



# RURAGRI ERA-NET

## Strategic Research Agenda



## Foreword

This strategic research agenda had been developed by RURAGRI Work Package 3 (WP3: Formas, SE; FOAG, Switzerland) in close interaction with the Management Committee of RURAGRI and in cooperation with the RURAGRI Expert Panel. It has been developed and discussed in an interactive process with a few milestones, being: a workshop in Hague, NL in March 2011 with the RURAGRI Expert panel, a discussion on research priorities at the RURAGRI Steering Committee Meeting in Zürich, CH June 2011, finalised by the Management Committee of RURAGRI in Stockholm, SE January 2012, and approved by the RURAGRI Steering Committee in April 2012.

It is our hope that this Strategic Research Agenda will be used as inspiration for all researchers concerned with the interrelated issues of RURAGRI, i.e. agricultural development, rural development and sustainable development.

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# **RURAGRI**

## **Deliverable 3.2**

# **Strategic Research Agenda**

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Prepared by Work Package 3 in interaction with the Management Committee of RURAGRI  
and cooperation with the RURAGRI Expert Panel

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## 1 Summary

Rural areas, defined as predominantly rural and intermediate regions, represent a majority of the territory (91%) and the population (59%) across Europe. Social and economic progress in these areas, or rural development, is of vital importance for large parts of Europe and an influential policy area. Besides farming and forestry as main land uses, the development of rural communities and the management of natural resources and landscapes are essential for regional development, territorial cohesion and sustainable development.

The ERA-NET RURAGRI was established with the objective of fostering co-ordination and co-operation between national research programmes concerned with the interrelated issues of agricultural development, rural development and sustainable development. One of the primary means of meeting this objective is the development of a Strategic Research Agenda (SRA). This document contains a brief overview of the development of the SRA and recommendations for key research topics and issues.

The approach adopted by the Network recognises the diversity of rural areas in Europe in terms of their opportunities, challenges and potential. This perspective also accepts that the economic and social dynamics of rural areas are increasingly influenced by interrelations between places, particularly those linking urban and rural areas. By recognising the territorial embedded nature of social, economic and ecological linkages implicit in agricultural practices RURAGRI seeks to strengthen integrated development within and between regions, both rural and urban, and hence contribute to territorial cohesion.

Drawing on a review of a number of recently published foresight initiatives key drivers, trends and challenges confronting agricultural development and rural areas have been identified. A distinction has been drawn between underlying challenges (e.g. food security, climate change, sustainable energy production) and core challenges (e.g. competitiveness, social cohesion and quality of life in rural areas, sustainable use of natural resources).

Based on the assessment of challenges, the SRA prioritises future research concerning agricultural and rural development in three key areas:

- a) Ecosystem Services / Public Goods: e.g. the scarcities and provisioning of resources.  
Research needs to:
  - 1) *Identify the various types and quality of ecosystem goods and services in different rural areas and improve monitoring systems of goods and services to ensure their sustainability.*
  - 2) *Enhance methods measuring the value of goods and services on spatial and temporal scales for monitoring, including indicators for follow up and impact assessment. Research could consider the development of governance systems, procedures and tools managing ecosystem goods and services in a regional perspective.*
  - 3) *Increase understanding of how to achieve mutual benefits between economic development in rural areas and the delivery of public goods. Define tools for marketing these values to the general public and to decision makers. Assess the influence of production and consumption patterns on the use of ecosystem goods and services in different rural areas. Identify best practices, innovative solutions and system innovation suitable for use in rural areas.*
- b) Socio-economic development: e.g. the economic and social activities in the rural areas and the valorization of resources.  
Research should aim to:



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- 4) *Explore economic activities, public and private services, provision of infrastructure and technology to enhance sustainability and identify best practices supporting vibrant rural areas.*
- 5) *Identify barriers that hinder innovation and evaluate novel mechanisms and socio-economic structures (networks) which encourage innovation in rural areas.*
- 6) *Identify and evaluate agricultural development trajectories in different rural areas paying particular attention to the potential for specialisation and/or diversification.*

Furthermore, research needs to:

- 7) *Assess the reasons for migration and the impacts on the quality of life, culture and social identity for different types of rural areas. This should include studies on the potential of migration on the capacity for innovation in different types of rural areas.*
  - 8) *Assess and evaluate the implications of mobility and commuting on the quality of life, culture and social identity for the potential and sustainable development of different types of rural areas*
  - 9) *Identify the diversity of urban-rural relationships and evaluate their potential to contribute to sustainable rural development, assessing best practices in the management of rural-urban relationships. Research in this area might also consider issues related to the use of ecosystem services.*
  - 10) *Identify the mechanisms of interaction between sectoral policies and their intended and unintended territorial impacts. Formulate recommendations for the coordination of sectoral policies fostering synergies. Research in this area might also consider issues related to land use and/or ecosystem services.*
- c) Land use / Land Management: e.g. conflicting targets in production vs. maintaining biodiversity or production of food and feed vs. production of bioenergy.
- Research needs to:
- 11) *Explore and evaluate innovative land use and management practices to overcome conflicting demands on land and identify best practices reconciling.*
  - 12) *Evaluate those economic networks utilising natural resources that result in increasing demands on land use; identify and explore novel resource efficient networks. This research could include consumer perspectives.*
  - 13) *Assess multifunctionality of agriculture and how this concept could overcome land use conflicts and contribute to diversification of rural economies. Research linking the concepts of multifunctionality, ecosystem services and public goods is also of interest.*
  - 14) *Assess land use implications of new paradigms (e.g. green growth).*

The scale, structure and composition of economic activities associated with a rural region play a central role in determining its type and level of potential. They are important in supporting the development of links between rural areas and other places, whether they are urban or rural. The nature of these linkages also facilitates new or improved knowledge flows, particularly in the areas of innovation and governance. Based on this understanding of potential three cross cutting issues are identified:

- a) Diversity: To address and reflect the diversity of (rural) European regions, their potential, challenges and opportunities is an essential precondition for the scope of this SRA.
- b) Rural-Urban-relationships: Rural areas, communities and economies do not exist in a vacuum but, rather, are integrated into networks or circuits of capital, knowledge and material flows.
- c) Governance: Innovations in governance are considered to be crucial to enable current and future transition of rural areas in order to achieve balanced regional development.



## 2 Introduction

According to the Lisbon Strategy, the European Union aims to become a dynamic and competitive knowledge-based economy capable of sustainable economic growth that will support more and better jobs, greater social, economic and territorial cohesion whilst simultaneously maintaining the environment. These objectives of economic and social cohesion are increasingly pertinent within the context of recent and planned EU enlargement. This process, which enhances the EU's wealth of human, economic and natural resources, has also led to increased territorial diversity within the Union. Territorial diversity is reflected in national, regional and local differences in social, economic and environmental conditions, which influence the potential for development.

The diversity of development trajectories is most apparent in rural areas that, according to the European Commission, encompass approximately 91 % of the territory of the EU. Unsurprisingly, economic activities associated with the use of natural resources are the primary source of income in most rural areas. Of these activities, those related to agriculture are ubiquitous. There is however, significant variance in the type, structure and scale of agriculture practiced in different regions. This in turn results in spatial or territorial differences in the viability of farm businesses and their capacity to support the development of rural economies. The social, economic and environmental sustainability of agriculture is important to all parts of the Union and by extension, to the success of strategic EU objectives. Agriculture is central to meeting the main challenges faced by the EU, i.e. meeting growing demand for high quality, nutritious and safe food whilst ensuring that agricultural practices are socially and environmentally sustainable.

In addition to overcoming these challenges agriculture is expected to contribute, both directly through economic activities and indirectly through the creation and maintenance of landscapes and ecosystems of high cultural value, to balanced regional development. Contemporary trends have seen the emergence or strengthening of linkages between agriculture and the broader rural economy and between rural and urban areas. These interconnections are important drivers of innovation and change. In some spaces they are well developed and yield advantages to both rural and urban communities in term of access to resources and services of general interest; in other spaces the interconnections are at an early stage of development.

These interconnections are increasingly important as the strong urban movement that characterises most of the population and economic flows within extensive areas of the EU demands improved connectivity between urban and rural areas if balanced regional development is to be achieved and territorial cohesion realised.

The multiplicity and complexity of demands placed on agriculture, particularly in light of the current economic challenges confronting many countries, has resulted in the development of a range of national research programmes. These are focused on overcoming what are perceived of as 'national' challenges but are in reality common issues facing all European states. This fragmented approach is inefficient. Each country is allocating what are limited resources to tackle the same or similar research questions. Furthermore, by focusing on the national level, insufficient consideration is given to the common or supranational nature of many of the key drivers of agricultural restructuring and rural change.

In order to overcome this issue and enhance research capacity focused on the issues outlined above the RURAGRI ERA-Net was established with the objective of fostering co-ordination and co-operation between national research programmes concerned with the interrelated issues of agricultural development, rural development and sustainable development ([www.ruragri-era.net](http://www.ruragri-era.net)). One of the primary



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means of meeting this objective is the development of a Strategic Research Agenda (SRA). This document contains a brief overview of the development of the SRA before identifying key research topics and issues. Whilst the purpose of the SRA is to inform and influence national and international research support agencies concerned with these issues, it is relevant to other funding bodies given the broader implications of agricultural and rural development for other economic sectors, the environment and society as a whole.



### 3 The ERA-NET RURAGRI

#### 3.1 Objectives

RURAGRI aims, through enhanced cooperation between 20 partner countries and greater coordination of their national research programmes, to better understand the processes shaping interactions between agricultural production, other rural land uses and the broader rural economy. This goal reflects the increasing orientation of agriculture policy towards improving ecological practices and the provision of public goods, supporting the economic viability of rural areas and contributing to sustainable development. The approach adopted by the Network recognises the diversity of rural areas in Europe in terms of their opportunities, challenges and potential. This perspective also accepts that the economic and social dynamics of rural areas are increasingly influenced by interrelations between places, particularly those linking urban and rural areas.

The aim, objectives and approach developed by RURAGRI is framed by and will contribute to the *Europe 2020* strategy goals of smart, green and inclusive growth (EC, 2010a). Greater cooperation between partners will result in smart targeting of key issues confronting different types of rural areas. Enhanced coordination between national research programmes will identify critical knowledge gaps and foster the development of trans-disciplinary approaches that are fundamental if the multi-dimensional challenges of sustainable development are to be successfully overcome. Finally, by recognising the territorial embedded nature of social, economic and ecological linkages implicit in agricultural practices RURAGRI seeks to strengthen integrated development within and between regions, both rural and urban, and hence contribute to territorial cohesion.

#### 3.2 The Strategic Context

The overarching framework guiding policy development within the EU is contained within the *Europe 2020* strategy. Unsurprisingly, as the primary policy effecting rural areas, the EU Commission proposals on the future **Common Agricultural Policy (CAP)**, draws directly from the *Europe 2020* objectives emphasising the need for smart, green and inclusive development. Closer reading of the Commission proposals points to the objective of territorial cohesion or ‘balanced territorial development’ as one of the main references underscoring the targets of **Rural Development Policy**. In order to contribute to this goal the Commission proposals aim to stimulate economic development, by valorising ‘rural potential’. Potential is generally defined as the capacity – incorporating physical, natural and human capacity – that can contribute to economic development. While it is envisaged that potential is activated within each region, an element of a region’s potential is determined by how it integrates into wider spaces of production. As a consequence, social and economic development driven by interconnections with other places facilitates endogenous development thereby contributing to greater interaction with other places and, hence, increased territorial cohesion.

From the perspective of EU economic policy, the introduction of the Single European Market and European Monetary Union are viewed as having led to greater economic and social integration. Internal borders between member states and/or regions became less relevant as “more intensive [spatial] relationships and inter-dependencies” emerged (CEC, 1999, p.7). Associated with these developments is a range of spatial imbalances, e.g. social, economic and demographic, between a core area identified as the zone of global economic integration and the rest of the EU (EC 2007a, EC 2011). This perspective of European regional development came to the fore with increasing integration of national, regional and local economies with global systems. It gained further credence with recent rounds of EU-accessions that resulted in an additional 12 member states which are characterised by differences in their level of development relative to the rest of the EU.



A number of EU reports drew attention to the diversity of regions within the EU both before, but particularly after, the enlargement of the Union to 27 members (CEC, 1999; CEC, 2004; CEC, 2007; EC, 2011). In response, accepting that economic processes influencing and operating within the Union were resulting in greater divergence in regional economic performance, territorial cohesion became a priority for the EU. Following the ratification of the Lisbon Treaty (2009), the EU gained legal responsibility for territorial cohesion. *Europe 2020*, the primary strategy shaping the EU's response to a series of international, regional and national economic crises, has adopted territorial cohesion as one of three key objectives. Territorial cohesion is generally defined as supporting balanced regional development through the valorisation of the socio-economic potential inherent within regions. Rather than take a blanket approach, the member states have agreed that specific types of regions will be the focus of territorial cohesion. These are specified in Article 178 of the Lisbon Treaty and include 'rural areas'.

### **3.3 Mapping of the current situation within the network**

By way of initiating the development of a Strategic Research Agenda a survey of RURAGRI partners sought to identify and evaluate, in terms of research priorities, relevant existing national and international research programs concerned with agriculture, rural development or sustainable development (Brouwer and Sas-Paszt 2011).

The survey sought to establish both current and future research priorities. Topics covered by existing research programmes were identified and classified. An evaluation was subsequently undertaken establishing commonalities between partners in terms of their priority interests. Common topics associated with *existing national research programmes* include land management (19 countries), management of natural resources and ecosystem services (17 countries), climate change (16 countries), landscape and biodiversity (15 countries) and farming practices (15 countries). These are topics that currently have a high policy profile and represent major scientific challenges for agriculture within the context of contributing to both rural and sustainable development.

In relation to future research priorities and potential areas for co-operation, the highest scores recorded concerned management of natural resources and ecosystem services (15 countries), land management (12 countries), rural and urban areas (11 countries), landscape and biodiversity (10 countries), food security, safety and consumer behaviour (10 countries) and climate change (10 countries). Emerging from the results of this survey is a concern not just with individual topics but also with the multi-dimensional, i.e. ensuring agricultural development whilst sustaining ecosystems and the environment, and interrelated aspects, i.e. contributing to broader social and economic development, of these issues. Unsurprisingly, those topics identified as potential areas for future co-operation are far more complex than those topics associated with existing research programmes.



## 4 Current Situation in the European Union

### 4.1 EU policy

Despite the general urbanization tendency all over the world, rural areas, defined as predominantly rural and intermediate regions, represent a majority of the territory (91%) and the population (59%) across Europe (DG Agri 2010). Social and economic progress in these areas, or rural development, is of vital importance for large parts of Europe and an influential policy area. Besides farming and forestry as main land uses, the development of rural communities and the management of natural resources and landscapes are essential for regional development, territorial cohesion and sustainable development.

*Europe 2020* sets out a growth strategy for the coming decade, aimed at smart, sustainable and inclusive growth that takes account of increasing global challenges, in particular those resulting from climate change and the need for increased resource efficiency (EC 2010a). The strategy acknowledges the pressing needs resulting from greater global competition for natural resources and the resulting pressures on the environment. Seven flagship initiatives are proposed within *Europe 2020*. A number of these, the “Innovation Union” and a “Resource efficient Europe” in particular, are directly relevant to RURAGRI.

A number of initiatives have been developed in response to *Europe 2020* including the European Innovation Partnership (EIP) on “Agricultural Productivity and Sustainability”. This initiative seeks to enhance co-operation and co-ordination between research programs, both national and EU, and stakeholders, including farmers, businesses, industry, advisory services and NGOs. This integrative approach seeks to strengthen the agricultural innovation system by supporting the translation of research results into innovation, improve the communication of knowledge to practitioners and foster joint efforts to support sustainable innovation.

The Common Agricultural Policy (CAP) is the farm support program addressing agriculture in the EU. European agriculture has shaped the landscape resulting in a great variety of different landscapes. Farming is essential for many habitats in Europe as well as for a large portion of biodiversity. By contributing to the variety of European landscapes, agriculture contributed to the diversity of European cultures and heritage. Notwithstanding these positive effects, agriculture can also have large negative impacts on resources like soil, water and biodiversity. Thus, the CAP has identified three priority areas to protect and enhance the EU's rural heritage: i) Biodiversity and the preservation and development of 'natural' farming and forestry systems, as well as traditional agricultural landscapes ii) water management and use and, iii) dealing with climate change. Hence in the communication “The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future” (EC, 2010b) three main challenges are identified: i) food security, ii) environment and climate change and iii) territorial balance.

The agricultural expenditure is financed by two funds: the European Agricultural Guarantee Fund (EAGF) which finances direct payments to farmers and measures to regulate agricultural markets, and the European Agricultural Fund for Rural Development (EAFRD) which finances the rural development programmes (RDP) of the Member States. These programmes aim not just at farm development, but also at the stimulation of growth, the creation of employment and at sustainable development of rural areas. In the period 2007-2013 they are based on three thematic priorities: i) improving the competitiveness of the agricultural and forestry sector, ii) improving the environment and the countryside through land management and iii) improving the quality of life in rural areas and encouraging diversification of economic activity. In addition, local development activities of rural



regions are supported as a “horizontal” programme priority by local partnerships, referred to as “Leader” measures.

Following from lessons learnt through previous networking activities of the former Community Initiative Leader a European Network for Rural Development (EN RD) has been established that acts as a focal point for all rural development actors across the EU. Collaboration within this network should enhance the effective implementation of RDPs by Member States and improve impacts for rural regions.

**Regional Policy** is the second policy domain with direct implications for rural regions. Being responsible for the economic, social and territorial cohesion of the EU, it aims to reduce the disparities between regions and countries of the European Union. The European Regional Development Fund (ERDF) as its funding instrument intervenes in the three objectives of regional policy: (i) Convergence, (ii) Regional Competitiveness and Employment, and (iii) European Territorial Cooperation. While all the programmes are of relevance to rural areas, European Territorial Cooperation is particularly interesting for RURAGRI through the dimension of cross-border cooperation (Interreg IVA, B and C) and the three networking programmes (Urbact II, Interact II and ESPON).

A place-based approach of rural policy extends beyond these two main intervention fields and call for the integration of relevant policy domains within the future Strategic Partnership approach. One of these additional policies that affect rural regions in particular is included in the **EU Sustainable Development Strategy** (SDS, EC 2009). It is an overarching strategy for all EU policies which sets out how we can meet the needs of present generations without compromising the ability of future generations to meet their needs. The strategy deals in an integrated way with economic, environmental and social issues. The EU SDS identifies key challenges for the EU, e.g. climate change and clean energy, sustainable consumption and production, conservation and management of natural resources and social inclusion, demography and migration.

## 4.2 Research activities

Many initiatives of the 6th and 7th Framework Programme address core issues for research priorities in the scope of RURAGRI. These include in particular many networking activities, like a series of ERA-NETs, European Technology Platforms (ETPs) and Joint Programming Initiatives (JPIs) covering topics relevant for RURAGRI (See Annex 1).

At least 18 ERA-NETs are undertaken to foster transnational collaboration in various topics relating to RURAGRI issues. Most obvious is the relevance of eight KBBE-related ERA-NETs. Four ERA-NETs are running or in preparation under the thematic priority of “Environment (including Climate change)”. Another six ERA-NETS of different thematic priority have some relevance for RURAGRI.

Joint Programming Initiatives (JPIs) aim to tackle major but common European societal challenges by combining national research programs. In April 2010 the Commission invited the Member states to launch JPIs in three areas, all of which have relevance for RURAGRI, though in varying degrees; *Agriculture, Food security & Climate Change, Cultural Heritage, climate change and security, and Health, Food and prevention of Diet related diseases.*

In addition Annex 1 lists some transnational EU research projects that focus on rural areas and their development potential, agriculture and sustainable development. Nevertheless those activities primarily focus on an increased cooperation in specific research fields and hardly address issues of interrelations between the three RURAGRI dimensions - rural development, agriculture and sustainable development.

## 5 The Strategic Research Agenda

This document develops a Strategic Research Agenda (SRA) to inform and guide the activities of the RURAGRI network and those research communities concerned with the impact and implications of interrelationships between agriculture, rural development and sustainability. Drawing on a review of a number of recently published foresight initiatives this section identifies key drivers, trends and challenges confronting agricultural development and rural areas. This document evaluates the implications of these developments for the future of rural areas. Finally, priority research needs are identified. The SRA supports enhanced co-ordination and co-operation of transnational research, contributing to the delivery of key European objectives, particularly balanced regional development through smart, sustainable and inclusive growth.

### 5.1 Drivers and Challenges

By way of providing a framework to support the development of the SRA, it is necessary to identify drivers shaping those development trajectories effecting agriculture and rural areas (see Annex 2). This also afforded the opportunity to outline key challenges associated with the objective of balanced regional development (Figure 1). Within the SRA drivers are defined as underlying causes of change in agriculture and rural areas. Drivers operate across different spatial scales and can result in different outcomes in different types of area, i.e. rural or urban, giving rise to trends. These trends can create new challenges, which require a response in order to achieve sustainable development. Challenges are described in Annex 3 and summarised in Table 1. A distinction has been drawn between *general or underlying challenges* and *core challenges*. Overarching challenges are largely associated with and operate at the global and European scale. Responses to these challenges at these

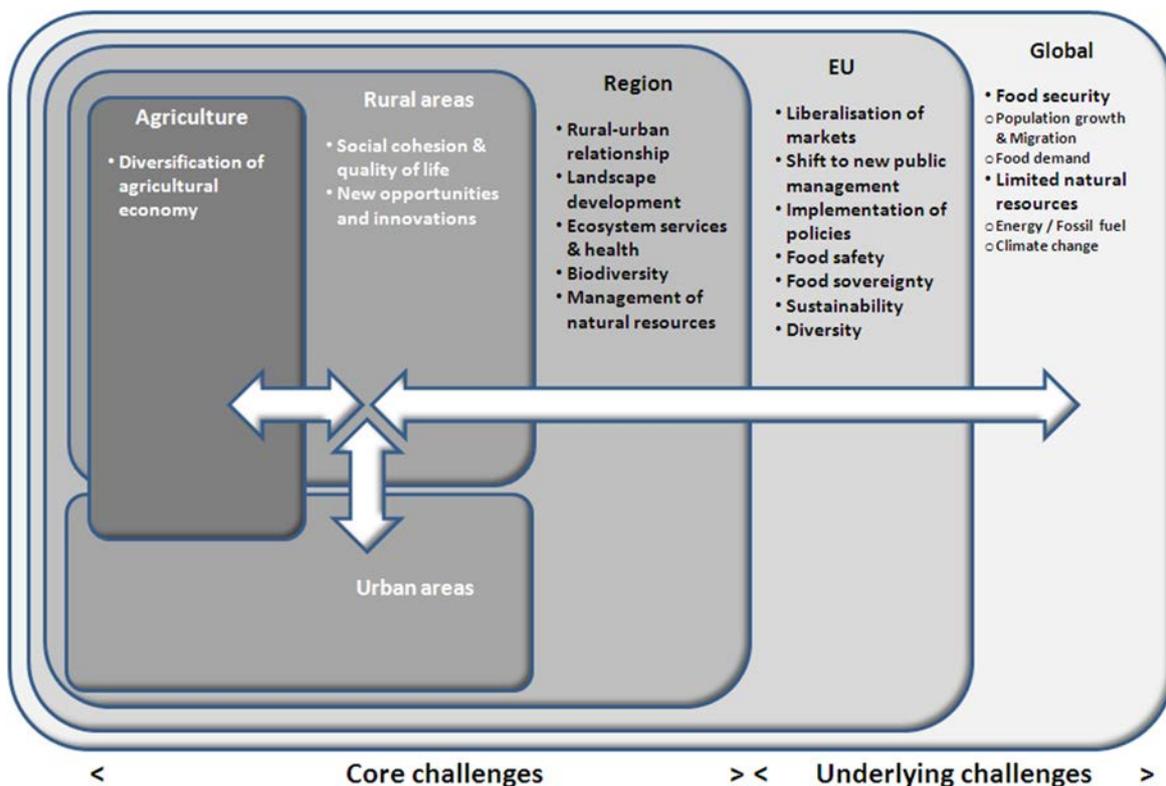


Figure 1. The RURAGRI SRA: Core and underlying challenges for the sustainable development of agriculture and rural areas.



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scales shape the core challenges, which influence functional regions, comprising rural and urban areas, and agriculture (Figure 1). The SRA focuses on the core challenges while considering underlying challenges in the identification and formulation of research needs.

**Table 1.** Summary of challenges associated with a balanced regional development.

	<b>Challenge</b>	<b>Drivers</b>
<b>Underlying challenges</b>	<p><b>Food security, safety and sovereignty</b></p> <p>A challenge for rural areas in Europe will be to face the concerns of food security, safety and sovereignty in a sustainable way, taking into consideration both local, regional and global contexts. This includes taking into account farmers and consumers demands in the international/national policy decision processes in order to find a balance between international agreements and rules or production systems decided by local/regional actors.</p>	Demographic change, market liberalisation, globalisation, increase of welfare, changes in consumption patterns, scarcity of resources
	<p><b>Adapting to and mitigating climate change</b></p> <p>A challenge for the rural areas will be adapt in best way possible to climate change, with the use of both new techniques and changed activities. A special challenge will be to make rural areas and agriculture resilient against unpredictable extreme weather events.</p>	Climate change, diversity of geography
	<p><b>Sustainable energy production and management</b></p> <p>Technological advances, innovations and policy development that can secure global food supply, as well as other renewable resources, in the future.</p>	Scarcity of resources, energy crisis, demographic change
<b>Core challenges</b>	<p><b>Increasing competitiveness, innovation and resilience in rural areas</b></p> <p><b>a) Diversification of agricultural and rural economy</b></p> <p>A great challenge for farmers, but also for other economic actors in rural areas will be their ability to identify their specific role in the region. This comprises challenges with regard to the capacity to diversify (remote areas) and to gain access to new technologies while improving environmental quality.</p> <p><b>b) Develop new opportunities for rural areas</b></p> <p>A crucial issue for the future of rural areas is to recognise opportunities for development in order to foster a balanced development of regions and to turn diversity into strengths. Initially, capacity building might be the first priority to enable actors in these regions to cope with place-specific challenges and opportunities.</p>	Globalization, liberalization of markets, technological change, new public management, EU-enlargement, diversity of spatial structures, policy framework, institutional fragmentation, decrease of the importance of agriculture for rural economies
	<p><b>Maintaining social cohesion and quality of life in rural areas</b></p> <p>One future challenge for rural areas is to mitigate social disparities and maintain social cohesion in areas with societies in transition.</p>	Demographic change, new public management, institutional fragmentation, liberalization, infrastructure and technological change, decrease of



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	Furthermore, another future challenge is to improve the quality of life of farmers and rural communities.	the importance of agriculture for rural economies
	<p><b>Sustainable use of natural resources</b></p> <p><b>a) Maintaining ecosystem health and biodiversity</b></p> <p>A challenge for the future is to modify existing, and develop new, farming practices in order to manage nutrients and water resources sustainably. Also higher energy costs and the need to take actions to maintain biodiversity call for adaptations in farming management systems.</p> <p><b>b) <i>Balanced management of use of natural resources between urban and rural areas</i></b></p> <p>There is a need to strengthen the connection between rural and urban areas to tighten the nutrient loops. In order to reduce the use of fossil energy, the use of bio-energy in rural and urban areas needs to support resource-efficiency. This includes a much more improved waste management and optimized substrate/material handling and flow between urban and rural areas.</p> <p><b>c) Sustainable landscape development</b></p> <p>The actual land use and varieties of land management systems is manifested in the development of the specific landscape character. As a product of both natural and cultural processes, it is a core target for the future to find sustainable patterns of economic and social development considering landscapes and regions as a whole.</p>	Scarcity of resources, CAP, implementation of spatial policy, diversity in geography, diversity of spatial structures, demographic change

## 5.2 Research needs

### 5.2.1 Framework

Based on the forgoing assessment of drivers and challenges, this section of the SRA defines research needs in the areas of sustainable agricultural and rural development that can contribute to delivering balanced regional development. The SRA seeks to contribute to enhancing balanced and sustainable regional development in Europe by fostering better understanding of those interrelationships between agriculture and the broader rural economy and between rural and urban areas. For balanced development to be successful, approaches that activate rural potential are required, i.e. an integrated approach to rural development drawing on the distinctive combination of natural resources, cultural characteristics, human capacity and links to other places associated with different types of rural areas. This approach differs from conventional rural development which largely focuses on improving the economic performance of the agricultural sector. For balanced regional development to be achieved the focus must go beyond the sectoral role of farming and food and explore how these resources can be drawn on to support cross-sectoral and inter-sectoral growth and development. This form of integrated development seeks to harness the capacity of other or non-agricultural rural communities and non-food resources to improve the opportunities available to all those living in rural areas.

Many of the underlying and core challenges outlined above (Figure 1) result in competing demands, which in turn can result in conflicts concerning the management and use of natural resources. Inte-



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grated rural development calls for agreement, at the local or regional level, on the most appropriate utilisation of available resources and how they are to be developed. It is to be expected that differences in views and opinions, reflect evolving social values, will arise as different groups seek to shape the development strategy for their area.

In order to understand rural potential, activate this potential and achieve balanced sustainable development, the SRA prioritises future research concerning agricultural and rural development in three key areas (Figure 2):

- a) Ecosystem Services / Public Goods: e.g. the scarcities and provisioning of resources,
- b) Socio-economic development: e.g. the economic and social activities in the rural areas and the valorization of resources,
- c) Land use / Land Management: e.g. competition of production, protection and urban sprawl.

As intimated above, the agriculture sector has a clear role to play in delivering on this objective. In addition to the obvious importance of agricultural activities to the social and economic development of rural areas, the sector plays a significant role in the development of linkages to other regions through the functioning of commodity supply chains. Furthermore, farming also plays an important role in the creation of potential in other economic sectors, particularly those that draw on public goods, i.e. culturally significant landscapes. Other economic sectors are equally important, particularly those that integrate rural areas into non-local flows of capital, e.g. energy, tourism, manufacturing activities and services. The scale, structure and composition of economic activities associated with a rural region play a central role in determining its type and level of potential. They are important in supporting the development of links between rural areas and other places, whether they are urban or rural. The nature of these linkages also facilitates new or improved knowledge flows, particularly in the areas of innovation and governance. Based on this understanding of potential three issues are identified, geographic diversity, rural – urban relationships and governance, which cut across each of the three research priorities (Figure 2):

- a) Diversity: To address and reflect the diversity of (rural) European regions, their potential, challenges and opportunities is an essential precondition for the scope of this SRA
- b) Rural-Urban-relationships: Rural areas, communities and economies do not exist in a vacuum but, rather, are integrated into networks or circuits of capital, knowledge and material flows.
- c) Governance: Innovations in governance are considered to be crucial to enable current and future transition of rural areas in order to achieve balanced regional development.

Viewing the challenge of balanced regional development through this framework facilitates the identification of key knowledge gaps (see chapter 5.2.3). These gaps require enhanced co-operation between researchers and national research programs if the functioning of global or non-local processes and their implications for rural areas are to be understood and managed.

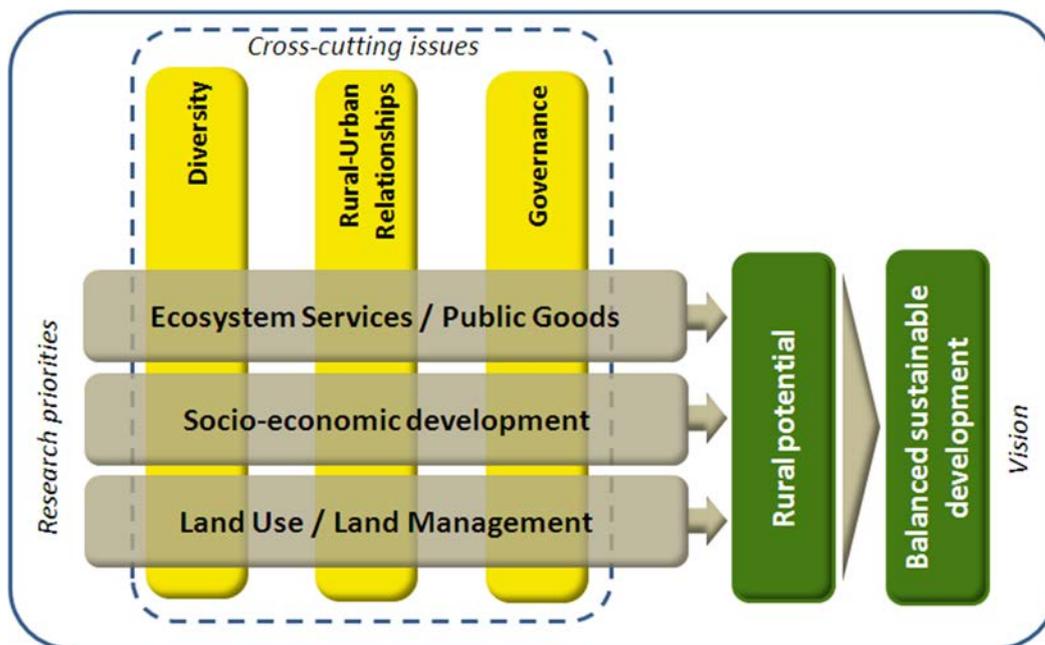


Figure 2. The RURAGRI SRA: Strategic research priorities and cross-cutting issues contributing to balanced sustainable development

## 5.2.2 Cross cutting issues

### 5.2.2.1 Diversity

Geographic diversity, hereafter diversity, is a key characteristic of European rural areas. These spaces are complex economic, natural and cultural spaces which cannot be reduced to classifications by one-dimensional criteria (e.g. population density, dominant mode of agriculture or types of natural resources), but require multi-criteria approaches. Rural areas have varying levels of endogenous potential and are also strongly influenced by external factors (ESDP, 1999; EC 2011).

The success of many rural regions in the EU demonstrates that being 'rural' is not in itself an obstacle to dynamic economic performance and employment growth. Some rural areas have successfully undergone structural change. This is due not only to local drivers, such as favorable locations or low wages, but also because other resources, e.g. the quality of the natural and cultural heritage, the existence of networks and partnerships, and innovative governance frameworks that bring together stakeholders and facilitate the development of a common vision of the future, have been successfully harnessed. However, a number of rural areas are still characterized by structural problems and weak economic performance. In some instances this is associated with their peripheral location but the friction of distance is not the only or even most important barrier to development. Besides a dependence on agricultural employment other issues are important in understanding the inability of some areas to economically restructure. These include challenging natural conditions, the absence of sufficient socio-economic critical mass, cultural attachment to traditional forms of economic activities and those patterns of labour market segmentation that make it difficult for certain groups to access suitable employment opportunities. Many rural areas face not one but a multiplicity of these and other challenges.



EU strategies and policies increasingly recognize that rural regions are highly diverse. This is a clear break from the past when rural regions were regarded by policy makers as homogenous spaces each of which was considered to face the same obstacles and opportunities for development. This understanding of regional processes no longer fits the reality of the EU regions. While there are commonalities between rural areas (e.g. low population density and high proportion of agricultural and forest land use), the pathways taken and prospects for development differ greatly between rural regions.

#### 5.2.2.2 Rural - Urban Relationship

*Europe 2020* has adopted territorial cohesion, and associated with this balanced regional development, as a key strategic objective, guiding the future development of the EU (see chapter 3.2 The Strategic Context). Central to achieving this objective is the need to develop and strengthen the linkages between rural and urban areas. This point is reflected in the *Territorial Agenda of the European Union 2020* (EC 2011) that acknowledges the diverse nature and quality of links between urban and rural territories and their importance to integrated territorial development. This perspective depends on a regional approach, which takes both 'rural' and 'urban' spaces into account. Previous research in this area established that the heterogeneous quality of rural – urban linkages necessitates consideration of both rural and urban perspectives of the relative significance of these networks. This is important given that it is to be expected that different communities will ascribe different values to different elements of the networks.

Reflecting this view, the SRA recognises that it is essential to capture 'urban' and 'rural' perspectives of integrative networks whether they be natural (i.e. ecosystems), economic (i.e. supply chains) or cultural (i.e. governance frameworks) or a mix of these individual dimensions (i.e. supply chains closely associated with a particular type of ecosystem e.g. PDO – Protected Designation of Origin). These relationships are highly complex and imply different circuits and flows of material, people and finance. Each depends on different forms of infrastructure, resources, human capacity, forms of cooperation and integration with multi-level governance systems. The structure, characteristics and performance of sustainable rural-urban relationships in different types of rural region need to be identified and evaluated as part of the research programme associated with the research priorities outlined above. For further discussion of types of rural – urban networks see Caffyn & Dahlström, 2005; EDORA 2010b.

It is imperative that the interrelationships between sectors and places be considered if key drivers of change influencing spatial patterns of development are to be understood. A regional approach, including urban spaces, needs to be taken if challenges such as competitiveness of rural areas, social cohesion and the sustainable use of resources are to be resolved.

As the EDORA reports show the economic development in rural areas as well as spatial development and the development of the rural-urban relationship were very heterogeneous in the last decades. Future research need to support the steering of policies delivering knowledge which help to define the strategic role of rural areas considering the expectations of rural and urban population and stakeholders.

Rural-urban relationships are very complex and imply different processes (e.g. material flows, migration), forms of cooperation and multi-level governance issues. The characteristics for sustainable rural-urban relationships within the diversity of European regions need to be addressed when investigating the research priorities.



### 5.2.2.3 Governance

At the heart of the SRA is a strategic context related to the objectives of inclusive development and, hence, the concepts of territorial cohesion and balanced regional development. The document has already made reference to the diversity of rural areas and the importance of rural – urban linkages in supporting the achievement of these goals. Overarching these elements, however, are facilitative governance frameworks. This cross-cutting theme takes a starting position that views bottom-up based strategies supporting development of local resources as a key element in realising rural potential and achieving balanced regional development. It can be expected that the different demands and expectations regarding the future development of agriculture and rural areas as well as the expected conflicts regarding possible land use conflicts (including the provision of ecosystem services and public goods) also necessitates a thorough understanding and integration of various actors, stakeholders or stakeholder groups. Governance issues, including the development of new frameworks, pertaining to the three priority topics are central to ensuring the delivery of balanced regional development.

Governance in this context is understood in a broad sense and also includes public policies. It is understood as integrating various stakeholders and collective forms, and as a form of steering decisions in order to work towards a balanced regional development. This comprises cross-sectional political actions on a national, regional or local level as well as steering through the economic sector and through a private sector (e.g. societies, special interest groups) or others. This approach of multi-level governance is consistent with the approach of the Territorial Agenda of the European Union 2020 (EC 2011) for working towards territorial cohesion. Likewise, the 3<sup>rd</sup> SCAR foresight report, concentrating on scarcities (such as the availability of fertile land, water, nutrients and energy) and their distribution, emphasises the crucial impact of governance in resolving competing demands for these resources (Freibauer et al. 2011).

## 5.2.3 Strategic research priorities

### 5.2.3.1 Ecosystem Services / Public Goods

Ecosystem services and public goods are considered a new field of policy that is increasingly important within the European context, particularly in those areas focusing on land use, farming practices, links between rural and urban areas, the development of new or novel, high value added products. Despite this, it remains unclear at the European level, how ecosystem goods and services are distributed among and within different rural areas and, importantly, how they are valorized.

Public goods are defined by the following characteristics: a) Non-excludable – if the good is available to one person, others cannot be excluded from the benefits it confers and b) Non-rival – if the good is consumed by one person it does not reduce the amount available to others. In reality, these characteristics of non-excludability and non-rivalry may be exhibited to almost any degree. Pure public goods are rare because the potential sometimes exists to exclude - often at considerable cost - people who do not contribute to covering the costs associated with the provision of a particular public good. Other public goods, such as popular cultural landscapes, can become congested, leading to a loss of enjoyment and degrading of the good in question.

Ecosystem services are categorised as in the Millennium Ecosystem Assessment (MA, 2005) into; a) supporting (e.g. nutrient cycling, soil formation), b) provisioning (e.g. food and fresh water), c) regulating (e.g. climate regulation and water purification) and, d) cultural (e.g. aesthetic, recreational) services. A range of approaches are either in use or are being piloted in the EU and other countries to encourage the provision of environmental public goods through agriculture. These include an exploration of ways to improve the cost effectiveness and enhance the environmental outcomes through the use of more competitive discretionary schemes and the use of more collaborative approaches to



deliver within a territory. For the time being, these are mainly small-scale and pilot initiatives and their broader application outside of specific contexts is difficult to assess. It is desirable to build on the experience within the EU and globally to ensure that appropriate policy frameworks are based on evidence. This assessment should start from the experiences of the application of agri-environmental measures that are fairly advanced in some programs and which can be considered as the primary tool for delivering public goods through agriculture (Cooper *et al.* 2009). Research should support policy in finding effective mechanisms to be applied at the most adequate scale (local, regional, transnational) for managing ecosystem services and public goods.

It seems particularly important to identify, classify and evaluate those spatial processes conditioning the long term future of agro-ecosystems. These processes are affected by intrinsic environmental characteristics (topography, soils, hydrology...) and by the spatial organization of cultivation, farming systems and the intensity of agricultural production and give rise to a variety of habitats, i.e. high-nature value farm land, semi-natural landscape elements: wood, hedges, permanent grassland...). An integrative study of the spatial organization of the mosaic of farming practices and their significance in producing / protecting socially, economically and culturally important ecosystems is required. This research will contribute new knowledge concerning the links between farming practices and their associated governance frameworks, both 'official' and 'unofficial' (i.e. cultural practices or socially enforced norms of behaviour). Research could consider the landscape and its evolution by way of understanding those benefits that can result from mixed and/or diversified production systems likely to better use resources, to foster nutrients and carbon recycling and high levels of biological diversity.

Given the defining characteristics of public goods, their supply cannot be secured through markets (Cooper, T. *et al.* 2009). While several studies have explored the identification and classification of ecosystem goods and services and landscape functions (e.g. Verburg *et al.* 2008, Willemsen *et al.* 2008), an overview and a classification of goods and services for all European rural areas which could be used as the basis for co-ordination of policy measures in Europe is still missing. Furthermore appropriate policy measure would need systems to classify and monitor ecosystem goods and services for all Europe. Research therefore needs to:

- 1) *Identify the various types and quality of ecosystem goods and services in different rural areas and improve monitoring systems of goods and services to ensure their sustainability.*

This identification should be based on the study of (i) the ecological functioning, (ii) properties and ecological services of agro-ecosystems and include both the study of the major biogeochemical cycles and their relations with the productivity of the agro-ecosystems, taking into account the problems of maintaining (or restoration) of the soil fertility, and for the integration of knowledge of ecological processes across a landscape mosaic. This is to understand the interaction between different territorial scales (i.e. the parcel, the parcel and its immediate environment, the landscape mosaic.) and between the different dimensions of sustainability (i.e. social, economic and environmental).

Although the concept of ecosystem goods and services is considered very valuable by policy makers, it is still difficult to estimate the weight that should be given to environmental and economic dimensions within policy frameworks. Researchers, supported by policy makers, should elaborate an appropriate method of valuation to be applied in all European countries for supporting regional/local policy decisions. Research therefore needs to:

- 2) *Enhance methods measuring the value of goods and services on spatial and temporal scales for monitoring, including indicators for follow up and impact assessment. Re-*



*search could consider the development of governance systems, procedures and tools managing ecosystem goods and services in a regional perspective.*

A way to improve sustainable development could be policy measures which support private activities producing public goods. It is, consequently, important to establish, where synergies between market activities and the delivery of public goods are possible, and in particular which mechanisms favour benefit sharing. Comparative studies of good practices in similar types of rural area are considered one means of exploring such mechanisms. Research needs to:

- 3) *Increase understanding of how to achieve mutual benefits between economic development in rural areas and the delivery of public goods. Define tools for marketing these values to the general public and to decision makers. Assess the influence of production and consumption patterns on the use of ecosystem goods and services in different rural areas. Identify best practices, innovative solutions and system innovation suitable for use in rural areas.*

#### 5.2.3.2 Socio-economic development

Rural economies are, due to on-going reliance (to varying extents) on exploitation of natural resources including agriculture, fisheries and landscapes, best understood as highly complex socially, environmentally and culturally embedded sets of socio-economic systems that vary across, and because of, geographic space. These systems are connected to other places, some near and some far, through flows of products, commuters, tourists or patterns of migration. They are also connected by transport and communications infrastructure and ecological systems, e.g. rivers.

Socio-economic development of rural areas is conditioned by the spatial nature of these social, cultural, economic and ecological interlinkages. Understanding the nature of the linkages highlights the importance of space and scale in the study of socio-economic development and illuminates how challenges and opportunities arise and their implications for the future successful and sustainable development of rural communities.

Based on the results of the EDORA, RUFUS and ENRD studies, future research should focus on the understanding of the mechanisms supporting, generating and hampering development potential in rural regions. The interaction between macroeconomic development and microeconomic processes is considered to be a major precondition shaping socio-economic development of rural areas. Results will allow the formulation of concrete governance mechanisms and policy instruments with the aim to enhance rural vitality in very diverse contexts. In particular research should aim to:

- 4) *Explore economic activities, public and private services, provision of infrastructure and technology to enhance sustainability and identify best practices supporting vibrant rural areas.*
- 5) *Identify barriers that hinder innovation and evaluate novel mechanisms and socio-economic structures (networks) which encourage innovation in rural areas.*
- 6) *Identify and evaluate agricultural development trajectories in different rural areas paying particular attention to the potential for specialisation and/or diversification.*

Migration, mobility and commuting have been recognised as major drivers which causes important challenges for rural and urban areas. However, research in several different areas is still needed to:



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- 7) *Assess the reasons for migration and the impacts on the quality of life, culture and social identity for different types of rural areas. This should include studies on the potential of migration on the capacity for innovation in different types of rural areas.*
- 8) *Assess and evaluate the implications of mobility and commuting on the quality of life, culture and social identity for the potential and sustainable development of different types of rural areas.*
- 9) *Identify the diversity of urban-rural relationships and evaluate their potential to contribute to sustainable rural development, assessing best practices in the management of rural-urban relationships. Research in this area might also consider issues related to the use of ecosystem services.*
- 10) *Identify the mechanisms of interaction between sectoral policies and their intended and unintended territorial impacts. Formulate recommendations for the coordination of sectoral policies fostering synergies. Research in this area might also consider issues related to land use and/or ecosystem services.*

### 5.2.3.3 Land use / Land management

Land use denotes how humans use the biophysical or ecological properties of land. The different categories of land use comprise land for settlement and infrastructure purposes, agriculture, forestry and other uses including those that exclude humans from land, as in the designation of nature reserves for conservation.

Due to various drivers, pressures on land increase even within one land use category. For example, bio-productive land is becoming increasingly important both with growing demand for food due to the growing world population and with the increased need to convert from a fossil fuel dependent economy towards a knowledge-based bio-economy and green growth. Furthermore, changes between land use categories occur throughout the EU. These may either be due to a general trend or differ significantly between different regions. E.g., between 1990 and 2006 at least 275 hectares of soil per day were permanently lost through soil sealing in the EU, with varying regional degrees. There is growing awareness of conflicting targets in land use, e.g. production vs. maintaining biodiversity, feeding a growing population vs. loss of arable land, production of food and feed vs. production of fuel and energy. There are also conflicting perceptions of the effects of agricultural activity as contributor to climate change and simultaneously a victim of climate change. The increasing pressure on bio-productive land will ultimately impact differently on the various types and contexts of rural areas.

Land management in this respect can be defined as an information- and knowledge-based procedure which tackles these conflicting targets and strives for the integration of varying demands on land use in order to meet these demands in a sustainable way.

Hence, research in this key area should, where appropriate, include aspects of land use, land use change and land management. Knowledge about the regional differences is expected to help finding new opportunities to address these new challenges. Research therefore needs to:

- 11) *Explore and evaluate innovative land use and management practices to overcome conflicting demands on land and identify best practices.*



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- 12) *Evaluate those economic networks utilising natural resources that result in increasing demands on land use; identify and explore novel resource efficient networks. This research could include consumer perspectives.*
- 13) *Assess multifunctionality of agriculture and how this concept could overcome land use conflicts and contribute to diversification of rural economies. Research linking the concepts of multifunctionality, ecosystem services and public goods is also of interest.*
- 14) *Assess land use implications of new paradigms (e.g. green growth).*



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## 7 Annexes

### 7.1 Annex 1

**Table 2.** European research activities in the scope of RURAGRI.

ERA-NET	Content in a nutshell	Website
ERA-ARD-II	Agricultural challenges and issues faced by developing countries, emerging countries and countries in transition	<a href="http://www.era-ard.org/">http://www.era-ard.org/</a>
EMIDA	Emerging and Major Infectious Diseases of production animals, including fish and bees and including those conditions which pose a threat to human	<a href="http://www.emida-era.net/">http://www.emida-era.net/</a>
ARIMNet	Use and management of natural resources (soil and water), crop protection and threats to the security and sustainability of agricultural production resulting from climate change	<a href="http://www.arimnet.net/">http://www.arimnet.net/</a>
ICT-AGRI	New technologies in ICT and robotics for a competitive, sustainable and environmentally friendly agriculture	<a href="http://ict-agri.eu/">http://ict-agri.eu/</a>
CORE Organic 2	Organic food and farming research	<a href="http://www.coreorganic.org/">http://www.coreorganic.org/</a>
BiodivERsA2	Biodiversity research containing global change and biodiversity dynamics, ecosystem functioning and ecosystem services	<a href="http://www.biodiversa.org/">http://www.biodiversa.org/</a>
NET-HERITAGE	Protection of tangible cultural heritage	<a href="http://www.netheritage.eu/">http://www.netheritage.eu/</a>
ERA-ENVHEALTH	Environment and health research. The ERA-NET deals with aspects of human well-being and disease that are determined by environmental factors	<a href="http://www.era-en-vhealth.eu/servlet/KBaseShow?srt=-1&amp;cid=23174&amp;m=3&amp;catid=23175">http://www.era-en-vhealth.eu/servlet/KBaseShow?srt=-1&amp;cid=23174&amp;m=3&amp;catid=23175</a>
CIRCLE-2	CIRCLE-2 is focused on the interface between Climate Change science and policy. Through the promotion of networking activities it aims to maximise the degree to which research outcomes address both national and European climate policy needs.	<a href="http://www.circle-era.eu/np4/home.html">http://www.circle-era.eu/np4/home.html</a>
EUPHRESKO	Phytosanitary (statutory plant health) research	<a href="http://www.euphresco.org/index.cfm">http://www.euphresco.org/index.cfm</a>
BIOENERGY	Bioenergy research programmes to improve cost-effectiveness and ensure the maximum research impacts for this vital energy sector	<a href="http://www.eranetbioenergy.net/website/exec/front">http://www.eranetbioenergy.net/website/exec/front</a>
WoodWisdom-Net 2	Transformation of the European forest-based industry from resource-intensive to value-added knowledge-intensive, innovative and globally competitive industry	<a href="http://www.woodwisdom.net/">http://www.woodwisdom.net/</a>
ERA-AGE 2	Human ageing research.	<a href="http://era-age.group.shef.ac.uk/">http://era-age.group.shef.ac.uk/</a>
SNOWMAN	Sustainable management of soil and groundwater	<a href="http://www.snowmannetwork.com/main.asp">http://www.snowmannetwork.com/main.asp</a>
CRUE	Flood research	<a href="http://www.crue-era-net.net/about_CRUE.asp?more=1">http://www.crue-era-net.net/about_CRUE.asp?more=1</a>
URBAN-NET	Urban sustainability and land use	<a href="http://www.urban-net.org/">http://www.urban-net.org/</a>
ANIHWA	Building on the experience and achievements of the previous ERA-Net EMIDA, the Animal Health and Welfare ERA-Net (ANIHWA) focus on animal health and welfare of farm animals, including fish and bees.	
SUSFOOD	Development of more sustainable food systems	



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Transnational EU research projects:		
Project	Description	Website
CAP-IRE	The Common Agricultural Policy (CAP) is the main expenditure chapter of the EU and is directly affecting the economy of rural areas. The objective of the project CAP-IRE (Assessing the multiple Impacts of the Common Agricultural Policies on Rural Economies ) is to <b>develop concepts and tools to support future CAP design</b> , based on an improved understanding of long term socio-economic mechanisms of change in rural areas. The focus is on farm households as the reference agents in the connection between policy and socio-economic change, as well as between agriculture and other sectors of the economy.	<a href="http://www.cap-ire.eu/default.aspx">http://www.cap-ire.eu/default.aspx</a>
DERREG	The objective of the DERREG (Developing Europe's Rural Regions in the Era of Globalization ) project is to produce an interpretative model that will enable regional development actors to better <b>anticipate and respond to the key challenges for disadvantaged regions</b> arising from globalization. DERREG aims to expand scientific knowledge and understandings, inform policy development, and identify examples of best practice. While performing research across different four key themes and with nine case study regions in different types of rural regions DERREG wants to produce an overarching analysis of the impact of globalization on rural Europe.	<a href="http://www.derreg.eu/index.htm">http://www.derreg.eu/index.htm</a>
EDORA	The over-arching aim of the EDORA (European Development Opportunities for Rural Areas) project, funded in the scope of ESPON <sup>1</sup> , is to better understand the <b>development opportunities and challenges facing rural areas in Europe</b> , in order to support targeted policy development, especially in relation to job creation and social change. One of the main results of EDORA is its evidence about regional capacities and regional specificities rather than focussing on traditional, mainly partial primary or land-based industries. Several reports have been published regarding the role of agriculture in different rural European areas, future perspectives and urban-rural relationships.	<a href="http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/edora.html">http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/edora.html</a>
LIAISE	LIAISE is a Network of Excellence (NoE) aiming to improve the application of Impact Assessments (IA) by both the research and the policy making communities. Its focus is on policy development relating to sustainable development strategies. The main approach of the LIAISE NoE is to identify and bridge the existing operational gaps between researchers of IA tools and the practitioners within the policy making community in order to improve the quality and application IA tools resulting in enhanced effectiveness and efficiency in decision making. <b>LIAISE aims to contribute to the renewed EU Sustainable Development Strategy by bridging the gaps between science, policy making and implementation</b> , with academically-grounded approaches to IA.	<a href="http://www.liaise-noe.eu/">http://www.liaise-noe.eu/</a>

<sup>1</sup> The ESPON 2013 Programme, the European Observation Network for Territorial Development and Cohesion, was adopted by the European Commission on 7 November 2007. The mission of the ESPON 2013 Programme is to support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory.



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Transnational EU research projects:		
Project	Description	Website
PASHMINA	<p>2 major objectives of PASHMINA are:</p> <ol style="list-style-type: none"> <li>1) Analyse possible <b>paradigm shifts in the land use and territorial functions</b> related to agriculture, forestry and more in general ecosystem services (e.g. biofuels, biodiversity, ecosystems metabolism, etc.), generating new paradigm shift sensitive tools and testing them with a number of pilot applications.</li> <li>2) Develop a new generation of global indicators and models, starting from already existing sustainability accounting and general equilibrium modelling frameworks and adapting these to make them (more) sensitive to paradigm shifts in the long-term perspective.</li> </ol>	<a href="http://www.pashmina-project.eu/">http://www.pashmina-project.eu/</a>
RuDI	<p>RuDI (Rural Development Impacts) aims to improve the understanding of the processes and structures underlying the formulation, implementation and impacts of <b>European rural development policies</b>. It examines priority setting, design, targeting and delivery processes of the 2007-13 programming period. The project addresses the question of how best to assess the impact of rural development policies at all relevant levels and across the diversity of rural Europe.</p>	<a href="http://www.rudi-europe.net/">http://www.rudi-europe.net/</a>
RUFUS	<p>As the objectives of the CAP (Common Agricultural Policy) shift from an agricultural-centred approach to wider rural development, the idea of multi-functionality of rural areas comes into play. It brings the CAP into closer association with a wide range of sectoral policy regimes: regional policy, spatial planning, environmental management; social, energy policy etc. RUFUS (Rural Future Networks) will provide policy makers and stakeholders with a better theoretical and practical understanding of how CAP measures interact with other forms of public intervention in rural development; and how policy regimes can be combined to ensure a more sustainable development. RUFUS will investigate how rural development policy can be targeted at the specific endogenous potential of rural regions to encourage multiple functionalities which go beyond physical landscape potentials to include social as well as economic activities and opportunities. RUFUS will create a <b>rural typology incorporating social aspects and endogenous potentials</b>. Scenarios of rural futures - the trajectory of policy interaction processes - will be generated.</p> <p>The RUFUS project elaborated a typology of rural areas in order to permit an integrated policy approach which considers the diversity of environmental and socio-economic characteristics of rural areas (Scholz, 2009).</p>	<a href="http://www.rufus-eu.de/">http://www.rufus-eu.de/</a>



## RURAGRI Strategic Research Agenda

Transnational EU research projects:		
Project	Description	Website
TERESA	TERESA (Types of interaction between Environment, Rural Economy, Society and Agriculture in European regions ) aims to analyse the <b>interrelations between rural development policy, the CAP and the impact on agriculture</b> focusing on (i) identifying typical interrelationships between farming activities, rural economy, rural society and the environment, (ii) developing an agent-based model demonstrating the typical interrelations between agriculture, the rest of rural economy and the environment in different types of rural areas in Europe and the impact of policies on its development and (iii) identifying and assessing different integration policies regarding their effectiveness in generating positive externalities for farming activities and rural development.	<a href="http://www.teresa-eu.info/about">http://www.teresa-eu.info/about</a>
VOLANTE	VOLANTE aims to <b>develop a new European land management paradigm</b> , providing an integrated conceptual and operational platform which allows policy makers to develop pro-active and context-sensitive solutions to the challenges for the future, rather than to react on largely autonomous external land systems developments. Objective of VOLANTE is to provide European policy and land management with critical pathways defining the band width of possible land management policies for future European land use. (Source: Cordis)	No website yet (project started 1 <sup>st</sup> November 2011)
Joint programming initiatives (JPIs)		
Initiative	Description	
FACCE	The JPI <b>Agriculture, Food security &amp; Climate Change</b> (FACCE) has very pronounced thematic relations to agricultural issues. FACCE addresses the major challenges dealing with agricultural production in a changing climate with the aims of securing food availability under increased demand while securing production conditions.	<a href="http://www.facejpi.com/">http://www.facejpi.com/</a>
	Amongst other aspects, the JPI <b>Cultural Heritage, climate change and security</b> also aims at preserving the rural heritage including the support for local communities as an important measure for sustainable development	
	The JPI <b>Health, Food and prevention of Diet related diseases</b> is aims inter alia for the production of high-quality, healthy, safe and sustainable food products.	
	Additionally, from a second wave of JPIs, the JPI <b>Water Challenges for a Changing World</b> addresses the relevance of water supply for agricultural production. Likewise, agricultural production has an important impact on the amount and quality of groundwater and surface water.	



## 7.2 Annex 2

In order to make it easier to get an overview, we have aggregated the drivers in political, socio-economic, environmental and structural and technological drivers and give below a short description of each. These drivers are responsible for the development trends observed in rural areas and agriculture in Europe and for the future challenges described in the next chapter.

### **Political drivers**

Political drivers concern policy concepts, measures and their application, as well as institutional framework which guide the application of these policies.

#### *The enlargement of EU*

The enlargement of the EU increases the diversity and the complexity of the socioeconomic context of rural and urban areas within the EU. Future policies should be able to manage this diversity and use it as a tool to future development and management of migration from rural to urban areas.

#### *Implementation of spatial policies*

In the last decades spatial policies have been aiming at improving the links between periphery and the core areas through projects and infrastructures with a sectoral rather than territorial approach. Through these measures, remote rural areas were sometimes left out. Moreover, the implementation of the different spatial policies such as land use policies, traffic infrastructure policies, structural policies and agriculture policies were not optimally coordinated. This led to the reduction of landscape diversity, landscape fragmentation, urban sprawl, loss of biodiversity and cultural heritage.

#### *Shift from the welfare state ethos to new public management*

Reforms in the services of general interests provided by the state were driven by the philosophy of the new public management, which brought more market orientation in the public sector in order to increase the cost-efficiency for governments. These meant for many European countries a reduction of such services in rural areas with the consequent centralisation in core areas. The reduction e.g. the postal service or governmental agencies centres in rural areas led to the reduction of employments and consequently to migration in areas with more employment opportunities.

#### *Common agriculture policy (CAP)*

The CAP focused mainly on farm modernisation and fails to take a regional approach considering agriculture as multifunctional activity being part of the interaction of rural and urban areas. However, the payments of agro environmental programmes have supported the ecological modernisation of farms. This has enhanced the opportunities for generating income from environment-based rural activities and non-commodity public goods.

#### *Institutional fragmentation*

Spatial relevant decisions or decisions regarding rural-urban relationships are made independently in different areas or regions. This has made the sustainable development of regions uncoordinated and inefficient.

### **Socio-economic drivers**

Socio-economic drivers concern the context of economic and social rules or changes of such rules.

#### *Demographic change*

The world population is predicted to grow from 6.7 billion to 8.3 billion in 2030 and 9.2 billion in 2050, while in Europe the population is projected to decrease. This is due to the fact that the birth rate in the majority of EU member states is below "maintaining level". Many regions can only grow because of migration. Changes of the economic structures in rural areas lead to migration towards



urban or periurban areas. The migration of the young generation leads to the change of the social structure of the rural areas. This influences the social and economic development of both rural and urban areas. In many rural areas the two factors "low birth rate" and "out migration" add up thus accelerating demographic change with all its implications for the rural capacities.

#### *Actor's perception and behaviour*

Consumer perception and behaviour influence agriculture and rural economy. Scandals in the food chain led sometimes to new sensibilities and this has an effect on the agricultural/rural economy. Agrotourism can only be successful and can hence boost rural economy if the expectations of the tourists concerning the regional identity, biodiversity, landscape beauty etc. are met and sectors like organic farming can only live and grow if the consumers are willing to pay a different price for its products and direct marketing can only be successful if there is a good regional identity.

#### *Decrease of the importance of agriculture for rural economies*

The decrease of importance of agriculture in many rural economies leads to different consequences in different areas depending on their infrastructure and socio-economic structure.

#### *Progressive liberalisation of the agricultural markets*

The progressive liberalisation of agricultural markets increases the pressure on farms and consequently leads to the intensification of agricultural activities in favourable areas and abandonment in unfavourable areas. Liberalisation also leads to the increase of regional specialisation in agriculture and technological change. Another consequence of liberalisation is the increase of diversification or pluri-activity on farms which are unable to compete as specialist producers. Also, the importance of production of non-commodities in agriculture is increased.

#### *Increase of welfare and change of lifestyles*

The increase of welfare and the working persons per household for the large part of the population in industrialised countries causes an increase of mobility and of land consumption per person for housing. The higher welfare increases in general the consumption of goods and thus increases the demand of diversified goods from agriculture and rural areas. Increase of welfare in developed countries is also increasing the demand of meat.

### **Environmental and structural drivers**

Environmental and structural drivers concern resource distribution and natural processes.

#### *Scarce resources*

Natural resources i.e. soil, water, biodiversity are limited, differently distributed over the world and often degraded. The increasing demand on natural resources leads to shortage in some areas, as well as to environmental problems and conflicts. Several factors will have an impact on availability of natural resources and agricultural land use in the future. The most critical may be overuse of freshwater, land degradation, changing consumption patterns, loss of biodiversity, scarcity of fossil fuel and phosphorous rock and climate change. More renewables (fuel and fibre) need to be produced creating potential conflicts between various types of production as well as creating additional risks and options for markets.

#### *Climate change*

Climate change is widely recognized as a major driver for the globe. Climate change includes changes in precipitation, extreme weather events, such as floods, landslips, storms and droughts, and shifting seasons. The change of temperature and precipitation will have a different impact in the different regions. Some regions may benefit from better climate conditions but other regions will suffer. Some regions (mid- to high-latitude regions) may benefit from better climate conditions but other regions



(seasonally dry or low-latitude regions) will suffer. The frequency and severity of extreme climate events will have more serious consequences for food and forestry production, and food insecurity, than will changes in projected means of temperature and precipitation (IPCC 2007).

*Spatial structures and geographical differences*

Different topography, remoteness, availability of space for urban development and presence of landscape amenities constitute different conditions which channel regional development. These structural elements lead to a differentiated development of the demand of goods and services, development of opportunities of rural areas and different development of the rural-urban relationship, economic development and commuting.

**Technological drivers**

The major technological drivers are the improvement of farm-technology and improved infrastructure.

*Improvement of farm-technologies*

On one hand new technologies led to the automatisisation of some production processes and consequent increase of production and quality with positive effects for the competitiveness and the environment. On the other hand new technologies allowed production intensification with negative consequences for biodiversity and soil quality.

*Infrastructure and accessibility*

Development of the infrastructure of some rural areas is increased and this changes their opportunity to diversify their economy. The remoteness of a region is dependent from the spatial structures and topography (see spatial structures and geographical differences as driver). Remote areas tend to have fewer opportunities for diversification outside of agriculture, with the exception of areas of high natural beauty, where alternative activities provide other benefits that create opportunities for enhanced linkages with tourism and trade. Closeness to larger urban centres appears to be one of various inter-linked factors that may influence the opportunities for a region to strengthen forward linkages.

*Innovations in transportation and packaging*

Thanks to the innovations goods are shipped around the world in a relatively sustainable manner. The food market becomes increasingly globalised which intensifies the competition in local markets.



## 7.3 Annex 3

### Underlying challenges

#### Challenge: Food security, safety and sovereignty

##### *Food security and safety*

The increasing demand for food quality and safety will require innovative technologies to assure high quality and safe food in the next few decades. The degradation of natural resources and environmental pollution has negative impacts on food quality and safety.

Next to producing a sufficient amount of food for a growing world population, consumer behaviour will have an important influence in achieving food security (type of nourishment, waste of food). Food safety aims to protect the consumers. Adequate handling and regulatory control of food is mandatory to prevent human and animal health hazards which can be pathogens, chemical residues or of physical nature. Food safety problems with international consequence have occurred, such as the recall of export products from supermarket shelves or the large scale, ethically problematic slaughter of thousands of animals leads to extremely high costs, which until now not have been taken into account in cost calculations or in technology assessments, nor have those responsible had to pay for the effects. The EU integrated approach to food safety aims to assure a high level of food safety, animal health, animal welfare and plant health within the European Union through coherent farm-to-table measures and adequate monitoring.

##### *Food sovereignty*

For achieving the goals of food security, for years countries - especially developing countries - have been advised to move towards large-scale industrial, export-oriented production in order to be more competitive. However, often the needs of the large number of smallholder farmers working under marginal conditions have been overseen and not respected. For many small farmers market liberalisation has caused hard and often unfair competition with farmers or commercial entities that have “acquired” comparative advantages through decades of subsidisation. Only recently, international organisations have begun to recognise that a sincere attempt to achieve poverty reduction and to reduce the number of hungry and malnourished people implies the improvement of the situation of these producers.

In meeting the challenge of poverty and hunger it will be necessary to address these structural constraints, most of which are directly related to a system where local developmental, as well as social and environmental goals particularly for marginalised peasants are not taken adequately into consideration and where international trade rules receive primacy. For the majority of the rural poor, changes are needed, both in ending the neglect in national policies, but also in international policies to increase the ability of countries and communities to define their own agricultural, pastoral, fisheries, and food policies which are ecologically, socially, economically and culturally appropriate to their circumstances – these are key areas for policy reform.

The concept of food sovereignty was developed by Via Campesina, an alliance of smallholder farmers’ organisations, landless peasants, and indigenous communities, and was brought to the public debate during the World Food Summit in 1996. Food sovereignty focuses on the right of peasants to produce food, which is undermined in many countries by national and international agricultural trade policy regulations. Food sovereignty is thus a set of principles that protect the policy space for peoples and countries to define their agricultural and food policy, their model of production and consumption of food. In the final document of the parallel NGOs forum “Profit for few or food for all” the civil society organisations demanded the development of two new international legal instru-



ments: (1) *A Code of Conduct on the Right to Adequate Food* and (2) *a Global Convention on Food Security*. There are however several more options for new policy instruments to foster food sovereignty. (Windfuhr M. and Jonsén J., 2004)

Food sovereignty is increasingly becoming a concern also in Europe facing the increasing vulnerability of farmers in rural areas and rural communities. Farmer's unions, environmental organisations, consumer's groups etc. see food sovereignty as alternative paradigm to improve sustainability of agriculture (ecological, economic and social). Food networks between producers and consumers show that it is possible to produce, distribute and consume food based on ecological practices and social justice principles, maintaining a direct relationship between farmer and consumer. Similar initiatives rapidly spreading across Europe in the last few years include farmers' markets, direct distribution, participatory certification models, and urban gardens. However, such innovation networks are not part of the agricultural knowledge system and are not supported by policy (SCAR 2009).

### **Challenge: Adapting to and mitigating climate change**

Climate change is expected to bring new crop diseases and pests in formerly unaffected regions. Furthermore, climate change is expected to introduce pronounced regional shifts in agricultural production. Some natural ecosystems are very vulnerable to even moderate rises of temperature and climate change can seriously affect agricultural productivity.

Efforts to address climate change mitigation aim at the reduction of carbon dioxide emissions in the atmosphere and the substitution of fossil fuels by renewables. Low-carbon technologies and higher energy efficiency in transport, buildings, industry and agriculture are central towards a resource efficient economy. Besides innovations in technologies the mode of life, the subsistence strategies and economic system need a fundamental reassessment.

Climate change adaptation comprises adjustments in agricultural systems to alleviate the negative impacts of climate change or to exploit its potential benefits. Technological innovations with improved farm management practices, land use, harvesting patterns and irrigation systems are important measures.

A changing climate will affect the opportunities in some and the risks in other areas. In some areas climate change will open new opportunities for agriculture and in other areas it will limit resources (e.g. water) creating more threats for agricultural activities, ecosystem services and biodiversity. (SCAR 2009)

### **Challenge: Sustainable energy production and management**

World food supply is heavily dependent on fossil fuels at all stages, from planting, fertilizing, irrigating, harvesting through to processing, packaging and retailing. It is questionable whether this form of high energy dependence and the closely connected GHG emissions will be tolerable in the future under climate change conditions or whether it will be even feasible under the foreseeable scarcities of fossil fuel, phosphate, water, etc. Oil output is expected to peak in the next ten to twenty years with a steady decline thereafter, while energy demand is estimated to grow by 50% by 2030, with potentially serious implications for the food supply and prices. Should the cost of oil and other agricultural inputs increase after the end of the current recession there is the potential for food prices to surge again provoking the next global "food crisis". (SCAR 2009)



## Core challenges

### Challenge: Increasing competitiveness, innovation and resilience in rural areas

#### *Diversification in the economy*

The value of agriculture in terms of employment in rural areas and in terms of its contribution to the Gross Domestic Product (GDP) is progressively decreasing in many parts of Europe. Farms are developing differently depending on their structure, on the chance to find work opportunities outside of their agricultural activity and on regional characteristics. The patterns of agricultural development are driven by agro-environmental policies and the new paradigm of multifunctional agriculture which recognise the role of agriculture to deliver goods and services for the whole society.

One pattern of development is the ecological modernisation of farms. This means that farms restructure their structural and technological aspects in order to increase income and maintain competitiveness but also to increase environmental quality of the farm activities (reduction of negative externalities). Another pattern of farm development is the commodification, meaning the transformation of elements of rural environment and culture to tradable commodities. These types of farms tend to diversify their activities and therefore to be pluriactive (i.e. agro tourism or care farming). A third pattern is the extreme technological modernisation, farm specialisation and intensification of farm production in particularly favourable places like the Mediterranean area. The Thematic Working Group “Linkages between agriculture and the wider rural economy” of the European Network for Rural Development showed that the more remote areas tend to have fewer opportunities for diversification outside of agriculture, with the exception of areas of high natural beauty, where alternative activities provide other benefits that create opportunities for enhanced linkages with tourism and trade. Furthermore, closeness to larger urban centres appears to be one of various inter-linked factors that may influence the opportunities for a region to strengthen forward linkages. But other factors appear to be of equal significance in certain regions such as the presence or absence of larger scale agri-processing facilities, tourist centres or attractions. (EDORA 2009)

#### *Development of new opportunities for rural areas*

Rural areas react differently to the mentioned drivers. Centrifugal and centripetal forces cause and hamper innovations and therefore development in regions (Krugmann 1998). Because of good infrastructure characteristics like accessibility and the neighbourhood with market or other resources (workers, innovation, research and development) some areas develop a new regional economy with the creation of employment and social benefits. In such areas favourable to agriculture activity, farms often change towards more intensified and specialised production in order to strengthen their competitiveness. In more remote places with rather unfavourable condition the role of agriculture decreases and some farms search for diversity in their activities, like agro-tourisms. These remote places are usually dislocated from markets and therefore not attractive for factories and commerce because accessibility is unfavourable. The labour forces are attracted and the young workers migrate to urban centres or new growing regions. This migration hamper the creation of strong social networks necessary for encouraging social life and new economic activities and of a working environment/quality of life which attracts/retains a high quality workforce. This is also the result of the uncoordinated policy implementation of spatial relevant policy measures which fostered the dependency of rural / remote rural areas from urban centres. (EDORA 2009)

For developing new opportunities, rural areas heavily rely on access to information and communication technologies (ICT). In a globalised world there is a high need to have quick access to information and to the market. Agricultural enterprises will be more and more forced to incorporate ICT technologies to be able to compete and to comply with information needs (cross compliance, ‘farm to fork’, traceability etc.). ICT can also bear a chance because even remote areas will have the options to be



competitive on the market. Agriculture will be able to offer more high quality jobs. For rural areas it is also a big chance to develop attractive work conditions ('home offices') in the information society.

### **Challenge: Maintaining social cohesion and quality of life in rural areas**

#### ***Marginalisation of rural areas***

Migration as a driver has consequences in the rural areas: skilled persons capable to create networks and give impulses for innovation migrate outside of such areas. This generates a vicious circle which contributes to the social and economic marginalisation of such areas. One indicator of this development is that the within-country dispersion rate of regional GDP rose in 18 out of 24 Member States between 2001 and 2006 (Eurostat 2009). At the same time the immigration into favorable centers in urban areas and rural areas may also threaten social cohesion and the traditional (agrarian) culture and heritage.

#### ***Quality of life in rural areas***

The improvement of quality of life for farmers is essential for a sustainable development of the whole society, and for ensuring that agriculture can fulfil economical, ecological and social needs of rural and urban society. Farm families work longer hours and have greater income uncertainty. One strategy for reducing the vulnerability of their business activities and thereby increase the quality of life is diversification of the agricultural activities. (SCAR 2009)

### **Challenge: Sustainable use of natural resources**

#### ***Maintaining ecosystems health***

Both natural and agro-ecosystems are under pressure, and many of the services provided by them such as upgrading waste to new resources (e.g. soil) and managing air (e.g. greenhouse gases) and water pollution (e.g. eutrophication), are at high risk. Human over-exploitation of natural resources causes a disturbance of the ecosystems. Contamination of water is closely related to nitrate application in agriculture. On average across Europe the amount of fertilizer applied is approximately twice the need for current crop production. Reference

#### ***Maintaining biodiversity***

Biological communities and ecological systems are deeply affected by human activities, through habitat loss and disturbance, changes in land use, introduction of invasive species and climate change. The loss of biodiversity, in particular of species and of genetic biodiversity, is still on-going despite the measures and incentives started on a range of levels (global, EU, national, regional). The Millennium Ecosystem Assessment 2005 reports: "The number of species on the planet is declining. Over the past few hundred years, humans have increased the species extinction rate by as much as 1,000 times over background rates typical over the planet's history (*medium certainty*). Some 10–30% of mammal, bird, and amphibian species are currently threatened with extinction (*medium to high certainty*). Genetic diversity has declined globally, particularly among cultivated species." Even advanced genomics is dependent ultimately on freely circulating genetic diversity in the wild as a feedstock. Existing forms of agriculture are critically dependent on maintaining capacity in-field to respond to climate surprises and shifts in biological relationships. The extreme narrowing of the global food system's reliance on a limited range of crop and animal species is of particular concern in this regard. Institutional barriers hinder the re-introduction of modern composite-cross or population-based seeds back into modern farming. Loss of agri-biodiversity is associated with a range of causal factors, including destruction and fragmentation of habitats and the increasing use of land for non-



agricultural purposes, emissions, agricultural intensification, and consumer's behaviour etc. (Millennium Ecosystem Assessment, 2005). Biodiversity loss will reduce nature's ability to maintain ecological status and "ecosystem services" such as water filtration, nutrient cycling or pollination. (SCAR 2009)

***Management of use of natural resources between urban and rural areas***

Increasing scarcity of natural resources further reinforce the pressure on agricultural land use and the need to increase productivity per hectare and per unit input. Since resources are limited, the challenge for the future is to manage resources in a way that promotes an economic, social and ecological sustainable development.

In addition to food resources being transported from the rural areas, nutrient rich human wastes need to come back to the agricultural land for many reasons.

***Landscape development***

The drivers of demographic change (increasing world population, low birth rate in the majority of European regions, ageing), prosperity and production of renewables, absolute land consumption and per capita become increasingly important. This creates land use conflicts between open landscape with high biodiversity values, intensified agricultural systems and built-up areas (residential, economic buildings and infrastructures). Infrastructures often cut landscapes and fragments open landscape with negative consequences for flora and fauna. This has a negative consequence on landscape perception and diminishes the societal value of landscapes. Additionally, the living in cities increases the wish to recreate in rural areas. This increases traffic and its infrastructures with negative consequences for the landscape. Furthermore, there is a high requirement to settle in rural areas located close to the cities which facilitates the combination of living in nice landscapes and working in prospering cities with cultural offers. In remote areas abandonment of agricultural activity leads to the loss of cultural landscapes such as pastures and meadows through afforestation (ESDP 1999, Council of Europe 2006).