changes.

1.6 Methodology

The work carried out and presented in this report is based on a successive deepening of analysis: Actual work started with two more generic work packages. The first was an up-to-date synthesis of relevant conceptual frameworks and theories. In a member-states-level review of innovation practice in the seven countries represented in the consortium we then examined innovation systems and processes in the agricultural, environmental and rural sphere (Germany, Switzerland, Italy, Latvia, the Netherlands, France and Finland). Building on the first two work packages, three in-depth reviews were carried out in order to deepen the analysis. These reviews focused on

(a) innovations in agriculture with a particular focus on marketing alternatives;
(b) innovations in environmental technologies with a particular focus on bioenergy; and
(c) innovations in rural development with a particular focus on innovations in the provision of new rural services and a better use of ICTs.

The comparative analysis of the results of the three in-depth reviews provided, together with the results of the first two work packages, and the results of a series of consultations with relevant institutions and stakeholders, the basis for deriving recommendations for EU- and member-states-level innovation policy as well as innovation practice.
1.7 Content and structure of report

The structure of the report at hand is based on the following cross-cutting questions:
- socio-technical context, framework conditions and drivers of rural innovation processes;
- processes, organization and networks;
- knowledge and social capital;
- systemic, cross-sectoral and territorial aspects of innovation processes;
- support strategies and frameworks; and
- co-production of rural innovation: towards an enriched theoretical model.

A guiding idea of the report as a whole is to contrast the concept of linear relationships in technology transfer with a more systemic, participatory and actor network oriented view of innovation processes (Knickel, Brunori and Barjolle, 2008; Knickel et al., 2008a; Scoones and Thompson, 2009). Change and innovation are analyzed in the context of societal and agricultural (knowledge) system changes, alterations in socio-technical networks, and challenges faced by European agriculture and rural societies. Explicit reference is made to the establishment of the European Knowledge-Based Economy, the reorientation of the CAP, the challenges of climate change, mitigation and adaptation, and the more recent energy and food crisis.

In chapter 2, ‘Socio-technical context, framework conditions and drivers of rural innovation processes’, S. Rand, T. Neri and K. Knickel discuss differences and dynamic in innovation contexts, and the related drivers of change and innovation. The institutions engaged in innovation processes, the role of conventional innovation policy approaches, and the coexistence of different innovation paradigms is explored. Reference is made to major innovations in direct marketing in agriculture, environmental technologies and new rural services. The authors emphasize the importance of the socio-technical context of processes of change and innovation, and the influence of economic and regulatory framework conditions.

In chapter 3, ‘Processes, organization and networks’, A.-C. Dockès, M. Rantanen, D. Bourdin, T. Tisenkopfs and F. Guidi explore the type and interplay of different types of innovation, the dynamic of innovation from inception to maturity, and the question of the scope and scale of innovations. Emphasis is on the process nature of and development dynamic in innovation, the role and interplay of different actors, and the question of inclusiveness in innovation systems and processes.
In chapter 4, ‘Knowledge and social capital’, J. Proost, G. Brunori, M. Fischler, A. Rossi and S. Šūmane examine the role and interplay of different forms of knowledge, the role of the formal Agricultural Knowledge and Information System (AKIS), the importance of knowledge networks and the involvement of different organizations specialized in research, extension and training/education in these networks. The authors emphasize the embeddedness of innovation processes in social structures, the importance of the territory as a reference system and of differences in economic context. They conclude that the building of social capital and of functioning knowledge networks is the key to successful change.

In chapter 5, ‘Systemic, cross-sectoral and territorial aspects of innovation processes’ are discussed by G. Brunori, J. Proost, L. Granberg, T. Tisenkopfs, K. Knickel and C. Couzy. Reference is made to the embeddedness of innovation in the particular territory and economic context, and the shifts, first, from government to governance, and second, from the separation of knowledge, local resources and territorial capitals to integration. The authors emphasize the importance of the context acting upon individual action, the existence of much more complex knowledge networks and information flows, and the importance of learning and social interaction. They argue that conventional approaches have, as a result, concentrated their research efforts on the concept of ‘adoption’, and tried to understand why, given certain available innovations, adoption rates are much lower than expected on the basis of a neo-classical behavioural model. The authors conclude that the specifics in the governance of rural and cross-sectoral innovations require the adoption of a systemic perspective in innovation-related analyses as well as in policy formulation.

In chapter 6, ‘Support strategies and frameworks’, David Bourdin, D. Barjolle, M. Fischler, S. Rand, K. Knickel, T. Tisenkopfs and J. Proost examine facilitating and hampering factors in rural innovation as well as support instruments and innovation-related funding. The influence of ICTs on innovation is explored, and practice, policy and research recommendations are derived. The direct involvement of institutions and stakeholders involved in rural innovation in the research process contributed to the development of policy and practice recommendations that are directly applicable to the work and decision-making of relevant actors at EU, national and regional level.

In the concluding chapter 7, ‘Co-production of rural innovation: towards an enriched theoretical model’, T. Tisenkopfs, G. Brunori, K. Knickel and S. Šūmane attempt to capture the new insights derived in innovation processes during the project work and to capitalize from that in their reflections on a more strategic structural reorientation. The authors argue that the fundamental challenges that confront the rural world need novel solutions and a more substantial reorientation. The authors try to widen our understanding of innovation. Four steps towards sustainable innovations are outlined and innovation promises explored in relation to future models of rural economy and society.
2 Socio-technical context, framework conditions and drivers of rural innovation processes

By Sigrid Rand, Tommaso Neri and Karlheinz Knichel

2.1 Country-level reviews as point of departure

As the country-level reviews for Germany, Switzerland, Italy, Latvia, the Netherlands, France and Finland have shown, the national and regional socio-technical contexts considerably affect the structure and performance of innovation systems and the outcomes of innovation processes. There is often a close relationship between the general socio-technical context, the framework conditions, and driving forces of innovation processes. At the structural level, geographical factors, demographic situations, as well as agricultural structures and the characteristics of the dominant production systems affect innovative performance. The framework of support conditions, the institutional set-up of innovation systems and the endeavours of (rural) innovation policy also play a major role in facilitating or hindering innovation processes. The following chapter will summarize the findings of the above-mentioned country-level reviews.

We start with a general description of the role of the socio-technical context (including the coexistence of paradigms), drivers of innovation processes, institutions and frameworks, and innovation policies for the success of rural innovation processes. We will then commence with illustrating fields of innovation that were in the focus of our in-depth reviews: New forms of direct marketing in agriculture, new environmental technologies, and new rural services. Each of these sections will contain an outline of the field of activity, a short description of the main innovations, the relevant factors of the socio-technical context, institutional and framework conditions, drivers and policy approaches. Where relevant, we will refer to geographical, demographic or structural factors.
2.2 Socio-technical context of rural innovation systems

In the last years, major changes in the organization of agricultural production and in the perception of rural space have taken place. Important determinants of these changes are the liberalization of agricultural markets, the increasing consideration of environmental concerns, a far-reaching move towards a recognition of the multifunctionality of rural space and towards supporting a diversification of agricultural and, more widely, rural activities. In the theoretical framework of the project, the coexistence of various paradigms and the importance of these paradigms to innovation processes were underlined. Although sustainable development is the general discourse, in the country studies different models and pathways for agricultural and rural development were mentioned. These models and pathways bring about varying socio-technical trajectories, different kinds of innovations and diverse forms of support. A central outcome of the discussion on diversity was that diverging streams of development can successfully coexist.

Innovators and innovation processes are influenced by shifts in paradigms. In this section, we illustrate this on the basis of the renewable energy paradigm and its triggering role for rural innovations in the field of renewable energy production.

Socio-technical trajectories in energy supply systems include both the renewable energy paradigm and the fossil fuel paradigm. In the renewable energy paradigm, different meanings and expectations are attached to energy production/consumption, like sustainability, positive environmental impacts and cleanliness. The turn to increased bioenergy production and utilization is motivated by a complex interplay of very different economic and environmental challenges (climate change, fossil energy prices) and the developments in the socio-technical system (advancement of technology, growing energy concerns, and political targets towards renewable energy production).

The evolution of renewable energy-based systems and the attempts to produce energy from biomass started after the oil crisis in the 1970s. The experiments were carried out with different technological equipment and were stopped because of insufficient success. This shaped the belief that certain utilization paths such as wood-based heating systems (Finland) or biogas plants (France) were, as a rule, economically not viable. These experiences still affect the attitudes of consumers as well as producers and can pose a potential hindrance to the success of innovation processes in the sector (Rand et al., 2008).
In the last years, in many countries a change has taken place in the way of thinking about energy. Technological developments have occurred that have increased the efficiency of biomass usage and rendered it economically more viable. Bioenergy is seen as an opportunity to contribute to rural development and attempt to follow social, economic and environmental goals simultaneously (e.g. the Camporgiano plant in Italy that was developed on the basis of a sustainable management of forests and correct use of wood respecting local traditions) (Rand et al., 2008). In many cases there is a link between the domination of different utilization paths of biomass and the prevalent paradigms of agricultural production/rural development (see Guillaumin, 2008; Tis- enkopfs and Šūmane, 2008).

The spreading of the renewable energy paradigm also entails economic and environmental risks, since the production of biofuels from grain and rapeseeds has major implications such as the increase of grain prices for food production and the environmental pollution challenges (Rand et al., 2008). The utilization of wood for energy production may put a strain on the forest resources (Rand et al., 2008).

### 2.3 Drivers of change and innovative behaviour in rural innovation processes

Drivers of innovation can be political, economic, social and technological. In some cases, crisis brings about a sense of urgency among actors and embodies a driver of change. Examples are economic crises, the decline of certain sectors of production, the BSE crisis, public health concerns or other external events.

Depending on the circumstances, both individual entrepreneurs and collective initiatives are important drivers of innovation. There is no given evidence that collective initiatives in innovation are more successful than those undertaken by single entrepreneurs, since both are able to achieve their goals. For example, the Dutch knowledge infrastructure brokers speed up the process of connecting demand and supply of knowledge services for innovation. At the same time, in-depth studies on new rural services show that in new rural services individual entrepreneurs develop new products and improve business performance faster if they are organized in business clusters (the Latvian experience) or form a network organization (the Finnish case) (Rantanen and Granberg, 2008). Combination of individual and collective forces can be seen as yet another driver of innovations. The importance of networks in rural innovation processes is emphasized in chapter 3 of this report.
Some countries have started to distinguish between public and private goals of innovation policies and to differentiate among support schemes and magnitude of public support. An example is Germany, where in the last decade specifically improved framework conditions for renewable energies were established. They were aiming at counteracting climate change and reducing the consumption of non-renewable fossil resources. In addition, in Germany in 2001 an agreement was reached on the phasing-out of the use of nuclear energy. Since then, more emphasis has been given to fostering the use of renewable energy sources (Rand, 2008).

Also the supranational programmes can act as drivers for innovative activities in the rural space. The Community Initiative LEADER is to support innovative projects at regional level. Innovations in the fields of a sustainable development of rural areas are considered crucially important among relevant interest groups, authorities and politicians, as well as society at large. Innovative projects make policy concepts understandable, and the discussion at different levels becomes more focused.

2.4 Institutions involved in rural innovation processes and support frameworks

In all country-level reviews of innovation systems it is stressed that institutions should support innovations more actively and proactively. The overall impression is that this happens insufficiently, partly because of the fact that administrators are not receptive and proactive towards innovative concepts and projects in so far that they do not recognize and do not know how to manage them. There is a need for greater flexibility in organizations and institutions dealing with innovation. Flexibility is also requested in assessing if an innovation is ‘challenging’, ‘promising’, capable of deviating from routines and bringing value added. Those capacities to assess the potential of emerging innovations are not always present in support organizations and embedded in their institutional culture.

The other aspect important to innovations is time. Innovations need some ‘incubation time’, and support institutions need the flexibility to go with the time-flow of an innovation. The discussions on this issue showed that hybrid networks or multi-actor platforms are better stewards of innovation time and catalysts of change processes than formalized institutions. However, these structures can hardly be steered by outsiders. Institutions tend to conceive innovations as projects with strict deadlines that are often incompatible with the experimental, creative nature of new endeavours and their dynamic.
There is far-reaching consensus among concerned actors that often the time allocated for a multi-actor project is too short. Building relationships, networking and education are important features in innovation processes where constant cooperation with different actors, from various organizations is essential. In those cases were experiments are going on, like in Switzerland and the Netherlands, for more demand-driven operations, financial support should not be stopped too soon.

Several partners signalled that their national and regional innovation support systems are mainly supply-driven. Support investments are predominantly linked to technology and business. Mainstream innovation systems and policies are urban-centred, science- and technology-oriented. In their analysis of the Latvian innovation system, Tisenkopfs, Šūmane and Murins (2007) pose the question how to balance mainstream scientific/technological and rural innovation policies.

### 2.5 Diversity of innovation systems and innovation policy approaches

In each country review the innovation system and innovation policies at national level are described. The innovation systems are complex and there is considerable variety in the institutional set-up and sectoral focus between countries. Since innovation systems include several areas of competence, like research, education and technology development, in most cases support for innovation belongs to the domain of several ministries. In worst cases, the resulting institutional barriers can hinder innovations.

National reports mention quality, technological advancement and productivity of the agricultural sector as among the most important strengths. Diversity of rural areas, of farming systems and of initiatives is considered as an opportunity in France and Latvia (Proost et al., 2008). An innovation policy is needed to deal with the variety of agricultural production systems and rural areas and, consequently, with the different contexts of agricultural and rural innovation processes. In general, the bias of innovation policies towards urban-centred, science- and technology-oriented high-tech sectors and business innovations is very strong in countries like Finland, but dominates also in Germany, Latvia, and France. Therefore, innovation policy is not emphasized in rural policy very often. Agricultural and rural innovation policy is a rather young policy. More recently (in the 1990s), innovation has become an objective of regional development policy, in particular through the LEADER programmes, but also through national policies.
In the WP2 country reports, innovation policies were analyzed according to criteria such as demand-/supply-driven, linear/system focus, emphasis on technological/social innovation, orientation towards niche/mass production. There is a strong coherence between the dominant bias of the national innovation system (high-tech vs. low-tech sectors), the agricultural production system (highly competitive mass production vs. niche production) and the predominant view of agriculture (productivist vs. multifunctional provider of public and private goods). In the Netherlands, there is a shift from a linear perspective on innovation towards a more inclusive system view. A focus of demand-driven innovation policy is on entrepreneurship, allowing for the development of business strategies and strategic cooperation as key premises. Contrary to most cases where existing innovation systems have been designed around the paradigm of productivist agriculture, in Italy the emphasis is on quality, and locally embedded products are seen as strength. Consequently, agricultural and rural innovation policy is oriented towards quality and sustainability, emphasis is on locally embedded products. In Switzerland, the notion of innovation is ‘trendy’ and also central to agricultural policy. Agriculture on the whole has a positive image and the population is ready to support the multifunctionality of rural space. Public and private sectors are sharing common paradigms of multifunctionality and competitiveness. In Latvia, the technological vision of innovation prevails (innovation as transfer of technological knowledge to the commercial sphere) which determines a top-down approach. It is difficult to receive public recognition for alternative, ‘non-official’ innovations in rural areas. In Germany, the tendency to prioritize internationally competitive high-technology sectors draws attention away from less spectacular fields of innovation like agriculture and the rural sphere. In France, there is a competition between paradigms.

In general, technological innovations are, in all countries studied, supported more than social and organizational innovations. Regarding the integration of innovation as an objective of rural policy and agricultural policy, important differences can be observed between countries. Innovation is, for example, not well emphasized in Finnish rural and agricultural policy, while in Switzerland and in the Netherlands innovation is central to agricultural policy (Proost et al., 2008). Also the prevalence of a productivist discourse over a quality/niche discourse in agricultural innovation policies is mentioned as a weakness of the system in Finland, Latvia and France.

Geographical proximity plays an important role in innovation systems. Enterprises in rural areas, because of the distance to knowledge organizations (universities, research institutes), and because of their small size do not always have the same access to innovation networks as enterprises located in urban areas. This is particularly the case in areas with strong centre-periphery divides resulting from remoteness or lack of infrastructure like is the case with Finland and Latvia. In Switzerland, one of the objectives of the new regional development is to bridge this gap. These endeavours are supported by the polycentric structure of the country facilitating networking and clustering, and the access to innovation centres (Proost et al., 2008). Geographical remoteness can be further aggravated by demographic decline in the countryside.
2.6 Major innovations in direct marketing in agriculture, environmental technologies and new rural services

In this section we review the main innovations studied in the field of direct marketing in agriculture, environmental technologies and new rural services. Table 2 gives an overview of the innovation processes analyzed.

Table 2. The main innovations studied

<table>
<thead>
<tr>
<th>Main innovations</th>
<th>Direct marketing in agriculture</th>
<th>Environmental technologies</th>
<th>New rural services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumer-supported agriculture, CSA (CH, FR)</td>
<td>Production of biofuels (DE, CH, LV)</td>
<td>Social services:</td>
</tr>
<tr>
<td></td>
<td>Solidarity consumer groups (IT, NL)</td>
<td>Wood-based heating plants (FIN, FR, I, DE)</td>
<td>Health care (FIN)</td>
</tr>
<tr>
<td></td>
<td>Selling via the Internet</td>
<td>Biogas from agriculture (CH)</td>
<td>Green care farms (DE)</td>
</tr>
<tr>
<td></td>
<td>Farmers’ collective shops</td>
<td></td>
<td>Social care farms (NL)</td>
</tr>
<tr>
<td></td>
<td>Collective sale to local communities</td>
<td></td>
<td>Rural tourism (LV)</td>
</tr>
<tr>
<td></td>
<td>Selling to individuals in groups</td>
<td></td>
<td>New links with other products and services:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Care + organic farming + region branding (NL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New ways of organizing the service system (PPPs)</td>
</tr>
</tbody>
</table>

2.6.1 New forms of direct marketing in agriculture

Dockès et al. (2008) define agricultural direct marketing as a traditional way of marketing, developed on the basis of relations of proximity amongst farmers and consumers. There is a multiplicity of forms of direct marketing, some of which are examined closer in the WP3 country reports on the field surveys carried out in France, Italy, the Netherlands and Switzerland. The characteristic examples of innovations studied were: consumer-supported agriculture; establishment of new collective shops owned by farmers; re-organization of a production-consumption system with emphasis on sustainability, equity and mutual trust principles through solidarity consumer groups; and marketing of agricultural products in on-farm sales and lessons learned from farmer cooperation in the marketing of organic produce.
In itself, direct marketing is not an innovation. Rather, it is the traditional method of marketing by farmers characterized by a diversity of forms in which farmers directly commercialize their products: street markets, markets at the farm, roadside sales, community-based agriculture, basket of products, e- or classical mail selling by farmers, self-service on farms, collective shops for farm products, farm restaurants, renting of rooms with providing of farm products, farm visits or farm activities with selling of the products, and other (Dockès et al., 2008). Nonetheless, today these forms are in full evolution.

Many traditional forms of direct marketing have become progressively a specific market due to innovations during the last 5-10 years. Some innovations are evoked by the use of the latest methods of information exchange, involving selling via the Internet; others are inspired by improved collective organization among producers, some others are driven by new interfaces between producers and consumers, like sales to individuals organized in networks, so-called solidarity-based purchasing groups (Dockès et al., 2008). A new demand appeared for farm products, favoured by urbanization, the urban way of life and the needs for alternatives to industrial food products. Urban consumers are becoming more interested in consuming local products, and, through this activity, in supporting the local production and farming community. Those values and behaviours trigger innovations such as community-supported agriculture. Meanwhile, farmers are seeking new opportunities to improve the added value of their products, particularly on small farms.

The substance of innovation in direct marketing in agriculture is related to:

- Re-development of existing forms and frameworks of direct marketing (farmers’ markets, on-farm selling, etc.);
- Development of new types of direct marketing or diffusion of pioneer initiatives (community-supported agriculture, sales to individuals organized in networks, solidarity-based purchasing groups, baskets of products for tourists, shops of producers, etc.).

The main innovations analyzed in the report on direct marketing were:

- **Selling via the Internet**, via a web site: it uses modern information and communication technologies to capture clients’ interest and facilitate their search.

- **Farmers’ collective shops**: the innovation here is in the appropriation of commercial logic by farmers and in their capacity to organize collectively.

- **Collective sale to local communities**: local producers join forces to supply school lunch, for example.

- **Sale in supermarkets**: producers manage a counter in a supermarket.
- **Selling to groups of individuals:** the case of solidarity-based purchasing groups or community-supported agriculture. These innovations bring a farmer and his consumers together in an (formal or informal) association. The consumers buy in advance a part of the crop, which is delivered to them in baskets on a weekly basis. Consumers play an important role in the economy of the farm. The innovation establishes a link between city-dwellers and small-scale agriculture and encourages farmers to adapt to new forms of consumer demand and distribution, possibly even production (Dockès et al., 2008).

Social factors like consumer-farmer interface are at the centre of direct marketing. On the one hand, the consumers are inspired by the values of food safety, ethical consumption, solidarity that influence their demand for direct marketing products; on the other hand, the producers have a great incentive to find an alternative market niche for their production. Consumer groups are often animated by a rejection of food industrialization and farm concentration. At the same time, they express new demands for a high quality of food, environmentally friendly production processes, safety, healthiness and naturalness of food, as well as more transparency of prices. Consumers want to develop an ethical way of consuming, based on local, fresh and healthy food products and direct relations with producers (Dockès et al., 2008).

The search for an alternative market niche is the key economic factor and main driver behind innovations in direct marketing. Consumers are looking for an alternative to the offer of the big retailers and may be interested in direct sale. Producers meet more and more difficulties to get a high or fair price for their products, due to the concentration of logistic platforms, pressure on prices, etc., and so some of them have great incentives to find an alternative (either complete or complementary) to sell their products. Nevertheless, even if the general context can be interpreted as a favourable one, the economic importance of agricultural direct marketing remains low (Dockès et al., 2008). The social context inspires also farmers’ action. Those farmers who want to create alternative agriculture networks often organize in groups, and as the innovation spreads, more traditional farmers join to find outlets.

These socially stimulated innovations were clearly present in the Italian and Swiss case studies (Dockès et al., 2008). In the Netherlands, the social context played an even greater role in agricultural innovation as an organic cooperative was founded by an environmental NGO. To solve the problem of the lack of nature in the countryside, the NGO wanted to promote organic agriculture and found organic farmers interested in creating a cooperative to sell their products together. The motivation of the farmers was the prices and the collective promotion of the products with an own brand.
Despite these strategies, agricultural direct marketing currently faces several challenges. One main difficulty is the lack of involvement of the public decision system – in fact, it is generally not taken into account by the official institutions. As a rule, innovation processes in the field of direct marketing are not characterized by close ties with the conventional regulatory and institutional framework, due to the rather informal nature of these initiatives. In some countries, the public now recognizes the existence of alternative circuits of marketing, but the official innovation system does not provide any kind of direct support to their growth. Therefore, the development seems to be mainly horizontal. In some cases, public decision actors can support projects through legal consultancy or local funding (for shops or groups), however, they are scarcely involved in the initial phase of the projects, but more frequently in their further development. A more indirect support is, however, arising from the interest that some regional and local public administrations and conventional farmers’ unions have recently expressed in these initiatives.

Regulations and legal definitions are rather different among countries. They also can be at the origin of difficulties, as the projects often have to face regulatory barriers. As a matter of fact, some decisions of governments, both local and national, can make the legal and institutional context more favourable to innovations in direct marketing, whereas other decisions may increase the constraints.

For these reasons the lack of involvement of the public decision actors can sometimes be considered as an opportunity for individual alternative innovators.

As reported in the national country reports in the field of agricultural direct marketing, the agricultural knowledge and information system (AKIS) was not present to support the innovation from the beginning. During the spreading period of innovations, the AKIS often gets involved. In the field of direct marketing, extension services are more often involved in innovation processes than (applied) research.

### 2.6.2 New environmental technologies

Innovations in environmental technologies were studied in Germany, Finland, France, Italy and Latvia. All of the country reports are concerned with the use of biomass as a renewable energy source. The reports cover three major biomass utilization paths and technological, organizational and political innovations in effectuating them: biogas, biofuels and wood-based heating plants.
Biomass is a very diverse source of energy. The definition of biomass includes residues (primary, secondary and tertiary residues with highly variable physical and chemical characteristics), as well as crops produced in energy farming (rapeseed, cereals, perennial crops like willow or Miscanthus). Biomass can be used for heating, for producing electricity and for transport biofuels. Consequently, environmental energy production has linkages with many other technological and policy areas (Rand et al., 2008).

The dominant utilization paths and level of development of bioenergy production differ to a great extent in the studied countries. Table 3 provides information on three possible utilization paths of biomass in the countries studied. The number of + signs indicates the level of development in a given country; o/+ signifies the very initial stage of development and first experiments (Rand et al., 2008).

Table 3. Biomass utilization paths in the countries studied

<table>
<thead>
<tr>
<th></th>
<th>CH</th>
<th>DE</th>
<th>FIN</th>
<th>F</th>
<th>I</th>
<th>LV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofuels</td>
<td>++</td>
<td>+++</td>
<td>o/+</td>
<td>++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Wood</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Biogas</td>
<td>++</td>
<td>++</td>
<td>o/+</td>
<td>o/+</td>
<td>+</td>
<td>o/+</td>
</tr>
</tbody>
</table>

The socio-technical contexts and the associated renewable energy paradigm differ to a great extent in the countries studied. For a long time, the Finnish energy policy was not very active in researching and developing alternative forms of energy production. To support the pulp and paper industry, water energy, coal, oil and natural gas, later also nuclear power were established as the predominant sources of energy. The search for an alternative use of wood started not least because of the problems created by climate change. Here we can observe how landscape issues, speaking in the terminology of our theoretical framework, like climate change affect innovation (Rand et al., 2008).

In Latvia, the spreading of bioenergy crop production for biofuels can be seen in the context of structural transformation of the agricultural sector and developments towards conventional industrial agricultural production. The idea formally meets the renewable energy paradigm; however, the whole sector is highly dependent on the international market fluctuations, and the national value added chains remain fragmented. Most of the rapeseed and grain produced for biofuel are sold abroad. In Latvia’s case we can see that the emergence of the bioenergy sector does not necessarily lead to a changing energy paradigm (Rand et al., 2008).
The discourses on the production and utilization of bioenergy play an important role in the spreading and popularization of this renewable energy source. In **Italy**, these issues are discussed in the context of reduced energy dependence and better use of available domestic resources. In **France**, biofuels are at the heart of a polemic about their energy balance and environmental impact. Biogas and wood are less disputed from the environmental point of view. In **Switzerland**, two popular initiatives led to a debate on how to foster renewable energies: the ‘solar initiative’ and the ‘energy-environment initiative’ (Rand et al., 2008). The production and utilization are increasingly contested in **Germany**. For example, the overall employment effects of renewable energy production and utilization are still disputed. The example of Latvia shows that critical voices do not always feature in discourses – this can be seen as an indicator for the marginal importance of bioenergy production and utilization.

The attitudes of the consumers influence the development of the bioenergy sector and are interlinked with the prevailing energy paradigm. There is evidence that in some of the countries studied interest in environmentally cleaner energies has increased and in certain cases the consumers are prepared to pay more for renewable energies (most notably Germany, Switzerland and Italy). This attitude is less the case with biofuels, but can be observed in electricity and heating. In Finland and Latvia, the attitudes of the consumers seem to be affected clearly more by the price of bioenergy than by ecological values (Rand et al., 2008).

The economic context of innovations in environmental technologies is different from that in direct marketing. In biofuels production it is characterized by economy of scale, a productivist paradigm and high integration in global markets whereas for utilization of wood and biogas the regional and local economy paradigm prevails. Production of bio-diesel depends on economies of scale and the role of farmers is often reduced to providers of raw materials. Even though they profit from increased demand and higher prices for their crops, their current positions in the value added chains often exclude them from further stages of processing and biofuel production where most of the profits lie. Communal wood-based heating plants presume greater economic inclusion of a wide range of actors and the use of local sources (Rand et al., 2008).
Whether the production of bioenergy is in public or private hands is a further important issue. While at the national level there often is hesitancy concerning bioenergy, at the regional and local levels there is a lot more space for initiatives and supporting actions in the sector. Typical examples of an increased involvement of public actors are wood-based heating plants in municipalities; different constellations of public and private actors in building, operating and maintenance of the plants are possible (e.g. as is the case in heat contracting). The reports on the use of wood in communal heating plants (Germany, Finland and Italy) provide abundant examples. On the other hand, the increasing internationalization of biomass markets fosters the appearance of large bioenergy production sites financed by private/corporate investors, most noticeable in biofuel, as documented in the German, French, Swiss and Latvian reports. A counter-force to the increasing internationalization and edging out of farmers from value added chains (thus reducing them to mere suppliers of biomass for biofuel or biogas plants) can be the establishment of cooperatives (Germany, Latvia) (Rand et al., 2008).

The institutional framework for innovations in the field of bioenergy is characterized by a multitude of public institutions. It is complex and fragmented, since it involves several policy areas and decision-making levels. In each country we can distinguish between three institutional levels: European, national, and regional or local. At each level, several policies and the respective institutions responsible for their design and implementation constitute the framework: energy policy, agricultural policy, rural development policy, regional development policy, forestry policy, spatial planning policy, etc.

The definition of goals at European level is a driver for the definition of goals and strategies at national level. Similarly, the definition of goals at national level is a driver for strategies and priorities at regional and local level. At each level, two other influences are essential: new concepts and awareness generated by landscapes issues (like global warming, the scarcity of petrol in the future, green wave), but also the knowledge available on the existent novelties and niches that can offer potential solutions. Those policy strategies and goals are the basis for the definition and implementation of support instruments. Prior experience with particular instruments can be reflected in the definition of strategies and goals.

The framework can intervene at all three steps that characterize bioenergy production: collecting raw materials, processing biomass into energy, and selling the energy. For instance, in some cases, specific support instruments that facilitate the access to the market (taxes, quotas, price of energy etc.) can improve the development of those bioenergy applications that are limited by the regulatory framework or because of lacking competitiveness. In other cases, support instruments can be mobilized with the objective of assisting coordination and coherence between public policies and policy goals.

Funding of bioenergy initiatives can involve public, private and institutional investors depending on the position held within the socio-technical system (novelty, niche, regime).
Regarding the innovation policies in the field of bioenergy, it is possible to detect two main targets. On the one hand, the efforts of the policies are focused on R&D to increase the efficiency of biomass utilization in order to render it economically more viable. On the other hand, innovation policies aim at transferring bioenergy applications based on new technological developments into rural areas involving rural or industrial operators (as in the case of biofuels). At the same time, attention is directed at disseminating social and organizational innovations. Even though technological progress is very important to the success of establishing different utilization paths of biomass, there are examples of bioenergy projects that are committed to sustainable agricultural development and attempt to follow social, economic and environmental goals simultaneously. This is because at the base of the implementation of bioenergy policies there is a set of common problems that need to be solved. They are related to the issues of energy, environment and agriculture/rural development, and reflect the changes in agriculture and the new goals defined for it (Rand et al., 2008).

### 2.6.3 New rural services

New rural services are a result of innovation processes related to the needs and opportunities that appear in rural areas and are linked with the changing market, societal and environmental conditions, as well as entrepreneurial initiatives of rural actors. Sometimes only services supplied directly on the farm are understood as rural. In this project we follow a wider concept with the effect that ‘rural’ does not mean services should be produced by farms or should be necessarily related to agriculture. Rather, rural services are produced in the rural areas where the context of market, culture, environment and history are different from urban areas (Rantanen and Granberg, 2008).

New rural services are defined in the IN-SIGHT research as:

- **New service products**, both market-based services like rural tourism, and public services like social provisions;
- **New ways of organizing the service system**, in order to reach better efficiency in service production and enable new combinations of services;
- **New ways of producing services** (applications of technology, rationalization etc.).

The project identified and studied innovative rural services in the fields of rural tourism and care-taking in Germany, Finland, the Netherlands and Latvia. The IN-SIGHT study revealed a variety of possible directions in the development of new rural services like welfare and recreational services for the needs of tourists, services for second-home owners, green care (care farms) services and products, creation of local public space for permanent and visiting population (village houses, public forums), landscape management and nature conservation for public consumption.
To summarize the substance of innovations in the fields studied – in direct marketing, it is about new products, new coordination between farmers and new relations between farmers and consumers. In the bioenergy sector, it is about new technologies, new coordination at regional/local level, new organization, and new market structures and controversies regarding energy crops. In the rural services sector, the substance of innovation relates to the development of new service products, new ways of organizing the service system (PPPs), new ways of producing services (by application of new technologies) and proactive conception of services to meet the new urban and rural demands.

Social and organizational context factors are central when it comes to innovations in the field of rural services. There are several driving forces of innovation in the countryside, which is often characterized by lack of adequate infrastructure; fast growth rate of the ageing part of the population; increasing need of services for the elderly; higher unemployment rate and generally lower concentration of human and social capital than in the cities; relatively long distances in countries like Finland and Latvia. All of these aspects show that new rural services are essential to rural areas. Particularly in the light of the recent structural change of agriculture this has led to the need of new business ideas.

As stressed in the country reports, the role of market is very important to innovations in the field of new rural services. A different kind of demand requires a different kind of services, and consequently different innovations are needed. Changes of market create opportunities and these often first arise in the countryside near urban areas that are in a different position than remote areas. Especially the countryside close to urban centres has experienced the reverse migration from cities, which creates new local market for services demanded by, for example, secondary residents. In remote areas, second housing has increased remarkably, opening a different kind of market for services and also by increasing cultural and social capital in these areas. Changes in both urban and rural life-styles create many opportunities of new rural services. Urban society expresses increasing demand for recreational and tourism activities in the countryside which can be provided by farms and specialized service enterprises.

Other driving forces behind innovations are budgetary problems of the public sector and the feedback from clients and local inhabitants. Transformation of the social welfare state, rationalization of its functions and transfer of welfare services delivery to private hands is a general trend in the countries studied. This creates opportunities for social service enterprises to compete for contracts with local municipalities and state agencies, and in the meantime cooperate among themselves to raise capacity of service delivery and professionalization. For instance, in Finland the ongoing reorganization of local administration, which is connected to governmental attempts to maintain the performance of the welfare state even in rural areas and to guarantee welfare services, had many consequences on services in the countryside (Rantanen and Granberg, 2008).
At the same time, tourists’ demand has also effects on the rural society. Rural tourism is one of the fastest-growing activities in the countryside providing livelihood and additional incomes to farmers and other parts of the rural population. There is a wide range of rural and non-rural actors who develop innovative services for customers: farmers, entrepreneurs, urban investors, residents of peri-urban areas, local action groups etc. Rural tourism services are partly targeted at urban people, but often they also concern local inhabitants enhancing the diversity of services available to the rural population and enabling synergies between rural services at regional and local level.

National development programmes and sectoral policies do not always recognize rural services as a new area of innovation, as our research suggests, and in many countries rural policy has difficulties to notice the importance of the service sector as a whole. Opportunities created by rural services and their special characteristics are not known well enough: the whole area is quite large and there is a great variety of kinds of services supplied by public and private sectors. There are needs to strengthen the support system for innovations in rural services, but the most urgent task might be to create public awareness of the needs, opportunities and problems in this area.

As reported in the country reports, non-governmental organizations and informal networks were the most important actors and often the only supporters of knowledge of new rural services. Networks are places for new information and social learning; they increase competitiveness of small businesses, provide information and knowledge exchange, link public and private organizations in partnerships, enable better capitalization of local resources, and are grounds for creating territorial innovation partnerships. As to the existing advisory systems, they are not well prepared to assist entrepreneurs to offer new rural services, according to the country reports. Advisory service is in some cases able to facilitate start-up businesses. However, if farmers or other entrepreneurs already have some experience with the matter in question, the advisors cannot give much further help.

In the field of rural services, social and organizational innovations are the most important ones regarding the technological aspects. But in some cases, like in Finland and in Latvia, technological innovations are central within national innovation policies. This kind of orientation may become a problem for rural innovation policy obscuring the need for organizational and social innovations (Rantanen and Granberg, 2008). Another aspect very important to developing service innovations is public support, mainly financial. In fact, money is a strongly limiting factor in rural innovation work, and public funding is necessary to aid those initiatives as in the field of health and social services, which are not attractive to private investors. Fortunately, different EU development programmes have favoured innovative projects: the innovative character is used as one criteria for project funding, even if innovations usually need a maturing time before becoming profitable, which project financing cannot always grant. Nevertheless, in some countries there is a growing awareness that besides agricultural production there are service activities in rural areas. However, the economic importance of these services is not fully recognized, which has an affect on how these services are supported by innovation policies.
2.7 Conclusions

The contextual factors influencing innovations in direct marketing, environmental technologies and rural services can be classified as economic, political, social, technical and organizational. They are drawn together in table 4.

Table 4. Socio-technical context of innovation processes

<table>
<thead>
<tr>
<th>Contextual factors</th>
<th>Direct marketing in agriculture</th>
<th>Environmental technologies</th>
<th>New rural services</th>
</tr>
</thead>
</table>
| Economic           | Producers experiencing price pressure and looking for alternative markets  
|                    | Consumers looking for alternative offers  
|                    | Comparatively low economic importance of direct marketing | Economy of scale and productivist paradigm in biofuels  
|                    | High integration in global markets for biofuels  
|                    | Regional and local economy paradigm for utilization of wood and biogas | Opportunities for social service enterprises  
|                    | Demand of urban customers for tourism and recreational services in the countryside |
| Political          | Lack of involvement of public decision system  
|                    | Barriers posed by regulatory and controlling institutions | Renewable energy paradigm and policies  
|                    | Controversial disputes on the increase of grain prices for food production  
|                    | Climate change as universal discourse | Transformation of social welfare state (rationalization)  
|                    | Transferring social services to private hands  
|                    | Transformation of social insurance system |
| Social             | Consumer-farmer interface  
|                    | New food culture and values (ethical consumption, environmental concerns, solidarity with farmers, high-quality, healthy, natural, local products, etc.) | Environmental concerns and RD implications  
|                    | Attitudes of the consumers – clean energies, saving resources, renewable energies, bioenergy – less in the case of biofuels | Ageing of the rural population  
|                    | Newcomers to rural areas and their needs  
|                    | Relatively long distances  
|                    | Different rural areas and needs (close to cities, remote) |
| Technical          | Opportunities provided by new information technologies | Increased efficiency of biomass usage and wood utilization | Use of broadband Internet, telephone lines in social services |
| Organizational     | Consumer groups and NGOs initiative  
|                    | Alternative agriculture networks | PPPs and high involvement of social partners in biogas and wood utilization, less in biofuels | Business cooperation and networking |
3 Processes, organization and networks

By Anne-Charlotte Dockès, Manu Rantanen, David Bourdin, Talis Tisenkopfs and Francesca Guidi

This chapter presents:
- the problems and opportunities at the origin of an innovation;
- the different types of innovations at stake in the field studied and the interplay between them;
- the dynamic of the development of innovations;
- the main actors involved in the systems (a specific focus on the knowledge systems is made in chapter 4 and on the networks between actors in chapter 5).

3.1 Problems and opportunities – the origin of innovation processes

Our theoretical framework (Brunori et al., 2007) defines innovation as problem-solving and opportunity-taking activity. Both problems and opportunities are key motivators in the innovation process. Table 5 summarizes the main problems and opportunities behind innovations in the three fields studied.
Table 5. Main problems and opportunities behind innovations in the three fields studied

<table>
<thead>
<tr>
<th>Field</th>
<th>Problems</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct marketing in Agriculture</td>
<td>Low price for products, Concentration of food processors and retailers, Lack of farmers’ social relations</td>
<td>Alternative ways of production and consumption, Preservation of local resources and products, Repositioning of farming in social and cultural frameworks</td>
</tr>
<tr>
<td>Environmental technologies</td>
<td>Fuel dependence, Price of energy, Global warming, greenhouse gas emissions</td>
<td>New sources of income for farmers and rural operators, Multifunctionality of agriculture, Utilization of renewable energy</td>
</tr>
<tr>
<td>New rural services</td>
<td>Maintaining quality of life in rural areas (services in sparsely populated areas etc.), agricultural squeeze</td>
<td>Competition to enter the market for local service companies, building of competences and entrepreneurial skills for care farms, diversification and professionalization to create business clusters in tourist services</td>
</tr>
</tbody>
</table>

3.1.1 Drivers of innovation in direct marketing and consumer groups

In agricultural **direct marketing** (Dockès et al., 2008) innovations are driven by difficulties that producers meet in accessing the conventional channels. Processes of concentration of large-scale industrial production and the retail sector, globalization of trade exchange, low profitability (price squeeze), weak bargaining power within the chain, and inadequate norms (fiscal, hygienic) are making small-scale farming unsustainable.

For **community-supported groups**, it is more a question of ethical values of the consumers regarding the environment, fair trade, and local food. Consumers perceive a disembeddedness of food relations and don’t trust the safety and healthiness of industrial food and, at the same time, they express new demands for high-quality food, environment-friendly production processes, safety, healthiness and naturalness and more transparency of prices.
In 2004, a family is interested in organizing a direct supply of organic farming products, in partnership with other families. Motivated by the concept of box-schemes, a contact is developed with one of the initiators of the Jardins de Cocagne, a pioneer initiative in Switzerland settled in Geneva in the 1970s. This family studied the feasibility of the ‘Cocagne model’ in Lausanne (a cooperative of consumers renting the plots and hires the employees). But this model was too expensive and faced a technical problem: no organic plots were found and a conversion to organic took too long (5 years). The family contacted Biovaud, which is the cantonal organic farming organization. Biovaud provided 2 gardeners interested in direct selling. In March 2005, the one located closer to Lausanne (in accordance with the concept of proximity) was contacted and he rapidly agreed with the project. This gardener was in a conversion process from supplying one of the main Swiss retailers (Coop) to direct selling, following his interruption of contract because he refused new constraints in the logistics of the supply chain for organic products. He had already successfully developed the selling in open markets and on the farm, and was interested in this new project. The cooperative legal status has been chosen after personal contacts with friends of cooperative movements (especially a cooperative library called Basta). The contact with a volunteer lawyer has been especially fruitful. With this lawyer, he made a risk analysis and a proposal for the statutes, which have been deposited in the official register in December 2005. Started in 2006, the membership in the cooperative Le Jardin Potager rapidly became a success, with 260 members in 2007 and sales for over Fr 200 000 (130 000 €) per year. The strategy is now to stabilize the development, and to later limit the size to 400 members.

Both innovation streams aim at promoting local economy, the use of local resources, fair prices, and direct contacts between citizens and producers. In the different cases the consciousness of the benefits of a domestic-local dimension of production-consumption circuits, more embedded in cultural and social contexts and based on ethical considerations, constitutes an opportunity.

Dockès et al. (2008) emphasizes rather opportunities than problems behind innovation processes. In direct marketing, in response to the situation described above, a growing number of farmers is looking for new strategies to maintain access to markets and to improve financial revenues: increasing the value added on-farm (quality products, on-farm processing, direct selling etc.), diversifying farm activities (agro-tourism, landscape management, educational and social services), producing in a more environment-friendly way and responding to the increasing consumers’ demand for a domestic-local dimension of production.

Problems and opportunities at the origin of ‘Jardins de Cocagne’ in Switzerland

In 2004, a family is interested in organizing a direct supply of organic farming products, in partnership with other families. Motivated by the concept of box-schemes, a contact is developed with one of the initiators of the Jardins de Cocagne, a pioneer initiative in Switzerland settled in Geneva in the 1970s. This family studied the feasibility of the ‘Cocagne model’ in Lausanne (a cooperative of consumers renting the plots and hires the employees). But this model was too expensive and faced a technical problem: no organic plots were found and a conversion to organic took too long (5 years). The family contacted Biovaud, which is the cantonal organic farming organization. Biovaud provided 2 gardeners interested in direct selling. In March 2005, the one located closer to Lausanne (in accordance with the concept of proximity) was contacted and he rapidly agreed with the project. This gardener was in a conversion process from supplying one of the main Swiss retailers (Coop) to direct selling, following his interruption of contract because he refused new constraints in the logistics of the supply chain for organic products. He had already successfully developed the selling in open markets and on the farm, and was interested in this new project. The cooperative legal status has been chosen after personal contacts with friends of cooperative movements (especially a cooperative library called Basta). The contact with a volunteer lawyer has been especially fruitful. With this lawyer, he made a risk analysis and a proposal for the statutes, which have been deposited in the official register in December 2005. Started in 2006, the membership in the cooperative Le Jardin Potager rapidly became a success, with 260 members in 2007 and sales for over Fr 200 000 (130 000 €) per year. The strategy is now to stabilize the development, and to later limit the size to 400 members.
For community-supported agriculture/Solidarity Purchasing Groups the opportunities manifest in: new consumers’ awareness of ethical, social, environmental issues of the agro-food system; the rejection of the ‘industrial model’ of agriculture; looking for alternatives based on self-organization. These groups want to develop an ethical way of consuming, based on local, fresh and healthy food products and fair trade. The idea to support local agriculture is also present. They meet the expectations and projects of small- (or medium-) scale farmers, who want to create alternative agriculture and networks. Now that the innovation is spreading, more traditional farmers join to find secure outlets.

For both innovations the main opportunities are: to promote alternative ways of production; to create alternative patterns of relationship between producers and consumers; shared goals of preserving local resources; shared goals of fair prices for small-scale farmers and for consumers; to re-position farming in social and cultural frameworks (new farmers’ identity, new acknowledgement of their activity, new value and new meanings attached to food by consumers).

3.1.2 Drivers of innovation in bioenergy

In the field of bioenergy, the driving idea behind innovation processes is finding a renewable, sustainable and environmentally friendly alternative to fossil fuels, at the same time offering new opportunities to farmers and local operators (Rand et al., 2008). Rand et al. (2008) present the existing problems that are at the base of the implementation of specific innovation processes as opportunities and challenges, and vice versa. The main innovation problems and opportunities refer to three main issues: energy production, environmental aspects and agriculture.

The problems to solve are mainly linked to the energy production sector from an environmental viewpoint: reduction of fossil fuel dependence improving energy production from renewable sources, energy-saving and energy efficiency for the purpose of fighting global warming, reducing greenhouse gas emissions and solving pollution problems. In the light of these questions, the renewable energy sector opens up new opportunities for the rural economy and contributes to creating a new rural space in terms of sources of income for farmers and rural operators, reduction of unemployment in rural areas, increase of the multifunctionality of agriculture, and a better exploitation of renewable energy sources.
Bioregio Holz (Bioregio Wood) was initiated by the Hessian Ministry for Environment, Rural Space and Consumer Protection in 2003. Hesse is the German federal state richest in forest, and decided to support wood as the source of biomass most abundantly available. The goals of the strategy developed were to ensure energy supply, make a contribution to climate protection and strengthen the regional economy. The concept of the Bioregio Holz project was straightforward: the counties participating signed binding agreements that if a heating systems in buildings owned by the county had to be refurbished, a study was to be conducted whether it was possible and economically viable to change to a wood-based heating system. If the answer was positive, the decision had to be made in favour of such a system.

### 3.1.3 Drivers of innovation in new rural services

In the field of **new rural services**, the problems and opportunities vary between countries and types of service (whether these are social welfare services or market-driven tourism and recreational services). The problems of welfare services vary also according to the actors defining them (e.g. rural dwellers, enterprises or national policy actors). In Finland, the provision of social services in sparsely populated rural areas as well as the preservation of a working welfare state system is a problem concerning the whole society. For the local companies that have entered the field as new operators, the main challenges are, for example: How to be a credible interlocutor with the municipalities? How to be competitive when big national/international welfare service companies are emerging to the same regional market? How to increase volume in order to be able to provide common services (like training) to the whole network (Rantanen and Granberg, 2008)?

In all countries, the main problem is the disappearance of certain services in rural areas, and, as a consequence, lost opportunities of employment and a lower quality of life. From an innovation point of view, it is about novel ways of responding to existing problems and of finding new market opportunities. The opportunity-taking point of view can be both external (market demand, public opportunity) and internal (self-interest, self-realization) (Rantanen and Granberg, 2008). The conversion of problems into opportunities depends also on the character or typology of rural areas – whether it is the countryside nearby urban areas where new services may emerge in response to urban demand; or it is a remote, depopulating area where social services have to be delivered in efficient and new ways; or it is an ‘emerging countryside’ responding to the demand of newcomers where new services may be supplied to second-home owners and rural tourists.

Some studies show that the accessibility of everyday services, along with employment and entrepreneurship opportunities, are the main factors making a place attractive for living. The environment, culture, social life activities are important as well, but not that crucial (Tisenkopfs, Šūmane and Lāce, 2008). This means that innovations in the service sector have great potential to improve the quality of life in rural areas and keep them populated.
Problems and opportunities at the origin of innovation in new rural services

In Germany, many small farms discovering the economic threats look for alternative possibilities to preserve their quality of life, and start offering social services in care farming, taking up related activities (keeping endangered breeds, farming organically etc.). The motivations of social farmers to engage in social work are improved quality of life for clients, cost reduction of care/therapy, diversification of income, financial gains, and altruistic motives to help people.

In the Netherlands, promotion of care farm products and services by the branding and connection of care farm activities to the Groene Woud regional branding initiative is the main opportunity that has been taken up.

In Latvia, the main problem behind the development of rural tourism is the squeeze of rural economies – decline of agricultural production and processing industries in certain areas, and processes of concentration that push out many small producers. On the other hand, many novelties in rural tourism are opportunity-driven, following an increasing demand from urban customers. In small-scale rural tourism, the motivation of business entrepreneurs is personally grounded – related to their positive visions about country life, practising the ‘green philosophy’, having convictions about healthy life-styles and turning personal hobbies into profession by producing public goods.

3.2 Interplay of different types of innovation

In the IN-SIGHT project we distinguish economic, social, organizational and technical innovations which we call also the ‘types’ or ‘dimensions’ of innovation. Table 6 compares the presence and intensity of various types of innovation in agricultural the marketing, bioenergy and rural services sectors. Although all types of innovations are intertwined and necessary for innovation success, comparative analysis shows that in direct marketing innovations are mostly organizational and economic ones (even if in initiatives promoted by citizens the social dimension is usually predominant); in the field of environmental technologies they are primarily technical and organizational; and in the rural services field they are in the first place social and organizational.
Table 6. Types of innovations
(The number of ‘+’ signs indicates the level of presence of certain types of innovations in a given sector.)

<table>
<thead>
<tr>
<th>Innovations</th>
<th>Direct marketing</th>
<th>Environmental technologies</th>
<th>Rural services</th>
</tr>
</thead>
</table>
| Economic    | • Building market channels (farm shops, Internet platforms)  
• Improving marketing (collective promotion, logos, events, etc.)  
• Informal economy of solidarity purchasing groups +++  
• Biomass resources  
• Collective heating  
• Novel ways of energy provision (e.g. energy contracting)  
• Regional production structure +  
• Decentralization of public services  
• Territorially organized services +  | | |
| Social      | • Intensified interactions between producers  
• Networks between producers and consumers  
• Building up of citizens-consumers’ food culture ++  
• Farmers as energy producers  
• Involvement and active role of farmers and other local actors ++  
• Formation of partnerships  
• Local networks of communication and learning  
• Social/public goods ideas integrated in the services  
• LEADER groups  
• Extended knowledge and expertise networks ++  | | |
| Organizational | • New ways of management (farming and selling)  
• Better organization of labour +++  
• Novel ways of organizing the process  
• Set-up of production networks  
• Regional arrangements (Bioregio initiative, DE) +++  
• Organization of work in care farms (DE)  
• Network companies (FIN)  
• Regional business clusters (LV)  
• Formation of partnerships  
• Local networks of communication and learning. +++  | | |
| Technical   | • New products  
• Specific marketing techniques +  
• New crops and crop rotation  
• New technology for bio-energy production and use (heaters) ++  
• Use of broadband Internet  
• Telephone services  
• Recreational technologies +  | | |
3.2.1 Different types of innovation

**Economic motivation** is always one of the drivers for innovators in the cases we studied.

In direct marketing, economic innovations concern building distribution and market channels (shops on farms, Internet platforms for individual and several farmers, collective shops) and improving communication and marketing (organization of collective promotion, events, logos, flyers, gifts for clients, letters to clients etc.). Solidarity purchasing groups can also concern informal economy, in which monetary considerations are integrated with ethical and political values (Dockès et al., 2008).

In the field of environmental technologies and in the rural services sector, economic aspects do not represent the main driving element for innovation strategies improving at the moment, although bioenergy applications are an opportunity for farmers in order to integrate their traditional sources of income (Rand et al., 2008).

**Social innovations** presume the formation of new networks and relations between producers, consumers and other actors of the supply chain or territorially organized services. The essence of social innovation is double: to include a social idea in innovation, in a way that produces the social outcomes desired, and to form a new network or organization of actors.

For example, in direct marketing interaction between producers is increasing in the case of collective shops. In the case of solidarity purchasing groups, consumer-citizen alliances take the leading role and are often formalized in order to become actors recognized at a local level (Dockès et al., 2008). In social innovation networking, communication and sharing of common interests and values are emphasized.

In the field of bioenergy, farmers change their social function, adding to the traditional agricultural activity – food production – the activity of energy production. Furthermore, the implementation of bioenergy systems in rural areas involves a set of local actors that play an active role in the building of new networks (Rand et al., 2008).

Moreover, common learning processes are an important dimension of social innovation (Rantanen and Granberg, 2008).

**Organizational innovations** mean new ways of management (in farming as well as in selling routines) or establishment of new partnerships and alliances between actors.

Some important partnership types (e.g. LEADER groups) can be classified as organizational innovation, with substantial aspect of social innovation involved (Rantanen and Granberg, 2008).
In direct marketing, organizational innovations are used to better distribute the workforce, to organize local farmers and processors (such as a butcher or a miller), with direct selling on the farm, or in collective shops. For solidarity purchasing groups the establishment of direct relationships between producers and consumers determine changes in logistics, since farmers have to adapt produce typology, quantity and distribution methods according to choices taking with consumers. In both cases, e-mail, websites and mailing lists represent artefacts essential to the organization of those direct marketing relationships (Dockès et al., 2008).

In bioenergy, organizational innovations manifest as novel ways of organizing the process of energy production and provision (e.g. energy contracting), setting up of regional or local production networks at all stages of innovation (input, process, output) (Rand et al., 2008).

Organizational questions are important also to successful innovations in rural services. For example, in care farming, as it is described in the German case, there is a challenge to organize work procedures in care farms and divide the roles of specialists of different fields (therapists, pedagogues, agronomists). The share of social work and agricultural production should find the right balance in the farms and this is the matter of organizational innovation. In the service sector, the most efficient organizational innovations highlighted by IN-SIGHT study were network companies (in the Finnish case) and regional business clusters (in the Latvian case) (Rantanen and Granberg, 2008).

**Technological/technical innovations** concern the development of new products, introduction of new methods of production and delivery, technical solutions of logistics and marketing.

In some rural areas, technological innovations are the triggers of the whole innovation process in a given field as in the case of environmental technologies and production of renewable energy. In bioenergy, the input side is concerned with the production of biomass and entails cultivation of new crops, novel ways of crop rotation, harvesting or usage of industrial waste and slurry. The process stage involves new technological solutions for bioenergy production (Rand et al., 2008).

In direct marketing, technical innovations mainly manifest in new products created, for example: beef salami, new jam or syrup, noodles, etc. Specific techniques are developed or adapted for direct marketing: for example, a variety of packaging, pliable market stands, small-size processing units, etc. (Dockès et al., 2008).

In new rural services, the role of technical innovations is mainly to support organizational and social innovations and improve the ways services are delivered, for example, by applications of technological innovations in the rural context. The Finnish experience with technical innovations illustrates how the use of broadband Internet in remote areas allows ensuring some welfare and health services and enables in some cases professionals to move and work in the countryside (Rantanen and Granberg, 2008).
3.2.2 Integration in innovation processes

The different comparative studies we carried out (Dockès et al., 2008; Rand et al., 2008; Rantanen and Granberg, 2008) show that **different dimensions of innovation are clearly deeply integrated**.

On the basis of Dockès et al. (2008) we can see (figure 4) how social innovations (new relations between consumers and farmers) in the field of direct marketing bring about organizational innovations (new distribution systems) and are intertwined with technical novelties (e.g. new products) and economic innovations (new markets, higher prices for farmers).

**Figure 4. The main dimensions of innovation in agricultural direct marketing**
In the Dutch case of a ‘farmers’ cooperative for sales of organic produce in Rivier en Land’, the different aspects of innovation are deeply integrated. The organic cooperative mixes organizational innovations with social, economic and technical aspects depending on the specific context and, vice versa, also the type and impact of the innovation varies among the different groups of farmers. Some groups, for instance, purchase a van to distribute their articles; others make arrangements to gather all products in one place, requiring all farmers connected to transport their products to this place. Furthermore, farmers adapted their farming practice to each other and to the consumers’ demand. Different leek growers arranged their production over time so that they no longer competed but supplemented each other. Some producers, furthermore, took up new products in order to meet demands.

Various dimensions of innovations can influence each other and act, borrowing the terms from the EU ETUDE project, as ‘initiator’, ‘outcome’ and ‘lubricant’ for other types of innovations. ‘By loosely using expressions such as ‘initiator,’ ‘outcome’ and ‘lubricant’ it is not intended to assert an exact chronological sequence or a one-way, stimulus-response type of relations. ‘Initiator’ is intended to express the primary significance of the domain that triggers other positive interrelations in a specific RD initiative; ‘outcome’ refers to the notable benefits or positive developments that are entailed by such interrelations; ‘lubricant’ refers to the significant, yet not primary, domain that enhances or cements such positive interrelations’ (Kanemasu, Sonnino, Marsden and Schneider, 2007).

As shown by bioenergy cases (Rand et al., 2008), technical innovations often initiate organizational and social innovations, however, the two latter consolidate the whole innovation process and trigger further technological improvements and economic innovations.

In many cases of innovations in the field of environmental technologies, the ‘centre’ of the innovation process is located not within the technological process, but in the area of social and organizational relations.

For example, in the Italian case of the Camporgiano biomass collective heating plant (figure 5) a technical innovation offered an opportunity for farmers to differentiate their traditional activity towards the bioenergy field assuming a new social role as energy producers (a social innovation). At the same time, switching from an individual heating system to a collective one and the building of a locally organized wood energy supply chain was possible only due to organizational innovations and logistics. Innovation started as a technical idea that was implemented through social and organizational innovations, which brought economic rewards to farmers and consumers in the region.
In many cases, the introduction of new technology leads to social and organizational innovations, brings about changes in production networks, and requires new knowledge (Rand et al., 2008). Furthermore, as demonstrated by Rantanen and Granberg (2008), social innovations facilitate technological ones.
The interplay between different types of innovations is important to the development of rural areas. Poor consolidation of some innovations may originate from too little interaction between types of innovations and the institutions representing different disciplines. For example, in the social sector (Rantanen and Granberg, 2008), there is a tradition of nursing while the technical sector concentrates on developing instruments for clients. Sponsors, entrepreneurs and experts of different fields could easier accomplish innovations together than by working separately. The crucial question is, again, how to combine different aspects of innovation.

3.3 From inception to maturity: the dynamics of innovation

In the IN-SIGHT project we apply a systemic definition of innovation based on concepts of socio-technical systems and actor networks. Innovations are not studied as linear transfer of knowledge, but processes of co-creation involving people, artefacts, resources, institutions, and relationships. Hence the notions of processes, dynamic, networks, and organization of innovation are central.

Innovations are defined as new forms of socio-technical practice that develop and disseminate in networks. The main theoretical assumption is that changes in actor networks constitute the mechanism of innovations. As argued by Brunori et al. (2007), four levels of organization of the socio-technical network can be identified (see figure 6 below):

- **Novelties** are localized ‘breaks of the routines’. They are limited by external constraints like laws, actors, and norms.
- **Niches** are socio-technical networks governed by paradigms different from those prevailing in the dominant socio-technical systems. Niches are the result of an aggregation of different smaller systems. They are the places where new paradigms emerge as an effect of learning processes.
- **Regimes** are paradigms turned into practice, the incorporation of given paradigms into concrete socio-technical systems. Networks are structured and coordinated by rules.
- **Landscapes** can be changed as an effect of supranational policies or scaling-up of radical changes, but more often changes in socio-technical landscapes are important drivers of radical innovation.
Innovations start with recognizing problems and identifying opportunities, and evolve towards the creation of novelties. They may develop further with niches formation and lead to changes in market regimes. Through diffusion of innovations in wider societal and market networks the political, economic and cultural landscape may be transformed. Every stage of innovation is characterized by certain activities, leading actors, innovation forces, configuration of actor networks, and characteristic ways of cooperation and support. Not all innovations follow this sequential path, neither is it a precondition of success that every innovation achieves a higher degree of structuring and societal importance through the cycles of novelty, niche, regime and landscape. In the IN-SIGHT project we rather use these concepts to identify different scales in the development of innovations and to understand the actor network configuration in certain phases of the development of innovations. The key issue of comparative analysis is to understand how actor networks transform during the course of innovation and which support measures contribute to the emergence, development and diffusion of innovation.

Dockès et al., Rand et al., and Rantanen and Granberg (2008) introduce several concepts to analyze the development of innovations: emergence, scope and scope enlargement, scale and scale enlargement, horizontal development of innovations, vertical development of innovations, innovation cycles, diffusion of innovations, and other. The main reference model upon which the analysis is performed is the model of innovation cycles where novelties, niches, regimes and landscapes represent more and more structured phases of interactions between people, tools, natural, physical, social, economic and political resources.

### 3.3.1 Scope and scale of innovations

Dockès et al. (2008) analyze how innovations are developing and spreading by enlargement of scope (defined as ‘horizontal development’) and enlargement of scale (understood as ‘vertical development’) of innovations.

In direct marketing initiatives, the scope enlargement or horizontal development of innovations takes place, for instance, when other groups are developing the same innovations with the same methods. Or, alternatively, when the same group develops its project, for example, new farms join in a collective shop, new products are added to the basket, the initiative’s experience growing. The enlargement of the scale or vertical development of innovations takes place when innovation cycles are repeated, become more structured, several networks join together, the initiatives form alliances, get connected to external knowledge and policy networks, and achieve a higher degree of market and social diffusion.

Innovations in agricultural direct marketing, environmental technologies and new rural services are differently ‘placed’ on the model of structured phases (figure 6).
In **agricultural direct marketing**, innovations emerge from a few pioneers and develop by horizontal development or scaling-up. Most of the cases we studied remained at a novelty or niche stage. Nevertheless, some regime change aspects can be seen related to new urban/rural relations and new ways of consumption (Dockès et al., 2008).
The innovations studied in the bioenergy sector are mostly located at the novelty or niche stage speaking in the terminology introduced in the theoretical framework (Rand et al., 2008). Most of them do not yet seriously challenge the dominant energy system based on fossil fuels. Still, in the longer run they can contribute to a paradigmatic change from the fossil fuel paradigm to the renewable energy paradigm, since they represent a break in the routine of the energy system. The potential scale of innovation processes depends to a great extent on their specific regional and national context. The introduction of the same kind of technology, biomass/bioenergy production techniques or organizational models can result in innovation processes that have a very different scope, thus varying between a novelty and a niche, perhaps even coming close to a regime change. Moreover, the scale of an innovation in bioenergy depends on the path of biomass utilization chosen. While biogas and wood energy mainly pursue the model of multifunctional agriculture and sustainable rural development, the biofuel experience from the Latvian case study follows the pathway of the conventional agricultural production regime.

In the rural services sector, according to Rantanen and Granberg (2008), innovations are mostly concentrated in the novelty phase with elements of niche formation for new market-based and social welfare services. There are certain signs of regime change when it comes to the reorganization of welfare state services, the adoption of private services instead of state provisioning, subcontracting the former state functions into the hands of private organizations. The elements of landscape transformation in the field of new rural services concern the general effects of demographic change and urban-rural interface that alters the vision of the countryside, and create demand in new services.

### 3.3.2 Process and development dynamics in innovation

Assuming scale enlargement concept we do not claim that innovations are linear. They evolve from inception to maturation. Innovators sometimes do no want to enlarge, but rather stay at certain level of operation, as it is in many cases of direct marketing and rural hospitality services. Table 7 gives an overview of critical forces and actors at different stages of innovations.
Table 7. Innovation dynamics

<table>
<thead>
<tr>
<th>Novelties (Localized ‘breaks of the routines’)</th>
<th>Niches (Socio-technical networks governed by paradigms, an aggregation of smaller systems)</th>
<th>Regimes (Paradigms turned into practices, networks structured and coordinated by rules)</th>
<th>Landscapes (An effect of supranational policies or radical changes, drivers of radical innovation)</th>
</tr>
</thead>
</table>
| Emergence                                     | • Fundamental role of initiators  
• Innovative personalities  
• Creativity  
• Informal networks | • The market potential of innovations  
• Social acceptance of innovations | • The role of ‘high’ politics paradigmatic discourses  
• Structural change  
• Value changes |
| Enlargement of scope (horizontal development) | • Growth of initiative (e.g. new farms joining)  
• Developing a new product/services  
• Enlarging range of products/services  
• Building up market chain  
• The growth of networks, creation of new groups  
• Bottom-up and horizontal development | | |
| Scaling-up (vertical development)             | • Involvement of new actors, especially policy makers  
• Scaling-up of economic performance  
• Improving marketing, achieving a market share  
• Involvement and support of the AKIS  
• Support of the local development system  
• The role of policies  
• Establishing public-private partnerships and alliances  
• Bottom-up, horizontal and top-down development | Elements of landscape change:  
• Alternative food networks  
• Direct marketing  
• CSA  
• Care farms  
• Multifunctionality  
• Rural services | |
| Accomplishment                                | Novelties become routines  
Multiplication of niches  
Individualized regimes  
Fragmented landscapes | New innovation cycles | |
Emergence of an innovation

In the emergence phase, in most cases at novelty level, the role of initiators, individuals or collectives is crucial. The ‘I’ motivation prevails. Innovators are often left alone. At the emergence they focus on the ‘I’ process and not on the content of available or potential support. Many innovations originate in local practice. It is useful to let innovators perform, identify innovations. To an innovator, his/her initiative, knowledge, learning, and networking are key activities. The basic actions and, correspondingly, innovation skills in the inception phase are initiative, creativity and networking.

But innovations emerge in a certain context. If it is linked with niche production, for example, in direct marketing production or in solidarity consumer groups, the market potential of innovations and their social acceptance is essential.

The Solidarity-Based Purchasing Group movement in Italy can be considered a novelty, since it represents a change/transformation in production, distribution and consumption routines, linked to the socio-technical system of the mainstream food regime. Furthermore, each group can be defined as a novelty, since not only the idea is innovative, but also its peculiar characteristics depend on local context, persons’ background and ways of organization and management. At a macro-level, it is, however, possible to identify common characteristics, specific actors, rules and artefacts. The number of groups (more than 100 in Tuscany), the relations developing between groups, and the communication on their experience make the movement a niche in the present consumption system.

Enlargement of the scope of an innovation

As innovations enlarge by scope, building of a new network is important. Innovators are stronger in networks (local, national, extraterritorial) than alone. Social capital grows in informal networks where new knowledge, both tacit and codified, is changed. An interplay between individual motivations, collective objectives and the innovation support system starts.

During scope enlargement the initiative grows, new members join, the range of products or services is enlarged, novel products or services are tested in markets, accepted or refused by customers. Technological, social and organizational innovations continue to modify and consolidate the novelty. In the meantime, the original network of innovators may grow or be formalized, e.g. the links with other groups or initiatives are established, or network contracts are made.

During scope enlargement, it is important to demonstrate the economic viability of technologies and disseminate the knowledge through pilot projects.
An example of horizontal development: a collective farmers’ Shop in Rhone-Alpes, France. In 1978, seven producers wanted to break with traditional methods of marketing, and in particular with that of farming cooperatives which to them reduced farmers to producers of raw material, with no real collective project. They wanted to control the marketing of their products and direct a common project. So they threw themselves into the creation of a collective point of sale, on a basis of self-management and a principle of quality produce sold at high prices, they created ‘Uniferme’. They directed their project alone, with no other help than the experience most of them had acquired in trades outside that of farming. Nearly 30 years later they have succeeded for there are now 50 people selling their whole production through the shop. ‘Uniferme’ is located 20 km from Lyon, on an important main road between the regional capital and another town. The self-management is still active, there is not one single actor in charge, but an alternating leadership. New associates have arrived as well as new solidarities like, for example, helping a young man join them who is going to produce complementary foodstuffs or in replacing a partner who has left. Discussion and allowing for the opinion of everyone is their method of governance.

Scaling-up of an innovation

Aggregation of novelties may create niches, which can further evolve into a regime system. This process is called a scaling-up or vertical development of innovations. At this stage, a wider range of actors, like AKIS and policy makers, become involved. An economically viable market chain or a niche for novel products and services has to be created. Innovators’ own knowledge resources and network capacities may appear insufficient, therefore their connectedness to professional knowledge centres and support institutions is critical. Niches are collectively created, initiated by pioneers they are later joined by non-pioneers facilitating the dissemination of innovation.

The research shows that networks are important to develop a novelty and niche market. To innovators it is important to go beyond sector boundaries (agriculture, services, local development, regional branding etc.), bring various competencies and visions together and invent new solutions. Extended networks are the means for that, sometimes even distant networks, because then innovators do not feel pressures of competition.
**Vertical development of Biogas in Switzerland**

In Switzerland, biogas has three different origins and is made of different base materials: agricultural biomass, renewable components of industrial waste, sewage sludge from industrial water treatment plants. Since 1990, the number of biogas plants in Switzerland has decreased from 102 to 80, whilst the output of biogas has more than tripled (from 55.6 t/y to 191.6 t/y). Over 30 years ago, the first farms began to produce biogas (pioneer phase). The first plants were not very efficient.

Since 2003, there has been a renewed interest in biogas plants. Since then, bigger plants have been built. Average capacity/throughput has risen. At the moment, a boom in biogas production can be witnessed. The biggest potential lies in the fermentation of slurry, manure and crop remains.

Today, mainly individual plants are in use. In this case the farmers – as owner - are involved in the entire process from producing the biomass to the biogas production, net metering and reutilization of the residues of the fermentation. A special way of funding makes it possible that someone else finances the individual plant but the farmer operates it and delivers a fixed amount of heat or gas to the investor (so-called ‘contracting’). However, there is a trend to build bigger and co-owned biogas plants which produce heat (for heating), electricity (which is fed into the public network), but also fuels (which are fed into the gas network). These bigger plants can be industrial plants, where the farmers’ role is limited as deliverer of biomass. Apart from big plants small ones can be viable, too, especially when they are well integrated into the operational procedures and help to optimize internal processes (drying of end-products, treatment of farm manure and improvement of N-availability, hygienization of fermentation residues, fuel for tractors etc.) and help to close the nutrients cycle.

As far as regime change is concerned, the development of organizations and institutions plays a central role (Rantanen and Granberg, 2008). A regime shift takes place when a paradigm shift comes into practice, e.g. private social services become a normal practice. At regime level, innovations are viewed in meso or macro perspective and in the context of regional/rural development and technological change. As demonstrated by examples form bioenergy production, the enforcement of a new approach was possible only when new coalitions and partnerships of various actors were established, micro-enterprises were included in innovation processes, and regional/local authorities became involved. Regime change requires also a new thinking about innovations that goes beyond sector boundaries (not separating agriculture, rural, community, energy production, etc.). Regime change presumes cross-sector collaboration, strong public sector involvement, territorial governance and integration of different dimensions of innovation (social, economic, organizational, logistic, technological).

Concerning the stage of regime and furthermore, the stage of landscape, policy becomes important (e.g. how special rural circumstances are recognized in national policies). Moving from regime to landscape belongs to another category, already. It seems to be more dependent on external than on internal factors of rural development.
In the Abava Valley (Latvia), the formation of a territorial service cluster including organizational innovations and complex institutional arrangements can be shown, in link with a global urban demand. Society’s positive perception of rural areas helps to create a regime or ‘climate’ more favourable for the development of new services. In the Abava valley, structural changes in society, mobility and consumer convenience culture have changed the tourist demand and the very notion of rural services. The new demand requires innovation on the part of service providers. There are several tendencies that characterize current trends in rural tourism and services. Tourists are more fastidious and demanding in terms of service quality, recreational, leisure and amusement facilities, comfortable amenities, and convenience. There is a great diversity in consumer demand, values and expectations as to what rural services have to be, varying form nature tourism to extreme sports activities. Urban middle class consumers are the main customers. Consumption of rural services is dependent on mobility. The road infrastructure in the Abava valley itself is the organizer of tourist flows, connector to the customers. The main road that goes through the valley brings day-tourists, casual visitors as well as organized tourists. The road in a way groups and clusters services along itself.

Innovation dynamic is the term used to characterize the evolution and change of innovation phases and corresponding changes in actor networks that facilitate the emergence, scaling-up and diffusion of innovation. The central attention is given to the role and interplay of different actors in socio-technical networks that determine the evolution of innovation.

3.4 Actors and roles

Actors of the innovation systems are very diverse: farmers and end-consumers, government and legislative bodies, universities and research institutes, innovation agencies, private firms with their own R&D, industrial research centres etc. They can be private or public and mobilize both public and private money (Proost et al., 2008).

The governance of the innovation system is changing along with the following trends: public-private partnerships are becoming a principal cooperation form; the research agenda or innovation agenda are not defined only by the government and universities but by a large number of private and public stakeholders (Netherlands, Italy). However, government, universities and research institutes keep a strong influence within the innovation system, but to a different degree in each country (Proost et al., 2008).

Cross-national analysis shows an increasing plurality of actors involved in innovation practice. More and more, new actors, organizations, networks, and institutions add up to traditional components of national agricultural knowledge and information systems (AKIS).
The IN-SIGHT project proposes the following **four categories of innovation actors** (see figure 7 below):

- **Socio-economic actors** (farmers, supply chain actors, associations, etc.);
- **Information and knowledge system actors** (research institutions, extension services, schools etc.). They are presented in chapter 4 of this report;
- **Public decision system actors** (public administration, hygiene and control institutions etc.);
- **End users/consumers**.

![Figure 7. Four groups of actors interact in a typical innovation process](image-url)
Besides these types of actors it is interesting to note that leading personalities, or personalities mastering very specific knowledge and supporting an idea or a project, play a crucial role in the success of projects, especially at their emergence stage. Not only do their personal skills and networks provide a basis of the innovation, also their capacity to unite and motivate the other actors is essential. Depending on the specific context, their role can diminish over time, when other skills and knowledge are needed to further develop the initiative. Often however, these individuals continue to play an important role in the group process. These leading personalities are often socio-economic actors (farmers) or consumers (possibly involved in NGOs).

Rural areas, especially remote areas, are often characterized by a shortage of human capital due to sparse population and out-migration. Therefore it is very important that as wide a range of actors as possible is involved in the innovation work. Although the innovation system consists of many kinds of institutions and organizations, in the end the know-how of individual people is critical, their qualities and ability to combine their own experience with the information available. On the other hand, these individuals are often working in formal public or private organizations and if they are missing in rural areas, the innovation system is weakened. It is essential that there are also informal networks and partnerships that are not dependent on formal organizations. The flexibility of organizations is important in innovation work, and investments in the training of workers would help organizations to be more effective actors in the innovation system (Rantanen and Granberg, 2008).

The Finnish case about the welfare sector in rural areas shows that sound and flexible cooperation of private and public actors can lead to a good result. The birth of a company needed a person who took the initiating and leading role in the situation. The CEO of a regional pioneer company proposed a company network in the board meeting of the association in spring 2006. As a result of the process, a limited company of nine welfare sector companies was born during the same year. Defining the problems and their solutions for the companies was done by many other actors and persons on top of the entrepreneurs. The most important of these were the experts of projects and training supported by the Employment and Economic Development Centre and the person responsible for developing the field there. At the same time, one conducive factor is the discussion in society as a whole on networking as a possibility of improving the status of small companies.
3.4.1 Socio-economic actors

The main socio-economic actors

Socio-economic actors are of course essential in all innovation processes, as individuals or organized groups. They mainly include farmers, rural entrepreneurs, processors, and retailers.

As far as farmers are concerned, the main lines of differentiation can be traced along the axis of professional/part-time, old/young, men/women, conventional/organic, specialized/diversified and main motivations (entrepreneurship, ethics, innovation etc.). Pluriactive farming (farms with employees working also outside the farm) is prevalent in more than half of the total number of farms (80% in Italy). In Finland and in Latvia, a clear dualism can be observed, with professional farms following a modernization path based on the introduction of new technologies, scale enlargement, and integration into food chains, while small farms tend to diversify and supply rural services. In Italy, characterized by a great number of small-scale farms, there is a dominant trend towards ageing and absence of farm transfer to younger generations. Most innovative farms tend to be run by newcomers (not seldom, foreigners) in export-oriented sectors like wine and/or in diversified rural activities such as agro-tourism. In Germany, many farms have chosen to convert to the production of energy crops (23%). Pluriactivity and part-time farming brings about the problem of the definition of professional identity, and therefore put official knowledge systems into strain: in which category, and therefore in which innovation network, should a part-time farmer fit?

In general, a bias of innovation services towards professional, specialized, conventional, male farmers is observed. In Switzerland, virtually all farms can link up to innovation networks, but also in this case a bias towards professional farms is observed. As organic farming has become a priority of rural development policies, in most countries specific knowledge systems have developed in this field (Proost et al., 2008).

Rural entrepreneurs and SMEs are involved mainly in rural tourism, resource-based activities (wood, water), food processing, and social services. In most of the cases they have few links with the official AKIS. Social services are becoming a sector of growing importance (Proost et al., 2008).

Actors of the agro-food production chain: Relationships between producers, processors and retailers are more and more formed into codes of practice linked to quality schemes. They are among the most relevant drivers of innovation, because in order to comply with rules and standards farmers have to adapt their internal organization and technologies (Proost et al., 2008).
**Input providers:** The manufacturing enterprises of technical inputs (foods, fertilizers, machineries) increasingly turn their commercial networks into knowledge systems. More and more, input providers tend to strengthen customers’ loyalty by giving advice to farmers. This is particularly relevant in countries where extension services and cooperation are weak, like in Italy, in industries such as animal production or in agro-food processing (Proost et al., 2008).

**Cooperatives and producers’ organizations:** The knowledge and information flow frequently moves through cooperatives and producers’ associations. They provide inputs together with input-related technical advice. To this end, they carry out research, training and advice related to the product. As cooperatives tend to concentrate and compete on global markets, innovation increasingly is promoted through top-down approaches. In France and Switzerland, **inter-professional bodies** associate with producers, processors and representatives of the consumers in the same organizations, where professionals from several sectors work together (Proost et al., 2008).

**Processing and retailing** companies are among the most important drivers of innovation. In particular, retailers tend to control producers through labelling schemes. As retailers are the interpreters of consumers’ needs and motivations, they tend to pursue a top-down approach to innovation, and therefore reduce farmers’ possibility to follow independent innovation paths (Proost et al., 2008).

**Different economic actors in different fields of innovation**

**In agricultural marketing innovations,** socio-economic actors always play a central role in the innovation process. Farmers, individually or in small groups, can be at the initiative of the innovation like in the French case study of collective farmer shops. The farmers involved in direct marketing manage rather small farms, but with a comparatively relevant workload in order to be able to develop that kind of project. Some processors, like butchers or millers, can also be involved, but are scarcely at the initiative of the innovation. The role of individuals is often very important, innovative farmers are people interested in creativity and in developing new, original ways of producing and selling (Dockès et al., 2008).

**In bioenergy innovations,** socio-economic actors are also central in the cases studied. They can be involved in different steps of innovation processes, like production of biomass, processing, and sales and distribution. The biomass producers are mainly farmers or forest owners (private or public owners like the state, local municipalities). Farmers can produce biomass for different utilization paths. The size of the farms varies to a great extent, but generally it can be said that larger farms are often represented in biofuel or biogas chains. Bioenergy is usually one part of their activities among others and it constitutes a new outlet in competition with, or in addition to, other activities.
In many cases, the producers of bioenergy are large private firms, managing a new and more or less complex technology. This trend can be increasingly observed in biogas and biofuels where they possess specific knowledge about these technologies that they are not always willing to share. Large companies often operate in different European countries and this can result in new international networks and interesting exchanges between countries (country reports contain examples of experts from French cooperatives in Latvia; German and Swiss experts on biogas in France; Austrian and Finnish boiler manufacturers). This kind of biomass processors often is new to the agricultural system. In the biofuel chain it can be observed that farmers’ organizations are often the owners or among the owners of processing plants (Rand et al., 2008).

In rural services, individuals that first of all represent themselves (e.g. entrepreneurs, urban investors) play the key role. They combine information from different sources to produce new ideas. Private organizations and individuals representing these organizations (e.g. village associations/inhabitants, social associations and health insurance companies) are also always present. They experiment with new services and organize communication and information. In Latvia, for example, individuals (newcomers, local residents who reground their activity, unusual personalities and urban investors) play an important role. It is agreed that a strong leader with an extensive network is a success factor of innovation (Rantanen and Granberg, 2008).

### 3.4.2 End users

**Consumers** are more and more recognized as active players of innovation, especially with regard to green technologies and sustainable life-styles. At an earlier stage, consumers whose choice is differentiated products (local, organic, fair trade, green energy etc.) have been identified as targets of ‘radical marketing’. At a later stage, consumers become active players in reshaping socio-technical systems in which food consumption is embedded in the social, cultural and ecological environment and related to changing forms of everyday life practice. Slow Food movement, solidarity-purchasing groups in Italy (Brunori, 2007a) or consumer supported agriculture initiatives in Switzerland testify to the role of consumer values, knowledge and organizations in triggering innovations towards more sustainable agro-food systems. Initiatives such as urban gardening, farmers’ markets, box schemes, purchasing groups, and organic school meals belong to the latest generation of consumer-driven initiatives that tend to change the regimes of production and consumption.
NGOs play an increasingly important role in innovation. In most of the cases they provide ideas and motivation to innovate. They are particularly fit to perform brokerage activities, as it happens in the cases of Latvia (in the organic and in the rural tourism sector) in Italy (mainly in the local food sector, but recently also in the energy sector). They can be impetus factors (concerning natural parks, biodiversity and agriculture), but also put a curb on projects (concerning the installation of wind turbines in rural areas). In Italy, Slow Food was born as a consumers’ association but soon enlarged its scope by organizing food artisans (chefs, farms, small retailers) into original quality schemes (Slow Food Praesidia) and into creating networks of municipalities (Slow Towns). Following the Slow Food example, many NGOs in Italy have started to set up partnerships with producers’ organizations, farmers’ unions or local administrations to create labelling schemes. In France and in Italy, NGOs are involved in establishing direct commercial links between producers and consumers (AMAP in France, GAS in Italy). Village associations and professional associations in the social sector are also important actors of the rural innovation system, as for example in Finland. Those novel producers-consumers interfaces were studied in-depth in WP3 of the IN-SIGHT project in the case of direct marketing initiatives and consumer-supported agriculture.

In agricultural marketing, end users are clearly consumers. In the community-supported groups or the purchasing groups they are at the initiative of the projects, either as individuals (Swiss case study) or as organized citizen groups (Italian case study). In many cases, there are active links with other social movements and organizations, as well as some relations with local public administrations. At the moment, the initiative locally involves as main actors small farmers, non-food producers, and services providers. At a broader level, where the new discourse on food provisioning is built, there is an increasing engagement of other actors, as media and opinion leaders, experts and researchers, and political organizations (e.g. the Green Party). In collective sales (shops or cooperatives), consumers are less involved; they are only making purchase (Dockès et al., 2008).

In the bioenergy sector, end users are a necessary precondition of the existence of innovation processes. In some cases, the producers are also the users of their products (fuel; heat from biogas or wood). In other instances, end users are individuals or local communities: either at a rather local level in the case of wood logistics chains or at a wider level through providers of biofuel or electricity/heat from biogas. The local communities play an important role in the spreading of the innovation, because they constitute an influential and motivated user, setting an example by their energy consumption patterns. This is particularly clear in those cases where they are the main initiators of innovation processes (Rand et al., 2008).

In the rural services sector, the consumers of services are customers, inhabitants, and associations. They also experiment with new services, and provide feedback and new ideas. They can be considered as risk takers as they test new ideas and services (Rantanen and Granberg, 2008).
3.4.3 Public decision actors

Public decision actors are very often present in European, national and regional innovation systems.

In agricultural marketing, they can support projects through legal consultancy or local funding (for shops or groups). They are scarcely involved at the initiative of the projects and more frequently in its development. They also can be at the origin of difficulties as the projects often have to face regulatory barriers (Dockès et al., 2008). Geographical Indications consortia are important actors of innovation as well, particularly relevant in France, in Italy and in Switzerland. In order to label their products as PDO or PGI, producers have to follow specific codes of practice. Contrary to retailers’ codes of practices, Geographical Indications allow a greater participation of farmers, who are represented in consortia (Proost et al., 2008).

In the bioenergy field, the innovations studied are linked to energy, environment and agricultural policies at local, regional, national and European levels. There is the risk of a fragmentation of public support and decision-making processes. As a result, it can be difficult for the socio-economic actors to find the right partnership at the right time. Some countries have created new specialized energy agencies to fund and support the bioenergy sector (France and Germany with rather powerful agencies, Switzerland with a somewhat weaker agency). The importance of public funding and support leads to a lot of lobbying in the sector of green technologies. The diversity of actors and support systems has brought about new European networks focusing on the sector either in programmes directed at the member states (LEADER+) or mainly between countries (research projects, Interreg, Life, Leonardo, SAPARD). Whilst there is a wide diversity of policymakers and other stakeholders in the field, some projects can work with very little involvement of this type of actors. This is the case with very small local projects, for instance, with energy from hedge wood or small private forests (Rand et al., 2008).

In the rural services sector, public decision actors and financiers are mainly municipalities, officials, policymakers and local governments. They act as supervisors of development in some cases and are also in charge of the funding of some projects. Their role is also to be a critical evaluator and commissioner of public competitions (local government as subscriber).

Knowledge actors are analyzed in detail in chapter 4 of this report.
3.5 Summary

We define innovation as problem-solving and opportunity-taking activities. We also distinguish economic, social, organizational and technical innovations which can be termed also the types or dimensions of innovation. Although all types of innovations are intertwined and necessary for success, comparative analysis shows that in direct marketing innovations are mostly organizational and economic ones; in the field environmental technologies they are primarily technical and organizational; and in the rural services field they are in first place social and organizational.

The actors linking knowledge and innovation are numerous and of different kinds. They are positioned in different slots within the innovation system, and have different interests and objectives. We propose to make a distinction between four types of actors: socio-economic system; public decision-making system; knowledge system; end users.

Innovations are defined as new forms of socio-technical practice that develop and disseminate in networks. The main theoretical assumption is that changes in actor networks constitute the mechanism of innovations.

Four levels of organization of the socio-technical network can be identified:

- **Novelties** are localized ‘breaks of the routines’. They are limited by external constraints like laws, actors, and norms.

- **Niches** are socio-technical networks governed by paradigms different from those prevailing in the dominant socio-technical systems. Niches are the result of an aggregation of different smaller systems. They are the places where new processes emerge as an effect of learning processes.

- **Regimes** are paradigms turned into practice, the incorporation of new ideas into concrete socio-technical systems. Networks are structured and coordinated by rules.

- **Landscapes** can be changed as a result of policy changes or a scaling-up of new regimes. Often changes in socio-technical landscapes are important drivers of radical innovation.

Innovations in agricultural direct marketing, environmental technologies and new rural services are differently ‘placed’ on the structured phases model. In **agricultural direct marketing**, innovations emerge from a few pioneers and develop by horizontal development or scaling-up, but always remain at a novelty or a niche scale. In the **bioenergy sector**, the innovations studied are mostly located at the novelty or niche stage. Still, in the longer run they can contribute to a paradigmatic change from the fossil fuel paradigm to the renewable energy paradigm. In the **rural services sector**, accordingly innovations are mostly concentrated in the novelty phase, with elements of niche formation. There are certain signs of regime change when it comes to the reorganization of welfare state services.
4 Knowledge and social capital

By Jet Proost, Gianluca Brunori, Michel Fischler, Adanella Rossi and Sandra Šūmane

In this chapter the relations between knowledge exchange, social capital and the success of innovations are being discussed. Recent demands of society to agriculture have generated new impulses to the growth of different agricultural development trajectories in which an important role can be identified for both formal and informal networks. In these networks knowledge, information and experiences are exchanged. New networks are established between farmers, between farmers and institutions, and between farmers and consumers, modifying the pre-existent relationships among actors, both at local and national level. It is increasingly recognized that innovation involves not only technology but also implies a social dimension, and both of them are intertwined. As the case studies in the three rural development fields witness, networking and social learning – as social mechanisms for the implementation of new forms of practice – are important to any innovation.

4.1 Recognizing different forms of knowledge

One of the main conclusions from the research undertaken in this project is that innovations are often created in so-called knowledge networks. Actors and their interactions are the main components of these networks, in which generation, exchange and application of knowledge take place. Interaction in a network enables participants to connect the knowledge of network partners with their own practice (De Wolf, Proost et al., 2006). A distinction is made between implicit – or tacit – knowledge (Polanyi, 1966) and explicit knowledge (Davenport and Cronin, 2000). Implicit knowledge is particularly important to innovation processes. It consists of experiences, skills and attitudes. The innovation lies within this implicit knowledge, and yet is difficult to reveal because a new terminology has to be invented first. Partners in a conversation about innovations don’t yet have the vocabulary, and therefore formulate their questions in terms known to everyone in the network. Implicit knowledge cannot easily be transferred; however, it can be shared by means of demonstration and imitation (Nonaka and Takeuchi, 1995).
The novelty approach (Brunori et al., 2008) refers to a way of making implicit knowledge explicit through the identification of patterns in practice. As a consequence, the knowledge in the network increases when partners discuss the (changing) patterns. These knowledge networks also function as social networks. Mutual trust and social cohesion in a network is stimulated through informal contacts between network partners. Section 4.5 of this chapter elaborates on the issue of social capital. Both trust and cohesion are essential elements of knowledge sharing and exchange in a group or network.

4.2 The rural knowledge system

Several years ago, sponsored by official organizations such as OECD and FAO, the concept of ‘agricultural knowledge and information systems’ (AKIS) was introduced into the policy discourse. As Leeuwis and Van den Ban (2004) assert, the concept was originated by an interventionist policy in agriculture based on the idea that, in order to accelerate agricultural modernization, innovation transfer should be strongly coordinated. This concept was implemented in many countries through a strong integration, generally at national level, of public research, education and extension bodies, in many cases under the control of the ministry of agriculture (Brunori, Rand and Proost, 2007).

Röling (1990) described the agricultural knowledge and information system (AKIS) as ‘a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergistically to support decision-making, problem-solving and innovation in a given country’s agriculture or domain thereof’ (Birner et al., 2006). In one of its most recent versions (Rivera et al., 2002), the concept is broadened to include rural development and named AKIS/RD.

One of the most recent models takes into consideration four main actors, both public and private, whose mission is related to agricultural/RD innovation:

- Research
- Extension services
- Education and training
- Support systems (i.e. all organizations related to credit, inputs, producers’ associations, etc.).

All of these domains, according to this model, act upon farmers’ and rural actors’ knowledge and generate innovation this way (see figure 8).
Figure 8. An Agricultural Knowledge System model
(Source: Rivera et al., 2005)

The two-ways arrows from and to agricultural producers show that this model does not necessarily imply a top-down approach. However, this is very much true when we look at support systems. For many farmers, the greatest part of their relevant knowledge is carried through marketing networks of seeds, fertilizers, machinery, and pesticides.

In this case, innovation is produced outside the farm and of the farmer’s network, i.e. at the agribusiness level, and farmers’ learning capacities can be only linked to their speed of adaptation to change and to their capacity of making strategic alliances with the right input providers (Brunori, Rand and Proost, 2007).

As a general rule, the model suggests that agricultural information systems for rural development link institutions with people (the end users of knowledge and information, who are agricultural producers) to promote learning. The publication ‘AKIS/RD: Strategic vision and guiding principles’ (FAO/World Bank, 2000) proposes generating, sharing and utilizing agriculture-related technology, knowledge and information in a strategically aligned system (Rivera et al., 2005). This integration is needed now more than ever, as the agricultural and rural context is facing substantial changes.
4.3 The role of the formal AKIS

In almost all of the countries studied, the AKIS is traditionally composed of research, extension and education organizations, structured and governed by the government through a sectoral agricultural policy. The overall goal used to be in all cases to increase the productivity of the agricultural sector, with farms exploited by professional farmers (Proost et al., 2008).

The structure of the AKIS, and in particular how it is organized and governed (public or private structure), differs a lot from one country to another, as well as the level of centralization or decentralization. Diversity can also be found between the different regions of a country (Proost et al., 2008). For instance, in Germany three distinctive extension regimes can be detected: in the north-western Länder, the main extension provider is the Chamber of Agriculture, in the southern Länder this task is performed by the State Agricultural Office integrated either in the Ministry of Agriculture or in a broader-based Ministry of Economy or Ministry of Internal Affairs; in the north-east, extension is outsourced to private advisors and financed through fees and state subsidies.

In general, a high level of fragmentation and a dynamic process of new structures and actors emerging characterize the AKIS in the partner countries. The level of fragmentation and of investment of the central or regional administration and funding seem to be rather different among the countries (Laurent, 2006). We can distinguish:

- Privatized systems (Netherlands, some states in Germany) where the funding mainly comes from direct payments by farmers and where the AKIS is managed by private bodies;
- Co-management between farmers’ organizations and the state (France, Finland, some states in Germany), with public funding, partial payments by farmers and many farmers’ organizations;
- Management by the state with regional organizations (Switzerland, Italy, Finland).³

Generally, public systems face similar problems, like lack of capacity, a role conflict (the same organization as a controller and as an advisor), management and motivation issues, methods and staff qualification, etc. On the other hand, private systems may cause a different set of problems, like closure as sketched out by Klerkx and Proost (2007) in the Dutch country study or unstable employment opportunities for advisers and unequal financial means to profit from extension services, thus favouring large holdings or more profitable farms, as shown by the German country study (Rand, 2007).

³ See the synthesis report of the seven country studies (Proost et al., 2008) for more detailed information.
In several countries, a challenge is to transfer results from research into practice and vice versa (for example, Germany). Coordination within the system is assured in different ways:

- In France, special projects are funded for consortia of research, extension and education organizations. Those projects foster exchange between the different organizations and can increase responsiveness, but they are also time-consuming and more costly because of higher transaction costs.

- In Switzerland, platforms are in place in which actors from research, extension and education as well as committees of the different organizations are present, which reinforces the interaction between the stakeholders.

- In the Netherlands, privatization of the AKIS led to competition. Knowledge organizations are active in research, education and extension. As they are competitors, they are sometimes reluctant to share knowledge. To bridge this gap and to bridge the gap between demand and supply in the market of knowledge, intermediary brokerage structures are funded, often with public funds. Intermediary organizations such as innovation consultants, brokerage organizations and two national innovation organizations (Transforum, InnovationNetwork) play a central role in knowledge demand articulation, network brokerage and facilitate interaction between the actors of the AKIS (Proost et al., 2008).

However, not in every case there are clear links and coordination between the main actors of the system. This is, for instance, the case in Italy where a big discrepancy exists between the official discourse on the one hand and practice and organizational patterns in everyday reality on the other: a network among regions has been set up with the aim to achieve operative synergies, to carry a common methodological path, to join resources in order to introduce common projects with regard to shared issues; indeed, at the moment, regional agricultural service systems are characterized by several common problems: inefficiency of public administration; presence of ‘hidden agendas’ related to the influence of political parties and important lobbies; disproportionate weight of the major farmers’ associations in decision-making and in the distribution of public funding; separation of agricultural policies from other related policies (environment, land planning, health, promotion); lack of effective evaluation procedures; lack of strategic design; subaltern to academic bodies in the definition of research and innovation priorities.

Not all farmers have access to the support services of the AKIS. There are various reasons, such as:

- Farmers cannot afford the services.

- The AKIS does not answer to their needs.

- Farmers are not considered as potential beneficiaries by the AKIS, for example part-time farmers (see also Proost et al., 2008).
Generally, small farms engaged in extensive farming and not reaching a certain level of output find it difficult to qualify for government support and extension programmes largely designed for intensive modes of production. For them is also not viable to use the services of private extension providers, so that they are excluded from every kind of extension. In the same way, in some countries like Germany, areas with more marginal production conditions, multifunctional farms, or farm households with various sources of income and farm households engaged in farm-based processing and direct marketing, can find themselves outside the official innovation and advisory system because they are promoting alternative innovations in areas that have not previously enjoyed sufficient government interest and support.

4.3.1 Innovation consultant organizations

Under the new prevailing liberalization regime, a large variety of private and semi-private organizations providing extension services have emerged. This is the case especially in the Netherlands, but also in Italy, Switzerland and some Länder of Germany. Moreover, there is an increasing tendency of universities (and the more so polytechnics) to enter into the business of extension (Proost et al., 2008).

Country reports show a large variety of innovation consultant organizations. Following the classification introduced by Klerkx and Leeuwis (2008), these organizations can be labelled as:

- **First-level consultant organizations** addressing individual entrepreneurs in the articulation of their innovation needs, helping them to forward demand to suitable providers of R&D and extension service providers;

- **Second-level consultant organizations** giving information, training, specialist support to the first-level consultants;

- **Brokerage organizations** engaged in networking activities, and linking peers or actors belonging to different spheres.

Table 8 shows the representation of innovation consultant organizations in the countries studied and the systemic instruments of innovation support used. Smits and Kuhlmann (2004) argue that the support of innovation processes requires instruments that focus not only on individual organizations or on the relation between two organizations, but also on the higher system levels (Proost et al., 2008).
Table 8. Types of Innovation Consultant Organizations in different national contexts
(Source: Proost et al., 2008)

<table>
<thead>
<tr>
<th></th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Latvia</th>
<th>Netherlands</th>
<th>Switzerland</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-level</td>
<td>Farmers’ organizations</td>
<td>Chambers of agriculture, cooperatives, producers’ organizations</td>
<td>Chambers of Agriculture, cooperatives, producers’ organizations, farmers’ unions</td>
<td>Farmers’ unions, cooperatives, consortia</td>
<td>Producers’ organizations</td>
<td>Private and public/private organizations, private consultants</td>
<td>Cantonal extension services, consultants</td>
</tr>
<tr>
<td>consultant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second-level</td>
<td>Polytechnics</td>
<td>Inter-professional bodies</td>
<td>(KTBL, Association for Technology and Structures in Agriculture), polytechnics</td>
<td>Regional agencies, training organizations, universities</td>
<td>Polytechnics</td>
<td>Private/public organizations, research centres, regional training centres</td>
<td>Cantonal extension services, consultants</td>
</tr>
<tr>
<td>consultant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brokerage</td>
<td>Centres of expertise</td>
<td>Clusters</td>
<td>Clusters, advice circles</td>
<td>Regional agencies, NGOs</td>
<td>NGOs</td>
<td>Private/public organizations</td>
<td>NGOs</td>
</tr>
<tr>
<td>organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systemic</td>
<td>Inter-professional</td>
<td>Clusters</td>
<td>Clusters</td>
<td>Regional agencies</td>
<td></td>
<td>Private/public organizations</td>
<td>Inter-professional bodies</td>
</tr>
<tr>
<td>instruments</td>
<td>bodies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3.2 Support system networks

Support systems are not only about material flows, they also channel information flows. The manufacturing enterprises of technical inputs (such as fertilizers and agricultural machineries) increasingly turn their commercial networks into knowledge systems. More and more, input suppliers tend to strengthen customers’ loyalty by giving advice to farmers on how to better position themselves in the market, thus setting up longer-term relationships through consolidated networks. This is particularly relevant in countries where extension services and cooperation are weak, like in Italy, and in industries that are more dependent on a strong vertical coordination, such as animal production or in agro-food processing. But also in countries like the Netherlands with a solid extension system input suppliers are important in the advisory market. Suppliers are seen as knowledgeable and their knowledge and advice as up-to-date (Proost et al., 2008).
Producers’ associations and cooperatives collect, process, and market agricultural products delivered by their associates, and quite often they provide inputs together with input-related technical and strategic advice. They carry out research, training and advice related to the product, and increasingly also to the business. Moreover, they can apply for PDO, PGI and TSG recognition. Producers’ organizations give support to their members and lobby for their interests. Often they constitute second-level ‘umbrella’ organizations to have a voice in national or supranational contexts.

Processing and retailing companies are among the most important drivers of innovation. In particular, retailers tend to control producers through labelling schemes. However, as they are the interpreters of consumers’ needs and motivations, they tend to pursue a top-down, market-driven approach to innovation, and therefore reduce the possibility for farmers to follow independent innovation paths.

Other important sources of innovation are geographical certification consortia, particularly relevant in France, in Italy and in Switzerland. In order to label their products as PDO or PGIs, producers have to follow specific codes of practice, whose enforcement and modification is in the hands of producers’ consortia. Contrary to retailers’ codes of practice, geographical indications imply a greater participation of farmers, who generally are represented in consortia boards together with other actors in the chain.

### 4.3.3 The importance of (informal) knowledge networks

In the last twenty years, agriculture has undergone a structural change: the crisis of mass production, the increasing significance of quality and safety problems, the income decline, the new demands of society to agriculture have given new impulse to the growth of different agricultural development trajectories. Farming has been diversified through the valorization of local resources, assuming a more multifunctional role and increasingly integrating into the rural context. At the same time, the evolution of the role of agriculture and rural areas has favoured the emergence of new stakeholders, claimed for innovation to meet their needs, and the development of new networks (between farmers, between farmers and institutions, and between farmers and consumers), modifying the pre-existent relationships among the actors, both at local and national level.
In several countries (e.g. Italy) formal AKIS/RD systems, designed around the paradigm of productivist agriculture, fail to correctly address the needs of the multiplicity of new actors and instruments. Consequently, they reveal themselves inadequate to the mission of anticipating problems and opportunities, and preparing farmers and other rural actors for managing change. In this context, farmers and other people or organizations dealing with agricultural and rural issues have started organizing themselves spontaneously in order to solve their problems and those of rural communities.

These processes can generate endogenous innovations, or novelties, that can steadily be strengthened to develop into niches. Conventional AKIS are unable to meet the needs for learning and innovation. One may observe that new knowledge networks and systems emerge around ‘novelties’ (unstructured networks). Only after some time (once the novelties have developed into ‘niches’) they qualify to get support. A typical example of this is organic farming. In its beginning stage, farmers created self-organized networks to circulate information, to carry out learning activities, to link up with consumers and to lobby (Proost et al., 2008).

Other examples of knowledge networks are study groups, which have a long tradition in the Netherlands and now are developing in other countries. These farmers’ learning groups are systems in which members with a similar farming experience or problems form an association that employs one or several extension agents (Proost and Van Weperen, 2006). This form of extension provides them with a comprehensive analysis of their farm, advice on production and marketing, and information about employment of new production techniques (Kidd, 2000).

Interaction-based learning processes, carried out in an informal network, empower actors and allow them to create a non-competitive learning context that produces higher-degree knowledge processes. They allow the explicating of tacit knowledge through experience sharing (learning by doing and peer-to-peer exchange) (De Wolf et al., 2006).

### 4.4 Bringing actors together: the role of formal and informal networks in innovation

The actors linking knowledge and innovation are numerous and of different kinds: national, regional and local administrations, farmers’ unions, advisors, farmers, non-farmers, associations, NGOs, consumers, and so on. They are positioned in different slots within the innovation system, and can be both inside and outside the official discourses. They have different interests and objectives and can belong both to the public and the private domain. However, their action converges towards the production of innovations. The IN-SIGHT study allows identifying certain conditions under which such interaction is most conducive to innovation.
A professional and well-educated farming community can explain the performance of some innovation systems, such as in Switzerland and in the Netherlands. Also the presence of well-trained advisers is a point of strength, as illustrated by the French case (Proost et al., 2008).

Some reports mention the vitality of actors and initiatives outside the official discourse, as in Italy, where producers’ networks and rural communities carry out initiatives directed at shifting the food sector from a conventional system to a more re-localized and farming regime, or in Finland, where Church communities are involved in local development.

A plurality of organizations involved can be a point of strength, as they may develop complementarities and efficiency. This was shown in the Latvian case study on new rural services.

However, when the working environment is too extended (as in the Netherlands) or too limited (as in Finland), risks of inefficiency emerge, related to a tendency to withhold (rather than share) information (Proost et al., 2008).

Actors can be analyzed in socio-technical networks across different levels of innovation (micro, meso, macro), which correspond with the scale of innovation (novelty, niche, regime or landscape; see also Brunori, Rand and Proost, 2007). The concept of a socio-technical network has been adapted in the course of the in-depth studies, making a distinction between four types of innovation actors from different systems: socio-economic, public decision-making, information and knowledge, and – finally – end users. They are linked to each other through artefacts, norms, rules, etc. (see figure 9).
In our case studies, actors of the socio-economic system generally initiate innovations. As they are searching for possible solutions in response to emerging problems, or as they see an opportunity, an idea can emerge. This idea can become reality thanks to common goals with potential end users, giving birth to a novelty.

In alternative food marketing strategies, for instance, farmers and consumers actively shape the process – re-organizing the physical and relational space of food markets, and contributing to the change on the basis of their specific needs. Farmers show an increasing awareness of the need to find new solutions to the increasingly difficult situation in which they are (low profitability, weak bargaining power within the chain, difficulties in accessing the conventional channels for farms of small size, etc.). On the consumption side, new attitudes, behaviour and needs are emerging as an effect of important transitions in consumers’ perception of food and farming (Brunori, Guidi and Rossi, 2008).

Much of the potential of development of these initiatives lies in building new relations through which a large share of ‘tacit knowledge’ can be made explicit and shared with other entrepreneurs. These networks, wherein learning and societal embedding processes are activated, are labelled as niches (Brunori, Rand and Proost, 2007).
During this process of the ‘disclosure’ of novelties into niches, actors from the public decision system or from the formal information and knowledge system can be mobilized to assume a supportive role.

Innovation develops through a progressive aggregation and reciprocal adjustment of roles and identities between actors of different systems. Once consolidated into systems, first networks can act as actors in higher-level networks. As long as niches develop and consolidate, they modify the networks in which they operate, and challenge dominant rules, actors, and artefacts by putting pressure on them (Brunori, Rand and Proost, 2007).

The model, adapted from the transition school (see e.g. Geels, 2004) suggests that radical innovation may proceed as progressive embodiment of new ways of doing and thinking into higher levels of aggregation (Brunori, Rand and Proost, 2007).

At the first stage of innovation, during evaluation of the context, we see a search for alternatives, consideration of problem-solving and opportunity-taking activities for an idea to be realized, and several ‘filters’ need to be cleared: we call them feasibility filters (figure 10). Most of the time, innovators do not realize that they go through those filters, in particular when they are close to a novelty. Those filters become clearer in the context of niche or regime, because there is more conducive context and support to link with.

![Figure 10. Innovation filters at novelty stage](image)

**Figure 10. Innovation filters at novelty stage**
The idea for a novelty spreads throughout actor networks, to the level of structuring the present socio-technical system. As innovations are replicated or redeployed, the socio-technical system becomes more structured (figure 11). When rules have become established and have more structuring effects, a regime emerges.

The figure presents one of the main research findings that actor networks saturate during the development (both scope enlargement and scaling-up) and new categories of actors and their partnerships are involved in the process.

![Diagram](image)

**Figure 11.** Structuring of the socio-technical system during the development of innovations
(Based on Brunori, Rand and Proost, 2007)
At the novelty-niche level, indirect and direct support measures are useful, for instance from information and knowledge actors as well as actors from the public decision system. Measures should support the ‘culture medium’, entrepreneurship competences, participative research, etc. On the other hand, information and knowledge actors (especially extension services or farmers’ associations) could hold an important role in organizing, stimulating, and developing the strategic management of niches (for instance, facilitating the establishment of social networks or supporting the dialogue with public administration for the creation of ‘protected spaces’ in which experimental projects can be carried out, etc.).

For a niche to flourish and spread out, it has firstly to be recognized as interesting to other actors. Measures like experience sharing and adaptation of laws can be useful.

There are different ways of innovation transfer (top-down, bottom-up, networks, territorial diffusion), and different levels of innovation diffusion and actors in the process. Figure 12 and table 9 provide examples of typical actor involvement in innovations in direct marketing, environmental technologies and new rural services. It is characteristic that in the emergence phase the producers-consumers/users interface plays a central role in direct marketing, as well as for new services. In the field of environmental technologies, local and regional authorities and research institutes/technological agencies are also among the initiators. As innovations enlarge by scope and scale, policy actors, NGOs and knowledge support institutions join the process.
A general trend has been observed in most of the countries studied, namely the creation of innovation agencies at regional level, aiming at the support and further development of innovations. Different types of agencies are described in the country reports: incubators, facilitating the development of innovative enterprises with infrastructures, business support, R&D (the focus normally is on the novelty/niche stage); technology transfer and contact points, facilitating coordination and cooperation between enterprises and R&D providers, peer-to-peer exchange, etc. Those organizations work as intermediaries, brokers, and facilitators (the focus is on the niche or regime level).

Examples are poles of excellence in France, technology transfer centres in Switzerland and Germany, T&E centres, regional centre of expertise in Finland, etc. (Proost et al., 2008).

The country reports suggest other types of support alongside with the distribution of information, such as peer learning amongst farmers in the Netherlands and long-term mentoring of entrepreneurs in Finland (Rantanen and Granberg, 2008).
Table 9. Main actors and the role of AKIS

<table>
<thead>
<tr>
<th></th>
<th>Novelties</th>
<th>Niches</th>
<th>Regimes</th>
<th>Landscapes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main actors</strong></td>
<td>• Producers-consumers</td>
<td>• AKIS</td>
<td>• Local development system</td>
<td>• Governments</td>
</tr>
<tr>
<td></td>
<td>• Farmers</td>
<td>• Local policy makers</td>
<td>• Regional partnerships</td>
<td>• EU</td>
</tr>
<tr>
<td></td>
<td>• Entrepreneurs</td>
<td>• Development agencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Innovation leaders</td>
<td>• Networks of initiatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Volunteers</td>
<td>• Cooperatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local authorities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Role of AKIS</strong></td>
<td>• AKIS is never really involved at the begin-</td>
<td>• In case of scaling-up</td>
<td>• New innovation support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ning of innovation (novelties); Projects re-</td>
<td>AKIS is often present</td>
<td>infrastructure stands apart from</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ceive no real support and are mainly self-orga-</td>
<td>• Official innovation</td>
<td>rural innovations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nized and -managed</td>
<td>system does not give any</td>
<td>• Innovations often occur</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>kind of direct support</td>
<td>in spite of conventional</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>regulatory and institutional</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>framework</td>
<td></td>
</tr>
</tbody>
</table>

The role of the AKIS and of other actors of the knowledge sphere – universities, research institutes, laboratories, innovation support centres and agencies, advisory centres, etc., has been contested in the IN-SIGHT project, and gaps in knowledge flows have been identified.

The major shortcomings identified are:

- Certain disconnectedness of the institutional knowledge system from innovation processes and information flows;
- Fractured and weak AKIS in relation to innovations, especially with regard to the emergence phase and needs and ‘cutting-edge’ innovations towards regime change;
- Remoteness of the institutional domain from the actual innovation processes;
- AKIS action is insufficiently oriented towards territory.
On the one hand, certain parts of the knowledge system are quite advanced (such as universities, laboratories, research institutes), but they have difficulties in responding to the demands of rural innovators and respectively the innovation process is interrupted. Other knowledge and educational institutes like agricultural schools/colleges have a strong sector orientation and are standing apart from the innovation agenda and needs. On the other hand, farmers, producers, processors and other actors across the agro-food chain, who create innovations, have established their own quite efficient knowledge networks with peers and private consultants and bypass the ‘official’ AKIS as primary source of information and advice. The IN-SIGHT study confirmed the gap identified by previous discussions between advisory services/training and farmers/rural actors’ needs and willingness to diversify business. As part of the recommendations, a plea is made to bridge this knowledge gap.

In the direct marketing case studies, the official AKIS was never really involved at the beginning of the innovative processes, and is still not involved as innovation remains a novelty or develops by diversification. In all countries studied, the exploration of tacit knowledge, personal experience, and horizontal networks between producers are very active components at the beginning of the innovation process. In France, for example, farmers themselves built the first collective shops. The first spreading is between farmers, without any framework. Strengthened by the positive experiences of pioneers, other producers decided to test the new form of marketing, with no external help. In some cases, farmers have created associations to help other producers to develop the innovation. In Italy, the solidarity purchasing groups represent a marketing innovation fully starting from spontaneous consumers’ initiatives, self-organized and self-managed within self-induced networks. In the case of ‘scaling-up’, agricultural extension services and, more general, the innovation systems are often present, with important differences between regions and projects. Recently, the national Dutch government created a ‘Taskforce Multifunctional Agriculture’ to stimulate professionalizing and scaling-up of multifunctional agricultural activities. The aim of this taskforce is to support several collective initiatives of rural entrepreneurs, taking a process approach as starting point (Dockès et al., 2008).
The bioenergy case studies show more examples about the weak involvement of formal information and knowledge actors in innovation activities, especially at the stage of emergence. In several countries (France, Germany, Switzerland), specific knowledge centres have recently been created at the local/regional levels to provide information on renewable energies, but they are usually not linked to the traditional agricultural knowledge and information systems (AKIS), although the latter are rather developed and well-organized in the countries studied. AKIS seem to be little involved in the bioenergy field, except in biofuel production (they motivate farmers to get involved in biomass production for biofuels and to improve the cultivation and harvesting technology). In Finland and Latvia, the agricultural knowledge system is less organized, not really involved in bioenergy, and there are no specific advisors. Only in Italy, the agricultural knowledge system seems to get involved in these issues. Alternative NGOs (France and Italy) and farmers’ cooperatives (Latvia) are sometimes set up to manage energy chains at local level, or simply provide information (France) (Rand et al., 2008).

4.5 Social dimension of innovation and importance of social capital

It is increasingly recognized that innovation involves not only technology, but also implies a social dimension, and that both of them are intertwined. As the case studies in the three rural development fields witness, networking and social learning – as social mechanisms for the implementation of new practices – are important to any innovation.

The social dimension of innovation manifests in two ways – (1) as social relations and organization of networks of innovators and (2) as values and objectives underpinning innovations. Implementation of any new technology requires respective rearrangements in social organization, norms and values. More and more innovation regards strategy, marketing, organization, management, and design (Brunori, Rand and Proost, 2007) transforming social relations. Innovation itself can be of a social character finding expression as new arrangements of social roles, relations and functions. Innovations can be aimed also at meeting social needs. Innovations are implemented not only for personal reasons, but also for the benefit to local societies and regions in general (defined as social innovations). The social ideas, common good and public benefits incorporated in innovations connect them with rural development objectives. Responding to social demands increases innovations’ sustainability: it reduces the risk of burnout or fade-out (Proost et al., 2008).

In most country studies on national innovation systems, a tendency of preferring technological innovations with economic achievements was identified in national policies. These initiatives are well integrated in the national systems. In the meantime, there are many new initiatives carried out which illuminate the importance of social innovation, witness that social sustainability is often even a prerequisite of innovation and demonstrate that human, social and educational
components are essential to implementing innovations. Nevertheless, the social dimensions of innovations are less recognized yet in innovation systems and policies which are mostly urban-centred, science- and technology-oriented (Proost et al., 2008).

Although entrepreneurial individuals often initiate innovations, they are a collective venture that demands cooperation, fine-tuning of interests, shared goals and an agreed strategy. Recent innovation studies underline that innovations occur in hybrid networks; they are the outcome of collective action and depend on the social structure in which innovators operate (Brunori, Rand and Proost, 2007). All of the initiatives analyzed in the IN-SIGHT project demonstrate the network character of innovations: they are constellations of various agents and their interactions. Those innovations have emerged within local or regional networks and they involve intensive networking processes, often accompanied by the creation of new networks (associations, partnerships, alliances etc.) or extending existing ones. Acknowledging the social and collective dimension of innovation and its network character brings social capital to the forefront of innovation processes, as it is the cementing and animating element of networks. High social capital in the form of norms of reciprocity and networks facilitates (economic) cooperation (Putnam, 1993a), whereas low social capital is a barrier to community development processes. Therefore, the emergence and development of innovative initiatives is highly dependent on the stock of social capital at the community’s disposal. The initiative studies in the IN-SIGHT project manifest in several ways how social capital influences innovation processes.
4.5.1 Detection of innovation

Social capital facilitates the development of innovative ideas and the initiation of innovative projects. Many innovations emerge at local level, and innovative ideas are often extracted from local networks. There is a great variety of formalized networks: interest groups, NGOs etc. operating in the countryside (environmental, hunting, animal welfare, food, consumers’ groups, village associations, church and religious groups, etc.), which provide ideas and motivation to innovate, and particularly are adequate to performing brokerage activities (Proost et al., 2008). In interaction with initiators, local agents identify common problems or opportunities and search for solutions. Common interest regarding certain (problem-) situations helps to crystallize innovation. For instance, many direct marketing initiatives arise at the intersection of consumers’ common aspiration for safe, healthy and natural food and farmers’ search for alternatives to industrial food chain market solutions. These initiatives are found on the basis of shared values and goals intercommunicated during intensive horizontal networking between producers and consumers at the beginning of the innovation process. The informal networks bring new skills to farmers and support the emergence of the projects. The new skills and the new ways of thinking are elaborated in an informal way (Dockès et al., 2008). In the bioenergy sector, in turn, policy actors who are motivated to find alternative energy solutions often promote innovations. Nevertheless, by local networks innovative ideas are caught up and disseminated, they configure these ideas according to local conditions and find local applications.

Through local networks, local/regional resources are better incorporated in innovative projects. Local embeddedness – local origin of innovations or their adaptation to local conditions – lead to better valorization of local resources and have a more synergetic impact on local rural development. For instance, local entrepreneurs in the Latvian Aabava valley try to specify and develop new products and services based on local natural and socio-cultural resources. Such innovations have positive effects also on farm diversification, multi-functionality of agriculture and the local economy in general (Rantanen and Granberg, 2008). In chapter 5 the concept of embeddedness will be elaborated in more detail.
4.5.2 Establishment of innovative projects and making them work

The implementation of an innovation demands the construction of new networks or the reorganization of existing ones. In order to attract new agents, bonding and bridging social capital is actively used among innovators. Often, community leaders mobilize others to join the network. In the development of rural innovations often-new actors come into play, which have to find their way in an innovation system. Also conflicting and negotiation phases are essential to innovation processes where people have to find consensus (Proost et al., 2008). Common goals, shared values, links, and networks help to reach agreement also along the whole food chain, both within farmers’/producers’ communities and between various food chain agents, which is important in order to ensure also economic success. For instance, solidarity-based purchasing groups in Italy demonstrate that intensive relationships within citizens’-consumers’ organizations and between these and farmers are essential to the success and the sustainability of the alternative food system (Brunori, Guidi and Rossi, 2008). Examples of Dutch collective direct marketing initiatives show that often too little interaction exists between the different parts of the production chain. This results in only little information exchange and little interest, especially among wholesalers and retailers and reduces the production’s efficiency (Dockès et al., 2008).

Often, a collective organization in the market takes on the form of a cooperative. The various benefits of cooperation are demonstrated by the Dutch collective marketing initiative. ‘The cooperation provides the farmers with a distinctive assortment, making their shop more interesting for costumers. Furthermore, it enables collective advertising and thus makes the different stores easily recognizable. Cooperation is more efficient due to the joint distribution. This reduced distribution cost results in a higher profit for the producer and a better position in the (inter)national market’ (Dockès et al., 2008). From the experience of the Latraps bioenergy cooperative it can be added that cooperation gives access to new markets and facilitates knowledge generation and exchange (Rand et al., 2008).
4.5.3 Facilitation of knowledge processes

Innovations are knowledge-intensive processes: in order to implement new practice, new skills and knowledge have to be developed. However, the initiatives studied witness that AKIS are often inefficient in providing local actors with the knowledge needed both because of lagging behind in the updating of knowledge and the shortcomings in the organization of knowledge dissemination. In the meantime, tacit and local knowledge is intensively applied in innovations in parallel to codified knowledge, and networks prove to be an effective alternative in the generation and dissemination of knowledge. Networks are spaces where (social) learning and knowledge exchange and accumulation happen. The links and interactions between actors serve as knowledge infrastructure. They are an immanent part of tacit knowledge. Embedded in local social and cultural contexts, it is built through direct experience (learning by doing) and its transfer requires physical presence and face-to-face interaction (Brunori, Rand and Proost, 2007). In order to successfully implement learning about new practice, a sufficient level of trust and shared rules and norms among the agents involved is indispensable. The long tradition of farmers’ study groups in the Netherlands demonstrates the efficiency of informal learning. Farmer-to-farmer study groups generate knowledge and information faster than formal research institutions. Farmers’ learning groups are popular as spontaneous self-organized gatherings, while advisors and researchers use them as an efficient way to get into contact with farmers. Farmers’ groups have an enormous potential for innovation, when the learning goes beyond reflection on accumulated data, and reach a shared commitment to collective action (Proost et al., 2008).

The role of informal networks in the provision of knowledge is of particular importance, especially at the novelty stage of innovation and in those fields where there is no codified knowledge available yet. For instance, the case studies in the rural services sector show that non-governmental organizations and informal networks are the most important and often the only supporters of knowledge. Engagement in such networks increases the competitiveness of small businesses as it is easier for entrepreneurs to find know-how through networks than to act alone (Rantanen and Granberg, 2008). Similarly, also direct marketing and bioenergy initiatives confirm socio-technical networks that have evolved around local projects as knowledge providers.
4.5.4 Dissemination of innovation

By facilitating the exchange of information, knowledge and positive experiences, social capital is also contributing to the dissemination of innovation. New forms of practice spread faster among agents who are considered reliable and are interactive; often they are core agents and community leaders. For instance, solidarity-based purchasing groups (SPGs) in Italy have spread quickly through word-of-mouth advertising. The first SPGs, in turn, have relied on existing experiences, such as fair trade organizations, political groups, international cooperation, cooperatives etc. (Brunori, Guidi and Rossi, 2008). Trust-based relations encourage the engagement of new actors, thus providing also the access to resources – information, knowledge, funding, equipment that is necessary for the scaling-up of innovation.

In order to stabilize innovation, there is a need to strengthen it in the broader socio-economic arena. Therefore the ability to represent and lobby innovators’ interest is crucial. Organized and institutionalized forms of social capital – associations, NGOs, partnerships, producers’ organizations etc. – play an important role in supporting and lobbying innovations. Often they constitute second-level (‘umbrella’) organizations to have a voice in national or supranational contexts (Proost et al., 2008). As it is demonstrated in the Italian case of solidarity-based purchasing groups, organized consumers can become political actors who are potentially able to affect discourses and politics on food and thus change also the power structure of food systems and the position of food in the culture and life-styles of society (Brunori, Guidi and Rossi, 2008). Organized interest groups can both impede developments (for example, restrictions related to natural parks, biodiversity and agriculture) and enhance changes (an example is the installation of wind turbines in rural areas). They are powerful and able to make laws change, to develop new public credit schemes, to foster research and development and to block concrete projects or laws formulated by other actors (Proost et al., 2008).

4.5.5 Contribution to local development

Belonging and being linked to local community is a strong motivating factor to participate in local development. Behind personal reasons and interest to innovate, often innovators also have in mind local community and territory development, an improvement of local socio-economic conditions. For instance, farmers from direct marketing initiatives stress a more idealistic motivation of promoting local production and marketing, as a way of preserving their village identity (Dockès et al., 2008).
Some innovation initiatives include a broad representation of various social groups and sectors. Their presence and involvement facilitate the social legitimization of the innovation and sharing its positive outcomes in broader society. Networking and participatory approaches are mechanisms leading to this representativeness and social embeddedness of innovation. For instance, the decision-making process concerning the small-scale collective heating biomass plants in Italy were featured by a bottom-up approach that actively involved local actors by means of public meeting and discussions, round tables, etc. The participatory approach enhanced the sense of commitment of the initiators and the positive outlook of the project (Rand et al., 2008).

Local communities and rural areas benefit more from innovations if the latter are locally/regionally embedded. As such they contribute to the creation of new jobs, raising the income of local actors, diversifying the local economy, knowledge development, valorization of local resources, and maintenance of traditions. In order to achieve support for the project from the local community, the interest from the side of local agents and a bottom-up participatory approach should be encouraged (Rand et al., 2008). This requires respective skills of cooperation and participation from the side of local agents.

Innovation and social capital are intertwined. Social capital stimulates innovation, whereas innovation processes improve social capital by providing a basis for establishing new links, stimulating new interactions, creating new networks or extending existing ones, developing common understanding etc. Social capital is intrinsically interwoven with the dynamics of innovation. It is present at all stages of innovation – novelty, niche, regime and landscape. Through networking where the exchange of ideas and knowledge takes place, social capital facilitates the emergence of innovative ideas and initiatives. Mutual trust, shared norms and knowledge help to consolidate the initial project. Through dissemination of the innovative practice social capital facilitates its repetition and multiplication, and therefore leads to scaling-up at niche and even regime level. To have an influence at regime level, a high degree of organization and representation of innovation at policy level is necessary. Organizing innovators’ interests formally helps to access policy and decision makers.

Different paradigms of rural development include also different organizational and behavioural patterns. The conventional model involves linear, vertically integrated, top-down approaches to knowledge transfer and innovation support where potential innovators are targeted individually. The new rural development paradigm takes more into account the plurality, networking, participation, and integrative, systemic character of innovation. It requires also respective (new) skills, action and resources from the side of rural innovators: cooperation, self-organization and participatory skills, active learning, access to networks etc. that largely depend on the social capital at their disposal.
4.6 Conclusions

At the preliminary stage of innovation, when novelties are created, actors operate in small informal networks where they generate endogenous innovations. It is in these networks that first experiences are shared, knowledge is exchanged, and implicit knowledge is made known by finding a common language. This process of discovery and gaining confidence sometimes challenges the existing rules. From various field studies carried out in the IN-SIGHT project it was shown that the institutional structures of the AKIS and of advisory services, often don’t match this informal vagueness, and gaps in knowledge flows have been identified. However, innovators can be helped in this early phase. Innovation observed as a learning process creates various options for a supportive role of advisors. To be successful in that role, advisors and others integrate their services into the endeavours of the innovative networks. As innovations grow into niches and expand, their role can become more proactive. A special point of attention was identified in the lack of access to support services for specific groups of farmers, as government support and extension programmes are largely designed for intensive modes of production. Innovators with promising ideas often find themselves outside the official innovation and advisory system. A high level of fragmentation characterizes the AKIS in the partner countries, and a dynamic process of new structures and actors is emerging. This changing situation offers challenging opportunities for new ways of stimulating innovations, in new actor constellations. In countries where extension services and cooperation are weak, industries and suppliers already are assuming this role.

Networks can be strong at the early stages of innovation processes because of the trust and social bonding innovators find in these groups. Social capital and agency are vehicles that can be used to bring innovative ideas into operation. However, outsiders cannot create them in a supportive role. The social dimension of innovations manifests also in the form of the values and objectives underpinning innovations. Implementation of any new technology requires respective rearrangements in social organization, norms and values. Responding to social demands increases innovations’ sustainability. Local embeddedness of innovations leads to better valorization of local resources and has more synergetic impact on local rural development. The next chapter on embeddedness will elaborate these components of innovation processes in more detail.
5 Systemic, cross-sectoral and territorial aspects of innovation processes

By Gianluca Brunori, Jet Proost, Leo Granberg, Talis Tisenkopfs, Karlheinz Knickel and Christele Couzy

5.1 Embeddedness in the territory

The increasing concern with the environmental impact of industrial agriculture, the quality of life of the rural population, rural employment, and a growing demand for agricultural patterns that improve the countryside instead of damaging it has deeply modified the political discourse around agriculture. Most emphasis is now put on rebalancing and integrating agricultural policies (which have a sectoral focus) with rural development policies (which have a territorial focus). This change of emphasis implies that there is a growing recognition that (a) innovation in agriculture does not necessarily have a positive effect on rural areas, and that (b) there may be a potential conflict of interests between ‘demand-driven’ innovation and public goals.

All of these changes have relevant implications for innovation policies, and ask for a reformulation of the concept of rural innovation.

First of all, innovation involves much more than only technology: it increasingly regards strategy, marketing, organization, management, and design. Farmers looking for alternatives to industrial agriculture don’t necessarily apply ‘new’ technologies: their novelties emerge as the outcome of ‘different ways of thinking and different ways of doing things’, as in the cases illustrated by Ploeg et al. (2004), and in recombining in an innovative way different pieces of knowledge.

Farmers’ markets reconfigure the roles between consumers and producers, and trigger learning processes of all actors involved that eventually lead to new production and consumption routines (Dockès et al., 2008).

Second, rural innovation does not occur only within farms, but may involve a plurality of actors and reconfigure outside relational patterns.

The case study of Camporgiano shows that the introduction of a biomass heating plant into a small community has been obtained thanks to the involvement of a large number of actors.
As a consequence, pursuing rural development implies broadening the scope and the targets of intervention, shifting focus from farmers to rural – and even urban – groups (of which farmers may be an important subgroup) and from private goals to public goals.

Most short-chain initiatives show a strong involvement, in some cases as initiators, of consumers.

> Figure 13. Actors involved in the introduction of a biomass heating plant in Camporgiano, Italy (Brunori and Neri, 2008)

In the Solidarity-based Purchasing Groups (SPGs) case study, organized groups of consumers establish direct relationships with farmers, in a collective form, on the basis of shared principles of responsibility for food purchasing choices and solidarity. The interest of this kind of experiences lies in their absolutely spontaneous nature, the impressive growth of their number in few years (the early experiences of SPGs appeared in 1994), as well as their capability to favour the growth of other kinds of civic engagement, inspired to principles of solidarity, environmental sustainability and social justice (Brunori, Guidi and Rossi, 2008). In Switzerland, the pioneer initiatives of community-supported agriculture (CSA) seem to have not involved farmers as such, but were rather based on the establishment of a productive system by the consumers themselves. In most of the CSA initiatives, there are consumers-members who are directly involved in the organization, the logistics of delivery, the definition of the objectives, etc. (Barjolle et al., 2008).

---

4 It is not possible to calculate the number of these groups, because of their absolutely informal nature. At an estimate based on the comparison of different informal sources, it indeed seems that in Tuscany alone there are about 100 SPGs.
Third, rural innovation assumes the shape of new social patterns aimed at improving service provision or at responding to emerging social needs. ‘Tandem operation’ projects (Moseley, 2000), providing separate and distinct services jointly (e.g. village halls with post offices, milk delivery/cheque cashing service, delivery service/passenger transport) are only some of the many examples.

In Eastern Finland a joint company of nine small local enterprises acts in social work and well-being services, supplying housing services for disabled and young people, nursing home services for elderly people, podiatry and home help services. The founding of the network relates to the wider problem situation of the Finnish rural areas: the changes of the service structure, the age structure of the population and the supplying of services to sparsely populated rural areas. Also the economic situation of the municipalities is in crisis in many parts of rural areas. Traditionally, the public sector has produced all basic services of the welfare sector. Now there is a change of thinking. Municipalities are gradually buying more and more services from the private sector. The new joint company produces support services for the individual member companies and allows, in turn, the member companies to concentrate on developing their customer service. Other benefits are increased visibility of the activities and gaining more negotiation power when negotiating for the long-term contracts with municipalities. It is easier for the municipalities to negotiate with a company that has the possibility to produce many different services than to negotiate separately with many small companies. The joint company also facilitates the division of work between companies and provides help through mutual companionship (Rantanen and Granberg, 2008).

Innovations such as those featured above take account of the changes affecting rural society and the new expectations of people living in the area. They have been adapted to the local population and the use of model projects is only possible if one takes the specific context into consideration, since they are realized by recombining information, practices, resources, knowledge and skills from local networks. Therefore, they are closely dependent on their embeddedness in the social context and often require a change in the basic strategies for societal organization to be successful and sustainable.

The concept of rural innovation implies a different understanding of the resource and knowledge base of innovation. Whereas the green revolution paradigm implies a strong emphasis on industry-generated knowledge embodied into technological artefacts (seeds, machines, chemical inputs) and substantially inaccessible by users, the multifunctionality paradigm is strongly based on ‘endogenous resources’ (such as natural, social, human and cultural capital of the territory) and on the importance of different types of knowledge.

In different regions in France, local stakeholders wanted to maintain hedges for environment and landscapes; however, the traditional use of the hedge wood in log seemed not fit for a modern way of life or only for auxiliary heating. Farmers, individuals and communities, helped by public funding, bought new boilers and wood choppers (coming from Northern Europe and forest) that permit to feed the fire with little handling (Guillaumin, 2008).
In the French case, innovation lies less in the use of new boilers and wood choppers, but rather in the consideration of hedges as a resource, both for the farm and for the community, which broadens the functions that farms can fulfil.

Growing empirical evidence shows that rural innovation is locally built, small-scale, strongly embedded in local networks. Innovative initiatives are based on intensive networking processes, often accompanied by the creation of new networks (associations, partnerships etc.) or extending the existing ones.

In the Rivier en Land case study, organic farmers of Gelderse Poort started operating together to strengthen their economic position and to improve, at the same time, environmental and landscape elements in the area. Farmers who knew each other before the establishment of the Rivier en Land cooperative changed their relationships and, to a certain extent, also their farming styles. They were no longer only competitors; instead, they needed to see each other as colleagues with a common product. Rivier en Land also tried to invoke changes among actors outside of their direct network making shop-owners and customers aware of the choices they have as buyers (Savelkouls and Proost, 2008).

Innovative initiatives are developed in response to the local demand and needs, and contribute to local economies, not only for direct income and employment generation, but also for the improvement of the image of the territory and of farmers.

Direct marketing case studies in Switzerland and in France show that competition with local retailers or restaurants can be the driver for further diversification (enlargement of a farmer shop which becomes a local supermarket with 80 farmers involved, for example), or for scaling-up (development of many similar initiatives) (Dockès et al., 2008). In the Italian and Finnish bioenergy cases, local municipalities facing the problem of energy provision have initiated local bioenergy production projects (increased demand resulting from the need to heat several new buildings in Camporgiano, or the need to find a new solution for heating a school in Sulkava) (Rand et al., 2008).

In general, innovative activities reduce farmers’ dependence on market returns from traditional agricultural activities.

In the French case on the use of wood-energy from hedges, farmers join to buy wood choppers, to store the chips and sometimes to deliver them. The project, initiated by groups of farmers or local communities, involves many actors including local authorities for heating collective buildings (village hall, swimming pool etc.). The collective projects also involve positive repercussions on the image of the farmers: in the zones where such actions are not set up, the farmers have to face negative reactions from their neighbours when they burn the pruned wood; in addition, private individuals are increasingly sensitive to socially aware ecological arguments and can choose to pay more to have local wood from the maintenance of hedges (prices are not always competitive compared to other heating products), rather than industrial or forest wood that has been transported over a long distance (Guillaumin, 2008).
5.2 From separation of knowledge, local resources and territorial capital to integration: breaking down the barriers

The local, micro level is probably the most appropriate level to pursue integration. In fact, at the local level actors can create room for manoeuvre to break the existing rules and experiment new ones, thus creating novelties. Novelties, in our approach, are new socio-technical patterns not coherent with the existing regime. As they are based on experiments, they are still unstable, and may depend on an exceptional leadership, relevant flows of financial resources from outside, exceptional external contexts (such as the BSE crisis in the 1990s).

Mr. Edvins Balodis is the owner of Zviedru cēpure (toboggan run and winter skiing centre), the largest service enterprise in the Abava valley (Tisenkopfs, Šūmane and Lāce, 2008). He started the business in 1999 when opportunity raised to buy the land on the slopes of Abava river on an auction. He had been engaged in the forestry business before and operated in another region of Latvia. The initial idea was to build a place for tourists. In 2000 his study mate, who is the owner of a winter skiing hill in the Vidzeme region, advised Mr. Balodis to try a similar activity in Kurzeme, thus the winter skiing centre was started. Then the question was to find new activities to offer to customers in summer. The local tourist guide told Mr. Balodis about summer bobsled track that are a tourist attraction in Germany and he went there to study the business. He soon made a decision and concluded a contract with an equipment supplier, the bank agreed to issue a credit (Tisenkopfs, Šūmane and Lāce, 2008).

Novelties are generated through a process of evaluation of local context and search for more satisfying solutions, as represented below. The subject through information perceives the context. Evaluation of this information leads to the assessment of a given situation. If the context is evaluated as source of a problem or an opportunity, the subject starts a process of search, which eventually may generate a novelty.

In the case mentioned just above, one of the driving factors during the inception phase of innovation was the appreciation of local natural resources. Much impetus was given by nature research in the valley and establishment of Abava Primeval protected nature territory. This raised awareness among farmers and local citizens about the values and heritage of the valley, necessity to preserve endogenous resources and also use them in development of tourism and new services. The other strong driving force was cooperation with external actors, who facilitated the recognition of endogenous values and helped to generate first collective activities in nature tourism (Tisenkopfs, Šūmane and Lāce, 2008).
Central to these problem-solving cycles are the cognitive frames of the subject: they allow selection and evaluation of all information. Each problem-solving cycle modifies – reinforcing or weakening – the cognitive frames of the subject, so that new problems, new search directions and new solutions are evaluated according to the new configuration that cognitive frames have taken along with past cycles (Brunori, Rand and Proost, 2007).

Novelties, as said above, are localized ‘breaks of the routines’. This means that novelties reconfigure the hybrid networks wherein they operate. But their further development is limited by compatibility with external constraints, that is with actors, rules and artefacts. Development of biofuels, for example, needs refineries, adapted engines, appropriate incentive or taxation systems, appropriate cultivation techniques and logistics, and consumers willing to switch from petrol to biofuels.

Networks ‘close’ into steady systems when actors’ identities are part of common cognitive frameworks, and when the consequences of their action are largely coincident with their expectations. In a farmers’ market, for example, producers may expect from consumers a more empathic, less bargaining-oriented approach than in conventional supermarkets.

Closure can be accompanied by formalization, as for example the foundation of a formal organization or to the agreement on a written internal regulation of a farmers’ market.

Closure is much easier at small scale rather than at larger scale, and the shift from the small to the bigger can be explained as progressive aggregation of small systems into upper-level networks.
In the Swiss case study, le Jardin Potager, a family interested in organizing a direct supply of organic farming products, in partnership with other families, contacted the initiators of the Jardins de Cocagne, a pioneer initiative of box-schemes in Switzerland, to study the feasibility of that model. But this model was too expensive and it faced a technical problem: no organic plots were found and a conversion to organic took too long (5 years). The family contacted Biovaud, which is the cantonal organization for organic farming. Biovaud put the family in contact with 2 gardeners interested in direct selling. In March 2005, the farmer located closer to Lausanne (in respect with the concept of proximity) was contacted: he was in a conversion process from supplying one of the main Swiss retailers (Coop) to direct selling. In fact, he had interrupted the contract with the retailer because he refused new constraints in the logistics of the supply chain for organic products. He had already successfully developed the selling in open markets and on the farm, and was interested in this new project.

Rip and Kemp (1998) call these small units of innovation niches. They can be defined as socio-technical networks governed by paradigms different from those prevailing in the dominant socio-technical systems (Brunori, Rand and Proost, 2007). They are spaces where norms, rules, routines of production, distribution and consumption are looser, subject to a rapid evolution. This makes new paradigms able to emerge as an effect of learning processes. Therefore niches are incubators of radical innovation (Brunori, Rand and Proost, 2007).

Started in 2006, the membership in the cooperative Le Jardin Potager rapidly became a success, with 260 members in 2007 and sales for over Fr 200 000 (130 000 €) per year. The partnership mainly involves the end consumers as volunteers in the building up and the management of the box scheme. Especially different members of organizations of the social movement have been directly concerned by the initiative, becoming volunteers and members of the box scheme. The organic farmer who is the main supplier of the box scheme has been very active as well, also being supported by an informal network he has built with other organic farmers from his neighbourhood for the exchange of organic products. Also ‘alternative’ farmers’ organizations have supported the initiative by giving information and helping its promotion and its coordination with other existing initiatives (Barjolle et al., 2008).

5.3 From government to governance

The potential for innovations in the agricultural sector and in rural areas develops along three different lines, according to different coexistent paradigms:

1. An industrial, modern type of sectoral innovations, oriented towards large-scale production and export;
2. Innovations aiming at multifunctionality and local products;
3. A post-productivist type of agricultural and rural development with innovations in landscape or territory management.

These options coexist and compete in most of the EU member countries analyzed.
These differences ask for a diversified set of support approaches, like regionally based research, methods of detecting and articulating regional needs, and also of regional innovation potentials.

These changes have shaken the concept of ‘agricultural knowledge and information systems’ (AKIS), originated by an interventionist approach to agricultural policy and based on the idea that, in order to accelerate agricultural modernization, innovation transfer should be strongly coordinated (Leeuwis and Van den Ban, 2004). Research, extension and education (the so-called ‘knowledge triangle’) – the state-owned or state-funded components of the system – have been criticized for being inefficient and bureaucratised, and for not responding to farmers’ needs. The trend towards liberalization has radically changed the system, leading to privatization of delivery, multiplication of extension organizations, farmers’ contribution to the costs, competitive bids to assign research and extension tasks (Garforth et al., 2003; Kidd et al., 2000), and tight evaluation procedures (Brunori, Rand and Proost, 2007).

These reform strategies have led from pure public sector models of agricultural innovation to models based on a plurality of actors.

Different bodies and levels of administration often support different types of innovation. Through public funding, both regional and national governments can have considerable influence on programmes and institutions, if they are open-minded, receptive to innovative ideas (Proost et al., 2008), as in the case of the Hessian Ministry for Environment, Rural Space and Consumer Protection (HMULV) who initiated the innovative Bioregio Holz project (Rand, 2008).

Generally, the linear model is still remaining in official innovation policies but it is balanced/confronted by other approaches. It results in a very fragmented pattern with internal contradictions.

The implementation of innovation policies involves several decision-making levels in all countries studied: European, national, regional, local. The actors involved are very numerous and their number is increasing as the innovation concern diffuses in several policies.

In Italy the producers’ associations, the cooperatives, the Food or Wine Protection Consortia, and other networks like The Cities of Wine (of Oil, of typical products), the Wine Tourism Movement and Slow Food play an important role in valorizing local and typical foods and wine, in promoting wine and taste tourism and in improving the wine/rural areas’ image and prestige, as well as their economic development. The activation of these initiatives stimulates producers to keep more in contact with each other and to start a deep discussion on the problems they have to face (Brunori et al., 2007a).

In some cases, the lack of an effective coordination both among different bodies and administration and the various sources of funding can lead to an overlapping of measures and initiatives with a waste of resources.
In Italy, CAP support to advice to olive growers runs parallel to regional funds for extension services. So far, no integration or joint evaluation schemes exist.

In several countries, it is possible to identify actors not officially recognized as belonging to official agricultural innovation systems, which are able to start new initiatives concerning local agricultural and rural development.

The Finnish Lutheran Church is taking care of deacon work, which plays an important role in the peripheral countryside, amongst others. In the last years, a debate inside the church has concluded that rural development should be one dimension of church work (Rantanen and Granberg, 2007).

When different actors, models and approaches to innovation coexist, the situation becomes rather complex. Actors involved in innovations have to understand the different innovation streams, adapt themselves to different procedures and deal with contradictions they may encounter (Barjolle et al., 2007).

In the Netherlands, privatization of the AKIS led to competition. Knowledge organizations are active in research, education and extension. As they are competitors they are sometimes reluctant to share knowledge. To bridge this gap and to make the demand side meet the supply side in the market of knowledge, intermediary brokerage structures are funded, often with public funds (Klerkx and Proost, 2007).

Because of this high level of fragmentation, different types of innovation may enter into conflict.

In Latvia the spread of new bioenergy crops is aimed at sustainable use of resources, but in the meantime it is stimulating intensification and scaling-up with possible negative environmental impacts (Tisenkopfs and Šūmane, 2008).

The process of ongoing restructuring shows a transformation of national AKIS into network-like innovation structures, each of them pursuing specific objectives and responding to different bodies. As in many sectors of society, there is an increasing need of thinking in terms of governance, that implies vertical and horizontal coordination based on good communication (Proost et al., 2008). In general, increasing attention is paid to coordinating different actors and contextual factors (funding, knowledge, legislation, physical infrastructure) needed for successful innovation, but such changes take place slowly and meet substantial institutional barriers.

In The Netherlands, the government acts as a system coordinator and an R&D and extension market facilitator by funding initiatives that aim at connecting several actors in the knowledge system at several aggregation levels, and with different innovation horizons and complexity levels. However, due to different expectations of actors, different incentive and value and norm systems, and inherent differences due to cognitive and cultural differences, organizing such interaction remains challenging and is not always successful (Klerkx and Proost, 2007).
Stakeholder participation in decision-making is being promoted. According to the study, some innovation systems are controlled by farmers, as in the French Chambers of Agriculture (present also in some states of Germany). In other countries, there is a certain degree of participation of farmers’ unions in decision-making, but this is not always beneficial to the system, as often the most conservative of them prevail.

An important governance scheme is the one provided by the LEADER programme. Under the programme, local action groups have activated innovative projects through competitive procedures, substantially opening the range of services provided, introducing collective approaches, facilitation, participatory research, training-development (Brunori et al., 2007a).

The LEADER project was essential for starting the initiative of a local power plant using woodchips in Sulkava. Without the joint project no individual actor would have had the potential to start developing the activity alone. The project acted as a creator of cooperation among the local administration and entrepreneurs and farmers with forest ownership (Rantanen and Granberg, 2008c).

In the Bioregio Holz Knüll case study, activities aimed at removing limiting factors for biomass production and utilization are partly financed by the LEADER project. These funds will be supplemented by financial support from the federal state of Hesse, the federal government and the municipalities. Examples for the programmes are:

- Hessian campaign for energy saving in old and new buildings
- Hessian programme for supporting rural development in Hesse
- Kreditanstalt für Wiederaufbau (KfW) Programme Ecological Construction (passive houses and energy saving houses; renewable energy-based heating in new buildings)

5.4 Specifics in the governance of rural innovations

There is a variety of organizational models to strengthen links between knowledge production and use. Linear and non-linear models often coexist. Researchers, professionals, civil society organizations or governments can take leading roles in a variety of institutional arrangements. The place of research organizations and the ways they interact with other players also differ from one model to the other. There is a need for a typology of these models and for identifying good practice. In addition, it is necessary to reflect on the respective roles of public and private organizations in linking knowledge to innovation as well as on the regional dimension, taking into account regional dynamic on that matter (SCAR workshop on ‘Strengthening the links between knowledge and agricultural innovation in Europe’, 6-7 October, Angers. First announcement).
The question of governance raises several key aspects:

- Multi-actor involvement (farmers, rural entrepreneurs, public decision bodies, universities and research institutes, innovation agencies, etc.). Some are private or public and mobilize both public and private money;
- Multi-level governance (local, regional, national, EU level);
- Complexity of innovation processes (diversity of driving forces and contextual factors; micro-, meso-, macro-level innovations; scale of innovations – novelties, niches, regimes, landscapes; type of innovations – economic, social, technical, etc.);
- Development, dynamic and path dependency of innovations (from emergence to maturation, evolution and diffusion);
- Interrelation between sectors and institutions (private and public, knowledge and market, agriculture and services, urban and rural, etc.);
- Sectoral and territorial dimensions of governance.

Governance is central to development, maturation, scope-development, efficiency and sustainability of rural innovations. The research evidence from various fields of innovations allows summarizing three principles of an improved governance of rural innovations:

- Removal of territorial and sectoral barriers;

In Germany, resource governance was characterized by increasing functional differentiation, but biomass production has generated new linkages between related policy fields, like agriculture and energy policy, agriculture and forestry, agriculture and biodiversity conservation, energy policy and regional development. This enhances cooperation in rural areas and contributes to opening up economic opportunities beyond the agricultural sector (Rand, 2007).

- Improved coordination, institutional cooperation and arrangement is the way to make rural innovations sustainable and to achieve policy objectives: farmers + rural actors + municipalities + AKIS + informal networks + formal organizations + national level policy institutes + private + public actors, etc.;
The Sustainable Development Plans in France is an experiment at a wide scale that was nationally funded and managed. It involved public and professional research and extension services of many regions. The idea was:

- to formalize a local diagnosis of the main territorial interests,
- to help farmers to build an individual project in order to provide services in line with these local interests and
- to provide follow-up and support the realization of the individual projects.

40 small regions were involved in the experiment. The results were really interesting and led the government to initiate a project of Territory Contracts for Farms (CTE). Thousands of farmers were interested and signed a contract, but the funding of the project didn’t last (Allaire, Dockès and Guillaumin, 2007).

- Territorial perspective and approach to innovations to enhance territorial flows of innovation and integrated development of rural areas.

Some of the leaders of the sustainable development plans used their experience of the subject to build IDEA, a diagnosis tool regarding farm sustainability. It was built by diverse applied research and education services. It’s a tool to qualify a farm with a set of use indicators covering all the aspects of sustainability (Zahm, 2005). All actors interested can the tool freely. Although deriving from the usual networks of extension, it is now quite frequently used, even if it might be criticized for providing an assessment without taking into account a farm’s regional and local context.

### 5.5 Territorial governance

Following the above illustrated approach, an appropriate governance pattern of innovation should be worked out. Analysis should be based on the following questions:

- What balance between and interplay of central/decentralized, public/private structures is the most appropriate?
- Who to involve in the decision processes? (This means defining what Smith et al., 2005, call ‘regime membership’.)
- What are the appropriate knowledge infrastructures? How to set appropriate links between research, training, extension and support systems?
- How to assess the effectiveness and the efficiency of the public policies and supports?
5.5.1 **What balance between central/decentralized, public/private structures?**

Rural innovations, as proved by IN-SIGHT study, are not linear, but systemic and complex. Correspondingly, the governance and coordination related to them should be complex as well. Governance/coordination/improved institutional arrangements are an appropriate way to make rural innovations sustainable and to achieve the policy objectives set.

In general, decentralization is seen as a point of strength of innovation systems, as decentralization allows for a more effective detection of local problems and development of tailored projects. Where innovation policies are more centralized, as in the case of Finland, rural areas suffer from lack of support to problem-solving innovations (Proost et al., 2008).

Therefore, regional governments and other regional bodies are key players in the innovation system as they are close to economic/social realities and because their resource base benefits from decentralization policies. Their role in boosting the mobilization of knowledge for innovation should be more emphasized and publicized. At a regional level it is possible to bridge bottom-up innovations that originate in local practice with top-down approaches, work out a systemic approach, to see failures and identify new instruments.

The Regionen Aktiv programme was launched in September 2001 with the aim to generate innovative approaches for financing rural development. According to Rand (2008), the Regionen Aktiv project has been widely perceived as an important gesture towards rural development indicating that BMELV (Ministry of Food, Agriculture and Consumer Protection) was really committed to the reforms initiated as a result of the Agrarwende. Since the programme introduced an element of competition among the regions participating, many new ideas, networks and partnerships were created as a result (Knickel et al., 2006; Peter and Knickel, 2005).

However, complexities of systems (number of actors, number of fields of intervention, procedures) make efficiency and effectiveness hard to realize. Some country reports have identified a lack of competences and differences in the ability of the regional administrations to manage innovation projects and the R&D resources.

In Italy, education and training are two separate spheres, not only for agricultural matters. Training is under regions’ jurisdiction since 1978; the Ministry of Education is in charge of determining and financing higher education policy (Agricultural Institutes) and vocational education that depend on it; the Ministry of University and Research (MIUR), is in charge of determining and funding university education policy (Agricultural Faculties, Veterinarian Faculties). These three policies are not coordinated.
In general, decentralization is seen as a point of strength of innovation systems, as decentralization allows for a more effective detection of local problems and development of tailored projects. Within case studies, it is possible to find a variety of options regarding type and degree of centralization/decentralization. The latter can take on many forms, depending on provision and funding of innovation support. Anyway, the new model of governance of innovations presumes a multi-actor and multi-level approach (Proost et al., 2008), configuring ‘hybrid governance structures’ (Williamson, 1985; Rivera et al., 2005).

In Germany, the federal system allows for decentralized and yet coordinated action: at the federal level, it is possible to respond to the particular needs of the Länder; at the Länder level, it is possible to concentrate on regional priorities and strengths. In addition to that, lower administrative levels like the counties, districts and communes play a role in the implementation of rural development policies. They can also draw up their own policies outside the given framework and allocate their own funds to these specific goals. Innovation governance is guaranteed through merged competences in the BMELV (Ministry of Food, Agriculture and Consumer Protection). The necessity to support diversification of the rural sphere is translated into a differentiated system of innovation support (Rand, 2007).

In Italy, innovation services are mainly a competence of the regions. Most of them set up Regional Agencies of Agricultural Development and Innovation (RAADI) as technical bodies of the regional administration, who are at the centre of the system. Normally regional laws followed a neo-corporative scheme and a linear approach to innovation. In fact, the system was restricted to a few components, such as the RAADIs, farmers’ organizations’ technical bodies, universities and research organizations located in the regions. The regional approach results in a variety of governance arrangements. In Tuscany, farmers’ organizations’ technical bodies operate at farm level on the basis of projects assigned to them by the regional government, ARSIA (the Tuscan RAADI) attends to funding research and to services targeted to farmers’ organizations’ technicians (training, demonstration, plant protection services), universities carry out regional research. In other regions, the roles are not as clear, so that some RAADIs carry out direct research activity or extension targeted at farmers. A timid attempt of governance and coordination of different systems is represented by the Rete dei referenti regionali (formal network among regions) whose aim is to achieve operative synergies, to carry a common methodological path, to join resources in order to introduce common projects with regard to shared issues (Brunori et al., 2007a).
In France, there are two majors sectors, the public and the private one. The public sector includes national research bodies (CNRS, INRA), universities and innovation agencies (which support and fund applied research programmes). It is mainly funded by public resources, more and more through a specific agency (like ANR: the National Agency for research), but some funding also comes from the private sector, through contracts with firms or associations. The regional level is gaining influence in the AKIS system by steering and funding projects led by the different institutions of the knowledge system. Recently, the French government has created a national research agency, to fund projects and stimulate the constitution of formalized networks and clusters between the different organisms of the information and knowledge system. Consequently, most of the recent R&D projects which are publicly or collectively funded, at a national or at a regional level, are conducted by a cluster of bodies including public and professional research, education, extension services and sometimes firms (Allaire, Dockès and Guillaumin, 2007).

Two poles characterize the Finnish administrative structure: a strong central administration on the one hand, and the local (municipal) authorities, with an extensive measure of autonomy, on the other. Both operate at the regional level in economic development issues. The core of current regional innovation policy is formed by the national Centres of Expertise Programme, which is an umbrella-like instrument for assisting regions in targeting resources to strategic areas of activity. The local authorities are important actors in regional development; networking among them is very common, enabling them to build sub-regional units that occupy the ground between the local government and regional levels. The majority of the regional development funding from the state budget is allocated through the Regional Employment and Economic Development Centres (T&E Centres), which have offices for business services, employment services and rural services, and they also play an important role in managing many projects co-financed by the EU Structural Funds. The T&E Centres also offer business services such as start-up financing for the unemployed, educational services for employers etc., and run the local labour offices (Rantanen and Granberg, 2007).

In the Netherlands, collective financing of agricultural R&D and extension activities by commodity boards, public-private partnerships with multiple actors (R&D, agri-business, farmers’ organizations) stimulate innovations in separate sectors (e.g. the dairy, horticultural and poultry sectors) and have allowed a shift from a linear perspective on innovation towards a more inclusive system view on innovation. In the last years, a need was perceived to reduce barriers originating from the increasingly closed nature of the market and strategic behaviour with regard to the sharing of knowledge and information. To stimulate innovation, learning amongst agricultural entrepreneurs, and learning from agricultural entrepreneurs from outside their own region, or even outside the agricultural sector, became a key issue on policy agendas. Moreover, some organizations were set up out of the wish of the providers of agricultural R&D and KIBS to install new linkages with agricultural entrepreneurs and a mechanism to improve procurement and to develop projects with agricultural entrepreneurs, i.e. stimulate demand (Klerkx and Proost, 2007).
In Latvia, innovation processes are spreading in all the regions, facilitated by government policies to establish knowledge transfer institutions in the cities where there are regional universities. There is no uniform and systematic approach to the support of rural innovations. Some municipalities have formed their own business incubators. Technology transfer contact points established at regional universities act together with research laboratories in attracting financing for innovative projects. Local governments along with regional universities are important focal points of rural innovation. The mix of urban and rural economies within polycentric regional development concept and technology parks, innovation centres, and university-industry clusters in regional cities is an opportunity of an improved governance of innovations (Tisenkopfs, Šūmane and Murins, 2007).

In Switzerland, the agricultural innovation system is well decentralized because of the political structure of the country and the sharing of responsibilities between the federal state and the cantons. Institutional structures and organizations differ a lot from one canton to another. Cantonal extension services can be either private or public, and in both cases benefit from public funding. Education and extension can be combined in the same cantonal structure. In general, the system is very fragmented with a lot of different and small structures, however agronomic research and the extension at federal level are quite centralized. The Federal Council and chambers remain the main drivers of the system. They design the agricultural policy, allocate the funds, and decide what is of public or private interest. Coordination between all the different structures and institutions, and between the cantons, is always a challenge: different thematic platforms are dedicated to that. For example, a platform on biodiversity in agriculture allows scientists (biologists, agronomists), administration representatives (agriculture, nature and environment), practitioners, farmers’ representatives to share experiences and improve the way they work (Barjolle et al., 2007).

The weaknesses in governance of innovations are generally related to poor coordination between actors, sectors and the levels of governance, as well as conflicting interests.

In Italy and France, difficulties in public-private research cooperation were reported. In addition, in the Italian innovation system the needs of local actors and the market are not addressed correctly by the public research system, which is self-referential and has no real or systematic liaison with the needs of society and of the production world.

In the Netherlands, the innovation agendas are mainly set for commodities and sectors. Moreover, there seems to be a permanent tension between collective interests and private interests, with regard to funding innovation support instruments (R&D, extension, intermediary organizations).

In Italy, Germany and Switzerland, the coordination of innovation policies at national/federal, regional/cantonal and local/commune levels is complex and responsibilities may overlap. In addition, the first two countries report the weak ability of the system to facilitate innovation transfer.
In Finland and Latvia, the municipal growth/amalgamation poses a threat to local development initiatives and actions (Proost et al., 2008).

Some of these weaknesses are being addressed by ‘clusters’ (networks of actors joining together to pursue common innovation objectives) or by ‘brokers’ (as in the Netherlands) whose specialist task is to create networks of innovators and by public-private partnerships, by establishing regional innovation boards and platforms, trying to create a new system of innovation at regional level as it is the case in Germany and the Netherlands (Proost et al., 2008).

The case studies on innovation systems and processes in the field of new rural services, agricultural markets and environmental technologies show some efficient governance schemes.

<table>
<thead>
<tr>
<th>In the Bioregio Holz Knüll case study extension services in the project are provided by the hessenENERGIE GmbH, which is an energy service provider established in 1991 by the federal state of Hesse. Until 2001 it had been in federal state ownership; now it is a private holding engaged in energy contracting and consultancy for efficient and sustainable energy usage. It has a service contract with the HMULV for providing evaluation and project consultancy services in the ministry’s energy support programmes. HessenENERGIE provides professional assessment of suitable objects; advice on technical and economic viability; advice and support in establishing wood logistics in the region. Three years ago, the federal state government of Hesse initiated a strong biomass advocacy and extension network with over 50 members (HeRo), which is supported by HMULV. It provides publicity, training and extension, project development and coordination in the area of biomass, and supervision of pilot projects. Also, energy consultants are concerned with cooperating with the companies installing heating systems and providing maintenance. They form a network whose task is to provide competent support and advice to the owners of wood heating systems (Rand, 2008).</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Finland, the task of municipalities is changing from a provider of services more towards the arranger of them and the builder of partnership between different sectors. The use of vouchers is one of the possible strategic approaches. The service voucher can be e.g. a purchase token or the financial obligation of the municipality to pay for a part of the expenses of a service by a private service producer (Rantanen and Granberg, 2008b).</td>
</tr>
</tbody>
</table>

### 5.5.2 Who to involve in decision-making?

A key issue is related to representation of interests. Within the corporatist model prevailing in the preceding phase, official farmers’ organizations and cooperatives were the legitimate communication channel between the state and farmers (Winter, 1997; Brunori, 2007). In several countries, farmers’ organizations had a very strong power over agricultural policy decisions, and in many cases they were strongly involved in extension and to some extent in research as well.
With the crisis of the productivist regime and the emergence of the rural development discourse, new actors have come to the fore. Organic farmers, for example, did not feel adequately represented by conventional farmers’ organizations; some of the most innovative farms would look for direct communication with administrative bodies, without being filtered by farmers’ organizations. Moreover, as the discourse shifts from agricultural to the rural, other rural actors look for representation in the decision-making process. Some of them, for example, small- and medium-sized enterprises, belong to strong associations whose involvement in decision-making could shift the balance in decision-making.

As for public interests, the issue is even more complicated. Generally speaking, public institutions should adequately represent public interest. But in many cases, political systems are affected by serious problems of representation, with political parties not being able to channel societal needs into policy decisions. In this context, the involvement of consumers’, environmental and community NGOs can open decision-making processes to new issues.

5.5.3 What are appropriate knowledge infrastructures?

From the points illustrated above a clear need for a new governance of innovation services emerges. In fact, appropriate knowledge networks should be able to:

- Be effective and efficient in promoting the production of public goods, and – if possible – to make private interest and public interest converge;
- Stimulate the growth of new paradigms and support niche development;
- Strengthen and mobilize endogenous resources, and – in particular – human and social capital through improved social learning capacity;
- Provide access to knowledge already available elsewhere and integration with existing knowledge;
- Improve network connectivity;
- Facilitate interchange between tacit knowledge and formalized knowledge;
- Facilitate adaptation of niches to existing regimes by negotiating changes of rules.

All of these aspects require:
- Public bodies able to clearly identify objectives of public interest, to set up research, training and extension programmes coherent with them and to carry out appropriate and effective evaluation procedures;
- The capacity to valorize the emerging of niches at a grassroots level;
- A multiplicity of innovation agencies/groups/organizations embedded into civil society and capable to adapt rapidly to the changing environment;
- A plurality of innovation networks including producers, users, processors, experts, able to guarantee their continuity in the time through access to an appropriate mix of public and private resources;
- Funding schemes designed to balance cost-effectiveness with the need of innovation agencies themselves to invest in human and social capital.

5.5.4 How to assess the effectiveness and efficiency of public policies and support?

Critiques of the efficiency and effectiveness of extension services have generated a growing demand for monitoring and evaluation procedures. However, most evaluation schemes have efficiency, more than effectiveness, as their main object. Effectiveness, in fact, is not easy to evaluate, especially in extension programmes that serve as general rural information systems, or respond to diverse production and social problems with no defined commodity, whose impacts may be diverse and difficult to measure. As Alex and Byerlee (2000) state, effectiveness of AKIS programmes is evaluated in terms of productivity, i.e. with a productivist paradigm. And also in this case, how to identify the specific role of AKIS programmes regarding productivity?

Today, in view of the emerging of sustainable development it is clearer that public and private goals can diverge or even conflict.

Therefore, the challenge for innovation policies is to combine efficiency, which is necessary to guarantee private goals, with public effectiveness. To face this challenge, policies had to set up a system of governance and an intervention strategy able to address goals that allow farmers to build ‘desirable’ technological paths autonomously. From this point of view, the distinction between the provision and the financing of agricultural support measures seems to be crucial: the state can pursue public goals pricing with suitable support instruments, also in front of a privatized system.

The following array allows a classification of services according to goals and effects:
Table 10. Classification of services according to goals and effects

<table>
<thead>
<tr>
<th>Goals</th>
<th>Effects</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>1. Compensations</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Demand incentives</td>
<td>=</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Demand incentives</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>6. Farm support</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Costs’ recovery</td>
<td>=</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Disincentives</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Excluding cases of inefficiency, that is public goal services with negative or invalid public effects or private goal services with negative or invalid private effects, each typology highlighted above asks for a different consideration from the point of view of functioning procedures and levels.

**Case 1** (public goal measures with negative private effects) is related to services without demand. In this case, measures that take effect on motivations have to be synergetic with binding instruments (as cross-compliance) or with compensations (as agro-environmental measures).

**Case 2** (public goal measures with neutral private effects) and **3** (private goal measures with neutral or positive public effects) imply a benefit solution for all of those concerned. In these cases demand could exist, but most of the time incentives are necessary to overcome barriers to change (for instance, disinvestments of physical capital, organization and knowledge).

**Case 4** (private goal measures with neutral public effects) represents actions of benefit to sectoral economy that can be stimulated through sharing in the expense. In theory, these services are negotiated on the open market; in practice, the possibility for them to have a market depends on the extent to traduce a service into a private good. A problem related to these kinds of services is the decrease of equity levels due to the privatization process: for instance, marginal and small farmers tend to be excluded from services. In these cases public bodies move in order to turn equity conditions back on and to stimulate particular farms.

**Case 5** (private goal measures with negative public effects) asks for disincentives or abstention from support.

**Case 6** provides for actions that are demanded since the private benefits expected are positive. In this case public bodies can sustain farms through an aid able to reduce the cost of service.
A monitoring and evaluation system coherent with the above-illustrated framework should be based on the following principles:

- It should distinguish public goals from private goals.
- It should detect learning processes at micro, meso and macro levels.
- It should identify socio-technical systems in which innovation occurs.
- It should detect how innovation policies act on novelties, niches and regimes.
- It should detect signals of transition from novelties to niches and from niches to regime.

Monitoring and evaluation can also have a specific effect on innovation. Appropriate monitoring and evaluation systems can in fact start learning processes at institutional level. This, within the terminology illustrated above, may produce ‘third-order’ innovation, i.e. the capacity to generate and to implement new paradigms. For this reason, however, monitoring and evaluation should be based on participation and should be based on a strong component of self-monitoring and self-evaluation of the actors involved in innovation policies.
5.6 Summary

The new policy paradigm for agriculture, based on multifunctionality as a key to rural development and on a shift from sectoral focus to territorial focus, has raised important questions regarding the way innovation is conceived and operated by private stakeholders and public institutions. Indeed, there is a growing recognition that (a) innovation in agriculture does not necessarily have a positive effect on rural areas, and that (b) there may be a potential conflict of interests between ‘demand-driven’ innovation and public goals.

First of all, innovation involves much more than only technology: more and more it regards strategy, marketing, organization, management, design. Farmers looking for alternatives to industrial agriculture don’t necessarily apply ‘new’ technologies: their novelties emerge as the outcome of ‘different ways of thinking and different ways of doing things’. Second, rural innovation does not occur only within farms, but it may involve a plurality of actors and reconfigure external relational patterns. Third, rural innovation assumes the shape of new social patterns aimed at improving service provision or at responding to emerging social needs. All of these aspects require new governance patterns for innovation policies. In particular, new governance patterns should be able to address aspects such as multi-actor involvement, multilevel governance, complexity of innovation processes, path dependence of innovations, interrelation between sectors and institutions. This chapter analyzed these issues through evidence from case studies across Europe and tried to give a first answer to the following questions: What balance between public/private, central/decentralized structures is adequate? Who to involve in the decision processes (this means defining what Smith et al., 2005, call ‘regime membership’)? What are the appropriate knowledge infrastructures? How to set appropriate links between research, training, extension and support systems? How to assess the effectiveness and the efficiency of the public policies and supports?
6 Support strategies and frameworks

By David Bourdin, Dominique Barjolle, Michel Fischler, Sigrid Rand, Karlheinz Knickel, Tālis Tisenkopfs and Jet Proost

This section of the report is composed of two parts. The first part presents the main findings concerning policy instruments and support strategies. The second part concerns the recommendations.

In the IN-SIGHT project the analysis of the innovation system is based on the concept of socio-technical networks (Brunori et al., 2007; chapter 3). In the innovation systems studied, four subsystems were identified:

- Socio-economic actors’ system
- End user actors’ system
- Public decision actors’ system
- Information and knowledge actors’ system

Different kinds of innovations featured different levels and forms of involvement of the above-mentioned actors. Socio-economic actors and end users were involved in all innovations. The role of the public decision actors’ system as well as of the information and knowledge actors’ system is to support the innovation processes with formal and informal links, tools, policy instruments, delivery measures, etc. In this chapter, those supporting measures are analyzed and described.

The theoretical framework of the IN-SIGHT project undertakes a classification of innovation processes according to their scope or scale: it distinguishes between novelty, niche, regime and landscape dimensions. This theoretical view on innovation processes and networks proves useful when analysing institutions and support systems involved in innovation processes. It draws attention to different kinds of support measures and approaches that are needed by innovators and their networks and thus allows designing appropriate policy instruments and means of delivery adapted to the different levels and scope of innovation processes.

Those two aspects, differences between the type of actors and the different levels and scope of innovation processes, will be considered in both sections as analysis grid that facilitates the understanding of the complex systems and processes studied.
6.1 Organizations, bottlenecks and delivery

In this part, support strategies are considered as innovation services that actors from the Information and knowledge system can provide in order to support innovation processes.

6.1.1 Organizations and institutions

To a great extent, this aspect of innovation support concerns the AKIS and their response and support to novelties, niches and regimes. In the Netherlands, the AKIS has taken a systems view of innovation and is open to new strategies and paradigms. However, in most of the countries studied, organizations of the AKIS are resistant to change and are not responsive towards the appearance of new paradigms. The AKIS seems to have the capacity to slow down radical innovations that are at the novelty (or niche) stage. On the contrary, when a movement from the niche to regime stage takes place (that is, once a series of innovations have been accepted by the AKIS), the AKIS can be very effective in ensuring the development of the innovation, even if it has to adapt its support measures (Proost et al., 2008).

A general trend that can be observed in most of the countries is the creation of innovation agencies at regional level. Therefore, one of the central issues is the ability of regional innovation agencies to support novelty and niches. Different types of agencies are described in the country reports:

- Incubators that facilitate the development of innovative enterprises with infrastructures, business support, R&D. The focus is on the novelty-niche stage;

- Technology transfer and contact points that facilitate coordination and cooperation between enterprises and R&D providers, peer-to-peer exchange, etc. Those organizations work as intermediaries, brokers, and facilitators. The focus is on the niche or regime level.

The following examples illustrate this: centres of excellence in France, technology transfer centres in Switzerland, regional employment and economic development centres (T&E centres) and regional centre of expertise in Finland, business innovation centres, innovation relay centres in Italy (Proost et al., 2008).
For example, in Finland and Latvia LEADER groups play an important role in learning for innovation. In best-practice examples they act as collective innovation platforms of local farmers, women's groups and other rural actors with the support from municipalities and, in some cases, AKIS (Proost et al., 2008). In the first instance, LEADER groups relate social innovation and mobilization of actors, spreading of knowledge and training, stimulating novelty creation. However, after the groups have been activated and formalized they engage either collectively or as individual members in economic projects.

Institutional support should be, first of all, targeted towards a better valorization of institutional resources and resource centres for innovation, like universities, technical colleges, research organizations, experimental centres, laboratories, and also educational programmes. Institutional support can be arranged in the form of training programmes and knowledge platforms like, for example, in Switzerland in the case of community-supported agriculture where such a platform includes training in marketing, communication, organization and cooperation (Dockès et al., 2008). In Italy training programmes on how to produce renewable energy from wood biomass (Camporgiano case) are oriented towards local actors: farmers, forest workers, young people, emphasizing the role of life-long learning (Rand et al., 2008). Institutional support should try to compensate for asymmetries in access to knowledge and uneven distribution of intellectual resources trying to work in close cooperation with local and regional organizations.

**Technological support**

In those cases where innovators develop a new kind of product or services, the application of new technologies is required, like in the cases of biomass utilization for communal heating and provision of health and elderly services in remote areas. This technological support has been provided by professional organizations in terms of advice and consultancy, local SMEs in terms of technological installations, and regional universities and research laboratories in terms of new technology development. Lack of support can be detected regarding other components of innovation, in particular social and organizational aspects.
Network support
As IN-SIGHT study proved, innovations are most successful in hybrid networks with multi-actor participation. However, traditional AKIS and extension services are much better prepared to deal with individual actors (farmers, entrepreneurs) than with collective ones and network-type social organizations. Funds, subsidies and advice are channelled predominantly towards individual users. There are few instruments to work with networks. According to our findings, learning for innovation is best achieved through communities of practice that are formed around common issues or projects.

6.1.2 Bottlenecks
All country teams accounted similar bottlenecks in the delivery of innovation services:
- Institutional barriers: the transition of knowledge and advice institutions from providing production-related support to offering direct payments support is not taking place fast enough (e.g. in the area of diversified activities).
- Diversity of advice requirements: privatization and demand-driven advisory systems ask for different advice processes.
- Complex and bureaucratic procedures to acquire funds: complex procedures hamper the use of funds meant to stimulate innovations, require specialized competences, are time-consuming and costly. The Swiss team acknowledged the need for motivated individuals who understand procedures and have access to funds and decision-makers (Proost et al., 2008).
- Outdated selection criteria: the French team describes the tender system that hampers innovative projects, because selection criteria are based on old formula for linear projects (Proost et al., 2008). Other teams reported similar situations, where, for instance, administrators are not open to innovative ideas in their decisions about allocation of subsidies.
- Difficult integration of rural and agricultural policies: the French team pointed out the absence of an agricultural component in many local development projects, although it is the major economic pillar in rural areas. The Finnish team reported resistance from agrarian circles towards networks of rural policies (Proost et al., 2008).

At the same time, certain difficulty and competition to get innovation funds may stimulate innovations. The German team reported that competition for acquiring grants in the case of the Regionen Aktiv programme resulted in many new creative ideas, networks and partnerships. The following figure reflects some facilitating and hindering factors of the knowledge-supporting system.
Facilitating factors

**Figure 15. Facilitating and hindering factors in innovation processes**

### 6.1.3 Delivery measures

The linear approach reinforced the capacity of organizations to tackle technical and economic aspects. To acquire/adopt a systemic vision, where social and organizational components are essential areas, is a challenge. Innovative but also delivery services already existing contribute to tackle this challenge through:

- Support networking, for example: cooperative and firm advice (Proost et al., 2008); innovation service web pages to gather the know-how of different actors (universities, other organizations etc.) for SMEs.
- Exchange of experience, for example: networks of innovative farms and group of farmers organize exchange visits between innovators/innovative projects in France, strong focus on peer-to-peer networks in the Netherlands (Proost et al., 2008).

- Systemic approach applied to network, for example in the Netherlands: multi-purpose approach combining funding, knowledge, legislation and infrastructure, initiatives as bypass from governmental domain (innovation network) to stimulate and bring to maturity (Proost et al., 2008).

- Nursing, for example in Finland: ‘innodiileri’ method connecting inventions, possible entrepreneurs and financiers as teams with the purpose to found enterprises; innovation sessions with entrepreneurs and external experts working together for one day to produce new product ideas etc. (Proost et al., 2008).

6.2 Influence of ICT on innovation

Applications of technological innovations can be of vital importance in the social sector (e.g. safety telephones) or in agro-tourism (Dockès et al., 2008). Innovative ways of direct marketing use the latest methods of information exchange. That is, selling via the Internet, in producers’ collective shops, or through sales to individuals organized into networks, as, for example, in the case of solidarity-based purchasing groups (Dockès et al., 2008). The use of e-mail, websites, and mailing lists is essential to the growth of the direct marketing phenomenon (Dockès et al., 2008).

The use of ICT enables, for instance, farmers in the process of developing new services to acquire information from all over the world. In the Netherlands a group of farmers in Het Groene Woud started an exchange network with Irish farmers by means of the Internet (Rantanen and Granberg, 2008). Acquiring this information and lessons learned accelerates the innovation process and helps to professionalize the new services.

6.3 Policy instruments

The approaches towards innovation support vary greatly between the countries studied as is demonstrated in the country-related studies and summarized by Proost et al. (2008). Rural and agricultural innovation support structures can be created and promoted by several policy areas like agricultural, innovation, regional, economic or social policies. They can focus on certain actors or networks like the SMEs or the knowledge actors’ sub-system, but can also pursue a system approach. In some countries like Germany or Italy, regional sub-systems are of great importance besides the ones at national level. This part of the report proposes an analysis of the policy instruments that support innovation processes.
6.3.1 Aim of policy instruments

Brunori et al. (2007) viewed innovations as outcomes of hybrid networking processes and distinguished between first- and second-order innovations. Based on these assumptions, the following rural innovation policy principles were formulated:

- Innovation policies concern production as well as consumption, transportation, commerce, land use and management, planning, and therefore should involve a broad range of stakeholders;

- Currently, changes are occurring in the socio-technical landscape and therefore innovation policies should focus more on second-order rather than first-order innovation.

One of the first questions to be solved is to decide when and why an innovation should be supported. Also, it needs to be clarified whether the policy instruments contribute to reaching public or private goals. Based on that, a choice of instruments can be made according to the location of the innovation process at the novelty, niche or regime stage (Proost et al., 2007).

6.3.2 Diversity of instruments

We see a trend that entails a shift from compensation- and infrastructure-based policy towards added value/innovation-based instruments (Proost et al., 2008). We arrived at this conclusion by summarizing support measures for innovations applied in the seven countries studied. Policy instruments to support innovation processes can be classified according to different criteria:

- Some instruments support the ‘milieu’ or the context in an indirect way. In the case of regulations such as taxes, quotas, etc., they can act as barrier or driver of innovation (Rand et al., 2008), in particular at the novelty and niche stage.

- Other instruments target specific projects or networks in a direct way. They are, most of the time, providing financial support. At the novelty and niche stage, they can support the process without having very clear information about the results possible. The notion of risk is important.

- At a more elaborated level of the innovation networks (regime), policy instruments targeting the institutional framework define the level of engagement of the public sector. Policy instruments can, for example, concern certification or standardization schemes as well as coordination platforms.

- At regime level, policy instruments supporting projects can fund ‘classic approaches’ of technology transfer and information support or co-finance projects, but with determined objectives and clear expectation in terms of evaluation of the results and impacts.
Figure 16 summarizes some of those policy instruments that are adapted to the different structures of the networks (novelties, niche, regime, landscape):

![Innovation support instruments](image)

**Figure 16. Innovation support instruments**

Bottom-up approach, demand driven orientation and flexibility of procedures are key issues that require a comprehensive priority-setting process prior to devising support instruments.

### 6.3.3 Instruments of financial support

Government bodies mobilize different financial instruments to support innovation: funding of public or private organizations and institutions; funding of projects, for example, through the LEADER programmes; funding of networks or platforms (Switzerland); distributing vouchers to private firms so they can buy knowledge from public knowledge institutes or large companies with an R&D department (Netherlands). This funding is channelled through regional, national
and EU programmes. Some are oriented towards a specific sector, for instance, horticulture in the Netherlands; others are aiming at the support of innovations in a specific geographical area like in Switzerland, or at target groups like SMEs in Finland.

The strength or weakness of an innovation system is linked also to the availability of funding. In countries that put a lot of emphasis on innovation (like Finland, Switzerland and France) funds are abundant, and in many cases cover a large spectrum of fields. Availability of funds, however, does not necessarily mean easy access to funds. Procedures to get access to funds are too complex for farmers, who have not developed enough capacity and willingness to express demand for innovation (as in the Netherlands) or do not have enough information to be able to apply successfully (Proost et al., 2008).

In many cases, public authorities have concentrated their efforts on creating and maintaining public goods and are reluctant to spend public money on innovations with private goals. In general, private capital, and especially risk capital, is lacking. In Switzerland and Latvia, private banks consider supporting innovative projects as too risky. In Italy, continuous decrease of resources allocated on R&D means that in many cases instruments have only been ensured by European funds and further innovation funding opportunities are related to the availability of resources through Structural Funds (2007-2013) (Proost et al., 2008).

### 6.4 Policy coordination

The link between sectoral, territorial and innovation policies is one of the most relevant areas investigated. In general, it appears that coherence between these policies should be able to foster change. Indeed, this is the case: in some countries, official innovation systems are not able to timely follow the changes in economy and society. In Finland and Latvia, rural policies are considered as the most important driving forces of innovation, whereas the official innovation policy discourse emphasizes only high-tech innovation. In Switzerland, contradictions between sectoral policies (environment, biodiversity, energy, etc.) are hindering innovations. Farmers have to contribute to multi-functionality, fulfil different roles corresponding to different paradigms at the same time. In Finland, rural and agricultural policies are still separate although rural policy is well developed and integrated at national level. Traditional agricultural policy does not emphasize the innovativeness of farms (Proost et al., 2008).

In general, a lack of integration between policies (and namely between rural and agricultural policies) is considered a point of weakness, as it hinders innovation. Opportunities to improve policy coordination are seen in territorially based development initiatives (France) or cooperation between LAGs and other regional development organizations (Finland) (Proost et al., 2008).
Bottlenecks
To face the complexity, a combination of instruments and policies exists. It combines: demand-and supply-driven instruments, bottom-up and top-down approaches, public and private partnerships. The public decision system contributes to private and public goals simultaneously and must be able to propose different instruments that are adapted to different dimensions of the network (novelty, niche, regime and landscape). For the institutions and organizations responsible for those policy instruments, the main challenges regarding innovation support are:
- Coordination between policies;
- Capacity of being flexible;
- Questions as to when and why support an innovation in a context where private and public goals are combined.

6.5 Recommendations and research gaps
Based on the national innovation system analysis and in-depth review as well as the discussions during the meetings in Rome, Riga and Brussels, a series of recommendations can be formulated. They are classified according to the stage of the innovation process: emergence (novelty, niche), deployment (niche, regime) or generally valid and to the innovation actors concerned. These recommendations are of a general character and have to be studied and developed at European level and in each country/region to add appropriate measures to the specific European, national and regional conditions and frameworks.

6.5.1 General recommendations
Openness (all stages, all actors)
- Social and organizational aspects of innovation should be considered, and a limitation to economic and technical aspects should be avoided. New cultures, attitudes, needs, groups, networks etc. are also relevant. For example, in the case of innovations in the field of rural services, social aspects (networking, communication) and organizational aspects (multidisciplinary approach and coordination) were the central questions to be solved before any new services could be developed (Rantanen and Granberg, 2008).
- All actors need to have an ‘open attitude’ or an ‘innovative mind-set’ towards change. Sectoral and territorial barriers should be overcome. Collaborations between communities, regions and countries, and between various sectors (agriculture, rural economy, industry etc.) are innovation drivers. The German case of care farming illustrates how specialists of different fields (therapists, pedagogues, agronomists, amongst others) can cooperate. Individuals as well as institutions and networks through their openness, motivation and interest were able to overcome the sectoral and territorial barriers existing (Rantanen and Granberg, 2008).

6.5.2 Policy recommendations related to innovation and regulation

Transparency (all stages)

- The legal framework should be transparent and easily accessible. The administrative (planning) effort must be easy to handle. The complexity of the procedures and instruments (calls, different budgets available, request for detailed business plans, etc.) requires a high investment to have access to funds and hampers the accessibility of support (Proost et al., 2008).

- Connect innovation policies with agricultural and rural development policies and make strategic objectives more clear (what are policy goals towards innovation). For example, in the case of bioenergy, diverse public strategies and policy goals were defined by different public actors at EU level (‘Renewable energy road map’ by the EU Commission) with a clear objective of 20% for renewable energy’s share of energy consumption in the EU by 2020. This definition of goals at European level is a driver for the definition of goals and strategies at national level and gives clear indications for innovators (Rand et al., 2008).

Flexibility (niche, novelty)

- The public administration (state, regions and communities) must provide flexible and accessible support (financing, eligibility), since novelties may not fit in an existing framework and in the current administrative processes. They should provide authorizations for new projects, even if they interfere with current rules and frameworks (characteristic of ‘research projects’ or ‘pilot projects’). For example, in the field of bioenergy, at the early stage, funding issues are strongly limiting the shift from novelty to niche. Innovations are not funded because they do not fulfil all the requirements of a business plan since the uncertainty is too high and private investors for small (agricultural) plants are not available (Rand et al., 2008).
- An innovative fund could facilitate novelties as long as the conditions of accessibility are not restrictive. Financial support must also be accessible for small-scale initiatives. LEADER initiatives have been clearly identified as positive support of innovation. Similar instruments could be developed for smaller, even riskier projects at regional level (Dockès et al., 2008).

**Capacity of adaptation (niche, regime)**
- The existing legal framework has to be adapted at the right time to make novelties successful and to allow the deployment of innovations (niche, regime). Therefore, the authorities have to be well informed about the new ideas etc., their potential and the obstacles existing. Limiting factors for innovations in the regulatory framework should be identified as soon as possible and, if appropriate, be eliminated. In the case of bioenergy, tax policies and prices were adapted in Germany and contributed strongly to the development of bioenergy production while in Switzerland the absence of an encouraging price policy has been a barrier for a long time (Rand et al., 2008).

### 6.5.3 Practice recommendations related to knowledge, research and information

**Recognize (niche, novelty)**
- Novelties can emerge in areas where no research has been conducted yet. Researchers may collaborate with innovators within a participative approach, and both sides can profit from this relationship. New outcomes can promptly be combined with existing know-how. Some examples: In both the German and Italian cases of bioenergy production, universities and extension organization participated in the initiatives. Their contribution was important in terms of feasibility and impact evaluation and allowed further development and sharing with other initiatives (Rand et al., 2008).

- AKIS and other knowledge systems should be able (in terms of time and capacity) to anticipate novelties and stop resistance. AKIS should be capable of capacity building (including analyzes of novelties and acquisition of know-how). Example: in the case of collective shops for agricultural marketing in France, the AKIS who did not participate in the initial stage of innovation recognized the existence of such initiatives and developed some know-how in supporting the development of those initiatives (Dockès et al., 2008).
**Connect carefully**

Novelties have to be analyzed and described, and this information needs to be disseminated in an appropriate way to all other actors (codification of new knowledge about novelties and niches). When innovators are ready to share their ideas, positive examples and successful projects should be spread and made known in order to motivate imitators (this applies to novelty and regime). Example: in the case of collective shops for agricultural marketing in France, the initiatives were documented and communicated on the Internet and in the newspapers by journalists, the extension organization or farmers’ organizations. Methods were developed to support the development of new initiatives. It allowed other farmers to develop similar projects by themselves (Dockès et al., 2008).

**Support**

Support measures such as making a business plan, coaching, support in finding financial resources etc. should be provided to innovators (relevant in the case of novelty and niche). In the case of direct marketing, skills related to project management methods played an important role in the initial phase of projects, and became more and more crucial at a later phase of diffusion with the support of the AKIS, especially when the needs in terms of organization became more complex (Dockès et al., 2008).

6.5.4 **Recommendations related to the governance of innovation processes**

**Analyze (niche)**

To help innovators and other actors orient in the existing system, one should provide support for the exact analysis of the socio-technical system. This enables the identification of networking possibilities and gaps. Innovation institutes could be installed with the aim to concentrate on niche/novelty, cross-sectoral initiatives, social innovations and networking. Regional centres and intermediary organizations are promising actors (Proost et al., 2008).

**Learn**

- New training programs for mid-career professionals in AKIS system, continuous education regarding innovation processes should be implemented. As regards the forthcoming generation, changes in academic degree programs for students (curriculum change) might be necessary to adapt to innovation logic. There is a need to combine ‘courses’ with practical application in the ‘real world’ in partnerships of innovation.
Innovation is complex; to understand and govern it insights are needed from various disciplinary perspectives and scientific backgrounds (agricultural science, natural science, environmental ecology, economics, engineer sciences, sociology, political science, communication science, etc). Scientists themselves have to stipulate interaction with practitioners and across academic boundaries. Science policies have to provide adequate incentives for scientists to transfer knowledge. Currently the scientific community is disconnected by the emphasis on academic performance criteria. More appreciation should be given to ‘grey’ scientific knowledge and literature, popularization of research results, explaining and discussing them in communities of innovation practice.

Network (all stages)
Instruments to support communities of practice and learning partnerships should be developed, for example:

- Embed practical work in partnerships with stakeholders outside academies, involving local people, integrating local and academic knowledge, recognizing and building on existing capacities of the various actors.

- Providing opportunities for all actors to participate in exchange programmes and connect with new knowledge in a new context (e.g. Bologna process of student exchange, twinning between municipalities, partnering process among communities).

- Horizontal networks should be fostered to connect persons with similar interests. This allows an exchange between similar groups of persons (who share the same language), for example farmers’ groups.

- The first level (regional actors) and the second level (national actors) of the knowledge support system should be linked in order to guarantee knowledge circulation in all directions. Brokerage positions should be developed.

- Connections between European rural networks and innovation networks should be reinforced.
7 Co-production of rural innovation: towards an enriched theoretical model

By Talis Tisenkopfs, Gianluca Brunori, Karlheinz Knickel and Sandra Šūmane

IN-SIGHT research provides rich evidence regarding the complex nature of rural innovations and contributes to systemic, network-oriented vision. In the preceding chapters we argued that the dynamic of innovations depends on the evolution of socio-technical systems and hybrid networks (structured phases model). In this chapter we develop the initial conceptual framework further and propose a model of the co-production of innovations.

First, we reflect on the application and refinement of the conceptual framework during various work packages. Then we examine the reference theories relevant to understanding rural innovations. Third, based on comparative analysis and synthesis (chapters 2-6) we highlight the most relevant dimensions of rural innovations. Fourth, we develop a four-step model of the co-production of innovations emphasizing the role of actor cooperation. We argue for openness, multi-actor participation, collaboration and reflexivity in innovation processes. Finally, we discuss the strategic potential of innovations to (re)orient agriculture and rural development towards new objectives and future challenges.

7.1 Testing and developing the conceptual framework

The conceptual framework of the IN-SIGHT project has been a moving cognitive tool during the whole project cycle. We started with the assumption that innovation is a problem-solving activity in response to internal or external pressures. Incorporating also the dimension of opportunity taking soon broadened this definition. The proposed theoretical framework (Brunori, Rand and Proost, 2007) introduced the notion of socio-technical systems and classified innovations as first-order (‘gradual’) and second-order (‘radical’) innovations. The hypothesis was formulated that innovations occur in hybrid networks and develop due to changes in these networks. So called structured phases model was elaborated, according to which socio-technical systems and hybrid networks may take on the shape of ‘novelties’, ‘niches’, ‘regimes’, and ‘landscapes’, depending on the degree of network structuring. As argued by Brunori, Rand and Proost, novelties are breaks of routines that emerge in individual or collective action; niches are new cognitive frameworks applied by aggregated actor networks; and regimes are paradigms turned into practice due to consolidation of networks. Landscapes might be interpreted as systemic changes achieved by
innovation and reflected in new products, new markets, new methods of production, new norms of cooperation and forms of coordination. Not all innovations follow the uniform pathway of scaling-up or vertical development; some may remain small-scale at novelty or niche level, or develop horizontally by enlargement of scope. Novelties, niches, regimes and landscapes are not consecutive steps in the evolution of innovation; they are rather ‘degrees’ of the structural composition of networks and actor systems, notions that allow to grasp the complexity of innovation.

The adoption of such a conceptual framework emphasizes the IN-SIGHT project’s stance towards a systemic vision of innovation as opposed to the linear model of knowledge transfer. Examination of national innovation systems, however, revealed that the linear model is still strongly embedded in the innovation policies existing and the way the agricultural knowledge and information system (AKIS) operates (Proost et al., 2008). In the meantime, national studies have identified many best practice examples where innovations were developed due to intensive networking and collaboration.

In-depth reviews of innovation processes in the field of agricultural marketing, bioenergy and rural services at country level and in a comparative dimension (Dockès et al., 2008; Rand et al., 2008; Rantanen and Granberg, 2008) tested the hybrid network model in empirical contexts. We analyzed the limiting and enabling factors, examined internal and external driving forces, specified the actors and their roles, explored the main dimensions of innovation, like technical, economic, social and organizational. The conceptual framework was further enriched during the empirical case study work along the following lines:

- Re-endorsement of a multi-actor model of innovations;
- Specification of actor roles, skills, interactions, and network relations;
- Determination of changes in actor systems during the evolution of innovations;
- Affirmation of interplay between technical, economic, social and organizational innovations;
- Analysis of collaborative arrangements of innovation processes;
- Identification and investigation of key innovation dimensions: the context, organization of networks, knowledge and social capital, governance and territorial embeddedness, support.
The enriched theoretical model of rural innovation is represented in figure 17.

Figure 17. Enriched theoretical model of innovation

According to the IN-SIGHT study, innovation starts with actors and evolves in hybrid networks. Actors might be individuals and collectives, private and public ones – farmers, entrepreneurs, informal groups, networks of NGOs, research institutes, local governments, etc. Innovation does not always derive from research or extension, often it is generated in informal networks without help. Therefore it is important to recognize all actors and stimulate interaction.
We proposed a four-fold typology of actors: socio-economic actors (farmers, processors, networks of SMEs), public decision-making actors (diverse public administrations at national, regional and local level), information and knowledge system actors (research institutions, extension services, schools, farmers’ unions), and end users/consumers, NGOs (see chapter 3). Socio-economic actors are essential in all processes and at all stages of innovation – in learning, networking, organizing, investing, cooperating, commercializing. They turn an idea into practice. Market actors are more important at niche and regime level. The end users were affirmed to be central actors – they signal new societal demands, bring about changes in the socio-economic landscape, verify the innovation results. Innovations cannot be complete without consumer/citizen involvement. In-depth studies provided examples of urban demand for recreation in the countryside stimulating innovation in rural tourism. The needs of ‘new rurals’, second house owners, part-time residents, and the ageing rural population foster innovation in social services (Rantanen and Granberg, 2008b). A similar consumer influence was observed in agricultural marketing where new ways of consumption stimulate novel forms of direct relations between producers and consumers, like selling via the Internet, or solidarity purchasing groups (Couzy and Dockès, 2007). In bioenergy the rising citizen awareness about energy issues stimulates development of locally organized renewable energy chains as demonstrated by examples of municipalities in Germany (Rand, 2008) and Italy (Brunori and Neri, 2008).

Adoption of a network model does not mean that the role of research and extension organizations is negligible. In the case of renewable energy the regional universities and research laboratories played a key driving role in introducing new technologies of wood processing for communal heating. However, the full innovation cycle became possible only after the research institutes, local farmers, forest owners, the energy companies, the users, and citizen/consumer groups joined together in coordinated action that was supported by the regional authorities (Rand, 2008). This collaboration as shown by the case of Bioregio Holz Knüll clearly illustrates that all actors are equally important and collaboration is the mechanism of success.

As concerns the dynamic of innovations, it is determined by changes in actor networks. Typically, networks enlarge by development of innovation (Dockès et al., 2008). For example, in direct marketing many initiatives are started by small farmers’ groups who seek to improve their income. As innovation develops, links with consumers are established and producer-consumer networks are formed. Networking helps to bring in new participants, improves the circulation of knowledge, and stimulates building a distribution channel. In the meantime it increases social capital and trust among producers and consumers. Such an evolution has been demonstrated also in the cases of community-supported agriculture in Switzerland (Roque et al., 2008) and ‘Friends of the Countryside’ sales-on-the-farm organization in the Netherlands (Savelkoul and Proost, 2008).
In all fields of innovation (direct marketing, community-supported agriculture, green energy, care farming, rural tourism, welfare services) the key starters have been initiative personalities and groups of producers/entrepreneurs. In some cases, for example, the De Groene Woud regional branding initiative in the Netherlands, urban environmental groups in coalition with entrepreneurs were among the initiators. In renewable energy, policy actors and research organizations played the key driving role from the very start.

During the scaling-up process, innovation networks become hybrid as new actors engage. Especially at niche and regime level the number of participants increases and the role of policy and knowledge actors becomes more visible. As argued by Rantanen and Granberg (2008), in rural services the policy regulations and formal education system are actors critical to innovation dynamic at regime stage. Scaling-up may require the establishment of a formalized organization and professional management instead of a loose network as shown by the Latraps energy crop producers association in Latvia (Tisenkopfs and Šūmane, 2008).

Not all innovations follow the uniform path from novelty to niche or state of regime. Especially in direct marketing, care farming and rural tourism innovations may remain small-scale. In the welfare sector (health, care, services for elderly people) innovations develop and consolidate at niche or regime level, and foster the transformation of the social welfare system. Vertical development or scaling-up is more characteristic of innovations in the field of environmental energy, especially in biofuels, where energy crop producers become involved in globalized supply chains and reorient the local farming systems towards new energy cultures with further socio-economic and environmental consequences.

One of the main conclusions from research was that the development and unfolding of innovations requires new forms of actor collaboration. We determined the following institutional arrangements of organized collaboration: partnerships, producer-producer networks, producer-consumer networks, coalitions and alliances, regional innovation platforms, communities of practice. They are analyzed in detail in section 7.4.
7.2 Reference theories in the analysis of rural innovation

The IN-SIGHT project takes a complex approach to innovation as co-production of knowledge, economic, social and technological solutions. One of the first conceptual frameworks developed for understanding innovations has been the linear model which postulates that innovation is transfer on knowledge from science to practice. It starts with basic research, adds applied research and development, and ends with production and diffusion (Godin, 2006). As Godin argues, this model has developed since the beginning of 20th century until the 1980s in three stages: science-driven innovations, technological innovations and RTD, and diffusion. The linear model has been expanded from the science and technology domain to industrial, economic and social development, and formed the basic reference platform. Although increasingly doubted by social scientists, it is still strongly entrenched in official innovation policies, funding systems and the ethos of AKIS. The rival models have been developed since the 1980s as more complex paradigms that incorporate aspects of learning, social interaction, territorial dimension and alternative economies. However, these paradigms have difficulties to become substitutes in innovation practice because of the strong lobby of natural scientists, the dominance of linear or sectoral thinking among many agricultural scientists and extension workers and the lack of statistical foundations. The system theories may also experience resistance in terms of their practical application, because it is always more difficult to support networks than individual actors.

E.M. Rogers’ book *Diffusion of Innovations* (1983, 1962) was one of the first attempts to ‘socialize’ innovations and view them from a communicative perspective. According to Rogers, innovations unfold in several phases: needs and problems, research, development, commercialization, diffusion, adoption, and the consequences in society. Rogers also emphasized evolution of innovations over time.

The move towards system theories started in the 1980s and proceeded in several streams of thought: the industrial district theories, the innovative milieu approach, the regional innovation system approach, social learning theories, network approaches and actor network theories. In the next paragraphs we briefly examine the contribution of these theories to the study of rural innovations.

The industrial district theories developed within economic geography have taken a closer look at innovations in SMEs, business clusters, and sectors of industry. They emphasize the role of economic clustering/grouping of businesses to enrich competences, reduce transaction costs, and divide roles in reaching the markets. IN-SIGHT research proved that such clustering of companies is a successful strategy also in rural innovation, for example, in developing new services in remote rural areas where groups of enterprises collectively enter the new market of social services (Rantanen and Granberg, 2008b).
The innovative milieu approach developed by the French GREMI group in the 1980s and 1990s (Maillat et al., 1995) consider innovations as a result of synergy linkages in a region where numerous players act and can develop innovative forms of joint management of resources. Innovative milieu is defined as a territorialized set in which interactions among economic agents develop as they learn about multilateral transactions. Territorial factors and proximity are important, however, milieu is not restricted to a region. The concept of ‘innovative milieu’ contributed to a better understanding how innovation platforms can be generated on a territorial basis (cf chapter 5). IN-SIGHT research also confirms that defined territorial settings and clear administrative boundaries may stimulate innovation through mobilization of regional actors, deployment of local resources and support from regional authorities (e.g. Region Active and Bioregio cases in Germany, Groene Woud case in the Netherlands). On the other hand, territory itself is not a guarantee that a supportive innovative milieu is in place unless actors break barriers and start to cooperate, as it was shown by the case of Abava valley tourism services in Latvia (Tisenkopfs, Šūmane and Lāce, 2008).

The innovative milieu approach is closely related to the network approach that is more socially ‘grounded’ and emphasizes relational dynamic between numerous players on an innovation scene. Social ties, networking, communication, collectivity, and social capital are the key concepts in network theories of innovation. Networks improve access of small businesses to regional experience and knowledge pools as well as global markets increasing their competitive potential (Cooke and Morgan, 1993; Sternberg, 2000). Networks are also a social form favourable for learning and creativity. However, it should be noted that networks as well as milieus are not fundamentally and permanently innovative; they can age and lose their ability to innovate (Sternberg, 2000). This suggests the primacy of social action components of innovation (human capital, knowledge, social capital, communication, networking, collective action, etc.) over territorial and structural components (like physical capital, natural capital, territorial assets, infrastructure etc.).

In institutional and evolutionary economics, innovation is studied as business development in a socially and culturally embedded context. Amin and Thrift (1994) emphasize that the economic life of firms and markets is territorially embedded in social and cultural relations. They stress the role of strong networks (social embeddedness) and institutional ‘thickness’ for the economic development of a region.

Much contribution to the study of rural innovations can be derived from social capital theories (Coleman, 1988; Putnam, 1993; Fukuyama, 2001). Putnam (1993) argues that the ‘density’ of civic organizations and the intensity of civic engagement are core indicators of social capital that he defines broadly as trust, norms and networks. Social capital improves the efficiency of society by facilitating coordinated action. Asheim (2007) argues that in contrast with the linear approach, the application of social capital theories reflects intensive knowledge processes and the interplay of different forms of knowledge (codified and tacit) characteristic of innovations.
Swan and Scarbrough (2005) conceptualize innovations from a network theory perspective as integration of power, knowledge and technology. Networked innovations spread in informal networks rather than formal hierarchies. Novelty production requires dilution of hierarchical market or power relations, integration of ‘distant’ knowledge, intensive social exchange, inclusion of technology in social and knowledge networks.

Tomas Helstrom (2004) conceptualizes innovation as social action, putting an actor in the centre and emphasizing cognitive, normative, value and behavioural (conductive) dimensions. The actor can be either an individual or a group. Following Helstrom we may argue that the unfolding of innovation as a social activity starts with cognition and creativity, continues with communication and learning, followed by the intermediate stage of norm creation, and converges into practical rules of conduct. Thus the creative process is converted into accomplished social action that leads to a new product, process or social innovation. Such a conception opposes the functionalist vision that innovations are merely transmission of knowledge or technology from experts to lay people.

The regional innovation system (RIS) approach (Asheim, 2007; Asheim and Isaksen, 1997; Crevoisier, 2004; Lundvall and Borras, 1997) emphasizes the relationship between territorial and institutional aspects of innovations. Combining RIS with network approaches, social capital theories, and innovative action theories it is possible to obtain a complex vision of rural innovations where various dimensions: economic, territorial, technological, social, organizational are taken onboard and structural and dynamic aspects concerned.

The IN-SIGHT project confirms network and systemic theories of innovation, and supported a complex vision in many ways: by putting actors in the centre of innovation, highlighting the role of communication and learning, determining networks as a form of organization of innovation and collaboration as mechanism towards success.

### 7.3 Key dimensions of rural innovations

During comparative analysis and synthesis five cross-cutting issues/dimensions of rural innovations were identified: the context, organization of networks, knowledge and social capital, governance and territorial embeddedness, and support. Analysis of these themes at length is presented in the previous chapters; here we briefly summarize the main points and interrelation between dimensions.
**Context:** The specificity of rural innovation is determined by several factors: socio-demographic characteristics of the rural population (human capital available), specificity of the rural economy (traditional prevalence of land-based industries, domination of small businesses), importance of the natural and territorial resource base, geographical factors and distances that often inhibit innovations (Mahroum, Atterton, Ward et al., 2007). In the IN-SIGHT study we observed an increasing role of urban demand as catalyst for rural innovations, for example in recreational services, nature conservation, care activities, cultural consumption. Certain urban-based industries like regional energy companies may also stimulate innovations in non-food agriculture.

Rural innovations are influenced by spatial diversities of rural regions that can be classified as specialized agricultural areas, peripheral areas on the decline, new rural areas of multifunctional agriculture, segmented areas of diversified economy, and rapidly expanding new suburbia (Ploeg et al., 2008). It is quite difficult to innovate in sparsely populated and remote areas where there is a low concentration of human capital and a lack of infrastructure, like in many parts of Finland and Latvia. Unfortunately, new knowledge support institutions like technology competence centres, innovation transfer points, ICT centres etc. tend to concentrate in towns and cities where there is already a high concentration of economic and human capital and their assistance to rural innovators is limited (Tisenkopfs, Šūmane and Murins, 2007). The LEADER-type support and small self-organized local action groups and village committees are first-hand help to innovators in remote areas (Rantanen and Granberg, 2007).

There are other contextual factors, like mobility and international migration that influence rural innovation but those were less studied in the IN-SIGHT project. Several cases demonstrate the importance of trans-border cooperation, for example the Dutch-Latvian joint project on establishing botanical walks in the Abava valley protected nature territory became possible due to international exchange.

Telecommunications and modern information technologies should also be taken into account when considering rural innovations. Consumers’ life styles are increasingly mediated by the Internet, multifunctional mobile phones etc. The cases analyzed show that these technologies are quite broadly applied in rural innovations – both as technical base of innovations (for instance, organizing direct selling via the Internet) or facilitating communication and organization technique. Modern information technologies are of particular importance in remote and scarcely populated regions where physical distance is a barrier to direct contacts. Communication by means of the Internet and websites play an important role in the provision of new social services in the Finnish countryside.
Limiting and enabling contextual factors of innovation are field-specific. For example, in bio-energy the limiting factors are: restricted predictability of green energy markets and technological development consequences; predominance of industry-driven developments and industrial-scale economies; missing communal/local infrastructure hindering effective links between production, distribution and use of bioenergy; and focus on the technological side. The enabling factors are: political commitment to knowledge-based bio-economy; renewable energy policies at EU and national level; active role of local actors and SMEs that consider renewable energy as an opportunity; establishing of local energy supply chains; and attention to organizational and social aspects (Rand et al., 2008).

Organization of networks: Innovation happens in networks. The main question is how to bring actors together. This is only possible by doing, practising collectively. This is not an easy task. Actors have different interests, roles and path-dependent behaviour. They are inspired by different sets of norms, values and hitherto experiences. Private actors have to negotiate interests joining in collective action, public policy actors have to recognize novelties that do not fit in the existing framework; they have to learn to be supportive, not restrictive. Information and knowledge actors often are disconnected from grass-roots innovations and lack skills to support novelties, work with networks (cf. chapter 6). The function of organizational innovation is to break barriers, and to bring actors and their competences together.

The other major organizational dimension ascertained by IN-SIGHT research was a strong intertwinement between technological, economic, organizational and social innovations (Dockès and Tisenkopfs, 2008). Technical novelties, for example new products in direct marketing, new heating systems in environmental energy or new technologies of information in rural services might trigger economic innovation – new outlets and improved farmers’ incomes in direct marketing, energy contracts in the field of renewable energy or cross-sector service provision in the welfare sector. It is difficult to accomplish innovation without new organizational solutions. In direct marketing the main organizational innovation was the development of new distribution systems, in environmental energy it was new forms of cooperation among regional actors, in services it was the establishment of clusters of service companies. Social innovations are equally important because they are related to a redefinition of the identity of farmers, new relationship between general public and farmers, new solidarity between producers and consumers. Subsequently, these social innovations may facilitate the application of technological innovations. Different innovations are integrated and mutually conducive.
Knowledge and social capital: Innovation requires various types of knowledge: tacit and coded, informal and formal, local and global, traditional and modern etc. It is equally important to achieve an integration of knowledge, and to reproduce and renew the knowledge pool. For example in direct marketing the ‘old’, traditional and tacit knowledge of farmers was renewed through ‘remembering’ and learning of modern marketing techniques based on the use of the Internet. An important finding was that innovators need other innovators’ knowledge – tacit, codified, institutional, etc. Therefore learning was re-emphasised as an inherent part of innovation throughout the case studies. Similar to actor systems, learning processes also correspond to the evolutionary phases model of innovation (novelty, niche, regime, landscape). Every scale or phase of innovation requires specific knowledge and competences – novelties – the visioning skills, niches – technical, economic and social competences, regimes – organizational and political competences. Learning is evolutionary in the same way as innovation, for innovators it means life-long learning.

Social capital proved to be one of the central elements of innovation with several key functions: it ‘lubricates’ social activity, invigorates networks of innovators, improves access to information and knowledge – innovators often use contacts and relations to access the external knowledge networks, compensate for the deficits of own knowledge, bring new competences and advice. Hauser, Tappeiner and Walde (2007) argue that social capital and weak ties impact regional innovations. Not all dimensions related to social capital, however, exhibit the same explanatory power. The dimension of associational activity represents one of the strongest driving forces. Also in the IN-SIGHT research networking between innovators and professional associations proved to be an efficient driver of innovation. It is important to employ both bonding and bridging social capital. Successful examples suggest that bonding social capital increases trust and solidarity among the group of innovators, whereas bridging social capital helps to diversify the network, open it to new knowledge and participants, link the group of innovators to wider policy networks and generate support.
In theoretical literature trust is one of the basic measures of social capital (Coleman, 1998; Fukuyama, 1999). IN-SIGHT research proved that trust (personal, institutional, social) is generated in small networks but can be extended into wider networks, thus increasing the ‘radius’ of trust (lubricating both interactions within closer proximity of innovators and connecting them with partners at distance). Trust also helps to bridge sectoral barriers and link public and private actors in partnerships, especially in the case of community-supported agriculture (Roque et al., 2008), care farming (Proost and Savelkouls, 2008) and welfare services in rural areas (Rantanen and Granberg, 2008). As shown by successful innovations, the very existence of innovation partnerships, coalitions and communities of practice depend on the creation of trust. Trust is equally important to public- and private sector innovations – in the public sector it stands behind public goods innovations (welfare sector, environment, public care, education); in the private sector it leverages competition and cooperation (network companies, business clusters, product chains etc.). Trust always implies some guiding social principles and values that help to orient innovation towards sustainability.

Some research (Bar and Munk Riis, 2000) warns that social capital may act also adversely to innovations by closing networks. Grabher (1993) makes an argument that long-standing, unchanging ties among participants in the unfolding of a technological path can result in functional, cognitive and political lock-in and a formerly innovative regional economy may get caught in the trap of rigid specialization.

Governance and territorial embeddedness: Penker (2006) argues that there are three types of embeddedness: social – associated with networks and tradition, territorial – associated with spatial context, and ecological – manifesting in a natural production base. Research within the framework of IN-SIGHT proved that the success of innovations depends on the embeddedness of novelties in social, territorial, natural and cultural contexts.

Territorial embeddedness in local/regional settings appeared to be an important integrating factor. This observation supports the idea of territorial governance that is called to integrate knowledge, resources and various forms of capital (human, social, economic, natural, cultural, symbolic) on a territorial basis. Case studies show that innovations are more successful if they are based on the use of local resources, have a strong local or regional network and are connected with regional economy and planning objectives. This leads to a conclusion that the organizational and political arrangement of innovation according to the territorial principle helps to break cognitive, psychological and sectoral barriers, helps to establish regional innovation partnerships, to stimulate multi-actor cooperation and to allow the combination of various forms of territorial capital in innovative action.
An important issue raised by the IN-SIGHT project was the need for a mediating institution at regional level that coordinates innovation networks, a kind of *innovation platform* for the diverse voices, a *forum* for ongoing and open dialogue among local and regional stakeholders. Countries differ in this respect. In Germany regional governments play a coordinating role by facilitating links between individual initiatives and territorial development plans. The regional innovation support organizations like *Wirtschaftsfoerderung* in the Giessener Land region work in close relationship with the regional government and administrative actors. In the Netherlands there is a move towards establishing open territorial platforms for various types of rural and regional innovations, for example the Laag Holland Programme that fosters cooperation between rural stakeholders within the area and beyond. In Latvia as a new member state institutional capacities for cooperation are still in process of formation. The regional development agencies are weakly related to grass-roots innovations and emerging local innovation platforms. The inter-municipal institutional arrangements, like the Abava Valley Development Centre, were established only recently and seek to coordinate innovations and development on a regional scale. The creation of territorial innovation alliances might be a rewarding way to concentrate resources, coordinate actions, and manage professionally innovations in the context of regional and local development planning. Therefore there is a need to integrate territorial innovation strategies with territorial development plans.

**Support**: There is a great diversity of innovation support instruments (demand- and supply-driven instruments, bottom-up and top-down approaches, public-private partnerships) aimed at various types of innovations. The major challenges to support systems remain coordination and flexibility. More in detail support measures are analyzed and recommendations provided in chapter 6.

### 7.4 Co-production of innovations

Research results allow us to support an argument in favour of collaborative innovations and propose a four-step model of the co-production of innovations. These steps are: creativity and initiative, establishing partnerships, unfolding of innovation, and stewardship and reflexivity.

#### 7.4.1 Creativity and initiative

The first step in the co-production of innovation is releasing the creativity and initiative of actors and combining it through cooperation (figure 18).
The triangle model combining creativity, initiative and cooperation among actors was observed in a number of start-up initiatives. For example, the farmers in the Abava river valley in Latvia had to take initiative to diversify or even break from traditional agricultural production as local processing facilities and the market situation deteriorated. Farmers had to creatively identify new ways of doing business and to reorient towards rural services provision. By doing so in closer circles of neighbours and with assistance of professional associations they invented new agro-tourism, environmental tourism and recreational activities products and attracted urban customers. Creativity, initiative and networking were especially important activities at novelty formation stage (Tisenkopfs, Šūmane and Lāce, 2008).

Hellstrom (2004) argues that at the heart of innovation lies ideating, conceptualizing a desired goal. In the beginning innovation is purposeful projection of a vision and the act fulfilling it. Identification of opportunities, conception of new ways to organize work are necessary actions. The take-off phase involves ambiguity, even deliberate seeking of areas of uncertainty and exploiting them; it is a cognitive, but also an experiencing act. Psychologists and behavioural scientists particularly emphasize the mental and cognitive side. Innovation activity develops in two stages – in a cognitive space of generating an idea, and in a ‘real’ socio-economic space of implementation. The physical and organizational implementation can start only after an idea has been searched and formulated (cf. chapter 5), when the vision of the innovating actors is targeted towards concrete goals of the innovative process, e.g. a new product (Lowe, 1995).

Nightingale (1998) argues that in goal-directed search for the desired future the innovator relies on tacit knowledge, potential market niches, variable partnerships etc. Innovation is not normative but constructive at the beginning. In the conceiving phase actor and purpose are central. As soon as a practical transformation process is designed and takes root, social interactions (learning, networking) play the key role. At the end or ‘reifying circle’ (Hellstrom, 2004) the norm fulfillment, organizational design and institutional structures start to dominate the innovation process.
From the social action theories perspective, motivation, creativity, capability to learn, visioning, risk-taking and networking all are important drivers for innovation. They are predominantly individual ones at the beginning, dependent on personal qualities of innovators (their human capital), but soon these capabilities are being ‘socialized’ and put into action as innovators get in contact with partners, knowledge providers, clients, financiers etc. For understanding the individual drivers of innovation, the capability, and empowerment approach is meaningful, it allows to analyze the personal qualities and skills necessary for innovation. For understanding the collective drivers of innovation, concepts of network, social capital, and collective action are more relevant. Based on an exceptional role of creativity and initiative, we may propose the enriched definition that innovation is the creative combination of activities and forms of capital unfolding in networks and responding to the needs and opportunities of rural actors (rural specificity) and contributing to sustainable development (societal concerns).

Certain cultural values such as openness, tradition of cooperation, positive attitudes towards innovators favour innovation process. The production of novelties is much easier if community members and local authorities welcome new initiatives. Reluctance to publicly support innovations can be connected with low levels of social capital. Much of a favouring attitude in the rural context is based on the past experience and contribution of innovations to economic development and quality of life in the area.

7.4.2 Establishing partnerships

The second step in the co-production of innovation can be understood, in a broad sense, as establishing partnerships – involving actors, building relationships and alliances, differentiating roles and responsibilities, giving the network an organizational frame. This step can be understood as organizational, it is crucial especially to regime and niche formation when innovations are about development of a new product, a new chain, or a new relationship between producers and consumers.

Partnership building has to respond with the topical nature and technical side of innovation and the organizational structure has to be able to mobilize various physical, financial, human, technological and other resources (figure 19).
IN-SIGHT research identified several forms of successful innovation partnerships:

Clusters of businesses and network companies are an efficient organizational form in rural tourism and welfare service innovations (Rantanen and Granberg, 2008b; Tisenkopfs, Šūmane and Lāce, 2008). Companies share information about clients, organize collective training, develop common marketing strategy, coordinate investment, lobby political bodies.

Multi-actor partnerships are a workable organizational form in rural services as well as social innovations. The partnership principle emphasizes the involvement of various stakeholders (farmers, industry actors, research institutes, etc.), it requires formal organization of a network.
Learning partnerships: Partnerships are also established for learning purposes. Managing the competing interests of productivity growth, environmental concerns, landscape change and societal expectations require learning. Effective learning partnerships contribute to addressing the conditions of complexity faced by agricultural industries (Crawford et al., 2007). Learning partnerships are an offprint of multi-actor innovation networks, and as shown by IN-SIGHT research usually they include innovators and professional associations, sometimes also ‘official’ AKIS and extension services.

Public-private partnerships are operational in new welfare services, like care farms, day care services, they are also present in the renewable energy sector. Several bureaucratic obstacles were identified in the work of public-private partnerships, such as rather strict rules and control on the public involvement in investments.

Territorial partnerships, e.g. LEADER groups, rural partnerships are more active in the field of education, training, environmental action and social integration. They contribute to the improvement of quality of life in rural areas.

Communities of practice are yet another type or organization characterized by gradual evolution of collectivity, learning by doing, skill enhancement, elaboration of common rules of practice. Communities of practice often are an appropriate way to start open-ended innovations when there is a common idea but skills and practices have to be learned and partners found during the process. Many successful innovations have started as small communities of practice that gradually expand as innovation brings benefit. Examples can be taken from community-supported agriculture and care farming, but also from learning communities, vital communities, active regions and similar initiatives.

Territorial alliances are the most complex type of network organization, especially characteristic of the renewable energy sector and complex regional innovations, like city-regions, bio-regions, region-branding, public procurement of sustainable food, school meal programmes, and similar initiatives. The broad range of actors involved requires professional management.
The principal strategy in building partnerships and coalitions can be presented by the example of the Innovation Platform Sustainable Meierij (IDM) in the Netherlands (Proost and Savelkoul, 2008). IDM together with the multi-local knowledge network Regiowaarde (Knowledge Network Region’s Value) form a collective organization that enhances the synergy between natural values and a dynamic regional economy. A strong sense of community helped to establish social-cultural exchange between the rural population and the people of the surrounding urban area. The organization develops projects that combine the three aspects of sustainability (people, profit, and planet). Allied to these resources, the natural and cultural assets as well as a distinctive image and identity can be harnessed to enhance economic competitiveness. IDM also provides a platform for discussion on the regional development, thinking about diversifying, re-vitalizing and repositioning rural areas (Sonneveld, 2007). Innovation platform was present also in the Dutch case of Het Groene Woud region branding initiative that is about creating networks and production chains, delivering regional quality products and services with the aim at contributing to local economic development. Innovators bring together private and public partners and work in alliances. Three important aspects of operational territorial partnerships can be learnt from this case:

- **Cooperation** between entrepreneurs across businesses and sectors;
- **Societal values**. Initiative incorporates values, like identity of the region, pride, hospitality, rural life, etc.
- **Region’s identity**. Identity is regarded as an asset in development (Proost and Savelkoul, 2008).

In the IN-SIGHT research we explored involvement and roles of various types of actors – farmers, entrepreneurs, urban groups, researchers, AKIS, local authorities and various partnerships and coalitions. Several case studies testify to the particular ability of newcomers and returnees to rural areas to contribute to novelty production, by combining local and distant visions and competences. Involvement of regional universities in innovation networks is a crucial factor. Cooperation of researchers with the relevant business and professional organizations and dissemination of the relevant research results strengthens the intellectual capacities of innovative networks.
7.4.3 Unfolding innovation

The third step in co-production is unfolding of innovation that means establishing collective norms, promoting innovative products and services, achieving novel economic, social and organizational solutions. Unfolding can be understood as full implementation of innovation, the complete cycle of socio-technical transformation (Labour, 2005). This dynamic is particularly important at regime level. New practice codes are developed and consolidated along on-going networking and learning processes. In order to develop them at niches and regime levels, linkages with external processes are important (Schot and Geel, 2008). By unfolding of innovation new products reach the markets, innovation dilutes in economic, social fields where it starts to compete with other innovations. In the meantime network complexity increases, collaboration intensifies, and innovators’ capacities to learn, venture, cooperate, self-govern improve (figure 20). Innovations bring results in terms of economic, social or environmental gains.

![Figure 20. Unfolding innovation](image)

Examples from in-depth studies suggest that innovations unfold through network amplification and resource amplification.
The Finnish review of welfare services development in rural areas (Rantanen and Granberg, 2008b) provides a story of how a group of welfare-entrepreneurs from Eastern Finland established the network of enterprises and innovated in the welfare services sector by amplifying interaction with other networks – financial, learning, marketing, consulting, support. The network of companies made a contract for the delivery of elderly and day-care services with the local municipalities and tried to strengthen the business niche and improve competences and credibility in rural circumstances through mutual companionship. The Federation of Finnish Enterprises (Suomen Yrittäjät) provided consultations for such new welfare companies and the Employment and Economic Development Centre arranged educational courses. The municipalities in charge started to change from a provider towards an arranger of services. The introduction of a voucher system stimulated quality of services and competition among welfare companies. The joint company used EU structural fund projects to strengthen professional capacity. The Ministry of Trade and Industry acted as crucial funding and supporting agency. The network companies together with 20 other entrepreneurs from the health and social fields founded a regional association for Finland’s health and social entrepreneurs (Teso oy) which took over the supervision and training and started to influence the legislation connected to the operation of welfare companies. Thus networks were amplified and innovation diffused – currently there are about 20-30 similar networks of service companies in Finland providing about 200 service products at 1200 service points. The social and organizational dissemination of innovation has been a consequence of multiplication of networks and cooperation between various stakeholders: the entrepreneurs, the regional authorities, the Federation of Finnish Enterprises, training centres, experts, polytechnics, the banks.
Another example of unfolding innovations through the amplification of networks and resources can be taken from the field of environmental energy and the experience of establishing a small-scale collective heating plant in Camporgiano village in Tuscany (Brunori and Neri, 2008). The municipality of Camporgiano needed to heat new buildings and replace the old diesel heating plant. Interested actors started with round table discussions to find possibilities of sustainable energy provision from local sources and the use of available of woody biomass at local level. That offered new opportunities for local forest owners and heating operators. Fighting global warming, saving energy and money were other important motives. The local action group ‘Garfagnana Ambiente e Sviluppo’ and the Municipality of Camporgiano engaged in contacts with the planner of the biomass project, ARSIA (the Tuscan regional agency for development and innovation in agriculture and forestry), the regional government and environmental organizations that provided support. The LAG funded the biomass project and involved local actors. ARSIA coordinated the project and provided training regarding biomass use to public administrators, farmers and suppliers. The Italian Agro-forestry Energies Association took care of the technical side. As a result of network enlargement, coalition building and partnering, the local energy supply chain was established. In this case social innovation manifested as bottom-up approach and involvement of local actors. Organizational innovation took place in the form of establishing the relationship between local action group, farmers as energy suppliers, energy producers and consumers. Technical innovation reflected the transition from fossil fuel to the use of woody biomass. In the meantime, co-production of innovation generated new rules in forestry and energy use, new solidarities among the farmers and village community, and new technical competences for local energy companies. The local development effects were new jobs in the area and improved energy security at local level that helped to tackle also the environmental problems.

7.4.4 Stewardship and reflexivity

The fourth step in the evolution of innovation is stewardship and reflexivity – a critical ongoing evaluation of innovation process and results and re-direction towards new challenges and sustainability objectives. At regime and especially at landscape level, innovation structures become increasingly complex as new products, new methods, new markets, new norms and new forms of coordination develop and innovation consolidates in terms of economic, social and political recognition (figure 21). Not all innovations change regime or landscape; only few complete the cycle. However, even small-scale innovations, in fact, are complex ones and require reflexivity and governance.
INNOVATION

New products
Definitions, ideas, conceptions (private, collective, prescriptive)
Economic and technical solutions
Assets, resources, investment

New markets
Competitive situation
Existing and new regulations
Supply and demand
Marketing and communication
Consumer values and behaviour

New coordination
New interactions between producers, service providers, other market actors, policy institutions, local governments, knowledge providers, control institutions, etc.
New organisation: partnerships, councils, projects, associations, etc.

New norms
Informal: mutuality, exchange, sharing, social capital, cooperation
Formal micro-level: rules, codes of praxis, contracts
Formal macro-level: government regulations, sanitary norms, etc.

New methods
Technical
Economic
Intellectual (knowledge, learning)
Managerial
Organisational

Figure 21. Consolidating innovation
An example of reflexive innovation can be taken from the case of development of rural tourism services in the Abava river valley Latvia (Tisenkopfs, Šūmane and Lāce, 2008). A number of farmers and entrepreneurs entered the field of rural services for urban demand trying to valorize the natural and cultural assets of the nature protected territory. The novel services – nature walks, country guest houses, accommodation facilities, farm based services, sport, cultural, leisure and recreational activities were based on valorization of endogenous natural assets, landscape values, the history and tradition of the area. Crucial role in development of these services was played by informal exchange of ideas and mutual learning among farmers and entrepreneurs. This stimulated enhancement also of new technical and managerial skills. Gradually, entrepreneurs established an economic cooperation and created an informal business cluster. The major tourist attraction, Zviedru cepure (a toboggan run and winter skiing centre), cooperated with neighbour farms and businesses to mutually complement services (sports activities, lodging, bathing, cable way, horse ride, camping, catering, local food, souvenirs, etc.). The businesses exchanged information about clients and used a common web site for advertising. This helped to widen the market and attract new visitors. By cooperating, entrepreneurs developed informal norms of doing business. Some of these norms were based on increased social capital and trust, for example – collective provision of public goods such as accessible landscape, historical sites and walking paths through several properties. In the meantime, formal macro-level regulations and sanitary norms were often perceived as discrepant to the specificity of small-scale rural tourism businesses.

Although the consolidation and enlargement of the initial network have been quite successful, cooperation with external partners was relatively weak. The role of AKIS in the innovation process was negligent and there were institutional barriers – less at local level, more at regional and national level. Currently, the innovation process is at the crossroads, there is a need for reflexivity and reconsideration of the current profile of services, economic cooperation among businesses, and the links between the business cluster and local municipalities and regional development agencies. Especially important is institutional coordination on a wider territorial scale that would connect innovation with territorial development strategies. The first step towards improved coordination was establishing the Abava Valley Development Centre that tries to act as a common platform for innovation and development in several municipalities located in the valley. Bærenholdt and Aarsæther (2002) propose to connect reflexivity of innovation to the formation of identity. The central question is to reflect upon the location of assets of production and the use of space as markers of identity. The Abava Valley Development Centre considers to facilitate cooperation among municipalities, to more strongly involve local society in innovation, especially the youth, and to build an outer image of the area through branding activities like town festivals and artistic events. Further stewardship of innovation would benefit if the local innovation network would establish links with the regional universities and the Regional Development Agency.
7.5 Strategic potential of innovation

Innovation processes are dynamic and different across European rural regions. Different paradigms coexist in innovation and agriculture/rural development – the linear and systemic, the productivist and multifunctionality, the knowledge-based bio-economy, and other. As Lang and Hausman (2004) highlight, different paradigms coexist and different societal groups and political forces support each of them. The linear paradigm of innovation is still strong and coupled with the productivist paradigm in agriculture. The linear model was developed in the era of economic modernization and growth and was called to link science and production. It may still work efficiently in stimulating farm productivity and sectoral innovations, however, it cannot fully respond to the increased complexity of rural development. It also tends to divide actors, exclude some and diminish the role of social and organizational innovations.

Today, we experience new challenges for European agriculture and rural areas related to climate change, financial market shocks, energy crisis, and economic recession in a number of countries. In the meantime, agricultural policy is taking a shift towards more societal objectives like multifunctionality, sustainability, management of ecosystems, and quality of life. The structural dynamic of European societies, first of all an ageing of population, migration, mobility and intensification of urban-rural linkages adds to the complexity of development. Solutions to respond to these challenges depend on the collective capacity to produce innovation.

An independent Foresight Expert Group (FEG), funded by the European Commission, outlines three disruption scenarios for agriculture and rural areas: climate shock, energy crisis, and food crisis. The fourth scenario is more optimistic, called cooperation with nature (SCAR 2007). The eight major forces driving the process of change in the agro-food and rural sectors are: climate change; environment; economy and trade; renewables; societal and demographic changes; health; rural economy and regional development; and science and technology.

Changes are drastic, penetrating, global, and result in diversified, complex and interconnected effects. The speed of climate change is faster than predicted. Biodiversity loss, new extinction and natural resource depletion are threatening. The world economy is facing a crisis: a range of factors including oil, fertilizer and other input prices, increasing demand from emerging economies and other activities such as biofuels, and restrictions placed on trade by exporting countries has resulted in increasing food prices and has put additional stress on food security. Coincidentally, consumers’ demand for food safety and quality is becoming more intense (SCAR, 2008). In the meantime, rural areas are essential to provide energy, social care, health, recreation, nature conservation, social integration, and cultural traditions.
Radical challenges require novel responses. Contemporary conditions not only demand for first-order innovation that builds upon achievements already existing and trajectories given, but also are favourable also for second- and third-order innovation, adopting new rules and objectives of innovation and generating new paradigms (Brunori, Rand and Proost, 2007). In the current era of turbulence and uncertainties an open and proactive approach to innovation has to be tried out. The theoretical model of innovation developed by the IN-SIGHT research explains how rural innovations can respond to the new tasks of agriculture and rural development, such as orientation towards multifunctionality, development of a knowledge-based rural economy, management of natural resources, provision of public goods, enhancing integrated development, competitiveness and quality of life. Table 11 characterizes potential innovation strategies in the era of turbulence.

**Table 11. Innovation strategies in the era of turbulence**

<table>
<thead>
<tr>
<th>Reinventing tradition</th>
<th>Radical creativity</th>
<th>Scaling-down</th>
<th>Cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The values of traditional agriculture</td>
<td>Designing new models of economy: bio, eco, creative, lifestyle, regional, local</td>
<td>Shrinking of markets</td>
<td>Cognitive</td>
</tr>
<tr>
<td>Embeddedness</td>
<td>Radical transdisciplinarity</td>
<td>Anti-Globalization</td>
<td>Transdisciplinary</td>
</tr>
<tr>
<td>Traditional food</td>
<td>Mixing culture, arts, IT and RD</td>
<td>Revisiting the growth model of innovation</td>
<td>Sectoral</td>
</tr>
<tr>
<td>Local energy</td>
<td></td>
<td>Re-territorialization</td>
<td>Territorial</td>
</tr>
<tr>
<td>Living countryside</td>
<td></td>
<td>Re-localization</td>
<td>Innovation platforms, forums, alliances, communities, networks</td>
</tr>
<tr>
<td>Public goods</td>
<td></td>
<td>Principle of reduction</td>
<td></td>
</tr>
</tbody>
</table>

One of the possible strategies is reinventing tradition – building on values of traditional agriculture, embedding production chains in local circumstances and appreciating the ‘living countryside’. This strategy already manifests in direct marketing, short supply chains, initiatives regarding local (artisanal) products, and crafts as an essential part of the rural economy. It is visible in attempts to reconnect small-scale farming to local processing industries and regional retail chains. Reinventing tradition revives synergies, often lost in the course of modernization, between various types of local products, services and activities as it can be observed in so-called baskets of goods. Tradition also revives the cultural affiliation of contemporary citizens and consumers and reconnects them to the past stock of knowledge, skills and ideals that still can be useful to inspire modern economic and social strategies.
Radical creativity is another innovation strategy that looks at emerging types and models of economy in the ‘post-productivist’ era such as eco-economy, life-style economy, sign-value economy and related patterns of production, consumption and marketing. Changes in urban and rural life-styles, advanced processes of mobility and migration create opportunities of rural innovation. Urban consumers are willing to pay for immaterial values and services in the countryside that correspond to their life-styles and identities. In remote areas, second housing has increased remarkably, opening up the market for new services. Ecological patterns of consumption spread not only in the area of food consumption but also in clothing, cosmetics, housing, energy consumption opening up opportunities of environmental innovation in these industries.

Rural culture provides space for innovation. Rural areas are a crucial source and storage of culture. They are at the origin of traditional culture (folk music, dance, classical literature, crafts, rituals, local food, national architecture etc.). Likewise, following modernization trends in cultural developments, also various forms of modern arts and creative industry have found expression and are spreading in the countryside (publishing, design, video, performing arts, cultural events, festivities etc.). Nowadays rural images influence creative industries, fashion, design, advertising. Cultural activities form a base for social interactions and can stimulate innovation. Rural culture is often intertwined with other economic activities, thus contributing to culture economy as well as revitalization and innovation in traditional and novel sectors of the rural economy. Cultural meanings can be seen behind many initiatives from new/alternative food networks to environmental protection and the emergence of new sectors of eco-economy. Thus rurality becomes an experimental field where new forms of cultural representation, technology, communication and economy can be tried out. Creative industries exploit rural values and images in marketing, and position the countryside in the frame of consumerism.

Scaling-down is a kind of ‘negative’ innovation strategy in response to adverse effects and consequences of globalization (financial, economic crisis, disillusion in globalized markets, distrust in government). Some technological innovations that follow a clear globalization logic create dis-embedding effects, as shown by the Latraps case of energy crop production in Latvia (environmental problems, misuse of energy subsidies, imbalanced value chain, a kind of policy of non-place). In this context, innovation can be a form of resistance to the forces of globalization, a deliberate scaling-down and re-localization of production systems, reconnecting economy to the territory. Innovation also means the capacity to produce resistance as it is observed in alternative socio-economic activities, public food procurement initiatives, school meal programmes, healthy food initiatives, or the concepts and practice of community-supported agriculture.
Cooperation is a kind of integral strategy of innovation evidenced by IN-SIGHT research. First of all it means cognitive, trans-sectoral, and trans-disciplinary cooperation among a variety of stakeholders involved in innovation. Networks, territorial partnerships, communities of practice, innovation alliances were time and again determined as effective organizational forms for co-produced innovation. The need for partnering and networking in agricultural and rural innovation was emphasized also at the SCAR workshop on ‘Strengthening the links between knowledge and agricultural innovation in Europe’ held in Angers, 6-7 October 2008. The workshop argued for improved links between knowledge actors and other innovators, emphasizing the potential of coalitions, partnerships and communities of practice. Collective innovation requires skills of negotiation, conflict management, compromising, learning from each other, building inter- and trans-disciplinary relations, and working in teams. Innovation skill enhancement can be a new task of AKIS (Daane, 2008).

It is important to refer rural innovation to societal values, such as sustainability, responsibility, health, security, social cohesion, integrated development etc. Valceschini (2008) argues that the support of innovation must be focussed on the production of public goods. This sharpens the questions about a fair balance of public and private interests in rural innovation, responsibility and transparency of innovation policies. An attempt to visualize the core values of innovation in the context of a changing economy is presented in figure 22.

![Figure 22. Innovation values in the context of a changing economy](image_url)
The results of the empirical studies carried out in the IN-SIGHT project support the view that the future challenges of European agriculture and rural areas require a strengthening of the links between knowledge institutions and agricultural/rural innovation. Growth, competitiveness and development are increasingly dependent on knowledge and human resources (Lundvall and Johnson, 1994). The establishment of a knowledge/learning economy in the countryside therefore needs particular attention. Tapping of the research insights and human resources of universities, creating new infrastructure (e.g. broadband Internet), and especially building regional partnerships are crucial in order to foster rural knowledge-based developments.

Many innovations are not necessarily bound to one particular paradigm or strategic direction. In our field research we observed a multitude of novelties, niches and contesting innovations. For instance, bioenergy crop production sometimes aims at creating new value added chains and contributes to new rural functions. The paradigms and respective innovations can sometimes be compatible, but they may run into conflict. Landscapes are never homogeneous, they consist of different economic interests, political discourses, cultural values, societal demands and public agendas, for example the CAP reform, EU enlargement, reforms of the social welfare system, climate change etc. Therefore innovation policies should gain awareness of the coexistence between different paradigms and should consider innovation not only as a problem-solving or opportunity-taking activity but also as model-design for future economy and society.

7.6 Final reflection on approach used

IN-SIGHT research adopted a systemic, complex vision of rural innovation. The initial conceptual framework was based on an actor network approach and proposed a structured phases model to explain the collective dynamic of innovation. This model was tested during the country reviews of national innovation systems and helped to grasp the diversity of innovation processes, actors, systems and policies. The following in-depth studies of innovation in the field of agricultural marketing, bioenergy and new rural services brought about deepened evidence of how rural innovation networks are actually constructed and work in three fields of the economy in the six countries participating in the project. The subsequent comparative analysis and synthesis presented in the chapters 2-6 of the report at hand determined the special relevance of innovation dimensions such as networking, multi-actor participation, efficient work of agricultural knowledge and innovation support institutions, individual and collective learning, interplay between economic, technical, organizational and social innovations, the importance of collaboration and territorial governance. The original theoretical perspective was enriched by new concepts highlighting the role of the socio-economic context, organization of networks, knowledge and social capital, embeddedness, systemic aspects, territorial governance and support.
Drawing together the results of comparative analysis the project team enriched the original theoretical framework by proposing a four-step model of the co-production of rural innovation. Successful rural innovations are co-produced through the evolution of collaborative networks. Four steps in the co-production of innovation can be distinguished. They correspond to different types and levels of collaboration within networks. Not all innovations necessarily follow the uniform path through the four steps.

1. **Creativity and initiative** of actors are released and combined through cooperation. A creative combination emerges in response to problems and opportunities. Relations between actors are often informal.

2. **Establishing partnerships**: actors get involved, relationships and alliances are built, and roles and responsibilities are differentiated. The network or partnership mobilizes and uses various physical, financial, human, technological and other resources to develop a new product or service.

3. **Unfolding innovation**: collective norms are established; novel economic, social and organizational solutions are achieved. Innovative products and services are promoted and reach the market. Innovations bring results in terms of economic, social or environmental gains.

4. **Stewardship and reflexivity** of innovation: innovation networks, norms and practice are consolidated and results are evaluated in a reflexive process re-directing innovations towards new challenges and sustainability objectives. Critical assessment and governance of innovation become central.

Discussions at the International Innovation Focus Group meeting in Paris (June 2007), the SCAR workshop in Angers (October 2008) and the IN-SIGHT project’s final conference in Brussels (October 2008) endorsed the systemic approach to rural innovation and the conclusions regarding the collaborative nature of innovation.

### 7.7 Questions remaining for further research

The main initial research questions of the IN-SIGHT project had been:

- What kind of knowledge is required to support a sustainable development of rural economies?
- What kind of innovation infrastructure is required to support the future needs of rural economies?
- How to better integrate technological innovation with organizational and social innovation, and a production systems perspective with a consumption systems and value added chain perspective?

After two years of research with an active participation of stakeholders in seven different countries, we are in a position to more precisely define the research gaps remaining:

1. At a more theoretical level, an analysis of innovation processes in agriculture and rural space is needed, taking into account not only the differences in the scope and scale of innovation processes, but also their territorial and social embeddedness. To this end, it is important to have a stronger focus on social innovations and on the study of the interrelationship between technological, economic, organizational, institutional and social dimensions of innovation processes.

2. The development of an inter-disciplinary approach based on the latest insights in the field of economics, sociology and psychology could provide a better understanding of the production of knowledge and the processes of its codification. The challenge is to identify both the cultural component explaining the plurality and diversity of the knowledge production processes, and common practices. It should result in insights facilitating the establishment of common European frameworks, support policies and intervention tools.

3. The breaking down of cognitive and power barriers between the disciplines contributing to the understanding of innovation (economics, sociology, psychology, educational science, agricultural sciences, organizational research, applied natural sciences) is needed and a true inter-disciplinarity has to be promoted. Social sciences, basic sciences, applied research and humanities have their say and mutually enriching perspectives when it comes to the understanding of the complexities of current rural innovations. This objective can be reached by funding schemes promoting radical inter-disciplinary approaches.

4. In the field studies carried out in the IN-SIGHT project, the crucial role of hybrid networks in innovation processes is emphasized. There is a clear need for recognition of the role of these ‘catalysts in innovation processes’ among the relevant institutions and policy-makers. Furthermore, applied research ought to deliver operational tools for the description, analysis and support of hybrid networks.
5 The research shows that a linear model of innovation – from research to development and diffusion – is still strong when it comes to official representation of innovation processes in statistics and research policies. The funding of collaborative innovation networks is marginal. A certain redirection of a mindset of research policy makers and the academic community is required in order to design tools that support hybrid networks and facilitate multi-actor innovations. More research is needed on the kind of the support necessary for trans-disciplinary networks and collaborative research with practitioners.

6 In terms of public policy, in particular an economic analysis of the effectiveness and cost efficiency of different instruments in support of rural innovation is needed. There are gaps in terms of a delimitation of actual needs for public support vs. pure private entrepreneurship initiatives. The question of the public interest in the definition of the type of innovations that are considered eligible for financial public support also has to be addressed. Mechanisms to enhance public goods should be explored since innovation systems are still strongly missing this component and do not go beyond private interest. Simultaneously it should be tried to identify best policy practice – especially in view of priority-setting and facilitating innovations. Closely related to this is the question of how to accommodate innovations at the interface between different policies, e.g. rural and social/energy/regional policy.

The concept of ‘innovation governance’ ought to be developed.

Institutional support is clearly important, but a common European view on the agricultural and rural knowledge and information system does not exist. The current patchwork of multiple levels of institutions makes it difficult to identify the key actions at a particular level (neither local, nor regional or national or European). In that sense, a review of the AKIS that focuses on the above questions could be very helpful in the further elaboration of a coherent policy at European, national and regional level. The question of the role of different institutions in the innovation support system is to be examined in more depth than it had been possible in this project.

We know well the different functions in the AKIS, but we do not sufficiently understand their interplay and the coordinated action of different institutions (education, research, development, socio-economic support, animation and facilitation, knowledge brokers, financial support) that is required in order to support practitioners in agriculture and rural development in the best possible way.
8 References


Brunori, G., Guidi, F. and Rossi, A. (2008): In-depth review of innovation systems and processes / practical experiences in the field of agriculture and agricultural marketing (WP 3 Case Study).


Rand, S. (2008): Renewable energies: biomass production and utilisation in German agriculture and forestry. In-depth review and case Study (Bioregio Holz Knüll). (WP4 case study).


9 Main reports produced in the IN-SIGHT project

The following reports can be downloaded from the project website: www.insightproject.net

Brunori, G., S. Rand, J. Proost (2008) Conceptual framework and theoretical underpinnings of innovations processes in agriculture and rural development. WP1 Report produced in the EU funded IN-SIGHT research project. University of Pisa (UNIPI), Pisa, Italy

Proost, M.D.C., G. Brunori, D. Bourdin, K. Knickel (2008) Overview of innovation systems and processes in agriculture and rural development: a comparison based on seven country studies. WP2 Report produced in the EU funded IN-SIGHT research project. Wageningen University, Communication Science (WU), Wageningen, Netherlands

Dockès, A.-C., A. Guillaumin, A. Rossi, C. Savelkouls, E. Thévenod-Mottet, S. Rand (2008): Innovation systems and processes in the field of agriculture and agricultural marketing: A cross-national analysis of differences in France, Switzerland, Italy and The Netherlands. WP3 Report produced in the EU funded IN-SIGHT research project. Institut de l’Elevage (IEL), Paris, France

Rand, S., D. Bourdin, G. Brunori, A.-C. Dockès, M. Fischler, A. Guillaumin, T. Neri, S. Šūmane M. Rantanen (2008): Innovation systems and processes in the field of environmental technologies: A cross-national analysis of differences in Germany, Switzerland, Italy, Latvia, France and Finland. WP4 Report produced in the EU funded IN-SIGHT research project. IfLS Frankfurt at Goethe University Frankfurt (Main), Germany

Rantanen, M., L. Granberg, T. Tisenkopfs, M.D.C. Proost, S. Rand (2008): Innovation systems and processes in the field of (new) rural services: A cross-national analysis of differences in Finland, Latvia, The Netherlands and Germany. WP5 Report produced in the EU funded IN-SIGHT research project. University of Helsinki, Ruralia Institute, Helsinki, Finland

Knickel, K., T. Tisenkopfs and S. Peter (eds.) (2009): Innovation processes in agriculture and rural development. Results of a cross-national analysis of the situation in seven countries, research gaps and recommendations. Final Report produced in the EU funded IN-SIGHT research project, Priority 8.1 Policy-oriented research, Scientific support to policies, FP6-2005-SSP-5A, Contract no. 44510. IfLS Frankfurt at Goethe University Frankfurt (Main), Germany

Project coordination:
Dr Karlheinz Knickel
E-Mail: Karlheinz.Knickel@mfe.govt.nz
Website: www.ifls.de