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Report on governance mechanisms selection, methodology adaptation and

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#### 1 Introduction to deliverable D5.1

This document represents the deliverable D5.1 within Workpackage WP5 "Formulating and evaluating governance mechanisms for delivery of public goods" of the EU Horizon 2020 project PROVIDE (PROVIding smart DElivery of public goods by EU agriculture and forestry). WP5 targets designing and evaluating improved and applicable governance mechanisms for the smart delivery of Public Goods (PG) and the avoidance of Public Bads (PB). The objectives of WP5 are:

- to identify private and public governance mechanisms for the smart delivery of Public goods (PG)/avoidance of Public bads (PB),
- (2) to design evaluation approaches to integrated and innovative governance strategies,
- (3) to comparatively evaluate the potential success or trade-offs of the most promising governance strategies at case study level,
- (4) to analyse the practicability and transferability of these governance strategies at programming and EU level, and
- (5) to formulate guidelines for practical implementation of governance instruments for PG delivery.

Deliverable D5.1 represents the "Report on governance mechanisms selection, methodology adaptation and guidelines for evaluation". On the one hand, deliverable D5.1 reports on the achievements in respect to objective (1) and (2) of WP5, by synthesising the findings of Task 5.1 "Participatory selection of good governance mechanisms" and by giving an overview on the adaptation of approaches and methodologies to evaluate governance strategies at case study level. On the other hand, D5.1 serves as the basis to ensure the achievement of objectives (3) and (4) of WP5: It provides the results of task 5.2 "Developing guidelines for the evaluation of governance strategies for PG delivery". These guidelines prepare the successful implementation of task 5.3, which is the "Practical, case study based evaluation of governance strategies" as well as containing first inputs to task 5.4, which is the "Analysis of the practicability and transferability of the instruments at programming and EU level". The report is structured as follows:

**Chapter 2** includes an introduction to the topic of environmental governance and presents potential governance mechanisms for the provision of public goods/avoidance of public bads

from agriculture and forestry. **Chapter 3** reports on the process of governance mechanism selection in PROVIDE and presents the government mechanisms selected in the individual PROVIDE case study regions (CSR), depending on the public good hotspot story. **Chapter 4** reports on the adaptation of the methodology for the evaluation of governance strategies. **Chapter 5** presents the guidelines for evaluation.

#### 2 Environmental governance

The design and assessment of improved governance strategies for the smart delivery of Public Goods (PG) and the avoidance of Public Bads (PB) is one of the 5 main objectives of PROVIDE. The term *governance* was carefully chosen, as PROVDE explicitly aims at addressing not only (public) policy strategies but also mechanisms stemming from the private sector and from societal engagement. The term *governance* describes "the ways in which governing is carried out, without making any assumption as to which institutions or agents do the steering" (Gamble, 2000). Thereby *governance* refers not only to the single steering and regulation activities of the different institutions or agents, but especially to "hybrid mechanisms" describing the interplay between these agents and their steering approaches (Delmas and Young, 2009a; Lemos and Agrawal, 2009).

Delmas and Young (2009a) posit that the increasing overuse of environmental public goods leads to a rising demand for steering and regulating for sustainable development. This rising demand makes mechanisms and strategies going beyond the possibilities of policy measures inevitable. In parts, this is because governmental institutions are limited by their personnel, infrastructure, budgets, etc. Moreover, governmental governance is sometimes too slow and too inflexible and sometimes, as for example in the case of climate change, the nation-state is part of the problem rather than part of the solution. In such cases, intergovernmental activities (e.g. the UN framework Convention on Climate Change), the interests and the involvement of the private sector (certification, eco-labelling), or the engagement of the civil society (e.g. World-Wildlife Fund, Greenpeace) can push forward solutions faster and more efficiently (Delmas and Young, 2009b).

#### Agents involved

Within a political and social unit, different agents perform steering and regulation (Gamble, 2000; Lemos and Agrawal, 2009; Steurer, 2013). These agents are associated with the main societal domains, namely the public sector, the private sector and the civil society (Delmas and Young, 2009b). Also in literature on environmental governance, first and foremost state actors, market actors and civil society-based actors (associations, organizations, advocacy groups) are emphasized to be the most important and effective agents (Lemos and Agrawal, 2009). Delmas and Young (2009b) describe governance systems, which are constructed by the three societal domains as well as by the interplay between them (see Figure 1):

8



and Young (2009b)

"public The main domains sector" (represented by the state and the federal government) "private sector" (represented corporations, trade by associations, investors and consumers) and "civil society" (represented by NGOs and the Community) are displayed as overlapping circles. The build different overlaps seven "environmental governance systems". Three of these systems directly arise within Figure 1: Governance systems, adapted from Delmas the single domains. Four of the systems are located at the intersections of the circles

and are the so-called "partnerships". Here, "public-social partnerships" describe governance systems involving the public sector and the civil society, "public-private partnerships" involve the public sector and the private sector, "private-social partnerships" involve the civil society and the private sector, and "public-private-social partnerships" involve the public sector, the private sector as well as the civil society.

#### Steering and regulating

Depending on the sector(s) involved in the governance process, different instruments of steering and regulating are at hand. In his attempt to disentangle steering and regulation by and around the three societal domains, Steurer (2013) refers to the seven governance systems defined by Delmas and Young (2009b) and differentiates seven basic types of steering and regulating.

Governance by government (public sector) can be carried out via hard and soft regulation. Hard regulation is standing for legal instruments (laws, decrees) or economic instruments (taxes, fees, permits, cap-and-trade schemes). Soft regulation can take the form of legal instruments (soft laws without sanctions), economic instruments (subsidies, public procurement), informational instruments (studies, campaigns, websites) or hybrid instruments (labels, public voluntary programs) (Steurer, 2013).

Governance by civil society expresses itself via civil regulation in the form of formal standard setting (e.g. civil society organizations demand compliance with formalized standards developed by them, such as the rugmark label or the Amnesty International Human Rights guidelines for companies) and/or the less formalized pressuring of businesses and governments (e.g. against genetically modified food in the EU) (Steurer 2013). Moreover, also for the civil society forms of self-regulation can exist. Civil self-regulation aims at developing and administering common principle, norms and standards of behaviors and can include codes of conducts and ethics, certification and accreditation schemes as well as information services. (Warren and Lloyd, 2009; ECNL, 2015)

*Governance by business* (private sector) can take place as industry self-regulation (standards/codes, voluntary agreements, audit/certification schemes) or as firm self-regulation (codes of conduct, strategic CSR/stakeholder management, business partners impose restraints on a firm) (Steurer 2013).

As regards governance carried out by the above mentioned four partnerships, Steurer (2013) introduces the term of "co-regulation" in order to describe the co-operative forms of steering, involving actors from different societal domains.

Three of the partnerships, namely the "public-private partnership", the "public-social partnership" and the "public-private-social partnerships" make use of steering and regulating instrument with varying degrees of government involvement. They can take the form of a public co-management of common pool resources for *public-social partnerships*, of public co-regulation e.g. via certification schemes or negotiated agreements for *public-private partnerships* and of tripartite co-regulation via standards (like GRI, PRI, ISO 26000) or certification schemes (e.g. Kimberley process certificate, or partnerships like the UK climate change partnerships) for *public-private-social partnerships*. The fourth partnership, namely the "private-social partnership" between the civil society and the private sector makes use of private co-regulation in form of certification schemes (e.g. FSC, MSC) or in form of private-private-private partnerships (e.g. Greenfreeze).

# Governance mechanisms for the delivery of public goods and the avoidance of public bads from agriculture and forestry

Agriculture and forestry systems (AFS) occupy a huge amount of the European land area. Consequently, agricultural and forestry management has a powerful influence on the state of the rural environment and the public goods provided in this environment (ENRD, 2010). Most land management in Europe is performed by farmers and foresters, whose management decisions are normally driven by the aim to supply food and raw materials to the markets. In contrast, there are no/few markets for environmental public services and goods, consequently public good provision usually is not the first objective on the land managers' agenda. The provision of environmental goods from agriculture and forestry in Europe is therefore often not in line with the societal demand for these goods. The underprovision of environmental services and environmental public goods is described as a "classic, and pervasive case of market failure which affects the majority of the European land area" (Buckwell, 2009)<sup>1</sup>. Due to market developments and technological innovation, land use in Europe has shifted towards more intensive forms in the last decades. In competitive and "favoured" regions, this shift has led to high gains in productivity. In contrast, in areas with less favourable conditions, marginalisation and land-abandonment takes place. Both developments influence the provision of public goods from agriculture and forestry and induce (often negative) changes in e.g. biodiversity, water quality and availability, resilience to natural hazards and changes in rural viability and vitality (ENRD, 2010). It becomes obvious, that respective steering and regulating mechanisms are needed to guarantee a balanced and improved provision of public goods and the avoidance of public bads (Buckwell, 2009; ENRD, 2010; Hart, 2011).

In literature, potential steering and regulating mechanisms for the supply of environmental PG (and the avoidance of PBs) from agriculture and forestry have been broadly described:

As regards governance by government (public sector), important mechanisms are specific **directives**, regulations and binding standards. These mechanisms set reference levels and targets for environmental performance and are designed on national, supra-national or international level. Regulations and standards are mostly related to the use (storage, handling, application) of management inputs (e.g. pesticides, fertilizers) which have the potential to cause negative environmental effects (e.g. on soil, water, air). While normally applied across the whole sector addressed, such mechanisms can also be area- or topic-specific (e.g. national parks, water protection areas, etc.). In line with the polluter pays principle, no payments are provided to land managers merely for complying with

<sup>&</sup>lt;sup>1</sup> For a further read, the PROVIDE deliverable D2.2, stemming from PROVIDE WP2, gives a detailed insight into the theoretical backgrounds of public good provision from agriculture and forestry systems P. Novo;, B. Slee;, A. Byg;, R. Creaney; and M. Faccioli; (2015), 'Conceptual paper on the 'unpacked' notion of public goods - Deliverable D2.2 of the project PROVIDE', in, http://www.provide-project.eu/#publications-section: The James Hutton Institute, Aberdeen, Scottland..

environmental legislative regulatory requirements or other binding standards. On the contrary, violations of environmental regulations and standards normally lead to sanctions. Prominent examples for such mechanisms in the context of agricultural and forestry public goods are EU directives such as the water framework directive, the nitrates directive, the habitats directive or the birds directive, as well as the respective national acts guaranteeing their implementation. Also addressed under the category of public sector regulative mechanisms is environmental cross-compliance (CC) in line with CAPs 1<sup>st</sup> Pillar. CC is de-facto a regulatory requirement for those farmers eligible for 1<sup>st</sup> pillar direct payments (OECD, 2015).

Besides directives, regulations and binding standards, governing by government for the provision of agricultural and forestry environmental PG can be also be carried out via **direct and indirect economic instruments**. Such instruments come into existence if action going beyond the legislative baseline is needed in order to encourage land management practices and other investments that would "otherwise not make economic sense to the farmer" (ENRD, 2010). Especially voluntary incentives are the most common mechanism used to encourage conservation on privately owned lands (Lewis et al. 2011). Most prominent examples are CAP 2<sup>nd</sup> Pillar public payments directly and indirectly supporting environmental services, such as payments for agri-environmental measures or – respectively – other rural development measures such as farm modernization, LFA payments or payments for training and education (Cooper et al., 2009). Besides payments, also "negative" financial incentives, such as environmental taxes (e.g. enhancing taxes for chemical fertilisers), or "market-oriented" pricing instruments such as emission trading systems, both increasing the cost of polluting products or activities, and therefore discouraging production are important public sector mechanisms to support environmental services from agriculture and forestry.

When it comes to market-based economic mechanism, these can, but not necessarily have to be public sector measures: Auction mechanisms are mostly public-sector instruments, where farmers/foresters either submit financial bids to the respective state agency, in which they indicate the price for implementing environmental friendly management agreements (e.g. US Conservation Reserve Program), or where farmers "buy" property rights from state agencies by making environmental commitments (e.g. former countryside stewardship scheme in the UK). In both cases, the most competitive proposals are accepted (Latacz-Lohmann and Van der Hamsvoort, 1998). In contrast, marked-oriented labelling/standards/certification, through which environmental services are incorporated into commercially marketed goods and services, are initiated by governmental institutions (e.g. EU ecolabel), but are also strongly applied by the private sector (e.g. REWE AG: PRO PLANET label) or by collaborative partnerships (e.g. WWF and SPAR: humus formation). Payments for Ecosystem Services (PES)/contracts for services aim at finding and encouraging opportunities to purchase environmental services supplied by farmers or other land managers by the public sector, the private sector as well as the civil society and are defined as "a voluntary transaction where a well-defined environmental service (ES) (or a land-use likely to secure that service) is being 'bought' by a (minimum one) ES buyer from a (minimum one) ES provider if and only if the ES provider secures ES provision conditionally." (Wunder, 2005). A prominent example for private sector PES are contracts between water companies and farmers or foresters: In water catchment areas these contracts determine, how land management has to be carried out in order to reduce some costs of water treatment (Buckwell, 2009).

Mechanisms based on Partnerships and networks establish relations across sector boundaries. Partnerships are defined as "self-organizing, non-hierarchical alliances in which actors from one or multiple levels of government, the business domain and/or civil society pursue common goals by sharing resources, skills and risks" (Bauer and Steurer, 2014). Amongst others their aim is to enhance the potential for learning, adaptation, and social capital. Inherent to their definition and aim, within partnerships and networks responsibilities and authorities are shifted between the participating actors. The process of partnering is described as continuous, characterised by continuous adaptations and feedback loops due to partners' evolving experiences, roles, shifts in problem definitions and the external circumstances (Collins and Ison, 2009). Partnerships and networks can be driven top-down by the public sector, or bottom-up by the private sector or the civil society – depending on which actor groups are involved in the generation of the partnership. The combination of "partners" within a partnership or network is fully variable throughout the sectors and can take different "forms" of organisation (e.g. collective action approaches can be type cast as organisation style, external agency led, or non-organisation style collective action) (OECD, 2013). Coordination within a network or partnership can be vertical or horizontal; vertical coordination describes relations (formal, informal, institutional, financial or informational) between different levels of government (e.g. local, regional, national) and

can be carried out either bottom up or top down; horizontal coordination in contrast has the potential to bridge gaps between different policy areas or sectors, state and non-state actors or regions or local authorities (Bauer and Steurer, 2014). Prominent examples for partnerships and networks for the provision of agri-environmental public goods are collective action approaches (OECD, 2013) and collaborative partnerships (Glasbergen, 2011; Borg et al., 2015), communities of practice (Morgan, 2011) and the LEADER approach.

The last important group of governance mechanisms for the supply of environmental PG (and the avoidance of PBs) are **advisory and information** measures. These mechanisms can aim at awareness raising toward the benefits of public good provision and take the form of campaigns and/or even educational programs in schools and universities. Advice and guidance measures can target different stakeholder groups (farmers, foresters, local/regional authorities, civil society) and aim at supporting the interpretation and implementation of measures to enhance the provision of PGs. Targeted training/technical assistance aims at capacity building for those in charge of supervising as well as implementing measures to support the provision of environmental PG (and the avoidance of PBs) from agriculture and forestry.

The following list condenses governance mechanisms for public good provision and public bad avoidance described in literature as well as information gathered in the brainstorming activity which was conducted by the PROVIDE partners UNIBO, ZALF, LUKE, INRA, JHI and BOKU. The list divides governance mechanisms into the following categories:

- Directives, regulations and binding standards (Command and control mechanisms)
- Economic incentives
  - o Direct incentives (focused on PGBs), implemented individually or collectively
  - Indirect incentives (focused on private goods affecting public goods)
  - Market based incentives (creating environmental markets)
- Partnerships and networks
- Advisory services and Information
- Other mechanisms

| Type of mechanism   | Definition  | SELECTED examples of Governance mechanism <sup>1</sup>                                  |  | Sources  | Practical Example  |
|---|---|---|--|--|--|
| Directives, regulations and<br>binding standards<br>(command and control)   | Directives, regulations and<br>binding standards set reference<br>levels and targets for<br>environmental performance and<br>are designed on national, supra- | Directives  | Directives impose upon the addressee<br>an obligation to achieve a specific result<br>within a certain period of time, while it<br>is up to the addressee to decide how to<br>achieve this result  | (Scheurer, 2005;<br>Buckwell, 2009; ENRD,<br>2010; OECD, 2010a;<br>Hart, 2011) | Water framework<br>directive; Nitrates<br>directive; Habitats<br>Directive; Birds directive<br>(Natura 2000) |
| national or international level.<br>Regulations and standards are<br>mostly related to the use<br>(storage, handling, application) of<br>management inputs (e.g.<br>pesticides, fertilizers) having the<br>potential to cause negative<br>environmental effects (on soil,<br>water, air). Regulations are<br>mostly applied across the whole<br>sector addressed; however they<br>can also be area or topic-specific. | national or international level.<br>Regulations and standards are<br>mostly related to the use<br>(storage, handling, application) of                         | EU and National<br>Environmental<br>regulations   | Regulations are adopted to provide<br>legislation on issues requiring uniform<br>provisions throughout the community.  | (Scheurer, 2005;<br>Buckwell, 2009; ENRD,<br>2010; OECD, 2010a;<br>Hart, 2011) | German Act on Fertilisers<br>and fertilising   |
|   | Environmental Cross-<br>compliance  | Measures linking minimum PGBs-<br>related standards to agricultural<br>support programs | (Scheurer, 2005;<br>Buckwell, 2009; ENRD,<br>2010; OECD, 2010a;<br>Hart, 2011)   | EU's cross compliance<br>linked to Basic Payment<br>Scheme                     |  |
|   | mostly applied across the whole<br>sector addressed; however they<br>can also be area or topic-specific.  | Protected areas beyond<br>Natura 2000   |  | (Mazza, 2011)  | e.g. IUCN categories I, II<br>and IV   |
|   |   | Spatial planning  | Spatial planning/integrated territorial<br>development involves spatial planning<br>at local, regional, national or supra-<br>national levels, generally resulting in<br>the creation of a spatial plan reflecting<br>the choice to preserve or enhance<br>infrastructure. | (Mazza, 2011)  |  |

#### Table 1: Overview on governance mechanisms for the provision of environmental public good and the avoidance of public bads

| Type of mechanism  | Definition   | SELECTED examples of Governance mechanism <sup>1</sup>   |   | Sources   | Practical Example   |
|--|--|--|---|---|---|
| Economic incentives<br>- Direct incentives (focused  | Where action is needed going beyond that required in the   | Environmental<br>taxes/charges   | Negative monetary incentives (input-use, basically) enforced by the Government  | (OECD, 2010c;<br>OECD, 2015)  | Pesticide levies in several EU countries  |
| on PGBs), implemented<br>individually or collectively<br>- Indirect incentives (focused<br>on private goods affecting<br>Public goods) | legislative baseline, financial<br>incentives aim at encouraging<br>land management practices and<br>other investments that would<br>otherwise not make economic<br>sense to the farmer. | Payments based on<br>farming practices/ land<br>retirement/ farm fixed<br>assets               | Voluntary positive monetary incentives<br>linked to certain practices/land<br>retirement (or to offset the investment<br>cost of adjusting farm structure or<br>equipment to adopt such practices | (Buckwell, 2009;<br>OECD, 2015)   | EU's agri-environmental<br>schemes (AES)  |
|  |  | Payments based on<br>outcome (performance<br>levels/ performance<br>improvements) <sup>2</sup> | Voluntary positive monetary incentives<br>linked to the performed provision of<br>PGBs  |   | AES targeted on flower-rich<br>grasslands in Rheinland-Pfalz<br>(SW Germany)                          |
|  |  | Credit-based incentives<br>to support investments  | Investment aid providing assistance with the costs of physical capital investment   |   | Subsidised credit for in-farm<br>investments on renewable<br>energy equipment in some<br>EU countries |
|  |  | Grant schemes for<br>special farm types  |   |   | Small farms/new entrants/<br>start-up schemes in some EU<br>countries                                 |
|  |  | Area based collective<br>bonus /agglomeration<br>bonus   | Financial incentives based on the realisation of area thresholds  | (Parkhurst et al.,<br>2002; Bamière et al.,<br>2013; Kuhfuss, 2015;<br>Fooks, 2016) |   |
|  |  | Fiscal-based incentives<br>(Tax relief schemes,<br>hypothecated taxes)                         | Instead of subsidies, fiscal incentives (tax<br>breaks) reward PG provision/PB<br>reduction   | (OECD, 2010d)   | Reduced income taxation for<br>high natural value farming in<br>some EU countries                     |
|  |  | Deposits   | Combination of a charge on a particular item and a subsidy for its return   |   | Recycling in many countries   |
|  |  | Coupled payments (by area)   | Positive monetary incentives coupled to<br>the provision of marketed goods (e.g.<br>food products) on the basis that it will<br>promote the provision of PGBs                                     |   | Art. 52 of EU's CAP coupled<br>support to certain<br>agricultural systems                             |

| Type of mechanism   | Definition  | SELECTED examples of Governance mechanism <sup>1</sup>        |  | Sources   | Practical Example  |
|---|---|---|--|---|--|
| Economic incentives<br>Market based incentives<br>(creating environmental<br>markets) | The idea of environmental<br>markets is to take actions, which<br>create a class of potential<br>purchasers of environmental<br>services. These purchasers will<br>generally be private sector<br>individuals or businesses who will<br>then seek to strike contracts with<br>the suppliers of such services. | Payments for ES/<br>Contracts for services                    | Under PES agreements, a user or<br>beneficiary of an ecosystem service<br>provides payments to individuals or<br>communities whose management<br>decisions and practices influence the<br>provision of ecosystem services. PES is a<br>market-based mechanism aimed at<br>finding and encouraging opportunities for<br>private sector purchase of environmental<br>services supplied by farmers or other<br>land managers. | (Wunder, 2005;<br>Engel et al., 2008;<br>Buckwell, 2009;<br>Grolleau and<br>McCann, 2012;<br>Tyrväinen et al.,<br>2014) | Cooperative agreement (CA)<br>'Stevertalsperre' North<br>Rhine-Westphalia  |
|   |   | Tradable rights/permits                                       | Market-based mechanism consisted of trading permits, usually linked to negative externalities  | (Buckwell, 2009;<br>OECD, 2010c)  | Cap and trade (greenhouse gases)/Floor and trade   |
|   |   | Auctions  | Awarding conservation<br>contracts/certificates to/from farmers on<br>the basis of competitive bidding   | (Latacz-Lohmann<br>and Van der<br>Hamsvoort,<br>1998;(Hailu and<br>Thoyer, 2010)  |  |
|   |   | Habitat<br>banking/ecological<br>compensation<br>area/offsets | Market where credits from actions with<br>beneficial biodiversity outcomes can be<br>purchased to offset the debit from<br>environmental damage.   | (Buckwell, 2009;<br>eftec, 2010; Hart,<br>2011)   | CDC Biodiversity Project at<br>Cossure, Provence-Alpes-<br>Côte d'Azur   |
|   |   | Labelling/standards/cer<br>tification                         | Market-based instruments providing<br>information on the PGB-attributes of<br>marketed outputs in order to meet the<br>demands of an increasingly well-<br>informed and critical public.   | (Hart, 2011)  | EU's Ecolabel, private farm<br>certification, branch labels,<br>PDO (protected designation<br>of origin), PGI (protected<br>geographical indication) and<br>TSG (traditional speciality<br>guaranteed) |

| Type of mechanism                    | Definition   | SELECTED examples of G                   | overnance mechanism <sup>1</sup>   | Sources   | Practical Example   |
|--------------------------------------|--|--|--|---|---|
| Partnerships and networks            | Partnerships and networks<br>establish relations across sector<br>boundaries. Their aim is to<br>enhance the potential for<br>learning, adaptation, and social<br>capital in sustainable natural<br>resource management.<br>Partnerships are defined as "self-<br>organizing, non-hierarchical | Collective action                        | Collective action can be described by two<br>important keywords which are "group action"<br>and "common/shared interests". Participation in<br>collective action particularly to provide<br>agricultural public goods can involve farmers as<br>well as any other persons, organisations and the<br>government, sharing interest motivating the<br>action. | (OECD, 2013)  | Landcare associations in<br>Germany involve farmers,<br>local administration,<br>politicians and nature<br>conservation experts<br>working together in order<br>to implement nature<br>conservation and landcare<br>measures. |
|                                      | alliances in which actors from<br>one or multiple levels of<br>government, the business<br>domain and/or civil society<br>pursue common goals by sharing<br>resources, skills and risks".  | Collaborative<br>partnerships/networks   | In a collaborative partnership common interests,<br>assets, and professional skills are pooled in<br>order to promote broader goals and outcomes<br>for the entire group's benefit.  | (Glasbergen,<br>2011; Morgan,<br>2011; Bauer<br>and Steurer,<br>2014; Borg et<br>al., 2015) | Collaborative network<br>aiming at advancing forest<br>biodiversity conservation<br>in Finland  |
|                                      |  | <i>Communities of practice</i>           | The focus in the Communities of Practice (CoP)<br>model of social learning is specifically on the<br>interaction between knowledge, practice and<br>social structures. Learning through a CoP is<br>viewed primarily as a process of social<br>construction and knowledge sharing, rather than<br>a process of knowledge transfer.                         | (Morgan, 2011)  |   |
|                                      |  | Community-supported<br>agriculture (CSA) | Alternative, locally based economic model of<br>agriculture and food distribution. A CSA also<br>refers to a particular network, or association of<br>individuals, who have pledged to support one or<br>more local farms, with growers and consumers<br>sharing the risks and benefits of food production   | (Committee on<br>Twenty-First<br>Century<br>Systems<br>Agriculture,<br>2010)                |   |
|                                      |  | LEADER                                   | Bottom-up, partnership-based approach to rural development   |   | LEADER in many EU countries   |
| Advisory services and<br>Information | Advice and training is crucial to spreading innovation and   | Research and<br>development              | Fund research into the provision of PGBs by AFS  |   | Public agri-environmental research in EU  |

| Type of mechanism       | Definition  | SELECTED examples of Governance mechanism <sup>1</sup>  |   | Sources   | Practical Example  |
|-------------------------|---|---|---|---|--|
|                         | increasing the adaptation of<br>farmers to the changing policy<br>framework and the FAS could   | Farm Advisory services  | Programs for informing and assisting PGBs-<br>providers to adopt technology and improve on-<br>farm practices   |   |  |
|                         | play an important role in<br>demonstrating how market   | Technical<br>assistance/extension   |   | (Hart, 2011;<br>Mazza, 2011)                    | Canada's Environmental<br>Farm Planning Program  |
|                         | sustainability goals can be<br>achieved in tandem. This appears   | Awareness rising/moral suasion  |   | (Mazza, 2011)                                   |  |
|                         | particularly important in regions<br>with shorter histories of<br>environmental integration into<br>agriculture, a track record of low<br>environmental performance, or<br>those with specific<br>environmental problems (eg<br>areas of structural water deficit). | <i>Citizen science/ self-<br/>monitoring</i>  | On farm monitorin of biodiversity by the farmer.<br>Basically the comitment to participate is<br>voluntary, the programm is a monitoring add-up<br>to a nature protection measure in line with AES.<br>Strong effects on awareness rising and<br>education. | http://www.bi<br>odiversitaetsm<br>onitoring.at | Biodiversity monitoring<br>Austria: participating<br>farmers get a payment of<br>39€/ha additionally for a<br>maximum of 3 ha. |
| Others (non exhaustive) |   | Initiatives based on<br>changing consumers'<br>preferences (education,<br>awareness campaigns,<br>etc.) | Instruments (non-market-based) providing<br>information on the PGB-attributes of marketed<br>outputs in order to increase the social demand<br>of PGBs  |   | National Water Week in<br>South Africa   |
|                         |   | Volunteer work  | Volunteer work on private and public land   |   | e.g. removal of invasive species   |
|                         |   | Farmers will  |   |   |  |

## 3 Report on governance mechanism selection

The process of the "participatory selection of good governance mechanisms" for provision of public goods and the avoidance of public bads in the context of specific, local mismatches between supply and demand (the local hotspot issues) took place in Task 5.1. The selection process was carried out in accordance with the PG hotspot issues in the single CSRs identified in upstream work packages and by making use of a strong collaboration with stakeholders at local and European level. The report contains the description of the practical steps of the region-specific process and summarises its results. Task 5.1 took place with strong collaboration of WP4 to ensure the match between governance mechanisms and PG-values and valorising instruments.

The selection of governance mechanisms builds on the outcomes of Tasks 2.2.2, 3.3 and 3.4, where an inventory and mapping of public goods, as well as an identification of the major hotspot issues (concerning main public goods and bads affected by agricultural and forestry management, mismatches between demand and supply, stakeholder-based priority setting), and consequently a focus on the public good-topics and the areas of research took place. These outcomes have already been reported in the Deliverables D2.3, D3.2 and D.3.3. For a good understanding of the process of the selection of governance mechanisms, in Table 4 we present the hotspot storylines and the public goods under investigation in the single CSRs, as reported in the above named deliverables. (Novo; et al., 2015; Marconi et al., 2016).

Based on this hotspot storylines, the first step of the participatory selection of governance mechanisms took place at the 2<sup>nd</sup> PROVIDE CSR Stakeholder Workshops that were held in the 13 CSR countries of PROVIDE, as well as the EU Stakeholder workshop held in connection to the 3<sup>rd</sup> project meeting (task 2.2.2 and task 2.2.4). The aim of these workshops was to define the characteristics of "good" governance mechanisms and to discuss different mechanisms that appear to be promising in the context of the local public good issues under consideration of the criteria of "good" governance discussed. Moreover, in the common discussions valuable hint to failures and mismatches of the current governance system were given.

| Cluster         Code         Hotspot Storyline         Public goods           Cluster 1:<br>Intensive and<br>mixed         AT-1         Improving solif functionality and landscape diversity in an<br>intensive anable region         Solif functionality,<br>Agricultural landscape           mixed         DE-1         Investigate possibilities for better PG provision in grassland areas         Solif functionality,<br>and mixed         Quantity           under-provision         management         quantity,<br>concerning agricultural nitrogen emissions to groundwater used<br>ogricultural         Water (quality)           ocners to dinking water         provident mix of policy tools to manage water quality,<br>especially adadomment of traditional agricultural land use (and<br>abandomment of traditional agricultural protices as a result of<br>their increasing alternative costs)         Biodiversity, Water quality           Cluster 2: Lond<br>abandomment of traditional agricultural system (crop cultivation and<br>biodiversity)         Soli functionality<br>water quality         Soli functionality<br>biodiversity           Cluster 2: Lond<br>abandomment         ES-1         An agricultural system which provides PGs (food, rural vitality). Lot has also<br>some negative impacts on the environment (mainly in terms of<br>water quality).         Soli functionality<br>Biodiversity, Flood risk           Cluster 3:         C2-2         Provision of abuile goods by agricultural water (quality).         Biodiversity, Flood risk           Cluster 4:         Cluster 5:         C-1         FE-1         Angres the provision   | Cluster         Code         Notspot Storyline         Public goods           Cluster 1:<br>Intensive and<br>mixed         AT-1         Improving solf functionality,<br>intensive analytic region         Solf functionality,<br>and mixed           mixed vac functional<br>mixed         DE-1         Investigate possibilities for better PG provision in grassland areas<br>soil carbon sequestration<br>through improved water table management and related and use<br>biodiversity, water<br>quantity         Agricultural<br>Mater (quality)           and mixed<br>agriculturel         DE-1         Investigate possibilities for better PG provision in grassland areas<br>soil carbon sequestration<br>through mixed policy tools to manage water quality, especially         Water (quality)           and mixed<br>agricultural<br>production)         T-2         Optimal mix of policy tools to manage water quality, especial<br>to drinking water         Biodiversity, water<br>quantity           PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainty biodiversity, with unique species of birds) in a<br>context of raditional agricultural land use (and<br>abandomment<br>(mainty hiodiversity, with unique species of birds) in a<br>context of raditional agricultural land use<br>water pollution and pressures on biodiversity         Water quality           Cluster 2: Land<br>is dave to land         EFL An agricultural system (crop cultivation and<br>biodiversity         Water quality           Cluster 3:<br>Lis dave to land<br>is daver to land<br>is dave to land<br>is daver to land<br>is dave to land<br>is d  | al., 2016)                  |          |  |                               |
|--|--|-----------------------------|----------|--|-------------------------------|
| Cluster 1:<br>Intensive and<br>mixed         AT-1         Improving soil functionality, and landscape diversity in an<br>intensive arable region         Soil functionality,<br>Agricultural landscape           DE-1         Investigate possibilities for better PG provision in grassland areas<br>soil carbon sequestration<br>management         soil carbon sequestration<br>management           Data mixed<br>agricultural<br>production         TP-2         Optimal mix of policy tools to manage water quality, especially<br>concerning agricultural introgen emissions to groundwater used<br>to drinking water         Biodiversity, water<br>quantity           PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (maink) biodiversity, with unique species of birds) in a<br>context of intensification of agricultural parctices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery an<br>context of intensification of agricultural proctices as a result of<br>their increasing alternative costs)         Water quality           Cluster 2: Land<br>bandomment<br>(risk of PG<br>under-<br>rovision / PG         Es-1         Analyse a semi-intensive agricultural system (crop cultivation an<br>bandomment)         Biodiversity         Soil functionality<br>water quality)           Cluster 3:<br>Los due to land<br>(risk of PG<br>under-<br>rovision / PG         FR-1         Analyse the provision of bublic goods by agricultural wetlands in<br>the provision of a bundenment<br>the provision of a bundenment<br>theart aleveli         Soil functionality<br>Climate stabibl  | Cluster 1:<br>Intensive and<br>mixed<br>mixed         AT-1         Improving soil functionality, and landscape diversity in an<br>intensive anable region<br>Agricultural landscape         Soil functionality,<br>arcultural landscape           DE-1         Investigate possibilities for better PG provision in grassland areas<br>and mixed         Soil functionality, water<br>quantity           Under provision<br>and mixed<br>agricultural<br>production/         T-2         Optimal mix of policy tools to manage water quality, especially<br>concerning agricultural nitrogen emissions to groundwater used<br>agricultural<br>production/         Water (quality)           Vater (unality biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, water<br>unabandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Water quality           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>context of a very high risk of abandonment<br>to context of a very high risk of abandonment<br>the provision / PA         Water quality           Cluster 3:<br>Under         ES-1         Analyse the provision of public goods by agricultural wetlands in<br>water pollution and prevision of public goods by agricultural wetlands in<br>the provision of Pa         Water quality,<br>a context of avery high risk of abandonment<br>the provision of public goods by agricultural wetlands.         Water quality,<br>soil functionality<br>Biodiversity           Cluster 3:<br>Urbdn-rund         EC-1         Free diables/ Provision of Provision of Proble goods by agricultural wetlands.         Soi  | Cluster                     | Code     | Hotspot Storyline  | Public goods                  |
| Intensive and<br>mixed<br>agricultural (PG<br>under-provision<br>adder-provision<br>adder to intensive arable region         Agricultural Indiscape<br>agricultural<br>through improved water table management and related land use<br>biodiversity, water<br>quantity           DE1:         Investigate possibilities for better PG provision in grassland areas<br>agricultural<br>add to dinking water         Biodiversity, water<br>quantity           Intensive arable region         Mater (quality)         Mater (quality)           and mixed<br>agricultural<br>production         Nater (quality)         Biodiversity, Agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural land use (and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>system (mainly biodiversity, offood, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Water quality           Cluster 2: Lung<br>totas due to ind<br>biodiversity, Intensive agricultural system (crop cultivation and<br>biodiversity)         Soil functionality<br>Biodiversity         Soil functionality<br>Biodiversity, Rural vitality),<br>water quality           Cluster 2: Lung<br>totas due to ind<br>biodiversity, PG         FR.1 Analyse the provision of public goods by agricultural water (araility),<br>a context of a avery high risk of abandonment<br>the provision of recreational services steaming from landscape and<br>soil functionality<br>at the territorial level         Soil functionality<br>curvativality           Cluster 3:         C2.2 Provision of recreational services steaming from landscape and<br>sub subter to ada sub adaptio   | Intensive and mixed model         intensive arable region         Agricultural madscape           mixed model         DE1         Investigate possibilities for better PG provision in grassland areas soil carbon sequestration and gradultural for ponvision due to intensification of agricultural nitrogen emissions to groundwater used         Biodiversity, water quantity           and mixed agricultural nitrogen emissions to groundwater used         Biodiversity, Agricultural and use agricultural and use groups of the system (mainly biodiversity with unique species of birds) in a context of intensification of agricultural land use (scenery and eccreation) abandonment of traditional agricultural practices as a result of their increasing alternative costs)         Biodiversity, Agricultural and use (scenery and eccreation)           Cluster 2: Land         E5-1         An agricultural system (roop cultivation and Biodiversity low atter quality), leading to the public bad soil erosion in a group water pollution and pressures on biodiversity water quality         Water quality           Cluster 2: Land         E5-1         An agricultural system (roop cultivation and Biodiversity water of a aven high risk of abandonment (mainly in terms of water pollution and pressures on biodiversity)         Soil functionality           Risk d b for         FR-1         Analyse the provision of public goods by agricultural wetlands in Biodiversity. Flood risk lows and trade-offs         Soil functionality           Risk d b for         FR-1         Analyse the provision of public goods by agricultural wetlands in Biodiversity. Flood risk         Soil functionality  | Cluster 1:                  | AT-1     | Improving soil functionality and landscape diversity in an   | Soil functionality,           |
| Die-1         Investigate possibilities for better PG provision in grassland areas soil carbon sequestration<br>through improved water table management and related land use<br>Biodiversity, water<br>quantity         Output           IV-10         Optimal mix of policy tools to manage water quality, especially<br>concerning agricultural introgen emissions to groundwater used<br>agricultural<br>production)         Water (quality)         Water (quality)           IV-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>bandonment of traditosal agricultural practices as a result of<br>their increasing alternative costs)         Water quality           UK-1         Analyse the provision of public pools PGs (mainly biodiversity<br>intersive agricultural system which provides PGs (moinly biodiversity<br>context of aver high risk of abandonment<br>and rural vitality), leading to the public bad soil erosion in a<br>context of abandonment         Biodiversity, Flood risk           If -1         Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>Soil functionality         Rural vitality           Ubran-rudi         particulari system sthat provide and/or protect<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>groudivality (resist land. The providison of drought. There is need  | mixed<br>griculture / PC         DF-1<br>Investigate possibilities for better PG provision in grassland areas soil carbon sequestration<br>due to intensive<br>and mixed<br>gricultural intensive<br>admixed         Divestigate possibilities for better PG provision in grassland areas<br>griculture / PL         Goldversity, water<br>quantity           TF2         Optimal mix of policy tools to manage water quality, especially<br>concerning agricultural introgen emissions to groundwater used<br>gricultural<br>production         Water (quality)         Water (quality)           TP1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural apractices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>context of intensification of agricultural system (trop cultivation and<br>biodiversity<br>livestock) which provides PGs (food, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Soil functionality           Cluster 2: Land<br>bioandomment<br>(risk of PG<br>under-         EF-1<br>Analyse the provision of B babadomment<br>the provision of B bublic goods by agricultural wetlands in<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>oil functionality         Soil functionality<br>Biodiversity, Flood risk<br>Rural vitality           Cluster 3:<br>Urbon-rural<br>provision of Parceational services steaming from landscape and<br>supposed to be promoted by the establishment of ageopark<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>of ES provision<br>of ES provision of Factoreation in non-urban landscape as a result<br>of intensive AFS         Scenery a   | Intensive and               |          | intensive arable region  | Agricultural landscape        |
| agriculture (PG         through improved water table management and related land use Biodiversity, water<br>under-provision           IT-2         Optimal mix of policy tools to manage water quality, especially<br>and mixed<br>agricultural<br>production)         Water (quality)           IT-2         Optimal mix of policy tools to manage water quality, especially<br>concerning agricultural<br>system (maink) biodiversity, with unique species of birds) in a<br>context of intensification of agricultural land use (and<br>context of intensification of agricultural land use (and<br>context of intensification of agricultural land use (and<br>management)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>bandonment of traditional agricultural system (crop cultivation and<br>biodiversity)         Biodiversity, Water quality           Cluster 2: Land<br>dbandomment         ES-1         An agricultural system which provides PGs (mainly biodiversity)         Soil functionality<br>and rural vitality), leading to the public bad soil erosion in a<br>Biodiversity, Flood risk         Biodiversity, Flood risk           IT-1         Ffect of generic income support measures (CAP first pillar) on<br>a context of abandonment         Rural vitality           Uban-rural         Provision of Fuel services is<br>and table so shall bring opportunities for local business and<br>employment         Scenery and recreation<br>Particularly forest land. The provision of fuel separk<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>of ES provision           Cluster 4:<br>Retraviske<br>BG-1         <   | agriculture (PG         through improved water table management and related land use Biodiversity, water<br>management         quantity           due to intensive<br>and mixed<br>agricultural<br>production)         TT-2         Optimal mix of policy tools to manage water quality, especially<br>and mixed<br>ocners ing agricultural nitrogen emissions to groundwater used<br>to drinking water         Water (quality)           PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>biodiversity           UK-1         Analyse a semi-intensive agricultural system (roop cultivation and<br>biodiversity)         Biodiversity           Cluster 2: Lond<br>vater pollution and pressures on biodiversity)         Soli functionality         Water quality           Cluster 2: Lond<br>vater oplicultural system (roop cultivation and<br>biodiversity)         Soli functionality         Biodiversity<br>and rural vitality           Cluster 3:<br>Urder-<br>provision 7 G<br>usod uso tand<br>bis due to rain<br>context of abandonment         Water (quality),<br>a context of abandonment         Biodiversity,<br>Rural vitality           Cluster 3:<br>Urban-rural<br>relationships         C2-<br>provision of recreational services steaming from landscape and<br>soli functionality         Biodiversity, Flood risk           Cluster 3:<br>Urban-rural<br>relationships         C2-<br>provision of recreational services steaming from landscape and<br>soli functionality         Scenery and recreation<br>Rural vitality <td>mixed</td> <td>DE-1</td> <td>Investigate possibilities for better PG provision in grassland areas</td> <td>soil carbon sequestration</td>   | mixed                       | DE-1     | Investigate possibilities for better PG provision in grassland areas   | soil carbon sequestration     |
| under-provision         management         quantity           due to intensive         quantity         Water (quality)           and mixed         concerning agricultural nitrogen emissions to groundwater used         Water (quality)           agricultural         production         PL-1         Analyse the provision of PGs by the river valley agricultural         Biodiversity, Agricultural           aproduction         PL-1         Analyse the provision of PGs by the river valley agricultural         Biodiversity, Agricultural           approduction         PL-1         Analyse the provision of PGs by the river valley agricultural         Biodiversity, Agricultural           abandonment of traditional agricultural practices as a result of         their increasing alternative costs)         Water quality           UK-1         Analyse a semi-intensive agricultural system (roop cultivation and Biodiversity)         water quality         water quality           bandonment         and rural vitaity), leading to the public bad soil erosion in a         Biodiversity         Soil functionality           context of a very high risk of abandonment         Biodiversity         Soil functionality         Biodiversity, arclutural vitaity, atalty           abandonment)         TF-1         Effect of generic income support measures (CAP first pillar) on         Rural vitaity           at the territorial level         C2-2         Provisi  | under-provision         management         quantity           and mixed<br>agricultural<br>production         T-2         Optimal mix of policy tools to manage water quality, especially<br>to drinking water         Water (quality)           PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural landus (and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>undersequence of the system vince of system vince of the system<br>water pollution and pressures on biodiversity<br>biomdonment<br>and rural vitality), leading to the public bad soil erosion in a<br>context of a very high risk of abandonment<br>market to provision of public goods by agricultural wetlands in<br>water quality),<br>Biodiversity, Flood risk<br>accentext of a very high risk of abandonment<br>moder-         Soil functionality<br>Biodiversity, Flood risk<br>Biodiversity, flood resc atoming from landscape and<br>scenery and recreation<br>aretationships         Scenery and recreation<br>Rural vitality           Custer 4:<br>Eversive<br>agricultural<br>systems (PGs)         C-1         Provision of recreation al services staming from landscapes as a seult<br>of ES provision         Scenery and recreation<br>Rural vitality           Custer 4:<br>Eversive<br>agricultural         Biodiv  | agriculture (PG             |          | through improved water table management and related land use   | Biodiversity, water           |
| Use to mixed and mixed and mixed and mixed agricultural incregene emissions to groundwater used agricultural incregene emissions to groundwater used agricultural entropy of the provision of PGs by the river valley agricultural system (mainly biodiversity, with unique species of birds) in a context of intensification of agricultural particultural particultural system (mainly biodiversity, with unique species of birds) in a context of intensification of agricultural system (crop cultivation and biodiversity livestock) which provides PGs (food, rural vitality) but has also some negative impacts on the environment (mainly in terms of user of the provision of public goods by agricultural system which provides PGs (mainly biodiversity)         Soli functionality biodiversity, Soli functionality and rural vitality), leading to the public bad soil erosion in a context of abandonment accuter of a bundle of PG and PB, synergies and trade-offs Soli functionality at the terrotision of abundle of PG and PB, synergies and trade-offs Soli functionality at the terrotision of these services is supposed to be promoted by the establishment of a geopark (with the focus on of ES provision of creational services steaming from landscape as a result Scenery and recreation of ES provision of FGS from and scape as a result accure (availity) cost services is accure and recreation of ES provision of PGS from AFS under the reison and environmental PGS (availability) food security/ Scenery and recreation of ES provision of these services is accure and recreation of ES provision of the secure as a result Scenery and recreation of ES provision of FGS from AFS under the pressure of Scenery and recreation subalabitor recreation fandscape and ecreation of ES provisi | Gue to intensive IT-2         Optimal mix of policy tools to manage water quality, especially         Water (quality)           and mixed<br>agricultural<br>production)         Concerning agricultural nitrogen emissions to groundwater used<br>to drinking water         Biodiversity, Agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>abandonment<br>intensive agricultural system (crop cultivation and<br>biodiversity)         Biodiversity           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (fon anihy biodiversity)         Soil functionality<br>Biodiversity           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (fon anihy biodiversity)         Soil functionality<br>Biodiversity           Cluster 3:<br>Loss due to land         T-1         Effect of generi (incre support measures (CAP first pillar) on<br>a context of abandonment         Rural vitality           abandonment         a context of abandonment the provision of necetational services steaming from landscape and<br>scenery and<br>recreation         Scenery and recreation<br>Rural vitality           Cluster 3:<br>Urbon-rural<br>relationships         C2-2         Provision of recreational services steaming from landscape and<br>scenery and recreation         Scenery and recreation<br>Rural vitality           Cluster 3:<br>Vibronrurural   | under-provision             |          | management   | quantity                      |
| and mixed<br>agricultural<br>production)         concerning agricultural intriggen emissions to groundwater used<br>to drinking water         Biodiversity, Agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (roop cultivation and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity<br>Water quality           UK-1         Analyse a semi-intensive agricultural system (roop cultivation and<br>bodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>Biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>Biodiversity<br>and rural vitality), leading to the public goods by agricultural wetlands in<br>goodwersity. Flood risk<br>loss due to lond         Water (quality),<br>area context of a bandonment<br>the provision of public goods by agricultural wetlands in<br>Biodiversity. Flood risk<br>loss due to lond         Water (quality),<br>area vitality           Cluster 3:<br>Urban-rural<br>relationships         C2-2         Provision of necreational services steaming from landscape and<br>scenery and recreation         Scenery and recreation<br>Rural vitality           Cluster 4:<br>Bioful<br>relationships         BG-1         Analyse outdoor recreation in non-urban landscape and<br>scenery and recreation         Scenery and recreation<br>for By provision           Cluster 4:<br>Bioful<br>relationships         BG-1         Analyse agricultural systems that provide and/or protect<br>which also shall bring opportunities for local b   | and mixed<br>agricultural<br>production)         concerning agricultural introgen emissions to groundwater used<br>to drinking water         Biodiversity, Agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural land used (and<br>abandomment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity)         Biodiversity<br>UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity<br>water pollution and pressures on biodiversity)         Soil functionality<br>water quality           Cluster 2: Land<br>biondomment<br>under-<br>provision / PG         Es-1         Analyse the provision of bublic goods by agricultural wetlands in<br>the travity with high risk of abandomment<br>context of a very high risk of abandomment<br>acontext of a very high risk of abandomment<br>water quality),<br>a context of a bandomment<br>the provision of public goods by agricultural wetlands in<br>biodiversity. Flood risk<br>Biodiversity, Flood risk<br>Urban-rund<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>Rural vitality           Cluster 4:<br>browiser 4F5         BG-1         Analyse auricultural systems that provide and/or protect<br>for improving water retention of landscape as a result<br>of the provision of PG storest the Z2 is increasingly exposed to weather<br>for improving water retention of landscape (adjustment)         Scenery and recreation<br>for improving water retention of landscape (adjustment)  | due to intensive            | IT-2     | Optimal mix of policy tools to manage water quality, especially  | Water (quality)               |
| Upticitizing         Control in water           PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural and use (and<br>abandonment of traditional agricultural and use (and<br>beindonment of traditional agricultural system (crop cultivation and<br>biodiversity)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity)         Water quality           Cluster 2: Lond<br>bondomment<br>(risk of PG<br>under-<br>provision/PG         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>context of a very high risk of abandomment<br>sos due to lond<br>bondonment         Soil functionality<br>Biodiversity,<br>Recreation ad bandoment<br>a context of abandomment<br>the provision of public goods by agricultural wetlands in<br>bondonment)         Water (quality),<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity           Cluster 3:         C2-2         Provision of provision of these services is<br>services is<br>services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)         Scenery and recreation<br>for Sprovision           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>current as including extended periods of drought. There is need<br>(adjustment)         Scenery and recreation<br>for improving water retention of landscape and<br>secnery and recreation<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustm  | upricularial<br>production)         To analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural nad use (and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, Agricultural<br>Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>bondonment of traditional agricultural system (crop cultivation and<br>bondonment<br>water pollution and preusors on biodiversity)         Water quality           Cluster 2: Lond<br>bondonment<br>(risk of PG<br>bondonment<br>traditional agricultural system which provides PGs (mainly biodiversity)         Soil functionality<br>Biodiversity         Soil functionality<br>Biodiversity           Cluster 2: Lond<br>bondonment<br>traditional agricultural system which provides PGs (mainly biodiversity)         Soil functionality<br>Biodiversity         Soil functionality<br>Biodiversity           Cluster 3:<br>Usos due to long<br>to context of a very high risk of abandonment<br>babandonment         Rural vitality         Rural vitality           Cluster 3:<br>Urbon-rural<br>relationships<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>on scenery and recreation<br>of ES provision         Rural vitality<br>Scenery and recreation<br>of ES provision         Water (quality)/<br>(availability) Food security/<br>Scenery and recreation<br>of ES provision of the erecent years the C2 is increasingly exposed to weather<br>which also shall bring opportunities for local business as a resuit<br>subsidies on wildfire prevention of aladscape (mitigation) and<br>changing farming practices to cope with climate change<br>(  | ana mixea                   |          | concerning agricultural nitrogen emissions to groundwater used   |                               |
| Photocholm         PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural land use (and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Landscape (scenery and<br>recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity)         Biodiversity           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity)         Water quality           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>sone negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Soil functionality<br>Biodiversity           Inso of PG<br>a context of a very high risk of abandonment<br>trabandonment)         Rural vitality,<br>a context of abandonment         Rural vitality<br>Biodiversity, Flood risk<br>Soil functionality<br>Climate stability           Cluster 3:<br>Verbar-ural         C2-2         Provision of recreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>on scenery and recreation<br>of ES provision         Scenery and recreation<br>erviconumental PGs         Scenery and recreation<br>convert and recreation<br>of ES provision           Cluster 4:<br>browided in low<br>provided in low<br>intensive AFS         Biod. Analyse agricultural systems that provide and/or protect<br>wrintensive affect of agricultu  | Photocholity         PL-1         Analyse the provision of PGs by the river valley agricultural<br>system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural land use (and<br>abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Biodiversity, With<br>Water quality           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>Biodiversity)         Biodiversity           Cluster 2: Low ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>grancultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>context of a very high risk of abandonment<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>soil functionality         Soil functionality<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Soil functionality           Cluster 3:<br>Urban-rural<br>verticularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)         C2-2         Provision of a cultural systems that provide and/or protect<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>for ES provision           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>provided in the effect of agricultural systems that provide and/or protect<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>for Es provision<br>of ES provision           RC-1         Analyse the effect of agric   | agricultural<br>production) |          | to drinking water  |                               |
| system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         Canadian abandonment of traditional agricultural practices as a result of<br>their increasing alternative costs)         Canadian abandonment of traditional agricultural system (crop cultivation and<br>Biodiversity         Biodiversity           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and pressures on biodiversity)         Water quality           Cluster 2: Land<br>abandonment<br>(risk of PG         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>context of a very high risk of abandomment         Rural vitality           Isos due to land<br>IT-1         Effect of generic income support measures (CAP first pillar) on<br>acontext of abandomment         Biodiversity<br>Soil functionality           Isos due to land<br>IT-1         Effect of generic income support measures (CAP first pillar) on<br>acontext of abandomment         Soil functionality           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>of ES provision           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>provided in low<br>intensive AFS)         EG-1         Analyse agricultural systems that provide and/or protect<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)   | system (mainly biodiversity, with unique species of birds) in a<br>context of intensification of agricultural practices as a result of<br>their increasing alternative costs)         creation           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and Biodiversity<br>livestock) which provides PGs (food, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Water quality           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>adondonment<br>(risk of PG         Soil functionality           provision /F         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>biodiversity         Biodiversity<br>(rural vitality)           provision /F         a context of abandonment<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>supposed to be provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)         Scenery and recreation<br>particularly forest land. The provision of rurate stability           Cluster 4:<br>recreation         BG-1         Analyse outdoor recreation in non-urban landscape as a result<br>of ES provision         Scenery and recreation           Cluster 4:<br>recreation         BG-1         Analyse attricular systems that provide and/or protect<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation           Cluster  | ρισσατισπ                   | PL-1     | Analyse the provision of PGs by the river valley agricultural  | Biodiversity, Agricultural    |
| context of intensification of agricultural and use (and<br>abandonment of traditional agricultural system (crop cultivation and<br>Biodiversity         recreation)           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and<br>biodiversity)         Water quality           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (mainly biodiversity)         Soil functionality<br>water pollution and pressures on biodiversity)           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>margicultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>Biodiversity, Flood risk           Instance         FR-1         Analyse the provision of a bundle of PG and PB, synergies and trade-offs<br>bandonment)         Water (quality),<br>Biodiversity, Flood risk           Ioss due to lond         IT-1         Effect of generic income support measures (CAP first pillar) on<br>abandonment)         Rural vitality           Cluster 3:         C2-2         Provision of a bundle of PG and PB, synergies and trade-offs<br>soil functionality<br>(Cluster stability         Sciencery and recreation<br>Rural vitality           cluster 4:         BG-1         Analyse outdoor recreation in non-urban landscape as a result<br>of ES provision         Scenery and recreation<br>of ES provision           Cluster 4:         BG-1         Analyse agricultural systems that provide and/or protect<br>areitonalyse the effect of agricultural or a   | context of intensification of agricultural land use (and pabandonment of traditional agricultural system (crop cultivation and Biodiversity livestock) which provides PGs (tood, rural vitality) but has also water pollution and pressures on biodiversity         Water quality           Cluster 2: Land ES-1         An agricultural system which provides PGs (tood, rural vitality) but has also many pressures on biodiversity         Soil functionality           Cluster 2: Land ES-1         An agricultural system which provides PGs (mainty biodiversity and rural vitality), leading to the public bad soil erosion in a gricultural system which provides PGs (mainty biodiversity context of a very high risk of abandonment (mainty in terms of varer (quality), leading to the public bad soil erosion in a Biodiversity and rural vitality), leading to the public bad soil erosion in a Biodiversity (PG)         Soil functionality (PG)           FR-1         Analyse the provision of bubic goods by agricultural wetlands in Water (quality), a context of a bandonment (mainty errorision of a bundle of PG and PB, synergies and trade-offs Soil functionality (Limate stability)         Soil functionality (Limate stability)           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and servery and recreation an scenery and recreation in non-urban landscapes as a result of ES provision         Soil functionality (Limate stability)           Cluster 4:         BG-1         Analyse agricultural systems that provide and/or protect (availability) Food security/ Scenery and recreation of ES provision of a provise provide and/or protect (availability)         Scenery and recreation systems (hor improving water retention of landscape (mitigatio   |                             |          | system (mainly biodiversity, with unique species of birds) in a  | Landscape (scenery and        |
| Uk-1         Analyse a semi-intensive agricultural practices as a result of<br>their increasing alternative costs)         Water quality           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and Biodiversity<br>investock) which provides PGs (food, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity         Water quality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>context of a very high risk of abandonment         Biodiversity           (risk of PG         context of a bandonment         Rural vitality           provision /F         a context of abandonment         Biodiversity, Flood risk           loss due to land         T1         Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs         Soil functionality           Cluster 3:         CZ-2         Provision of recreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)         Scenery and recreation<br>of ES provision           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>provided in low<br>intensive AFS)         C2-1         Provision der cereation of andscape (mitgation) and<br>changing farming practices to cope with climate change<br>(adjustment)         Scenery and recreation<br>of ES provision           FR-2         Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention<   | With the focus         Value         Value         Solid functional agricultural practices as a result of their increasing alternative costs)         Water quality           UK-1         Analyse a semi-intensive agricultural system (crop cultivation and Biodiversity         Water quality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (nod, rural vitality)         Biodiversity           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity         Soil functionality           dbandonment         and rural vitality), leading to the public bad soil erosion in a biodiversity         Biodiversity           under-         FR-1         Analyse the provision of public goods by agricultural wetlands in         Water (quality),           provision PG         a context of a very high risk of abandonment         Biodiversity, Flood risk           abondonment)         the territorial level         Climate stability           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and soli functionality         Soil functionality           urban-rural         particularly forest land. The provision of these services is a context of abanal thing opportunities for local business and on scenery and recreation         Rural vitality           Vichan-rural         employment         cerceration         Scenery and recreation           NL-1  |                             |          | context of intensification of agricultural land use (and   | recreation)                   |
| Uk-1         Analyse a semi-intensive agricultural system (crop cultivation and Biodiversity<br>livestock) which provides PGs (food, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water quality)         Water quality           Cluster 2: Lond         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>moder.         Soil functionality           FR-1         Analyse the provision of public goods by agricultural wetlands in<br>boodnoment         Water (quality),<br>a context of a very high risk of abandonment         Biodiversity           Loss due to land         T-1         Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs         Soil functionality<br>cluater stability           Cluster 3:         C2-2         Provision of necreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>on scenery and<br>recreation         Scenery and recreation<br>for Sprovision           Cluster 4:         Bc-1         Analyse agricultural systems that provide and/or protect<br>gricultural         Water (quality)/<br>(availability) Food security/<br>subability of agricultural<br>systems (PGs<br>provided in low<br>intensive AFS)         Scenery and recreation<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)         Scenery and recreation,<br>water (quality), Rural<br>witality           Rv-1         Smalyse the effect of agricultu   | Their increasing atternative costs)UK-1 Analyse a semi-intensive agricultural system (crop cultivation and Biodiversity<br>livestock) which provides PGs (food, rural vitality) but has also<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)Water qualityCluster 2: LondES-1An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>glodiversity and rural vitality, leading to the public bad soil erosion in a<br>context of a very high risk of abandonmentBiodiversity<br>BiodiversitySoil functionality<br>and rural vitality), leading to the public goods by agricultural wetlands in<br>a context of abandonmentBiodiversityBiodiversityContext of a very high risk of abandonmentBiodiversity, Flood risk<br>Biodiversity, Flood riskSoil functionality<br>a context of a very high risk of AbandonmentBiodiversity, Flood risk<br>Biodiversity, Flood riskCluster 3:<br>Cluster 3:C2-2Convision of recreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>employmentScenery and recreationNI-1Analyse agricultural systems that provide and/or protect<br>environmental PGsWater (quality)/<br>Scenery and recreation<br>ground water)Cluster 4:<br>BG-1BG-1Analyse agricultural systems that provide and/or protect<br>environmental PGsWater (quality)/<br>Scenery and recreation<br>ground water)Cluster 4:<br>Cluster 5:BG   |                             |          | abandonment of traditional agricultural practices as a result of   |                               |
| 0b-1       Analyse a semi-intensive agricultural system (robot, provides PGS (food, rural vitality) but has also water quality is some negative impacts on the environment (mainly in terms of water quality).       Water quality         Cluster 2: Lond       E5-1       An agricultural system which provides PGS (mainly biothas also in a marrial vitality), leading to the public bad soil erosion in a marrial vitality).       Soil functionality biothas also in a marrial vitality.         Cluster 2: Lond       E5-1       An agricultural system which provides PGS (mainly biothersity).       Soil functionality biothas also in a marrial vitality.         and rural vitality), leading to the public bad soil erosion in a marrial vitality.       Rei A nalyse the provision of public goods by agricultural wetlands in Mare (quality).         a context of abandonment the provision of a bundle of PG and PB, synergies and trade-offs soil functionality at the territorial level       Climate stability         Cluster 3:       C2-2       Provision of recreational services steaming from landscape and particularly forest land. The provision of public poppart       Rural vitality         With the focus on scenery and eccreation in non-urban landscapes as a result scenery and recreation of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect water (availability) food security/ availability)         cluster 4:       BG-1       Analyse the effect of agriculture on wildfire prevention (and thus subidies on wildfire prevention flandscape (adjusthert)  | Ob-1       Analyse a semi-intensive agricultural system (trop culturation and biodiversity<br>ilvestock) which provides PGS (mainly biodiversity)       Water quality         Cluster 2: Land       E5-1       An agricultural system which provides PGS (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>more runder.       Soil functionality<br>Biodiversity         Cluster 2: Land       E5-1       An agricultural system which provides PGS (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>more runder.       Soil functionality<br>Biodiversity, Flood risk <i>provision / PG</i> a context of abandonment       Rural vitality) <i>provision / PG</i> a context of abandonment       Biodiversity, Flood risk <i>as context of abandonment</i> Biodiversity, Flood risk       Soil functionality <i>as context of abandonment</i> Tri Effect of generic income support measures (CAP first pillar) on<br>a context of abandonment       Water (vality) <i>as context of abandonment</i> Cluster 3:       C-2       Provision of recreational services steming from landscape and<br>particularly forest land. The provision of plos geopark<br>which also shall bring opportunities for local business and<br>on scenery and<br>employment       Scenery and recreation <i>Cluster 4:</i> B-1       Analyse agricultural systems that provide and/or protect       Water (quality)/<br>scenery and recreation <i>cluster 4:</i> B-1       Analyse agricultural systemes the C2 is increasin   |                             | 111/ 1   | their increasing alternative costs)  | Diediwaraitw                  |
| Some negative impacts on the environment (mainly but risa anso<br>some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Soli functionality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>and rural vitality). leading to the public bad soil erosion in a<br>biodiversity         Soli functionality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity<br>context of a very high risk of abandonment         Soli functionality           Biodiversity         Extension         FR-1         Analyse the provision of public goods by agricultural wetlands in<br>biodiversity. Flood risk         Water (quality).           Cluster 4:         Effect of generic income support measures (CAP first pillar) on<br>acting the territorial level         Cluster 4:         Cluster 3:         C2-2         Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus         Scenery and recreation         Scenery and recreation           Cluster 4:         BG-1         Analyse agricultural systems that provide and/or protect<br>(availability) food security/<br>agricultural<br>systems (PGs<br>provided in low         Scenery and recreation<br>of ES provision of recreative ereces to cape with climate change<br>(adjustment)         Scenery and recreation<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)         Scenery and recreation,<br>Wat   | Some negative impacts on the environment (mainly in terms of<br>water pollution and pressures on biodiversity)         Soil functionality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity)         Soil functionality           Cluster 2: Land         ES-1         An agricultural system which provides PGs (mainly biodiversity)         Soil functionality           Interview         and rural vitality), leading to the public bads of soil erosion in a<br>context of a bandonment         Biodiversity           Interview         FR-1         Analyse the provision of public goods by agricultural wetlands in         Water (quality),<br>Biodiversity, Flood risk           Interview         FR-1         Analyse the provision of public goods by agricultural wetlands in         Water (quality),<br>Biodiversity, Flood risk           Interview         Garcentext of abandonment         Biodiversity, Flood risk         Biodiversity, Flood risk           Interview         at the territorial level         Climate stability         Climate stability           Cluster 3:         CZ-2         Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation           Cluster 4:         BG-1         Analyse agricultural systems that provide and/or protect<br>environmental PGs         Wat  |                             | UK-1     | Analyse a semi-intensive agricultural system (crop cultivation and livectock) which provides PCs (feed, rural vitality) but has also | Biodiversity                  |
| Source ingestive impacts on the expersive on biodiversity)         Solid incention of the service on biodiversity           Cluster 2: Land ES-1         An agricultural system which provides PGs (mainly biodiversity and rural vitality), leading to the public bad soil erosion in a Biodiversity of the firsk of PG context of a very high risk of abandonment         Solid functionality           (risk of PG context of a very high risk of abandonment)         Rural vitality         Biodiversity, Flood risk           (risk of PG context of a very high risk of abandonment)         a context of abandonment         Rural vitality           (risk of PG context of a very high risk of abandonment)         a context of abandonment         Rural vitality           (risk of PG context of a very high risk of PG and PB, synergies and trade-offs at the territorial level         Climate stability           (risk of PG context of a very high risk of PG and PB, synergies and trade-offs a vitality supposed to be promoted by the establishment of a geopark (with the focus which also shall bring opportunities for local business and employment         Scenery and recreation of ES provision           recreation)         NL-1         Analyse agricultural systems that provide and/or protect         Water (quality)/ (availability) Food security/ (availability) Food security/ (availability) Food security/ (availability) Food security/ (availability)           environmental PGs         C2-1         During the recent years the CZ is increasingly exposed to weather environmental PGs         Cenery and recreation of landscape (mitigation) and changing farming practices  | Source impacts on the expersion biodiversity)         Soil functionality           Cluster 2: Land biodiversity         ES-1         An agricultural system which provides PGs (mainly biodiversity and rural vitality), leading to the public bad soil erosion in a gloodiversity and rural vitality), leading to the public bad soil erosion in a gloodiversity and rural vitality.         Soil functionality           (risk of PG context of a very high risk of abandonment provision/PG context of a very high risk of PG context of a very high risk of abandonment at the territorial level         Water (quality), a context of abandonment sources (CAP first pillar) on a context of a very high risk of PG and PB, synergies and trade-offs Soil functionality climate stability           Lost au load         TT-1         Effect of generic income support measures (CAP first pillar) on a the territorial level         Rural vitality           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and scenery and recreation particularly forest land. The provision of these services is supposed to be promoted by the establishment of a geopark (with the focus on scenery and ecreation in non-urban landscapes as a result of ES provision         Scenery and recreation           Cluster 4:         EG-1         Analyse agricultural systems that provide and/or protect         Water (quality)/ (availability) Food security/ agricultural of ES provision of PG for improving water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)           FR-2         Analyse the effect of agriculture on wildfire prevention (and thus subsidies on wildfire prevention   |                             |          | some pegative impacts on the environment (mainly) but has also   | water quality                 |
| Cluster 2: Land         ES-1         An agricultural system which provides PGS (mainly biodiversity<br>and rural vitality), leading to the public bad soil erosion in a<br>moder-<br>provision / PG         Soil functionality<br>Biodiversity<br>acontext of a very high risk of abandonment         Rural vitality           Investment<br>provision / PG         FR-1         Analyse the provision of public goods by agricultural wetlands in<br>a context of abandonment         Biodiversity, Flood risk           Ioss due to land         TI-1         Effect of generic income support measures (CAP first pillar) on<br>a bandonment)         Rural vitality           Cluster 3:         CZ-2         Provision of a bundle of PG and PB, synergies and trade-offs<br>at the territorial level         Climate stability           Cluster 3:         CZ-2         Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the estabilishment of a geopark<br>(with the focus<br>which also shall bring opportunities for local business and<br>employment         Scenery and recreation<br>of ES provision           Cluster 4:         BG-1         Analyse agricultural systems that provide and/or protect<br>environmental PGs         Water (quality)/<br>(availability) Food security/<br>(availability)           Systems (PGS<br>provided in low<br>intensive AFS )         C2-1         During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)         C2-1         During the recent years the CZ is increasingl  | Cluster 2: Land         ES-1         An agricultural system which provides PGS (mainly biodiversity<br>adandomment<br>(risk of PG<br>under-<br>provision / PG<br>loss due to land         Soil functionality<br>Biodiversity<br>a context of a very high risk of abandomment<br>a context of a very high risk of abandomment         Soil functionality<br>Biodiversity<br>Biodiversity           Instruction of PG<br>provision / PG<br>loss due to land<br>abandomment         R-1         Analyse the provision of public goods by agricultural wetlands in<br>a context of abandonment         Water (quality),<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Soil functionality<br>at the territorial level           Cluster 3:<br>Urban-rural<br>relationships<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>on scenery and<br>employment         Scenery and recreation<br>of ES provision<br>of ES provision           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGS<br>provided in low<br>intensive AFS)         C2-1         During the recent years the CZ is increasingly exposed to weather<br>which also son wildfire prevention (and thus<br>carbon emission) and the effection agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention provided by for |                             |          | water pollution and pressures on biodiversity)   |                               |
| Cluster 3:         Context of a very high risk of abandonment         Biodiversity           risk of PG         context of a very high risk of abandonment         Rural vitality,           provision/PG         a context of abandonment         Biodiversity           abandonment/         a context of abandonment         Biodiversity, Flood risk           loss due to land         Th-1         Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>at the territorial level         Soil functionality           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)         Scenery and recreation<br>Rural vitality           Cluster 4:         EG-1         Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision         Scenery and recreation<br>of ES provision           Cluster 4:         EG-1         Analyse agricultural systems that provide and/or protect         Water (quality)/<br>(availability) Food security/<br>Scenery and recreation           systems (PGS<br>provided in low<br>provided in low<br>provided in low<br>subsidies on wildfire prevention         G-1         During the recent years the CZ is increasingly exposed to weather         Water (quality)/<br>(ground water)           FR-2         Analyse the effect of agriculture on wildfire prevention (and thus<br>ubsidies on wildfire   | Closer of PG         and rural vitality, leading to the public bad soil erosion in a<br>context of a very high risk of abandonment         Biodiversity           under-<br>provision/PG         a context of abandonment         Biodiversity           loss due to land<br>abandonment)         T-1         Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>abandonment)         Rural vitality,<br>Soil functionality           Cluster 3:         C2-2         Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus         Scenery and recreation           NL-1         Analyse autodor recreation in non-urban landscapes as a result<br>of ES provision         Scenery and recreation           Cluster 4:         Bc-1         Analyse agricultural systems that provide and/or protect<br>environmental PGs         Water (quality)/<br>(availability)           Systems (PGs<br>provided in low<br>intensive AF5)         Bc-1         Analyse agricultureal systems the CZ is increasingly exposed to weather<br>extremes, including extended periods of drought. There is need<br>(adjustment)         (ground water)           FR-2         Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention         Wildfire risk<br>Climate stability           RO-1         Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activ   | Cluster 2. Land             | FS-1     | An agricultural system which provides PGs (mainly biodiversity)  | Soil functionality            |
| (risk of PG<br>under-<br>provision/PG<br>a context of a very high risk of abandonmentRural vitality(Rural vitalityRural vitality(Rural vitality)a context of a very high risk of abandonmentWater (quality),<br>Biodiversity, Flood risk(Rural vitality)a context of a very high risk of abandonmentBiodiversity, Flood risk(Rural vitality)a context of a bundle of PG and PB, synergies and trade-offs<br>at the territorial levelClimate stability(Cluster 3:<br>(Vitan-rural)<br>relationshipsC2-2Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus)<br>on scenery and<br>employmentScenery and recreation(NL-1Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provisionScenery and recreation(Cluster 4:<br>extensive<br>agricultural<br>systems (PGs<br>provided in lowBG-1Analyse agricultural systems that provide and/or protect<br>environmental PGsWater (quality)/<br>(availability) Food security/<br>Scenery and recreation(Z-1During the recent years the CZ is increasingly exposed to weather<br>(availability)Water (availability)<br>(ground water)(Ro-1Smart provision of PGs from AFS under the pressure of<br>subsidies on wildfire prevention<br>(adjustment)Scenery and recreation,<br>Water (quality),<br>(availability)(Rural vitalityRural vitalityScenery and recreation,<br>water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)Scenery and recreation,<br>Water (quality),<br>Rural vi   | (risk of PG<br>under-<br>provision/PG<br>loss due to landContext of a very high risk of abandonmentRural vitality(risk of PG<br>under-<br>provision/PG<br>abandonment)FR-1Analyse the provision of public goods by agricultural wetlands in<br>a context of abandonmentBiodiversity, Flood risk<br>Biodiversity, Flood risk(risk of PG<br>provision/PG<br>abandonment)TI-1Effect of generic income support measures (CAP first pillar) on<br>at the territorial levelWater (quality)<br>Soil functionality<br>Climate stability(Cluster 3:<br>relationshipsC2-2Provision of recreational services steaming from landscape and<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>employmentScenery and recreation<br>Rural vitality(Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>rovided in lowBG-1Analyse agricultural systems that provide and/or protect<br>stermes, including extended periods of drought. There is need<br>(ground water)Water (quality)/<br>(availability)<br>extremes, including extended periods of drought. There is need<br>(ground water)FR-2<br>rovided in low<br>intensive AFS jFR-2<br>Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention<br>for improving water retention of PGs from AFS under the pressure of<br>urbany subsidies on wildfire preventionClimate stabilityCluster 5:<br>Forest<br>landscapesEE-1Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of alreg scale clear cutting<br>deteriorating the living environment around densely populated<br>setting and urban in the provided by timber<br>production –private- forests, to benefit wi  | abandonment                 | 20 1     | and rural vitality), leading to the public bad soil erosion in a   | Biodiversity                  |
| under-<br>provision / PG<br>loss due to land<br>tabandonment)FR-1Analyse the provision of public goods by agricultural wetlands in<br>a context of abandonmentWater (quality),<br>Biodiversity, Flood risk<br>Biodiversity, Flood risk<br>Biodiversity, Flood riskloss due to land<br>abandonment)T1-1Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>Soil functionality<br>Climate stabilityBiodiversity, Flood risk<br>Rural vitalityCluster 3:<br>(Urban-rural<br>relationshipsC2-2Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(which hals os shall bring opportunities for local business and<br>employmentScenery and recreation<br>Rural vitalityCluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>intensive AFS )BG-1Analyse agricultural systems that provide and/or protect<br>extremes, including extended periods of drought. There is need<br>(ground water)Water (quality)/<br>(availability)<br>(ground water)FR-2<br>Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire preventionWildfire risk<br>Climate stabilityCluster 5:<br>Forest<br>landscapesEE-1Analyse the PG scenery and recreation<br>provinded in ow<br>wildfire preventionScenery and recreation<br>generationCluster 5:<br>Forest<br>landscapesEE-1Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention<br>systems in a context of high risk of large scale clear cutting<br>deteriorating  | under-<br>under-FR-1Analyse the provision of public goods by agricultural wetlands in<br>a context of abandonmentWater (quality),<br>Biodiversity, Flood riskloss due to landIT-1Effect of generic income support measures (CAP first pillar) on<br>abandonment)Rural vitalityabandonment)Effect of generic income support measures (CAP first pillar) on<br>at the territorial levelRural vitalityCluster 3:<br>urban-rural<br>relationshipsC2-2Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)Scenery and recreation<br>Rural vitalityNL-1Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provisionScenery and recreation<br>(availability)/<br>(availability)/<br>(availability)/<br>(availability)/<br>(availability)/<br>extremes, including extended periods of drought. There is need<br>(adjustment)Water (quality)/<br>(availability)<br>(availability)<br>extremes, including extended periods of drought. There is need<br>(adjustment)C1FR-2Analyse the effect of agriculture on wildfire prevention (and thus<br>urbaixies on wildfire prevention<br>(and thus<br>wildlity, foral<br>vitality)Wildfire risk<br>Climate stabilityCluster 5:<br>Forest<br>landscapesEE-1Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>setting the living environment around densely populated<br>setting activation - private- forests, to benefit wider public and in<br>production -private- forests, to b   | (risk of PG                 |          | context of a very high risk of abandonment   | Rural vitality                |
| provision/PG<br>loss due to land<br>abandonment)       a context of abandonment       Biodiversity, Flood risk         loss due to land<br>abandonment)       Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs       Rural vitality         Cluster 3:       CZ-2       Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and recreation<br>no scenery and recreation<br>on scenery and recreation       Rural vitality         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>scenery and recreation         C2-1       During the recent years the CZ is increasingly exposed to weather<br>intensive AFS /       Water (availability)<br>(ground water)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Scenery and recreation,<br>water (quality), Rural<br>vitality         RO-1       Serier y and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Floadwarerity  | provision/PG<br>loss due to land<br>abandonment)       a context of abandonment       Biodiversity, Flood risk<br>Rural vitality         loss due to land<br>abandonment)       T-1       Effect of generic income support measures (CAP first pillar) on<br>the provision of a bundle of PG and PB, synergies and trade-offs<br>oil functionality       Rural vitality         Cluster 3:       CZ-2       Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)       Scenery and recreation<br>Rural vitality         Cluster 4:       BG-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation<br>of ES provision         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>scenery and recreation         Cluster 4:       C2-1       During the recent years the CZ is increasingly exposed to weather<br>provided in low<br>intensive AFS )       Water (quality)         RFR-2       Analyse agriculture on wildfire prevention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       Giruan estability         RO-1       Smart provision of PGs from AFS under the pressure of<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Scenery and recreation<br>Water (quality), Rural<br>vitality  | under-                      | FR-1     | Analyse the provision of public goods by agricultural wetlands in  | Water (quality),              |
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| abandonment)       the provision of a bundle of PG and PB, synergies and trade-offs<br>at the territorial level       Soil functionality<br>Climate stability         Cluster 3:       C2-2       Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)       Scenery and recreation         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         gricultural<br>systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>the effect of agriculture on wildfire prevention (and thus<br>ubsidies on wildfire prevention       Wildfire risk<br>Climate stability         R0-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region<br>urbanization and diverse intensive activities in the region<br>witality       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment   | abandonment)       the provision of a bundle of PG and PB, synergies and trade-offs<br>at the territorial level       Soil functionality<br>Climate stability         Cluster 3:       C2-2       Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)       Scenery and recreation<br>Rural vitality         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation<br>of ES provision         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>scenery and recreation<br>of Carl         Systems (PGs<br>provided in low<br>intensive AFS )       C2-1       During the recent years the CZ is increasingly exposed to weather<br>intensive acroon emission) and the effectiveness of drought. There is need<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability<br>(Bround water)         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Water (quality), Rural<br>vitality         Cluster 5:       FI-1       Analyse how to enhance recrecation provided by timber<br>production -private– forests,   | loss due to land            | IT-1     | Effect of generic income support measures (CAP first pillar) on  | Rural vitality                |
| at the territorial level     Climate stability       Cluster 3:     CZ-2     Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>which also shall bring opportunities for local business and<br>employment     Rural vitality       NL-1     Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision     Scenery and recreation       Cluster 4:     BG-1     Analyse agricultural systems that provide and/or protect<br>environmental PGs     Water (quality)/<br>(availability) Food security/<br>scenery and recreation       C2-1     During the recent years the CZ is increasingly exposed to weather<br>provided in low<br>intensive AFS     Vater (availability)       FR-2     Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>cluster 5:     CImate stability<br>subsidies on wildfire prevention       R0-1     Smart provision of PGS from AFS under the pressure of<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements     Scenery and recreation,<br>Water (quality), Rural<br>vitality   | at the territorial levelClimate stabilityCluster 3:CZ-2Provision of recreational services steaming from landscape and<br>particularly forest land. The provision of these services is<br>supposed to be promoted by the establishment of a geopark<br>(with the focus<br>on scenery and<br>recreation)Scenery and recreation<br>Rural vitalityNL-1Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provisionScenery and recreationCluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>(adualbility)BG-1Analyse agricultural systems that provide and/or protect<br>environmental PGsWater (quality)/<br>(availability) Food security/<br>Scenery and recreationCluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>(adualbility)CZ-1During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)Wildfire risk<br>(Cimate stabilityFR-2Analyse the effect of agriculture on wildfire prevention<br>subsidies on wildfire preventionWildfire risk<br>Cimate stabilityCluster 5:<br>Forest<br>IandscapesEE-1Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlementsScenery and recreation<br>scenery and recreationCluster 5:<br>Forest<br>FI-1FI-1Analyse the VB scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlementsScenery and recreation<br>Biodiversity   | abandonment)                |          | the provision of a bundle of PG and PB, synergies and trade-offs   | Soil functionality            |
| Cluster 3:       C2-2       Provision of recreational services steaming from landscape and particularly forest land. The provision of these services is supposed to be promoted by the establishment of a geopark which also shall bring opportunities for local business and employment       Rural vitality         recreation)       NL-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect environmental PGs       Water (quality)/ (availability) Food security/ Scenery and recreation         agricultural systems (PGs provision of recreation of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)       TR-2       Analyse the effect of agriculture on wildfire prevention (and thus subsidies on wildfire prevention and diverse intensive activities in the region water (quality), Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation, Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation   | Cluster 3:       CZ-2       Provision of recreational services steaming from landscape and particularly forest land. The provision of these services is relationships supposed to be promoted by the establishment of a geopark which also shall bring opportunities for local business and employment       Rural vitality         recreation)       NL-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect environmental PGs       Water (quality)/         agricultural systems (PGs provision of recreation gradication for improving water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus subsidies on wildfire prevention       Wildfire risk         R0-1       Smart provision of PGs from AFS under the pressure of systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation witality         FI-1       Analyse the PG scenery and recreation provided by timber production -private- forests, to benefit wider public and in mode and provestion and diverse intensive activities in the region       Scenery and recreation Biodiversity   |                             |          | at the territorial level   | Climate stability             |
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| relationships       supposed to be promoted by the establishment of a geopark         (with the focus       which also shall bring opportunities for local business and         on scenery and       employment         recreation)       NL-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect environmental PGs       Water (quality)/ (availability) Food security/ Scenery and recreation         agricultural systems (PGs provision       CZ-1       During the recent years the CZ is increasingly exposed to weather water (availability) extremes, including extended periods of drought. There is need (adjustment)       (ground water)         For improving water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)       Wildfire risk         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus subsidies on wildfire prevention       Water (quality), Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         Fl-1       Analyse the PG scenery and recreation provided by timber       Scenery and recreation         respect       systems in a context of high risk of large scale clear cutting deteriorating the living environment around dens  | relationships       supposed to be promoted by the establishment of a geopark         (with the focus       which also shall bring opportunities for local business and         on scenery and       employment         recreation)       NL-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect environmental PGs       Water (quality)/ (availability) Food security/ scenery and recreation         systems (PGs       CZ-1       During the recent years the CZ is increasingly exposed to weather extremes, including extended periods of drought. There is need (adjustment)       (ground water)         for improving water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)       Kinate stability         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus subsidies on wildfire prevention       Kural vitality         RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Scenery and recreation, water (quality), Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         FI-1       Analyse the PG scenery and recreation benefits provided by timber production –priv  | Urban-rural                 |          | particularly forest land. The provision of these services is   | Rural vitality                |
| (with the focus<br>on scenery and<br>recreation)       which also shall bring opportunities for local business and<br>employment         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Kural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Provided by timber<br>provided by timber<br>scenery and recreation   | (with the focus<br>on scenery and<br>recreation)         which also shall bring opportunities for local business and<br>employment           Image: constraint of the provision         NL-1         Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision         Scenery and recreation           Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs<br>provided in low<br>intensive AFS)         BG-1         Analyse agricultural systems that provide and/or protect<br>environmental PGs         Water (quality)/<br>(availability) Food security/<br>Scenery and recreation           Itensive AFS         CZ-1         During the recent years the CZ is increasingly exposed to weather<br>intensive AFS         Water (availability)<br>extremes, including extended periods of drought. There is need<br>(adjustment)         (ground water)           FR-2         Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention         Wildfire risk<br>Climate stability           RO-1         Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region         Scenery and recreation,<br>Water (quality), Rural<br>vitality           Cluster 5:<br>Forest<br>landscapes         EE-1         Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements         Scenery and recreation<br>Biodiversity           FI-1         Analyse how to enhance recreation benefits provided by timber<br>production -private- forests, to benefit wider p   | relationships               |          | supposed to be promoted by the establishment of a geopark  |                               |
| on scenery and<br>recreation)       employment         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region<br>water (quality), Rural<br>vitality       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Production envirote envirote envirote the prestive and by timber<br>scenery and recreation   | on scenery and<br>recreation)       employment         NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:<br>Extensive<br>agricultural<br>systems (PGs       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Biodiversity         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in       Scenery and recreation<br>Biodiversity <td>(with the focus</td> <td></td> <td>which also shall bring opportunities for local business and</td> <td></td>  | (with the focus             |          | which also shall bring opportunities for local business and  |                               |
| Recreation       NL-1       Analyse outdoor recreation in non-urban landscapes as a result of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect environmental PGs       Water (quality)/         agricultural       environmental PGs       (availability) Food security/         agricultural       scenery and recreation         systems (PGs       CZ-1       During the recent years the CZ is increasingly exposed to weather       Water (availability)         provided in low       extremes, including extended periods of drought. There is need       (ground water)         intensive AFS )       for improving water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)       ER-2       Analyse the effect of agriculture on wildfire prevention (and thus carbon emission) and the effectiveness of target and general subsidies on wildfire prevention       Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Vater (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         Fl-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation  | Recreation       NL-1       Analyse outdoor recreation in non-urban landscapes as a result<br>of ES provision       Scenery and recreation         Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>agricultural       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region<br>water (quality), Rural<br>vitality       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Biodiversity         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production –private– forests, to benefit wider public and in<br>production –private–forests, to benefit wider public and in<br>pro  | on scenery and              |          | employment   | <u> </u>                      |
| Cluster 4:       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         agricultural<br>systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber<br>productionprivate_forests_to benefits wider public and in<br>productionprivate_forests_to benefits wider public and in       Scenery and recreation   | Cluster 4:<br>Extensive       BG-1       Analyse agricultural systems that provide and/or protect<br>environmental PGs       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         agricultural<br>systems (PGs<br>intensive AFS)       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>provided in low<br>intensive AFS)       Water (quality)/<br>(availability) Food security/<br>Scenery and recreation         FR-2       During the recent years the CZ is increasingly exposed to weather<br>(adjustment)       Water (availability)         FR-2       Analyse the effect of agriculture on vildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>vitality         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider public and in<br>production – private– forests, to benefit wider pu  | recreation)                 | NL-1     | of ES provision  | Scenery and recreation        |
| Extensive       environmental PGs       (availability) Food security/<br>Scenery and recreation         agricultural<br>systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       Water (availability)<br>(ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Productionprivateforests to benefit wider public and in<br>Productionprivateforests to benefit wider public and in       Scenery and recreation  | Extensive       environmental PGs       (availability) Food security/<br>Scenery and recreation         agricultural<br>systems (PGs<br>provided in low<br>intensive AFS)       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>particular nature-based tourism in a Finnish hill area       Sural vitality   | Cluster 4:                  | BG-1     | Analyse agricultural systems that provide and/or protect   | Water (quality)/              |
| agricultural<br>systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       Water (availability)<br>(ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Climate stability<br>Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Provided by timber         FI-1       Analyse how to enhance recreation benefits provided by timber<br>productionnrivateforests_ to henefits wider nublic and in<br>productionnrivateforests_ to henefits wider nublic and in       Scenery and recreation<br>Riodiversity  | agricultural<br>systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>extremes, including extended periods of drought. There is need<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         R0-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest<br>landscapes       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>Biodiversity   | Extensive                   |          | environmental PGs  | (availability) Food security/ |
| systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather<br>weather weather is need<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Provided by timber       Scenery and recreation<br>Provided by timber         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production — private— forests to benefit wider public and in       Scenery and recreation<br>Bindiversity   | systems (PGs<br>provided in low<br>intensive AFS )       CZ-1       During the recent years the CZ is increasingly exposed to weather       Water (availability)<br>extremes, including extended periods of drought. There is need<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Climate stability<br>Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Biodiversity         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production –private– forests, to benefit wider public and in<br>particular nature-based tourism in a Finnish hill area       Bural vitality   | agricultural                |          |  | Scenery and recreation        |
| provided in low<br>intensive AFS )       extremes, including extended periods of drought. There is need<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>Provided by timber         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production – private – forest to benefit wider public and in       Scenery and recreation<br>Biodiversity   | provided in low<br>intensive AFS )       extremes, including extended periods of drought. There is need<br>for improving water retention of landscape (mitigation) and<br>changing farming practices to cope with climate change<br>(adjustment)       (ground water)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire prevention       Wildfire risk<br>Climate stability<br>Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>production –private– forests, to benefit wider public and in<br>production –private– forests, to benefit wider public and in<br>particular nature-based tourism in a Finnish hill area       Scenery and recreation<br>Biodiversity  | systems (PGs                | CZ-1     | During the recent years the CZ is increasingly exposed to weather  | Water (availability)          |
| Intensive AFS /       For Improving Water retention of landscape (mitigation) and changing farming practices to cope with climate change (adjustment)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus carbon emission) and the effectiveness of target and general subsidies on wildfire prevention       Wildfire risk         RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Scenery and recreation, Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Provided by timber scenery and recreation provided by timber provided by timber and in the region production provided by timber provided by timber scenery and recreation provided by timber provided by timber production production provided provided provided by timber provided   | Intensive AFS /       For Improving water retention of landscape (initigation) and changing farming practices to cope with climate change (adjustment)         FR-2       Analyse the effect of agriculture on wildfire prevention (and thus carbon emission) and the effectiveness of target and general subsidies on wildfire prevention       Wildfire risk         RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Scenery and recreation, Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Biodiversity         FI-1       Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in particular nature-based tourism in a Einnish bill area       Scenery and recreation  | provided in low             |          | extremes, including extended periods of drought. There is need   | (ground water)                |
| Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Provided by timber Scenery and recreation Provided by timber Scenery and recreation   | Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Biodiversity provided by timber production – private – forests, to benefit wider public and in production – private – forests, to benefit wider public and in particular nature-based tourism in a Finnish hill area  | Intensive AFS )             |          | tor improving water retention of landscape (mitigation) and  |                               |
| (adjustment)FR-2 Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire preventionClimate stability<br>Rural vitalityRO-1 Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the regionScenery and recreation,<br>Water (quality), Rural<br>vitalityCluster 5:<br>Forest<br>landscapesEE-1<br>Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlementsScenery and recreation<br>Provided by timber<br>Scenery and recreation<br>Provided by timber<br>Provided by timber<br>Provided by timberScenery and recreation<br>Provided by timber<br>Provided by timber<br>Provided by timber<br>Provided by timber<br>Provided by timber   | (adjustment)FR-2 Analyse the effect of agriculture on wildfire prevention (and thus<br>carbon emission) and the effectiveness of target and general<br>subsidies on wildfire preventionClimate stability<br>Rural vitalityRO-1 Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the regionScenery and recreation,<br>Water (quality), Rural<br>vitalityCluster 5:<br>Forest<br>landscapesEE-1Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlementsScenery and recreation<br>BiodiversityFI-1Analyse how to enhance recreation benefits provided by timber<br>production -private- forests, to benefit wider public and in<br>particular nature-based tourism in a Einnish bill areaScenery and recreation<br>Biodiversity  |                             |          | (adjustment)   |                               |
| Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Picket                           | Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation Biodiversity provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber production – private – forests, to benefit wider public and in provided by timber provided by timbe                     |                             | FR-2     | Analyse the effect of agriculture on wildfire prevention (and thus   | Wildfire risk                 |
| subsidies on wildfire prevention       Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber<br>production = private= forests, to benefit wider public and in       Scenery and recreation   | subsidies on wildfire prevention       Rural vitality         RO-1       Smart provision of PGs from AFS under the pressure of<br>urbanization and diverse intensive activities in the region       Scenery and recreation,<br>Water (quality), Rural<br>vitality         Cluster 5:<br>Forest       EE-1       Analyse the PG scenery and recreation provided by forestry<br>systems in a context of high risk of large scale clear cutting<br>deteriorating the living environment around densely populated<br>settlements       Scenery and recreation<br>production –private– forests, to benefit wider public and in<br>particular nature-based tourism in a Einnish hill area       Scenery and recreation<br>Biodiversity   |                             | 111 2    | carbon emission) and the effectiveness of target and general   | Climate stability             |
| RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Scenery and recreation, Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber production provided by timber production provided by timber production provided by timber production       Scenery and recreation   | RO-1       Smart provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region       Scenery and recreation, Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in particular nature-based tourism in a Einnish hill area       Scenery and recreation  |                             |          | subsidies on wildfire prevention   | Rural vitality                |
| urbanization and diverse intensive activities in the region       Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber production production provided by timber production provided by timber production provided by timber production production provided by timber provided by timber production production production provided by timber provided by timber production production production provided by timber provided by timber production provided by timber production provided by timber provided by timber provided by timber production production provided by timber prov   | urbanization and diverse intensive activities in the region       Water (quality), Rural vitality         Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in particular nature-based tourism in a Einnish hill area       Scenery and recreation   |                             | RO-1     | Smart provision of PGs from AFS under the pressure of  | Scenery and recreation,       |
| Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry       Scenery and recreation         Forest       systems in a context of high risk of large scale clear cutting       deteriorating the living environment around densely populated         landscapes       FI-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation   | Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry       Scenery and recreation         Forest       systems in a context of high risk of large scale clear cutting       deteriorating the living environment around densely populated       Scenery and recreation         Iandscapes       EE-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation         FI-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation         production –private– forests, to benefit wider public and in       Biodiversity         particular nature-based tourism in a Einnish hill area       Bural vitality  |                             |          | urbanization and diverse intensive activities in the region  | Water (quality), Rural        |
| Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry       Scenery and recreation         Forest       systems in a context of high risk of large scale clear cutting       deteriorating the living environment around densely populated         landscapes       settlements         FI-1       Analyse how to enhance recreation benefits provided by timber       Scenery and recreation         production = private= forests, to benefit wider public and in       Biodiversity  | Cluster 5:       EE-1       Analyse the PG scenery and recreation provided by forestry       Scenery and recreation         Forest       systems in a context of high risk of large scale clear cutting       deteriorating the living environment around densely populated         landscapes       settlements       FI-1       Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in       Scenery and recreation         particular nature-based tourism in a Finnish hill area       Bural vitality  |                             | <u> </u> |  | vitality                      |
| Iandscapes       Systems in a context of high risk of large scale clear cutting         Iandscapes       deteriorating the living environment around densely populated         settlements       FI-1         Analyse how to enhance recreation benefits provided by timber       Scenery and recreation         production - private- forests, to benefit wider public and in       Biodiversity  | Iandscapes       Systems in a context of high risk of large scale clear cutting         Iandscapes       deteriorating the living environment around densely populated         settlements       FI-1         Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in particular nature-based tourism in a Finnish hill area       Scenery and recreation         Biodiversity       Biodiversity   | Cluster 5:                  | EE-1     | Analyse the PG scenery and recreation provided by forestry   | scenery and recreation        |
| Settlements         Fi-1         Analyse how to enhance recreation benefits provided by timber         Scenery and recreation           production = private=         forests_to benefit wider public and in         Biodiversity  | settlements         FI-1       Analyse how to enhance recreation benefits provided by timber production –private– forests, to benefit wider public and in particular nature-based tourism in a Finnish hill area       Biodiversity  | landscapes                  |          | deteriorating the living environment around densely populated  |                               |
| FI-1 Analyse how to enhance recreation benefits provided by timber Scenery and recreation  | FI-1 Analyse how to enhance recreation benefits provided by timber Scenery and recreation production –private– forests, to benefit wider public and in Biodiversity particular nature-based tourism in a Finnish hill area Bural vitality  | unuscupes                   |          | settlements  |                               |
| nraduction _nrivate_ forects to benefit wider public and in Biodiversity   | production – private– forests, to benefit wider public and in Biodiversity   |                             | FI-1     | Analyse how to enhance recreation henefits provided by timber  | Scenery and recreation        |
|  | particular nature-based tourism in a Finnish hill area Rural vitality  |                             |          | production –private– forests, to benefit wider public and in   | Biodiversity                  |
| narticular nature-based tourism in a Finnish hill area Rural vitality  | pur doular natare basea toanon ni a rinnon nin area inarar vitanty   |                             |          | particular nature-based tourism in a Finnish hill area   | Rural vitality                |

Table 2: Hotspot Storylines and public goods under investigation in PROVIDE based on the results of D3.2 (Marconi et al., 2016)

## 3.1 Failures and mismatches of the current governance system

Despite the enactment and implementation of a variety of European policies aiming at environmental friendly agricultural land use and PG provision (such the Birds and Habitats Directives and the Water Framework Directive), as well as the environmental measures within the framework of CAP, many public goods in agricultural and forestry areas in Europe still experience declines in PG provision, such as water quality degradation, or losses of biodiversity associated with agro-ecosystems and grasslands (EEA, 2010). Table 4 summarises statements raised by stakeholders in the 2<sup>nd</sup> CSR workshops (June 2016) in 13 PROVIDE CSR countries, on reasons why current governance and governance mechanisms do not reach the goal of efficiently enhancing the provision of public goods and/or avoiding the production of public bads in the context of the single hotspot issue. It has to be mentioned that stakeholders were not directly asked for identifying failures or mismatches of policies in the workshops, the statements were rather made in the discussions and excerpted from the single workshop protocols.

| Group          | Stat | tement  |
|----------------|------|---|
| Lack of system | 0    | Interaction between different strands of policy, especially environmental regulation    |
| thinking/      |      | and CAP payments is insufficient. (IT)  |
| integration/   | 0    | Missing integration of regional planning, being in the responsibility of the federal    |
| coordination   |      | states and –actually- in the hands of single majors of the municipality who are in      |
|                |      | power to reclassify areas of certain land use "as they wish". (AT)                      |
|                | 0    | Little coordination between actors, weak links between sectors. (CZ)                    |
|                | 0    | Different policies and aims from the separate heritage and nature (landscape-           |
|                |      | focussed) departments, which are not well aligned. (NL)                                 |
|                | 0    | Different PGs related to the physical environment or landscape are part of different    |
|                |      | departments and therefore are approached as sectoral issues. Policies are often         |
|                |      | focussed on specific compartments (e.g. water, soil, and environment) or sectors        |
|                |      | (nature, agriculture) by means of regulations or subsidies, but miss a more integrated  |
|                |      | approach. (NL)  |
|                | 0    | No streamlined governance of ground water, rather a multitude of different legislative  |
|                |      | rules (restrictions and obligations). (CZ)  |
|                | 0    | Responsibilities are distributed to a number of actors with overlaps, however, without  |
|                |      | clear coordination. (CZ)  |
|                | 0    | There is a lack of cooperation between local government and forest owners. Due to       |
|                |      | that the forest owners are often not aware of the locals' behavioural practices and the |
|                |      | usage intensity of local forests. (EST)   |
|                | 0    | The law in Estonia is rather gentle about forest owners' obligation to inform general   |
|                |      | public before the start of cutting activity (EST)                                       |
|                | 0    | A general lack of systems' understanding at the policy management level has also        |
|                |      | contributed to making the problem worse. (UK)   |
|                | 0    | Policies focussing on the short-term without a longer term vision. (UK)                 |
|                | 0    | Lobbyism overrules real demands. (AT)   |
| Missing/wrong  | 0    | Target setting not based on detailed scientific information. (UK)                       |
| targeting;     | 0    | Measures and compensation needs to be better targeted to basic natural conditions       |
| opposed        |      | (e.g. high windfall effects for organic agriculture in Marchfeld) (AT)                  |
| targets        | 0    | Regulation should be better targeted at the problem. (IT)                               |

Table 3: Failures and mismatches of the current governance system in the context of public good provision

| Group             | Stat | ement  |
|-------------------|------|--|
|                   | 0    | There are initiatives of the regional and central governments to address the issue of water scarcity, however, concentrated only on the supply of drinking water. (CZ) |
|                   | 0    | Cross compliance concerning fire prevention in the endangered areas of France  |
|                   |      | (Southern part) is very general and brings only compliance with the general regulation   |
|                   |      | (coping with the date of prohibition of the fire use). (FR)  |
|                   | 0    | AES are generally not designed for the fire risk prevention except where the general   |
|                   |      | link between farming and fire risk has been accepted by the local authority (Corsica).   |
|                   |      | But even there measures are targeted to the development of meadows that make   |
|                   |      | them look like a grassland premium. (FR)   |
|                   | 0    | Subsidies don't reach small farmers. (BG)  |
|                   | 0    | Mainly budget not target driven. (RO)  |
|                   | 0    | Great uncertainty in the outcome of applications at the same time as the application   |
|                   | ~    | Formers feel that they comptimes have to implement measures just in order to earn  |
|                   | 0    | rainers leef that they sometimes have to implement measures just in order to early   |
|                   |      | view or pot as they cannot just implement (and get rewarded) for single massures   |
|                   |      | but always need to implement multiple things (LIK)   |
|                   | ~    | Organic farming encourages an extensive production regime entails grassland use but  |
|                   | 0    | prevents rewetting. (DE)   |
| Lack of           | 0    | Lack of restrictions to forest management by means of land-use planning  |
| "consequence"     | 0    | Undefined standards and rules in the Charta of National Geoparks (CZ)  |
|                   | 0    | The size of forest cutting area in regulative acts rather loosely defined (EST)  |
|                   | 0    | consequences (UK)  |
| Lack of budget/   | 0    | Compensation for use of paths is not enough for estates to take care of the paths  |
| Inadequate        |      | leading through their land as required by local governments. Also, no compensation   |
| compensation/     |      | exists for required safety regulations (NL)  |
| lack of           | 0    | Decreasing budgets for nature conservation make performance oriented measures  |
| compensation      |      | difficult (NL)   |
|                   | 0    | LFA are of first importance in this area and the first pillar subsidies as well. But their   |
|                   |      | amount per hectare is low and can't hamper the general trend towards disappearance   |
|                   |      | versus enlargement of farms. (FR)  |
|                   | 0    | Payments based on income forgone are not enough in marginal regions (FR)   |
|                   | 0    | osually forest owners don't get compensation for landscape-oriented forest   |
|                   |      | forest management (FIN)  |
| Low               | 0    | Existing governance mechanisms are complicated (paperwork). (DE)   |
| acceptance due    | 0    | Participants experience rules and selection criteria as complex, unclear and frequently  |
| to complexity     |      | changing (UK)  |
| of mechanisms     | 0    | Due to complicated rules participants feel it is virtually impossible not to end up  |
| and measures      |      | breaking some of the rules associated with AES with the risk of losing the grant again   |
|                   |      | (UK)   |
|                   | 0    | Farmers prefer to abandon wetlands rather than risk a potential penalty because of a   |
|                   |      | legislation they do not understand any more (FR)   |
| Low               | 0    | Inventory of landscape elements led to their cutting down before mapping due to fear   |
| acceptance due    |      | of future maintenance obligations (AT)   |
| to risk of future | 0    | Inventory of wetlands in combination with rules of sanctions for wetland destruction   |
| determination     |      | in some cases led to abandonment or tillage of wetlands, rather than declaring them  |
|                   |      | to the administration (FR)   |
|                   | 0    | It land is used as grassiand by the tenant for five years it will be officially changed from   |
| Missing           |      | agricultural land to grassiand which is avoided by land owners (DE)  |
| iviissing         | 0    | mormation/communication about public goods is missing. (BG, AT)  |
| awareness         | 0    | negional population lacks of knowledge and awareness with regards to the PGBS  |
| awai C11633       | ~    | Some olive growers have a negative attitude towards the provision of DGs (FS)  |
| Market            | 0    | Governance won't be successful if the good produced is not supported by the market   |
| munct             | 0    | covernance won't be successial, if the good produced is not supported by the market  |

| Group           | Stat | rement  |
|-----------------|------|---|
| dependency of   |      | (AT)  |
| agricultural/   | 0    | Not enough regional brands of food (BG)                               |
| forestry sector | 0    | Price dependency/Value chain dependency of farmers (AT)               |
|                 | 0    | Incentives can't compete with prices (AT)                             |
|                 | 0    | Farmers are constrained by the global food system/global markets (UK) |

From the statements of the stakeholders it becomes obvious that failures and mismatches in governance systems and mechanisms, preventing better protection and provision of environmental agricultural and forestry public goods in the different CSRs, can have different "reasons".

An important reason mentioned by the stakeholder in many CSRs is a *lack of system thinking, integration and coordination* in the governance system and, consequently, in the mechanism design process. Major issues raised in this context were the fragmentation and distribution of responsibilities and decision making to different policy units, leading to inefficiencies in the coordination of measures and mechanism and making the development of "streamlined" governance strategies difficult. Moreover, the lack of system thinking can lead to disregarding important actors and stakeholders and their experience and knowledge in the decision making process and therefore to discontent after mechanisms' implementation due to ancillary costs and unconsidered side-effects. One result of the lack of fair and equal consideration and integration of all actors interests overrule the common demands for public goods.

The ineffectiveness of reaching aspired goals by the mechanisms in place, stakeholders explain by the often *missing, wrong or contrary targeting* of the mechanisms and measures and a *lack of "consequence"*. As regards failures in targeting, they can be the result of a lacking scientific substantiation. Many statements point to insufficient knowledge about public good provision and demand, such as e.g. in the case of Corsica, where agricultural measures for fire-prevention do not directly exist but are "hidden" in a grassland premium, or in one of the CSRs in Czech Republic, where general water scarcity is the main problem, but measures only target the supply of drinking water. Sometimes, the complexity of conservation objectives and the necessary setting of priorities in nature conservation can lead to failures in targeting. In the case of the German CSR for example, organic farming supports grassland systems on peatland area to the aim of biodiversity and low inputs,

however, the financial support for the grassland systems prevents the rewetting of these peatland areas, to the aim of carbon sequestration and climate change mitigation. Besides missing environmental objectives, the lack of targeting has also an effect on the acceptance of the measures: Many land-managers are sceptical about applying measures on their lands without understanding objectives and meaningfulness. As regards the lack of "consequence", stakeholders mainly criticise missing, weak and undefined standards and restrictions as well as the inconsequent and lax enforcement of obligations and compliance with environmental thresholds.

The *lack of budget and inadequate/lacking compensation* is perceived as a general and important cause for the unsatisfactory provision of public goods from agriculture and forestry. Here, the limits of the overall budget for nature conservation as well as the compensation payments for single measures are assumed to be too low to reach the aspired objectives.

A major point why governance mechanisms fail, in the eyes of the stakeholders is lacking acceptance of measures by the providers of public goods. Acceptance problems arise due to different reasons. On the one hand, the *complexity of mechanisms and measures* discourage many land managers to participate in programs. Beside high administrative costs for farmers and foresters (paperwork), also the risk of breaking rules which are "hidden" in the measures, and therefore facing penalties, appears to be high from the view of many land managers. On the other hand, the felt *risk of future determination* to keep up a "status quo," which has only been reached because a measure was applied, prevents many farmers from taking action or even from maintaining existent public good provision. Two examples are from Austria and France, where -due to fear of future maintenance obligations- the inventory of landscape elements of wetlands led to respectively cutting down of landscape elements, and the abandonment and tillage of wetland before mapping could be carried out. This also happened quite often during the area designation phase of Natura 2000 in Austria, Germany and Italy.

There are also drivers preventing the uptake of mechanisms taking place on "higher level" - which makes it even more difficult to overcome. One is the *missing information and missing awareness* about and towards public goods from agriculture and forestry. The other is the fact that agricultural and forestry production is characterised by the enormous *market-dependency of the agricultural/ forestry sector*. From the view of the stakeholders, many

governance mechanisms do not sufficiently take into account market solutions and aim at creating win-win scenarios, while the dependency and constraints of the agricultural and forestry sectors on the global market and foods system is constantly rising.

# 3.2 Aspects of "good" governance mechanisms

To overcome failures and weaknesses of existing governance systems and mechanisms, new or simply better governance mechanisms might be needed. To approach the identification and development of such mechanisms, in the PROVIDE CSR and EU level workshops the question of what makes governance "good" was discussed in detail.

## 3.2.1 The perspective of case study-level stakeholders

Table 4 summarises the statements provided in the 2<sup>nd</sup> CSR workshops (held in the 13 PROVIDE CSR countries in June 2016) by the local stakeholders when asked about aspects they consider to contribute to make a governance mechanism a "good" one (i.e. "smart" in PROVIDE's terms). In this question, stakeholders were not supported by guiding documents defining groups of criteria or by examples of good governance mechanism; rather stakeholders were fully free in their suggestions of characteristics of good governance. Nevertheless, some common characteristics assumed to be important for good governance mechanisms for the provision of public goods recurred in the different CSRs. Table 4 shows that the array of statements on aspects of good governance is vast.

| Criteria      |   | Statements of local stakeholders   |
|---------------|---|--|
| Effectiveness | 0 | Contributes to the goal  |
|               | 0 | Creates visible and practical results/outputs  |
|               | 0 | Leaves the situation better than it was before                                       |
|               | 0 | The desired outcome of governance must be reached                                    |
|               | 0 | Purposeful   |
|               | 0 | Focusses on results rather than on used resources                                    |
|               | 0 | Should be built on the final goal to be achieved and not the available budget        |
| Efficiency    | 0 | Efficient and affordable (financially, administratively)                             |
|               | 0 | High benefits/expenses ratio   |
|               | 0 | Good value for money   |
|               | 0 | Doesn't duplicate effort (wastes money)  |
|               | 0 | Minimizes (socio-economic) costs for local population                                |
|               | 0 | Achieves the objectives set to promote the provision of PGBs by agricultural systems |
|               |   | at the minimum cost for the whole society  |
| Sound basis   | 0 | Based on rigorous analyses and large volumes of information/data                     |
|               | 0 | Based on an existing demand for public goods (e.g. there is no reason to provide     |
|               |   | financial support for eco-farming if there is no market demand for such products)    |
|               | 0 | Based on societal demand   |
|               | 0 | Indicating/exploiting an emerging market demand                                      |
|               | 0 | Multiplies good practices from other regions   |
| Monitoring    | 0 | Subject to targeting and monitoring  |

Table 4: Criteria of "good" governance from the 2<sup>nd</sup> local stakeholder workshops

| Criteria        |   | Statements of local stakeholders  |
|-----------------|---|---|
|                 | 0 | Measurability of the outcome related to the implementation of the GMs                 |
|                 | 0 | Measurement of quantitative and qualitative (e.g. shift in mentalities) effects       |
|                 | 0 | Evaluation of medium/long term impacts  |
|                 | 0 | Easy monitoring   |
|                 | 0 | Adequate controls   |
| Targeting       | 0 | Tailor-made solutions   |
|                 | 0 | Adapted to each territory (and even to each type of farm)                             |
|                 | 0 | Makes benefit of local conditions and creates solutions that fit to those             |
|                 | 0 | Designed on a level that is the right one (local issues have to be designed locally   |
|                 |   | while superordinate issues have to be designed on higher level)                       |
|                 | 0 | Decentralization  |
| Participation   | 0 | "Invitation planning", in which local stakeholders are encouraged to actively engage  |
|                 |   | and contribute to new planning issues   |
|                 | 0 | Design of management plans and (environmental) target setting integrates all          |
|                 |   | actors, particularly land users   |
|                 | 0 | Public-private partnerships   |
|                 | 0 | Design of mechanisms integrates a bottom up approach, however it is important         |
|                 |   | that enough advice and information is given, enabling the necessary knowledge         |
|                 |   | transfer to decide on design issues   |
|                 | 0 | Design via dialogue and cooperation (so that it doesn't harm anybody)                 |
|                 | 0 | Backed up by the overall society affected by the mechanism                            |
| Trust, fairness | 0 | Accuracy and honesty  |
| and             | 0 | Equitable   |
| equitability    | 0 | Avoiding not to overcompensate certain farmers for low improvements in such           |
|                 |   | provision   |
|                 | 0 | Contract shared with every (representative) stakeholders of a territory would         |
|                 |   | increase farmers and stakeholders' commitment in public good conservation and         |
|                 |   | promotion   |
| Simplicity      | 0 | Simple administration   |
|                 | 0 | Simplification of legal and regulatory base   |
|                 | 0 | Clear and simple objectives (with prioritisation)                                     |
|                 | 0 | Some of the key information should be less technical in nature, presented in a clear, |
|                 |   | well-structured manner and be easily understandable                                   |
|                 | 0 | Low level of bureaucracy (based on local specifics and requirements)                  |
|                 | 0 | Easiness of adoption  |
| Flexibility     | 0 | Flexible and compliant with contractors according to climatic and economic events     |
|                 | 0 | Flexibility in the use of instruments (based on local specifics and requirements)     |
|                 | 0 | Designed to cope with the heterogeneity of provision of PGBs                          |
| System          | 0 | Takes account of the system as a whole and all its sectors                            |
| approach        | 0 | Seeks to have a snowball/multiplication effect within the industry and society        |
|                 | 0 | Considers social effects  |
|                 | 0 | Not only agricultural provision but also non-agricultural provision in the case of    |
|                 |   | marginal (very low profitable) productive systems                                     |
|                 | 0 | Considers side effects (linked to targeting and equitability)                         |
| Sustainability  | 0 | Has a long term vision  |
|                 | 0 | Sustainable results (or will the established systems collapse once financing ends?)   |
|                 | 0 | Aims to generate a behavioural shift  |
|                 | 0 | Seeks to shape mentalities and fulfil an educational role                             |
| Transparency    | 0 | Good governance mechanism is transparent  |
|                 | 0 | Provides high quality information regarding its usefulness and impact                 |
| Accompanied     | 0 | Need for technical assistance to help farmers adopt these GMs                         |
| by technical    | 0 | Supported by consultancy/information services, perhaps though established             |
| assistance and  |   | agencies  |
| information     | 0 | The skills of the ground-level operators are essential                                |
| Voluntariness   | 0 | Based more on volunteering  |
|                 | 0 | Works on the principle of deterrence rather than punishment after bad action          |

| Criteria  |   | Statements of local stakeholders  |
|-----------|---|---|
|           | 0 | Uses pedagogy solutions and do not use directly financial sanctions (at least for the |
|           |   | first time)   |
| Framework | 0 | Makes use of legal (regulation) and financial framework                               |
|           | 0 | Backed by top down financial support (state/EU)                                       |
| Others    | 0 | People understand, accept and buy into the mechanism                                  |
|           | 0 | Should generate examples of best practices  |

In an effort to cluster the statements in the aftermath, 16 groups of "criteria" for good governance could be identified: The most-mentioned aspects of good governance to the stakeholders concern effectiveness and efficiency. Paraphrased mainly by "reaching the environmental goals", effectiveness was in some statements even considered to be more important than efficiency (defined by the cost-benefit ratio of a mechanism) and was therefore suggested by some stakeholders as the preferable criteria in the governance mechanism design process. Another important group of criteria also to be allocated in the design process of mechanism is a "sound" basis for mechanism design, including scientific substantiation and the analysis of the needs for intervention on basis of societal demands. Also the topic of monitoring of environmental outcomes was raised in many workshops, reflecting the wish for measurability of outcomes and therefore – indirectly – for effective and performance-oriented mechanisms. Worth noting are statements on the importance of monitoring long-term effects of measures on public good provision, which were made several times. Broadly mentioned was the importance of targeting of instruments and measures. This aspect has to be understood comprehensively and refers to the targeting of the measures to the right beneficiaries and the wished outcome, as well as on spatial targeting. Moreover, participatory approaches of mechanism design were of utter importance for many of the stakeholders. Besides reflections on better and fairer design of mechanisms through the integration of all stakeholders affected, participation in the design process is also expected to lead to a higher acceptance rate of measures. Therefore, participatory approaches could be seen as a pushing factor for compliance with the raised aspects of trust, fairness and equitability and the criteria of system approaches. The latter was mentioned in different workshops and described as mechanisms taking into account not only the sector of the public good "providers", but also the private sector and the civil society, and considering ancillary effects beyond the ones directly targeted by the measure. More related to the mechanisms itself than to the design process were statements on the simplicity and *flexibility* of the mechanisms. Hereby simplicity was referred to questions of comprehensibility of contents as well as the bureaucracy and administrative burdens of an

implementation, flexibility to the adaptability of programs to changing natural and economic circumstances and to the heterogeneity of public goods. Further criteria mentioned in at least 2 workshops were *sound framework conditions* for mechanism implementation (legal and financial framework), *sustainability* of mechanisms (resilient to budget changes, aiming at behavioral changes), *transparency* (of the design process) and the voluntariness of measures.

|                  |     |    |    | ,  | 5 5  | ,<br>, |    |      |    |      |    |    |      |    |
|------------------|-----|----|----|----|------|--------|----|------|----|------|----|----|------|----|
| Criteria         | CLU | 1  |    |    | CLU2 | 2      |    | CLUE | }  | CLU4 | 1  |    | CLUS | 5  |
|                  | AT  | DE | IT | UK | ES   | FR     | IT | NL   | CZ | BG   | FR | RO | EE   | FI |
| Effectiveness    | х   | -  | -  | х  |      | х      |    |      |    | х    | х  | х  |      |    |
| Efficiency       |     |    |    | х  | х    |        |    |      |    |      |    | х  | х    | х  |
| Basis            | х   | Х  | х  |    |      |        | х  |      |    |      |    | х  |      | х  |
| Monitoring       | х   |    | х  | х  | х    |        | х  |      |    |      |    | х  |      |    |
| Targeting        | х   |    |    | х  |      | х      |    | Х    | Х  | х    |    |    |      | х  |
| Participation    | х   | Х  |    |    |      |        |    | Х    | Х  | х    |    |    |      | х  |
| Trust, fairness, |     |    |    | v  | v    | v      |    |      | v  |      | V  |    |      |    |
| equitability     |     |    |    | X  | X    | Х      |    |      | X  |      | X  |    |      |    |
| Simplicity       |     |    | х  | х  |      |        | х  |      |    | х    |    |    |      |    |
| Flexibility      |     | х  |    |    |      | х      |    | х    | х  |      | х  |    |      |    |
| System           |     |    |    | v  | v    |        |    |      |    | v    |    | v  |      |    |
| approach         |     |    |    | X  | X    |        |    |      |    | X    |    | X  |      |    |
| Voluntariness    |     |    |    | х  |      | х      |    |      |    |      | х  |    |      |    |
| Sustainability   |     |    |    | х  |      |        |    |      | Х  |      |    | х  |      |    |
| Transparency     |     |    |    |    |      |        |    |      |    |      |    | х  | х    |    |
| Technical        |     | X  |    |    | V    |        |    |      |    |      |    |    |      | V  |
| assist./inform.  |     | X  |    |    | х    |        |    |      |    |      |    |    |      | X  |
| Framework        | Х   | Х  |    |    |      |        |    |      |    |      |    |    |      |    |

Table 5: Cluster-wise allocation of criteria of good governance

#### 3.2.2 The perspective of EU-level stakeholders

Based on the local workshop results, the EU perspective on "good" governance was discussed in the EU level stakeholder-workshop held in connection with the 3<sup>rd</sup> project meeting in July 2016. At the European level, the focus of good governance mechanisms was on *the soundness of the design process* and the *accountability and controllability* of the mechanisms' implementation and performance. Both principles were also regarded as contributing to lower the risk for member states of facing disallowance penalties due to the inability to comply with the EU requirements to properly control and administer CAP payments.

As regards the *sound design process*, EU stakeholders stressed the importance of a profound planning, based on demand analysis, target analysis, beneficiary analysis, financial analysis, framework analysis and mechanisms analysis. The guiding questions in this planning process

should be: "what to support?", "with which money?" and "how?". Crucial in the planning process is the evaluation of the process itself: there was strong consensus that more emphasis should be put on monitoring the process of governance mechanisms design and on the governance framework also on national level and change, if necessary, the local governance in government itself. For the design of mechanisms and measures, participation was considered of utter importance. The integration of local knowledge through a dialogue process is considered to prevent both planning and design mistakes.

As regards accountability and controllability stakeholders agreed that the thought of how to control implementation and outcomes should be present already when setting up a system of governance mechanisms. Two different "targets" of controllability were identified: On the one hand, the mechanisms effectiveness should be controllable. Here, from the view of the European stakeholders the challenge lies in finding the right content and impact indicators, which are comparatively easy to measure and still suited to report on the results aimed to be achieved. Often the control for indicators introduces comprehensive data collection, which should preferably be solved with participatory approaches such as citizen science or the involvement of farmers in data collection. On the other hand, accountability and controllability should be possible for the implementation process, which means a sufficient infrastructure to monitor and bear testimony to the implementation of measures, the conformity with rules and standards (such as CC), and the sufficient administration of the respective schemes (e.g. timely payments to farmers).

Beside the two major principles of "good" governance presented above, one characteristic of mechanisms, which has been mentioned in the local stakeholder workshops repeatedly, has been particularly picked up for discussion at the European workshop: the criteria of flexibility. Also for the EU level stakeholders, there is scope for stronger integrating flexibility especially in the design of regulations. As an example of a successful scheme guaranteeing flexible and therefore fairer compensation was given by the HNV support in Denmark, where a scoring system is in place to rank HNV areas and allocate differentiated payments.

#### 3.3 Potential governance mechanisms adapted to local public good issues

In order to identify good governance mechanisms adapted to local PG issues, during the local workshops stakeholders discussed, which potential existing or novel governance mechanisms could be used to ensure a good and desired delivery of the relevant PGs in need

of intervention in their region by considering, where in the system the mechanisms would intervene and in which way the mechanism would affect the rest of the system. Also discussed were the advantages and disadvantages of the mechanisms and the question, who would benefit from the mechanisms and who would be negatively be impacted from their implementation.

#### 3.3.1 Cluster 1: PG under-provision in intensive and mixed agricultural regions

Cluster 1 is characterised by an under-provision of public goods and/or a provision of public bads due to agricultural management in intensive and mixed agricultural regions. The main public goods (mainly negatively) affected in this cluster are water quality, water quantity, agricultural landscape, biodiversity, soil functionality and, mostly as a result of degradation of the latter, climate stability. The main challenge of potential governance mechanisms in this cluster is to offer solutions of environmental protection, which are attractive and acceptable even against the background of high agricultural profitability and strong marketorientation and market-dependency of the farms. Table 6 lists the potential governance mechanisms to solve PGB issues in this cluster as discussed in the 2<sup>nd</sup> local stakeholder workshops. The major mechanisms suggested by the stakeholders are direct financial incentives, intervening directly in land use and land management and market based financial incentives, intervening either directly in land management via payment for ecosystem services or indirectly via certification changing the demand of consumers. Besides incentives, stakeholder suggest improvements of monitoring systems, fostering of information and knowledge exchange, improvements of integrative approaches as well as general changes/improvements of framework conditions.

| CSR  | PG/PBs  | GM  | Intervention in the system                                | Advantages & disadvantages  | Beneficiaries  | Dealing with heterogeneity  |
|------|---|---|---|---|--|---|
| Dire | ct financial in                                       | centives  |   |   |  |   |
| AT   | Soil funct.;<br>Biodiversity                          | Grants for protein<br>dominated crop<br>rotation                        | Intervenes in agricultural land use                       | <i>Advantage:</i> easy to administer as concept represents classical AES  | Beneficiaries: Farmers   | Targeted to specific public goods   |
| AT   | Soil funct.<br>Biodiversity                           | Collective bonus<br>for protein<br>dominated crop<br>rotation           | Intervenes in agricultural land use                       | <i>Advantage:</i> could be used to persuade farmers/ could strengthen future collaboration  | Beneficiaries: Farmers   | Targeted to specific public goods   |
| AT   | Land-scape/<br>recreation<br>and tourism              | Grants for<br>agricultural niche<br>strategies                          | Intervenes in agricultural land use                       | <b>Advantage</b> : Target oriented and specific <b>Disadvantage</b> : High transaction costs, difficulties of monitoring  | Beneficiaries: farmers   |   |
| DE   | Biodiversity<br>Soil funct.,<br>Carbon<br>sequestr.   | Organic farming   | Land management   | <b>Advantage</b> : Encourages extensive<br>production regime; <b>Disadvantage</b> :<br>encourages part of the grassland<br>use, preventing rewetting; Not<br>spatially targeted | Farmer (additional income from<br>financial support/ price premium<br>on product); Nature<br>conservation (+/-)                                      | not at all  |
| DE   | Biodiversity<br>Soil funct.,<br>Cultural<br>landscape | Contractual<br>natural protection                                       | Land management, specific<br>ecosystems                   | <b>Advantage</b> : Spatially targeted;<br>possibility to set specific<br>environmental targets for<br>management <b>Disadvantage</b> : High<br>transaction cost                 | Farmer (gets compensated for<br>additional work and reduced<br>yields); Nature conservation  | Highly spatially targeted and<br>therefore sensitive for spatial<br>heterogeneity   |
| IT   | Water<br>quality<br>degradation                       | Better targeting of RDPs measures                                       | Favour the conservation of water quality and availability | Advantages: those mechanisms<br>already include what is needed even<br>though they are not well applied<br>Disadvantages: increased<br>administrative burden;                   | Society disbenefits of this missed<br>opportunity and bears the cost<br>of consequences  | Regulations could entail<br>trade-offs between rural<br>viability and water quality |
| UK   | Biodiversity<br>& water<br>quality                    | Policy support for<br>organic agriculture<br>(change in<br>regulations) | This would mainly affect farmers                          |   | Consumers would benefit and<br>farmers with knowledge/supply<br>chain as well. But others might<br>suffer as the system isn't ready<br>for that yet. |   |
| UK   | Biodiversity<br>& water                               | Outcome/ output<br>based AES  | Land managers and owners                                  | Advantages Farmers are positive about simpler AES. D  | Farmers should be paid to<br>improve the level of  | Regional Spatial targeting<br>and collective actions would                          |

#### Table 6: Potential governance mechanisms to solve PGB issues in intensive and mixed agricultural areas (Cluster 1)

| CSR  | PG/PBs  | GM   | Intervention in the system  | Advantages & disadvantages   | Beneficiaries  | Dealing with heterogeneity   |
|------|---|--|---|--|--|--|
|      | quality   |  |   | isadvantages: there are concerns<br>with regards to measuring and<br>conditioning payments on<br>outcomes.   | environmental quality to overall benefit the rest of society                             | be important for dealing with<br>heterogeneity   |
| Indi | rect financial i                                    | incentives   |   |  |  |  |
| AT   | Landscape/<br>recreation<br>and tourism             | Grants for rural<br>development<br>strategies  | Intervenes at the demand side,<br>enable valorisation of the public<br>good "landscape"   | <i>Advantage</i> : Enhances rural vitality/identity  | Beneficiaries: (niche) companies, rural society  | General instrument, does not<br>directly intervene in<br>agricultural landuse                            |
| Mar  | ket based fina                                      | ancial incentives  |   |  |  |  |
| AT   | Soil<br>function;<br>Biodiversity                   | Certifications/<br>labels  | The value chain intervenes in<br>agricultural landuse and sells<br>products under the label of e.g.<br>"soil enhancing product" | Advantage: Market mechanism, payment for results   | Beneficiaries: Farmers and value<br>chain  | Only possible for public<br>goods that are "marketable"<br>in the sense of having<br>consumers awareness |
| DE   | Biodiversity<br>Soil funct.,<br>Carbon<br>sequestr. | Certification  | Holistic; Value chain, Marketing of products  | <b>Disadvantages</b> : Difficulty to develop<br>a label for the specific, small-scale<br>region; More generally on the land<br>use system (grazing on fen<br>grasslands); High transaction cost                  | Farmers, Regional economy  | Not at all   |
| IT   | Water<br>quality<br>degradation                     | Support to<br>changes in<br>consumers'<br>preferences /<br>products'<br>certifications | Favour the conservation of water quality and availability   | <b>Advantages:</b> Would reduce the<br>need for command and control<br>measures.<br><b>Disadvantages:</b> they are voluntary<br>so there is uncertainty on whether<br>compliance is located in relevant<br>areas | Farmers and society would both benefit   |  |
| DE   | Biodiversity<br>Soil funct.,<br>Carbon<br>sequestr. | PES  | Incentive for farmers, integration of civil society   | <i>Advantage</i> : Could be designed to<br>address specific targets, such as<br>ecosystems or public goods (carbon<br>sequestration, biodiversity); High<br>cost-effectiveness                                   | Farmers (compensation for output reduction or loss)                                      | Spatially targeted   |
| IT   | Water<br>quality<br>degradation                     | PES  | Favour the conservation of water quality and availability   | <i>Advantage:</i> Link between beneficiaries and providers of the service  | Society dis-benefits of this<br>missed opportunity and bears<br>the cost of consequences |  |
| UK   | Biodiversity<br>& water                             | Sustainable Land<br>Management   | Land managers, water company  | <i>Advantage:</i> Link between beneficiaries and providers of the  |  |  |

| CSR  | PG/PBs          | GM                   | Intervention in the system         | Advantages & disadvantages           | Beneficiaries                      | Dealing with heterogeneity     |
|------|-----------------|----------------------|------------------------------------|--------------------------------------|------------------------------------|--------------------------------|
|      | quality         | Scheme (PES-like)    |                                    | service. Disadvantages: difficult to |                                    |                                |
|      |                 |                      |                                    | design the right incentives to       |                                    |                                |
|      |                 |                      |                                    | comply with multiple regulations     |                                    |                                |
| Imp  | rovement of N   | Monitoring           |                                    |                                      |                                    |                                |
| AT   | Soil fertility; | Local Monitoring,    | Ex-post approach                   | Advantage: reveals problems,         |                                    | Only for specific public goods |
|      | Biodiversity    | e.g. nitrate         |                                    | makes improvements/                  |                                    | as every public good needs     |
|      |                 | balance              |                                    | deteriorations visible               |                                    | special monitoring             |
|      | 1               |                      |                                    | Disadvantage: Ex-post approach       |                                    |                                |
| UK   | Biodiversity    | Monitoring           | Monitor what is on the ground      | Disadvantages: Lack of capacity of   | Land managers would benefit as     |                                |
|      |                 |                      | and find good ways of sharing and  | farmers and organisations to         | would be able to make better       |                                |
|      |                 |                      | making people aware of this        | actually implement monitoring        | informed decisions                 | Monitoring a different levels  |
|      |                 |                      | information                        | systems on the ground                |                                    |                                |
| IT   | Water           | Improved             | Favour the conservation of water   | Disadvantages: increased             | Society disbenefits of this missed | Regulations could entail       |
|      | quality         | monitoring of        | quality and availability           | administrative burden; Advantages:   | opportunity and bears the cost     | trade-offs between rural       |
|      | degradation     | compliance to        |                                    | those mechanisms already include     | of consequences                    | viability and water quality    |
|      |                 | regulations          |                                    | what is needed even though they      |                                    |                                |
|      |                 |                      |                                    | are not well applied                 |                                    |                                |
| Fost | ered informat   | tion/education       |                                    |                                      |                                    |                                |
| AT   | Land-scape/     | Education/           | Intervenes in agricultural landuse | Advantage: Enhances rural            | Beneficiaries: farmers,            | General instrument, not        |
|      | recreation      | agricultural         | via many ways (collective action,  | vitality/efficient and sustainable   | companies, rural society           | target specific                |
|      | and tourism     | colleges             | innovative ideas, etc.)            | production/collaboration             |                                    |                                |
| UK   | Biodiversity    | Knowledge            | General public with emphasis on    | Disadvantages: Difficult to measure  | Public goods are difficult to      | Different methods of           |
|      |                 | exchange:            | school children                    |                                      | understand. It is necessary to     | knowledge exchange             |
|      |                 | practical and tacit  |                                    |                                      | make people aware of the           |                                |
|      |                 | knowledge            |                                    |                                      | connectivity of the system         |                                |
| IT   | Water           | Incentives for the   | Favour the conservation of water   | Advantages: exploit already existing | Farmers and society would both     |                                |
|      | quality         | creation of          | quality and availability           | mechanisms                           | benefit                            |                                |
|      | degradation     | support units to     |                                    |                                      |                                    |                                |
|      |                 | farmers/foresters    |                                    |                                      |                                    |                                |
|      |                 | willing to apply for |                                    |                                      |                                    |                                |
|      |                 | RDPs' measures       |                                    |                                      |                                    |                                |
| UK   | Biodiversity    | Presentation and     | The target would be the general    | Disadvantages: Difficult to measure  | General public would benefit       | Different types of marketing   |
|      |                 | marketing            | public so that they recognise and  |                                      | from an increase in knowledge      | for different levels           |
|      |                 |                      | are aware of it                    |                                      |                                    |                                |

| CSR  | PG/PBs  | GM  | Intervention in the system   | Advantages & disadvantages  | Beneficiaries  | Dealing with heterogeneity                                     |
|------|---|---|--|---|--|--|
| Impi | ovement of I  | ntegration  |  |   |  |  |
| AT   | Soil fertility;<br>Biodiversity                             | Local Think tanks   | Local Think tanks intervene in<br>many parts of the systems via<br>giving advice and information.<br>Especially they should advice<br>policy makers and suggest new<br>agricultural production solutions | <b>Advantage</b> : Assessment of Local needs and conditions, customised solutions, concrete solutions,  | Whole society as everybody could be integrated   | Can deal with all kinds of<br>heterogeneity of Public<br>goods |
| AT   | Soil fertility;<br>Biodiversity<br>Recreation,<br>landscape | Integrative work to<br>create local<br>identity/ Landes-<br>ausstellung | Intervenes on level of the society<br>to enhance the understanding for<br>agricultural processes and to<br>enable innovative ideas   | <b>Advantage</b> : enhances rural viability,<br>understanding for agricultural<br>processes <b>Disadvantage</b> : time<br>consuming and big personal<br>commitment, difficult to "measure"<br>effects | Beneficiaries: Whole society as everybody could be integrated  | General instrument, not<br>targeted on special public<br>goods |
| UK   | Biodiversity  | Policy integration and coordination                                     | At different levels as would mean<br>coordinating policies that may<br>affect different stakeholders   | Difficult to implement. Possibly high<br>transaction costs of coordination<br>and collective action   | Society would benefit from more coordinated policies   | With targeting of interventions                                |
| Char | nging/improv  | ement of framework  | conditions   |   |  |  |
| AT   | Land-scape/<br>recreation<br>and tourism                    | Area zoning/ area<br>planning   | Intervenes strongly in all processes allocating land use   |   | Beneficiaries: rural society, farmers (?)  | Not specific   |
| DE   |   | Alternative value chains  |  |   | Farmers, Regional economy  | Not at all   |
| UK   | Biodiversity  | Fair price for food   | Farmers and consumers would be the main target   | Fair price for the food could include<br>consideration of negative effects on<br>biota/habitats   | Society and farmers would<br>benefit. Farmers unable to<br>participate in those supply<br>chains would suffer.                               | Different levels in the supply chain                           |
| UK   | Biodiversity  | Land reform –<br>longer term<br>tenancy<br>agreements                   | Tenants and land owners would be the main target   |   | It isn't very clear but participants<br>said that Land Reform issues are<br>important. Community should<br>be able to affect more decisions. |  |

#### 3.3.2 Cluster 2: PG under-provision due to land abandonment in marginal areas

Cluster 2 is characterised by an under-provision/loss of public goods due to the abandonment of agricultural management in rather marginal regions. While the maintenance of agricultural management and businesses guarantees the maintenance of rural jobs and fosters rural viability and vitality, land stewardship and land maintenance by farmers mitigates the risks of landslides, floods and wild fires and contributes to the reduction of soil erosion, these services are lost, if agricultural management is abandoned. In the longer term, the degradation of abandoned land is likely to cause a loss of biodiversity, in some cases also a loss of soil functionality and soil carbon stocks (affecting climate stability and biodiversity), since soil erosion appears to be among its consequences, particularly under semi-arid climate conditions as being present in the Italian CSR. The main challenge of potential governance mechanisms in this cluster is to offer solutions which prevent the abandonment of agricultural management and agricultural areas, and the expected loss of agricultural public goods by making the maintenance of agricultural management attractive against the background of low agricultural profitability and by better valorising the public goods provided.

Table 7 presents the potential governance mechanisms to solve PGB issues in this cluster as discussed in the 2<sup>nd</sup> local stakeholder workshops. Also in the context of PG loss due to land abandonment, important mechanisms are *direct and indirect financial incentives*, mainly in form of payments for ecosystem services and improved rural development programs (RDP), fostering new businesses and value chains. *Marked based solutions* are seen in the certification for local production. Improved *advice, information* and *knowledge transfer* is thought to raise the local society's and farmers' awareness of the negative effects of land abandonment.
| CSR  | PG/PBs  | GM  | Intervention in the system   | Advantages & disadvantages   | Beneficiaries   | Dealing with heterogeneity  |
|------|---|---|--|--|---|---|
| Stai | ndards/Regulati                                       | ions  |  |  |   |   |
| ES   | Fostered<br>cross-<br>compliance                      | Biodiversity, rural vitality and soil erosion | Farmers' decision<br>making  | Advantages: Not additional budget<br>required; Wide implementation;<br>Government's and farmers' previous<br>experience on its implementation;<br>Disadvantage: Challenging control;<br>Farmers' sense of victimisation; Farm<br>internal control of the compliance of the<br>requirements (mainly when hired workers<br>are used)   | <i>Benefit</i> : Farmers<br><i>Disbenefit</i> : Government  | Limited flexibility for the<br>adaptation to the<br>heterogeneity of provision of<br>PGBs |
| FR   | Water quality<br>/ green algae                        | Application of the existing regulation        | Increasing control   | No need for collective action / is it<br>sufficient?   | local population; tourists<br>farmers; consumers  | negative  |
| Dire | ect financial ince                                    | entives                                       |  |  | · · · · · ·   |   |
| ES   | Biodiversity<br>rural vitality<br>and soil<br>erosion | Agri-environ-mental<br>schemes                | Farmers' decision<br>making  | <b>Advantages:</b> More flexibility for tailoring;<br>Promotion of higher farm technical<br>management (when AES are results-based:<br>promotion of self-commitment to comply<br>with the requirements and better<br>acknowledgement of the different<br>performance among farmers); Higher social<br>capital; <b>Disadvantages:</b><br>Inflexibility in the operational<br>implementation; Difficult monitoring;<br>Limited incentive power Payment delay | <i>Benefit</i> : Farmers,<br>companies providing<br>agricultural services<br><i>Disbenefit</i> : Government,<br>economic activities (when<br>lower yields result from<br>scheme implementation) | High flexibility for the<br>adaptation to the<br>heterogeneity of provision of<br>PGBs    |
| FR   | Biodiversity<br>habitat                               | PES   | Between local<br>authorities and farmers<br>on wetlands  | Collective action with financial incentives<br>→ enhances provision of these public<br>goods / will demand pay?  | local population, tourists;<br>farmers, consumers   | positive  |
| FR   | Recreation<br>goods and<br>services                   | PES   | Between local<br>authorities (or hunters,<br>hikes, fishermen<br>federations) and<br>farmers on wetlands | Collective action with financial incentives<br>→ enhances provision of these public<br>goods / will demand pay?  | local population, tourists;<br>farmers, consumers   | positive  |
| FR   | Recreation  | Individual contracts                          | Agreements with  | Advantages: More flexible than a PES /   | local population, tourists;   | Highly positive   |

#### Table 7: Potential governance mechanisms to solve PGB issues in areas threatened by land abandonment (Cluster 2)

| CSR | PG/PBs             | GM                       | Intervention in the      | Advantages & disadvantages                        | Beneficiaries                | Dealing with heterogeneity    |
|-----|--------------------|--------------------------|--------------------------|---|------------------------------|-------------------------------|
|     |                    |                          | system                   |   |                              |                               |
|     | goods and          |                          | partners (e.g. hunters,  | Disadvantages: difficult to establish and         | farmers, consumers           |                               |
|     | services           |                          | hikes, fishermen         | costly  |                              |                               |
|     |                    |                          | federations)             |   |                              |                               |
| FR  | Flood              | PES                      | Between house owners     | Collective action with financial incentives       | Farmers, House owners,       | positive                      |
|     | regulation         | (currently regulation)   | located in flood areas   | $\rightarrow$ enhances provision of these public  | Local inhabitants            |                               |
|     |                    |                          | and farmers with         | goods / will demand pay? When would               |                              |                               |
|     |                    |                          | wetlands                 | demand pay? How to define it?                     |                              |                               |
| FR  | Water quality      | PES                      | Between water            | Collective action with financial incentives       | local population, tourists;  | positive                      |
|     | / green algae      | (currently AEM)          | consumers (local         | $\rightarrow$ enhances provision of these public  | farmers, consumers           |                               |
|     |                    |                          | authorities) and farmers | goods / Will demand pay? It seems that            |                              |                               |
|     |                    | Contracts to             | Ensure land              | Advantages: already regulated by l                | Earmors and society would    | Detential supergies among:    |
|     | and vitality       | formers/foresters for    | maintenance favour       | 228/2001: creation of rural jobs: reduced         | hoth benefit                 | balting land degradation      |
|     | and vitality       | the management of        | rural viability and      | cost associated to land maintenance for           | both benefit                 | improving rural viability and |
|     |                    | public land              | vitality                 | the society                                       |                              | vitality an                   |
| IT  | Rural viability    | RDPs measures            | Favour rural viability   | <b>Disadvantages:</b> it is not very effective in | Society dis-benefits of this |                               |
|     | and vitality       |                          | and vitality             | preventing land abandonment because               | missed opportunity and       |                               |
|     |                    |                          |                          | measures are not directly addressing this         | bears the cost of            |                               |
|     |                    |                          |                          | issue   | consequences                 |                               |
| Ind | irect financial in | centives                 |                          |   |                              |                               |
| IT  | Rural viability    | Increase incentive for   | Favour rural viability   | Advantages: already regulated by RDP              |                              | Synergies between:            |
|     | and vitality       | the creation of start-up | and vitality             |   |                              | improving rural viability and |
|     |                    | in rural areas           |                          |   |                              | vitality and their associated |
|     |                    |                          |                          |   |                              | public good halting land      |
|     |                    |                          |                          |   |                              | degradation, , an             |
| IT  | Rural viability    | Incentive for the        | Favour rural viability   | Advantages: respond to market demand              |                              |                               |
|     | and vitality       | creation of new local    | and vitality             | for high quality, sustainable and local           |                              |                               |
|     |                    | certified value-chain    |                          | product   |                              |                               |
| Ma  | rket based finan   | cial incentives          |                          |   |                              |                               |
| IT  | Rural viability    | Incentives to strengthen | Favour rural viability   | Advantages: Would reduce the need for             | Farmers and society would    | By sustaining inome derived   |
|     | and vitality       | the local market /       | and vitality             | command and control measures.                     | both benefit                 | trom sustainable forestry,    |
|     |                    | certification for high   |                          |   |                              | such a mechanism would        |
|     |                    | quality timber           |                          |   |                              | sustain also the associated   |
|     |                    | (sustainable value       |                          |   |                              | public good                   |

| CSR | PG/PBs  | GM  | Intervention in the system  | Advantages & disadvantages   | Beneficiaries  | Dealing with heterogeneity  |
|-----|---|---|---|--|--|---|
|     |   | chain)  | -   |  |  |   |
| IT  | rural viability<br>and vitality   | Incentives to strengthen<br>the local market /<br>certification for local<br>food                                   | Favour rural viability<br>and vitality  |  |  | It sustain the rural viability<br>and their associated public<br>good |
| Imp | provement of M  | onitoring   |   |  |  |   |
| FR  | Water quality<br>/ green algae  | More monitoring for existing AEM  | E.g. Audit on water<br>quality every year   | <i>Advantages:</i> Farmers would be more commit in the policy goal / costly  | local population; tourists;<br>farmers; consumers  | positive  |
| Fos | tered information   | on/education  |   |  |  |   |
| ES  | Technical<br>assistance   | Biodiversity, rural<br>vitality and soil erosion  | Farmers' decision<br>making (MOG box in the<br>diagram)   | Advantage:<br>Better professionalization and farmers'<br>technical capacity, Promotion of young<br>people to run agricultural businesses;<br>Higher level of innovation; Higher<br>knowledge exchange; Flexible<br>implementation; High complementarity<br>with other economic activities<br>Disadvantage:<br>Cost (although not very high); Slow<br>implementation and achievement of<br>results (especially, related to overcoming<br>cultural barriers); Control needed for an<br>effective implementation (better not to<br>involve producers' cooperatives) | <i>Benefit</i> : Farmers,<br>companies providing<br>agricultural services<br><i>Disbenefit</i> : None (or just<br>Administration due to<br>implement-tation costs) | Flexible enough to adapt for<br>a heterogeneous reality               |
| FR  | Flood<br>regulation   | More pedagogy   | Guide of desired<br>practices and landscape<br>elements addressed to<br>farmers in flood areas            | <b>Advantages:</b> Based on trust → convinced farmers will act differently / no constraining effects   | Farmers<br>House owners<br>Local inhabitants   | +/-   |
| IT  | rural viability<br>and vitality,<br>conservation<br>of water<br>quality and<br>availability | Incentives for the<br>creation of support<br>units to<br>farmers/forester willing<br>to apply for RDPs'<br>measures | Favour rural viability<br>and vitality<br>Favour the conservation<br>of water quality and<br>availability | <i>Advantages:</i> exploit already existing mechanisms   | Farmers and society would both benefit   |   |

| CSR | PG/PBs   | GM   | Intervention in the system  | Advantages & disadvantages  | Beneficiaries   | Dealing with heterogeneity   |
|-----|--|--|---|---|---|------------------------------|
| IT  | rural viability<br>and vitality                              | (moral suasion)<br>Supporting society<br>awareness of the risks<br>of land abandonment | Favour rural viability<br>and vitality  | Advantages: they would lead to a long-<br>lasting cultural change;<br>Disadvantages: they rely on soft tools<br>whose result is uncertain               | Farmers and society would both benefit  |                              |
| Cha | nging/improve  | ment of framework condi  | tions   |   |   |                              |
| IT  | Degradation<br>of<br>abandoned<br>lands, land<br>maintenance | Facilitate land market   | Favour the formation of<br>consortium/collective<br>actions leaded by<br>farmers/foresters;<br>reduce fragmentation<br>of properties              | Advantages: auctions are already admitted<br>by regional laws; consortium are the<br>beneficiaries of several measures of the<br>current RDP (e.g. M16) | Farmers and society would both benefit  |                              |
| IT  | Degradation<br>of<br>abandoned<br>lands                      | Improved regulations<br>for the maintenance of<br>rural land                           | Favour the resilience to<br>flood and landslide and<br>wildfire risk and reduce<br>the fragmentation of<br>properties by fostering<br>land market | <b>Disadvantages</b> : there are not enough controls  | Society dis-benefits of this<br>missed opportunity and<br>bears the cost of<br>consequences | Potential trade-offs between |

#### 3.3.3 Cluster 3: PG provision with a focus on recreation

Cluster 3 is made up mainly around the public good issues of how the demand for the recreational potential of the public goods provided in (agricultural) landscapes can be used considering a good balance between demand and supply. These questions are investigated in two CSRs in the Netherlands and the Czech Republic. The main challenges of potential governance mechanisms in this cluster are (in the NL) to fairly balance land-use interests of the two user groups tourists and farmers and to "privatise" and "market" the public good 'landscape' for the benefit of the providers. At the moment, a strong tension between recreation and agriculture is felt, especially because of the experienced increase in recreation pressure and stakeholders are worried about the balance between the agricultural character of the area, recreation pressure and increased multi-functionality of the rural area, but also saw the potential (e.g. for regional marketing, different sources of income). In the Czech CSR, mechanisms are sought that have the potential to strengthen the collaboration of various actors to develop a formerly unused area for the benefit of the larger public and to tailor the provision of public goods to the capacity of local actors (farmers and foresters, and others) and to the demand (local and global). Here, mechanisms need to have a strong coordinating component, as well as clear rules for cooperation and for sharing the benefits.

According to the above named challenges, important mechanisms seen by the stakeholder in this cluster are the fostering and improvement of *integrative mechanisms*, such as collective action and private-public partnerships. Potential is also seen in *direct financial incentives*. On the one hand the "classical" CAP incentives are assumed as a good way to further compensate farmers and foresters for their contribution to the agricultural landscape. On the other hand financial mechanisms such as taxes are seen as a good way of internalising public good provision. Moreover, in this cluster *standards and regulations* as well as *fostered information and advice* play some role.

| CSR  | PG/PBs                   | GM  | Intervention in the system  | Advantages & disadvantages   | Beneficiaries  | Dealing with heterogeneity   |
|------|--------------------------|---|---|--|--|--|
| Stan | dards/regulat            | tion  |   |  |  |  |
| CZ   | Biodiversity             | Local regulation  | It regulates (restricts). Limited<br>capacity for incentives.   | Advantage: Effective if regulations are sufficient for the protection  | Local and general public   | Common and tailored<br>restrictions.   |
| NL   | Water<br>manag-<br>ement | Topic-specific<br>"Controlled<br>Activity<br>Regulations" | Management of boundary<br>conditions for agriculture and<br>biodiversity.                                     | Advantage: Reduced conflict. All<br>involved parties have influence in<br>the outcome. In practice this means<br>that a very detailed water<br>management plan meets most<br>requirements.<br>Disadvantage: Consensus-based,<br>which means no optimal solutions<br>for individual landowners/<br>stakeholders.  | Benefits and Disbenefits:<br>Stakeholders that have specific<br>water requirements in the area<br>have both benefits and<br>disbenefits, as the best working<br>solution is not always the<br>optimal solution for individuals.  | Yes, as this is a tailor-made<br>water management plan,<br>with a high level of detail<br>(sometimes even field<br>based). |
| NL   | Biodiversity             | Environmental<br>cross-compliance                         | Subsidies for agriculture.  | <b>Advantage:</b> All farmers have to do<br>some form of agrobiodiversity<br>measures in order to receive<br>financial support.<br><b>Disadvantage:</b> Increased pressure<br>on farmers regarding environmental<br>legislation.   | Benefit and disbenefit depends<br>on the situation. Farmers benefit<br>from support subsidies, but feel<br>that they disbenefit by having to<br>have to fulfil many requirements<br>Benefits are for the general<br>public and government, which<br>generally favour a high<br>agrobiodiversity. | No, applies to all farmers<br>who are eligible for area<br>support payments.   |
| Dire | ct financial in          | centives  |   |  |  |  |
| NL   | Recreation               | Location<br>advantage- tax                                | Relationship recreationists -<br>entrepreneurs - land owners<br>Financing mechanisms for nature<br>management | Advantage: Through an entrance<br>fee management of natural areas in<br>question would be financially<br>supported.<br>Disadvantage: When increasing the<br>general tourism tax, money would<br>flow to the general budget of the<br>local municipalities and not directly<br>to the management of the<br>recreation or natural areas in<br>question. This might lead to | Benefits: Landowners and/or<br>bodies responsible for nature<br>management (e.g. regional<br>government) will be supported.<br>Disbenefits: Recreationists and<br>recreational entrepreneurs<br>would have to pay for nature,<br>which is supposed to be publicly<br>accessible.                 | Focussed on hotspots of supply only.   |

### Table 8: Potential governance mechanisms to solve recreational PGB issues (Cluster 3)

| CSR | PG/PBs   | GM   | Intervention in the system   | Advantages & disadvantages  | Beneficiaries  | Dealing with heterogeneity   |
|-----|--|--|--|---|--|--|
|     |  |  |  | conflicts.  |  |  |
| NL  | Landscape<br>quality/<br>biodiversity<br>/ Rural<br>Identity | Tax relief schemes   | Landscape development of estates.  | Advantage: Estates have a strong<br>incentive to keep the landscape<br>around the estate up to high<br>standards, with forestry and natural<br>areas.<br>Disadvantage: Not all requirements<br>are area specific, which results in<br>planting or establishment of<br>landscape elements which are not<br>originally part of the landscape, just<br>to fit the tax requirements.  | <i>Benefit:</i> Estate owners<br><i>Disbenefit</i> : n/a   | Not really, because of the strict minimal requirements.  |
| NL  | Recreation/<br>Agriculture/<br>Rural<br>Identity             | Incentives for<br>local/rural<br>development                   | Support for recreation, economic activities, rural identity (through culture and heritage).  | <b>Advantage:</b> Financial<br>means/subsidies for a diversity of<br>plans for the development of the<br>countryside (area-specific plans).<br><b>Disadvantage:</b> financing unclear.  | <i>Benefit:</i> All stakeholders in the countryside, general public.<br><i>Disbenefit:</i> n/a   | Focusses on different rural issues, therefore also sensitive to heterogeneity.   |
| NL  | Agriculture/<br>Biodiversity                                 | Area payments<br>based on farming<br>or foresting<br>practices | (Agro-) biodiversity measures  | Advantage: Large variety of possible<br>measures regarding nature and<br>landscape management, agro-<br>biodiversity, landscape elements<br>and "blue services" (water<br>management).<br>Disadvantage: Dependent on<br>farmers collective (since 2016).<br>Measures are only eligible for<br>subsidies when they fit the specific<br>habitat and landscape type of the<br>area and the locally established<br>ambitions of the province. | Benefit: Farmers that partake (of<br>have interest to partake) in<br>agrobiodiversity measures.<br>Disbenefit: Individual<br>measures/solutions are not<br>possible anymore, so every<br>farmer has to partake in the<br>farmers collective. | Measures depend on<br>individual farmers and their<br>personal situation, but need<br>to fit in collective<br>plan/subsidy appeal. |
| Mar | ket based fina   | ancial incentives  |  |   |  |  |
| NL  | Recreation/<br>Rural<br>identity                             | Local initiative on<br>food supply chain<br>change             | Collaboration between local<br>parties with special local<br>knowledge on entrepreneurship,<br>logistics, distribution, marketing, | <b>Advantage:</b> Focus on well-being<br>within or life environment. This<br>initiative contributes to people's<br>awareness about patterns of  | Benefits: Consumers will get in<br>contact with the upper levels of<br>the food supply chain, namely<br>farmers and agricultural   | Heterogeneity is an<br>important issue due to the<br>variety of parties/<br>stakeholder/ layers included                           |

| CSR  | PG/PBs       | GM                 | Intervention in the system                               | Advantages & disadvantages   | Beneficiaries                                      | Dealing with heterogeneity     |
|------|--------------|--------------------|--|--|--|--------------------------------|
|      |              |                    | finance, legislation, purchase and process optimization. | consumption and their influence on the society. Citizen can actively | landscapes. Consumers gain access to healthy food. | in this initiative.            |
|      |              |                    |  | participate in the sustainable                                       |  |                                |
|      |              |                    |  | development of the region. This                                      | Disbenefits: Pressure from                         |                                |
|      |              |                    |  | initiative can have a substantial                                    | industrial food supply chain.                      |                                |
|      |              |                    |  | contribution to the employment                                       |  |                                |
|      |              |                    |  | Disadvantage: n/a  |  |                                |
| NI   | Biodiversity | Payments for       | Nature management  | Advantage: As the water company                                      | Renefit: Financially, the province                 | n/a                            |
|      | blouiversity | ecosystem          | Nature management  | financially benefits from the  | will benefit for having an extra                   | iiy a                          |
|      |              | services/Contracts |  | "services" provided by nature, this                                  | source of income for nature                        |                                |
|      |              | for services       |  | will also give the province some of                                  | management.  |                                |
|      |              |                    |  | this financial benefit for nature                                    | <i>Disbenefit:</i> Financially, the water          |                                |
|      |              |                    |  | <b>Disadvantage:</b> Difficult to establish                          | company has a disperient.                          |                                |
|      |              |                    |  | a baseline, which companies have to                                  |  |                                |
|      |              |                    |  | pay and which don't?   |  |                                |
| Fost | ered informa | tion/education     |  |  |  |                                |
| NL   | Agriculture  | Advisory services  | Providing a network for farmers,                         | Advantage: Farmers interests are                                     | Benefits: Farmers that are                         | Membership organisation.       |
|      |              | of farmer/forester | e.g. in advice.  | represented in many important  | member of the LTO have a                           |                                |
|      |              | organisations      | Makes sure that farmer's interest                        | government consultations, for  | strong network and                                 |                                |
|      |              |                    | are represented at different                             | example in the "Area commission".                                    | representation.                                    |                                |
|      |              |                    | governmental levels.                                     | Disadvantage: LTO farmers form a                                     | Disbenefits: Farmers that do not                   |                                |
|      |              |                    |  | "block": other stakeholders mention                                  | feel represented well by the LIO                   |                                |
|      |              |                    |  | (e.g. the NGO supporting   | have a weaker position.                            |                                |
|      |              |                    |  | difficult to approach individual                                     |  |                                |
|      |              |                    |  | farmers or find cooperation outside                                  |  |                                |
|      |              |                    |  | of the "ITO umbrella"  |  |                                |
| NL   | Agriculture  | Moral suasion      | Affecting farming practices                              | Advantage: By setting a positive                                     | Benefits: Farmers that have                        | (+) Focusses on several        |
|      | 0            |                    | 0 01   | example, the NGO hopes that  | interest in adopting sustainable                   | different ways to improve      |
|      |              |                    |  | appointing "early adaptors"/leading                                  | practices (for set examples,                       | sustainable practices, (-) but |
|      |              |                    |  | examples will have a spin-off effect.                                | support of NGO and by joining                      | is non-specific in approaching |
|      |              |                    |  | Hope that this eventually leads to a                                 | "community of practice").                          | farmers.                       |
|      |              |                    |  | "community of practice" and plan to                                  | General public gets acquainted                     |                                |

| CSR  | PG/PBs        | GM                | Intervention in the system       | Advantages & disadvantages                 | Beneficiaries                     | Dealing with heterogeneity    |
|------|---------------|-------------------|----------------------------------|--|-----------------------------------|-------------------------------|
|      |               |                   |                                  | support this.                              | with sustainable farmers in the   |                               |
|      |               |                   |                                  | <b>Disadvantage:</b> Optional for farmers, | region.                           |                               |
|      | A : 11 /      | " <u>`</u>        |                                  | Non-tormalised, Non-specific.              | Disbenefits: n/a                  |                               |
| NL   | Agriculture/  | "Community of     | (Agro-) biodiversity measures    | Advantage: Information and advice          | Benefit: Farmers that partake (of | Measures depend on            |
|      | Biodiversity  | practice          |                                  | exchange of agrophodiversity               | nave interest to partake) in      | norsenal situation, but need  |
|      |               |                   |                                  | well in the landscape. New policies        | (oithor for national or EU        | to fit in collective          |
|      |               |                   |                                  | make the cooperative relevant and          | (ettier for hational of LO        | nlan/subsidy appeal           |
|      |               |                   |                                  | important (hopefully new stimulus).        | schemes).                         | plany subsidy appeal.         |
|      |               |                   |                                  | <b>Disadvantaae:</b> Difficulty to engage  | Disbenefit: Individual            |                               |
|      |               |                   |                                  | farmers in the organisation. Reason        | measures/solutions are not        |                               |
|      |               |                   |                                  | is partly historical, as there were        | possible anymore, so every        |                               |
|      |               |                   |                                  | some setbacks in previous plans            | farmer has to partake in the      |                               |
|      |               |                   |                                  | Also, farmer's organisation (LTO) is       | farmers collective.               |                               |
|      |               |                   |                                  | strong, which makes the                    |                                   |                               |
|      |               |                   |                                  | organisation less                          |                                   |                               |
|      | _             |                   |                                  | influential/attractive.                    |                                   |                               |
| Impi | rovement of I | ntegration        |                                  |  |                                   |                               |
| CZ   | Recreatio-    | Collective action | Composition of forests/ crops    | Advantage:                                 | Local inhabitants and tourists    | Irrelevant                    |
|      | nal Eco-      |                   |                                  | Provided at the scale the actor is         |                                   |                               |
|      | system        |                   |                                  | willing                                    |                                   |                               |
| C7   | Public        | Public private    | Investment in infrastructure     | Advantaae:                                 | Local inhabitants and tourists    | Tailored to the character of  |
| 02   | recreational  | partnership       |                                  | Provided at the scale the actor is         |                                   | RES                           |
|      | infras-       | F                 |                                  | willing                                    |                                   |                               |
|      | tructure      |                   |                                  | 5  |                                   |                               |
| NL   | Recreation/   | LEADER            | Collaboration between public and | Advantage:                                 | Benefits: Especially local        | Applies to a variety of rural |
|      | Rural         |                   | private parties                  | Funds target local initiatives, from       | entrepreneurs/ inhabitants can    | issues and is therefore       |
|      | identity      |                   |                                  | inhabitants, farmers and                   | benefit through delivering ideas  | sensitive to heterogeneity.   |
|      |               |                   |                                  | entrepreneurs, with different levels       | to increase the regions           |                               |
|      |               |                   |                                  | of funding possibilities (directly         | innovativeness.                   |                               |
|      |               |                   |                                  | through LEADER or through                  | Disbenefits: Initiatives are      |                               |
|      |               |                   |                                  | "streektonds").                            | dependent on the LEADER           |                               |
|      |               |                   |                                  | increase participation of the              | tunding and are therefore likely  |                               |
|      |               |                   |                                  | regions stakenoiders in regional           | to be discontinued when funding   |                               |

| CSR | PG/PBs                            | GM   | Intervention in the system  | Advantages & disadvantages  | Beneficiaries  | Dealing with heterogeneity   |
|-----|-----------------------------------|--|---|---|--|--|
|     |                                   |  |   | politics<br>Stimulation of the regions'<br>innovativeness through bottom- up<br>financing<br><b>Disadvantage:</b><br>Dependent on financing from<br>different sources (municipalities,<br>province, private).   | ends.  |  |
| NL  | Biodiversity<br>/Recreation       | Public private<br>partnership for<br>new nature<br>development | Establishment and management of nature (biodiversity)   | <b>Advantage:</b> Planned as sustainable<br>financing model, to have a bottom-<br>up and society-relevant financing<br>for local nature planning.<br><b>Disadvantage:</b> Because there is no<br>money from the province assigned<br>to the establishment, in practice<br>there is little activity. | Benefit: Province (in charge of<br>nature legislation and<br>development), stakeholders<br>interested in nature<br>development.<br>Disbenefit: Stakeholders (e.g.<br>NGO's, business owners, estate<br>owners) are now responsible for<br>carrying part of the financial<br>burden for nature development. | Yes, tailor-made plans for<br>nature development and<br>management are possible.   |
| NL  | Recreation<br>infra-<br>structure | Private public<br>partnership                                  | Collaboration between local<br>governments & other local<br>stakeholders (e.g. inhabitants,<br>entrepreneurs) | Advantage: Improvement of<br>collaboration between local<br>government and local<br>entrepreneurs<br>Disadvantage: Way of financing the<br>TOP sites is unclear, although some<br>individual TOP sites are funded<br>through the LEADER programme.  | Benefits: Local economy, tourism<br>industry, tourists through easy<br>access of sites.<br>Disbenefits: Local inhabitants or<br>environment through increase of<br>tourism.  | Deals with heterogeneity in<br>terms of attributes needed<br>for a site to become a TOP<br>site (e.g. accessibility,<br>recreation potential,<br>recreational facilities such as<br>restaurants etc.). |

#### 3.3.4 Cluster 4: PG provision in low intensive agricultural systems

Cluster 4 investigates low intensive agricultural and forestry systems, where especially due to the low intensive management a broad variety of public goods, such as resilience to wildfire risk, climate stability or recreational ecosystem services as a result of the maintenance of the agricultural landscape are provided. The main challenges of potential governance mechanisms in this cluster will be to present solutions which are suited to sustainably develop the rural regions considering ways to foster rural viability and vitality by simultaneously protecting the public goods provided by the low intensive management of agriculture and forestry systems (AFS) in the context of either intensification or even land abandonment.

Table 9 lists potential governance mechanisms discussed by the stakeholders to maintain public good provision in low intensive agricultural and forestry systems. It becomes obvious, that here *direct financial incentives* play an important role. Besides "classic" ways to subsidise farmers, more targeted approaches, such as performance based payments and payments for ecosystem services, as well as tax relieve schemes are assumed to be effective to establish sustainable farming practices, particularly in the Romanian case. Also *regulation* is seen as a key tool in conserving public goods provision in the context of eventually intensifying regions, especially in protected areas. Last but not least, *improved and increased monitoring* of how efficiently and correctly subsidies and other financial support is used is assumed to be crucial.

#### Table 9: Potential governance mechanisms to solve PGB issues in low intensive agricultural systems (Cluster 4)

| CSR  | PG/PBs  | GM   | Intervention in the system  | Advantages & disadvantages  | Beneficiaries   | Dealing with heterogeneity  |
|------|---|--|---|---|---|---|
| Stan | dards/Regula  | ation  |   |   |   |   |
| BG   | Water<br>quality  | Environmental standards and regulations,                         | Extensive agriculture   |   |   |   |
| RO   | Logging<br>residue  | Stricter regulation<br>and enforcement                           | It would intervene in the system at<br>the following levels: local<br>administration, forest owners,<br>logging companies | <b>Advantages:</b> addresses a specific<br>and ardent issue in the area with a<br>potential for wide reaching negative<br>consequences<br><b>Disadvantages:</b> difficult to monitor<br>and enforce due to frequent<br>instances of illegal logging and<br>corruption | Benefits: forest owners<br>Disbenefits: logging companies   | Difficult to monitor due to<br>illegal logging activities in the<br>area. |
| Dire | ct financial in   | centives   |   |   |   |   |
| BG   | Biodiversity<br>Agricultural<br>landscape   | Financial<br>incentives<br>(subsidies, EU and<br>non EU projects | Subsidising HNV farming   |   | farmers   |   |
| BG   | Biodiversity<br>Agricultural<br>landscape   | EU and non EU<br>Projects  |   |   |   |   |
| FR   | Fire<br>prevention  | AES  | Keeps up agricultural<br>management   |   |   |   |
| RO   | Water<br>quality,<br>rural<br>vitality, air<br>quality, soil<br>quality,<br>Biodiversity<br>Health and<br>welfare of<br>animals | Tax relief schemes   | Intervenes in land management   |   | Benefits Local population,<br>farmers, businesses depending<br>on public goods<br>disbenfits<br>businesses which depend<br>on using public goods,<br>some land owners |   |

| CSR  | PG/PBs                | GM                 | Intervention in the system          | Advantages & disadvantages                 | Beneficiaries                  | Dealing with heterogeneity |
|------|-----------------------|--------------------|-------------------------------------|--|--------------------------------|----------------------------|
| RO   | Health and welfare of | Targeted subsidies |                                     | Advantage: targeted positive reinforcement | farmers                        |                            |
|      | animals               |                    |                                     |  |                                |                            |
| RO   | Water                 | Payments based     |                                     | Advantage: targeted positive               |                                |                            |
|      | quality, air          | on performance     |                                     | reinforcement                              |                                |                            |
|      | quality, soil         | level/measured     |                                     | Disadvantage: difficult to monitor         |                                |                            |
|      | quality,              | improvement of     |                                     | air pollution by each entity               |                                |                            |
|      | Biodiversity          | performance        |                                     |  |                                |                            |
| RO   | Water                 | PES                |                                     |  | local and regional population, |                            |
|      | quality               |                    |                                     |  | farmers                        |                            |
|      |                       |                    |                                     |  | businesses which depend on     |                            |
|      |                       |                    |                                     |  | using water resources, large   |                            |
|      |                       |                    |                                     |  | wastowator, some land owners   |                            |
| RO   | Biodiversity          | Compensation       | would intervene in the system at    | Advantage: based on positive               | local and regional nonulation  |                            |
| NO   | biodiversity          | navments system    | the level of land owners (including | reinforcement promoting a view of          | tourists eco-farmers and green |                            |
|      |                       | for eco-           | forest owners), farmers,            | responsible business                       | businesses                     |                            |
|      |                       | management         |                                     | <b>Disadvantage:</b> effective only at the |                                |                            |
|      |                       | 0                  |                                     | levels of those willing to become          |                                |                            |
|      |                       |                    |                                     | involved in these mechanisms; non-         |                                |                            |
|      |                       |                    |                                     | compliance is somewhat difficult to        |                                |                            |
|      |                       |                    |                                     | monitor                                    |                                |                            |
| Indi | irect financial       | incentives         |                                     |  |                                |                            |
| FR   | Fire                  | RDP measures       | Keeps up agricultural               | Disadvantage: (at moment) not              |                                |                            |
|      | prevention            | such as grassland  | management                          | very targeted to fire prevention           |                                |                            |
|      |                       | premium and        |                                     |  |                                |                            |
|      |                       | natural handicap   |                                     |  |                                |                            |
|      |                       | compensation       |                                     |  |                                |                            |
|      | <b></b>               | subsidy            |                                     |  |                                |                            |
| CZ   | Water                 | RDP and OP         | Support to non-productive           | Advantage: used when needed,               | Farmers, foresters, local      |                            |
|      | retention             | Environment        | investment (technical measures)     | reducing costs                             | population                     |                            |
|      |                       | measures           |                                     | Disadvantage: if from OP                   |                                |                            |
|      |                       |                    |                                     | Environment – water in ponds               |                                |                            |
|      |                       |                    |                                     | cannot de usea in agriculture.             |                                |                            |

| CSR  | PG/PBs                                      | GM   | Intervention in the system  | Advantages & disadvantages  | Beneficiaries   | Dealing with heterogeneity   |
|------|---|--|---|---|---|--|
| Mar  | ket based fina                              | ancial incentives  |   |   |   |  |
| BG   | Food  | Certification and  |   |   |   |  |
|      | production                                  | labelling  |   |   |   |  |
| RO   | Health and<br>welfare of<br>animals         | Eco labelling  | It would intervene in the system at<br>the following levels: end<br>consumers, local businesses                       | <b>Advantage:</b> supported by market<br>trends (demand for eco-products);<br>targeted, efficient use of resources<br><b>Disadvantage:</b> can encourage<br>corruption of evaluation bodies (in<br>order to gain a positive classification<br>without meeting the criteria) | Benefits: local population, local<br>businesses, end consumers<br>Disbenefits: high intensity<br>farmers    |  |
| RO   | Rural<br>vitality                           | Financial support<br>for new farmers or<br>non-agro<br>businesses                      | businesses  |   |   |  |
| Impi | rovement of N                               | Monitoring   |   |   |   |  |
| RO   | Air quality,<br>water<br>quality            | Systems of<br>monitoring<br>compliance with<br>regulations                             | Ex post   | <i>Disadvantage:</i> Complicated implementation by public/local authorities   |   |  |
| Fost | ered informat                               | tion/education   |   |   |   |  |
| BG   |   | Advisory and information   |   |   |   |  |
| CZ   | Water<br>retention/<br>water<br>availabilty | Operational group<br>EIP   | Bringing together farmers, other<br>stakeholders and research and<br>advisory   | Advantage: working together on the<br>issue<br>Disadvantage: capacity for collective<br>action necessary  | Farmers, local inhabitants  | Is to be overcome due to<br>collective action and transfer<br>pf knowledge |
| RO   | Rural<br>vitality                           | Education/informa<br>tion/consultancy<br>services for<br>developing human<br>resources | It would intervene in the system at<br>the following levels: local<br>population, businesses, local<br>administration | <b>Advantage:</b> ensure sustainable,<br>long-term development of the<br>region and maintenance of low<br>intensity systems   | Benefits: local population,<br>businesses, tourism, local<br>administration<br>Disbenefits: large companies |  |
| RO   | Landscape<br>(natural<br>parks)             | Promotional and<br>informational<br>campaigns,   |   |   |   |  |

| CSR  | PG/PBs                                       | GM                                      | Intervention in the system   | Advantages & disadvantages  | Beneficiaries              | Dealing with heterogeneity                                     |  |  |
|------|--|---|--|---|----------------------------|--|--|--|
| Impi | Improvement of Integration                   |   |  |   |                            |  |  |  |
| BG   | Rural<br>vitality,<br>food<br>production     | Private-public<br>partnerships          | Initiative LAG;Operational Groups  |   |                            |  |  |  |
| CZ   | Water<br>retention/<br>water<br>availability | Collective action                       | Establishing an association for<br>water retention improvement of<br>the landscape in the Sluknov area | Advanatge: appropriate for<br>managing commons, sustastainable<br>Disadvantage: capacity for collective<br>action necessary | Farmers, local inhabitants | Is to be overcome due to collective action for common interest |  |  |
| BG   | Agricultural<br>landscape,<br>rural vitality | Collective<br>action/self<br>regulation | Rural tourism  |   |                            |  |  |  |

#### 3.3.5 Cluster 5: PG provision in forest landscapes

Cluster 5 deals with the provision of public goods in forestry systems, where forestry activities such as clear cutting lowers the landscapes potential for providing recreational services. Here, particularly the question arises, how to remunerate the private provision of public goods by the forest businesses and how to enhance the mutual awareness of demands. At the moment in both CSRs in Estonia and Finland, forest management affects the forest landscape which is important for nature-based tourism. Clear-cuts and strong soil preparation are particularly harmful operations from the scenic perspective. However, landscape-oriented forest management causes economic losses in wood production. At present forest owners normally are not compensated for landscape-oriented forest management, unless they are nature-based tourism entrepreneurs themselves or experiencing private pressure towards this from e.g. their neighbors.

To better balance the recreational demands and the demands of the forest industry, stakeholders have different potential governance mechanisms in mind, in parts aiming at *raising the awareness* of citizens about forest management practices and to *educate forest owners* in terms of different possibilities for forest management and to encourage them to cooperate with local government. Table 9 moreover makes clear, that stakeholders see a strong need in *financially incentivising sustainable forest management*, which is in line with recreational demands, either through PES approaches or tax schemes. Also market-oriented approaches are assumed to have some potential

| CSR    | PG/PBs                      | GM   | Intervention in the system   | Advantages & disadvantages   | Beneficiaries   | Dealing with<br>heterogeneity  |  |  |  |
|--------|-----------------------------|--|--|--|---|--|--|--|--|
| Direct | Direct financial incentives |  |  |  |   |  |  |  |  |
| FIN    | Landscape                   | PES  | Forest planning + selected<br>operations   | Targets actions, but challenging to apply  | Land owner + tourism<br>business + visitors   |  |  |  |  |
| FIN    | Landscape                   | Area payments  | Forestry operations  | Encourages owners  | Land owner + visitors   |  |  |  |  |
| EST    | landscape                   | Payments based on<br>agreement between<br>forest owner and local<br>government | Stakeholders' agreement (forest<br>owner don't clear-cut the forest or<br>uses different cutting method in<br>certain time-frame and local<br>government compensates it) | Advantages: long term impact;<br>agreement holds better than mere<br>restrictions;<br>Disadvantages: case-specific and<br>time-consuming; needs finances;<br>change of forest owner may bring<br>along necessity to renew agreements | Beneficiaries: local<br>government, residential<br>citizens;<br>Losers: forest owners (more<br>time for reaching agreement) | It enables<br>implementation in<br>localities where PGs<br>related to forest are<br>of highest<br>importance       |  |  |  |
| EST    | Landscape                   | Public good tax  | Consumer of the public good  | Advantages: additional finances to<br>maintain forests; equitable choice:<br>the one who consumes pays;<br>Disadvantages: complicated to<br>administer   | Beneficiaries: forest owners;<br>but in broader sense all;<br>Losers: in narrow sense<br>locals, tourists, etc.             |  |  |  |  |
| Mark   | et based financi            | al incentives  |  |  |   |  |  |  |  |
| FIN    | Landscape                   | Forest certification   | The whole forestry system  | Low costs for single actors  | All actors  |  |  |  |  |
| FIN    | Water quality               | Forest certification   | Forestry operations  | Low costs for single actors  | Operators   |  |  |  |  |
| Foste  | red information             | /education   |  |  |   |  |  |  |  |
| FIN    | Landscape                   | Advisory services  | Forest planning at FMU level,<br>operational planning of stand-<br>level operations  | Creates motivation   | Land owner + visitors   |  |  |  |  |
| EST    |                             | Communication /<br>awareness raising<br>(notice-boards)                        | Preventive measure   | Advantages: prevents the conflicts;<br>supports the collaboration between<br>forest owners and local government,<br>local people<br>Disadvantages: doesn't solve the<br>visual annoyance and other problems<br>of (clear-)cutting    | Beneficiaries: all in general<br>Losers: forest managers and<br>local governments (due to<br>increasing workload)           | Communication<br>enables to deal with<br>localities where PGs<br>related to forest are<br>of highest<br>importance |  |  |  |
| Chan   | ges in framewor             | k conditions   | ·  | · · · ·  |   |  |  |  |  |
| EST    | Intensive                   | County level planning  | Land / forest cutting and zoning   | Advantages: long term impact;  | Beneficiaries: first and  | Planning enables to  |  |  |  |

#### Table 10: Potential governance mechanisms to solve PGB issues in low intensive agricultural systems (Cluster 5)

| CSR | PG/PBs               | GM                                  | Intervention in the system             | Advantages & disadvantages   | Beneficiaries  | Dealing with<br>heterogeneity   |
|-----|----------------------|-------------------------------------|--|--|--|---|
|     | forest<br>management |                                     | (especially near to residential areas) | inclusive, transparent, based on<br>existing structures and procedures,<br>not expensive.<br>Disadvantages: planning is time-<br>consuming, includes high potential of<br>private-public conflicts/litigation. | foremost local citizens; also<br>companies offering tourism<br>and recreation services.<br>Losers: forest owners | deal with localities<br>where PGs related<br>to forest are of<br>highest importance |
| EST |                      | Joint ownership of<br>local forests | Regulative / legal level               | Advantages: increases collaboration,<br>sense of unity and joint decision-<br>making; easier to manage (due to<br>bigger size);<br>Disadvantages: time-consuming;<br>needs new (regulative) mechanisms         | Beneficiaries: all   |   |

#### 3.4 Selection of governance mechanisms adapted to the local public good issues

Under consideration of aspects of good governance and the failures and mismatches of the current governance system in the single CSRs, and by taking account of collaboration potentials between the partners in the PROVIDE clusters, as well as the methodological capacities of the partners for mechanisms evaluation, most promising governance mechanisms have been selected from the list of potential mechanism to be investigated further in the next phase of work package 5. In order to ensure the match between governance mechanisms and PG-values and valorising instruments, the step of mechanism selection took place with strong collaboration of WP4. Particularly considered in the selection process was the interplay across different mechanisms. Within public policies, priority was given to the Common Agricultural Policy (CAP).

#### 3.4.1 Overview on most promising governance mechanisms

Table 11 provides an overview on the most promising governance mechanisms and their combination in the context of the single hotspot stories. It becomes obvious that in most CSRs the basis of a promising governance system is – rather classically – assumed to be a combination of fostered regulation and targeted financial incentives, mostly in form of improved agri-environmental schemes (AES) and/or in form of payments for ecosystem services (PES). Additionally, for solving the hotspot issues in the single CSRs, in nearly all cases participatory or collaborative components, or improved mechanisms of sharing knowledge, information and education, are chosen to complement the respective governance mechanism strategies.

| Cluster                                    | Code | Storyline   | Public goods                              | Most promising Governance<br>Mechanisms  |
|--|------|---|---|--|
| CLU1.                                      | AT-1 | Improving soil functionality and  | Soil functionality                        | Regulation   |
| Intensive                                  |      | landscape diversity in an intensive   | Diversity of agricultural                 | Targeted AES   |
| and mixed                                  |      | arable region   | landscape                                 | Private market initiatives   |
| (PG under-                                 | DE-1 | Investigate possibilities for better<br>PG provision in grassland areas   | Climate stability (soil carbon emissions) | Agri-environmental schemes<br>(AES)  |
| provision<br>due to                        |      | through improved water table  | Biodiversity                              | Farm coordination  |
| intensive                                  |      | management and related land use management  | Scenery and recreation                    | opportunities  |
| agricultural                               | IT-2 | Optimal mix of policy tools to  | Water (quality)                           | Regulation (CC)  |
| production)                                |      | manage water quality, especially concerning agricultural nitrogen   |   | Rural development programs<br>(RDP)  |
|  |      | emissions to groundwater used to drinking water   |   | Ambient mechanism  |
|  | PL-1 | Analyse the provision of PGs by the river valley agricultural system  | Biodiversity,<br>Agricultural Landscape   | Agri-environmental schemes<br>(AES)  |
|  |      | (mainly biodiversity, with unique<br>species of birds) in a context of<br>intensification of agricultural land                              | (scenery and recreation)                  | Education/ information   |
|  |      | use (and abandonment of<br>traditional agricultural practices as<br>a result of their increasing  |   |  |
|  |      | alternative costs)  |   |  |
|  | UK-1 | Analyse a semi-intensive  | Biodiversity                              | AES  |
|  |      | and livestock) which provides PGs<br>(food, rural vitality) but has also<br>some negative impacts on the<br>environment (mainly in terms of | tracer quanty                             | Marketing and branding   |
|  |      |   |   | initiatives  |
|  |      |   |   | Knowledge exchange and education   |
|  |      | biodiversity)   |   | Changes in regulation  |
| CLU2. Land                                 | ES-1 | Analyse the provision of an agricultural system (MOG of   | Soil functionality                        | Agri-environmental schemes   |
| nt (Risk of<br>PG                          |      | Andalusia) which provides PGs<br>(mainly biodiversity and rural   | Rural vitality                            | Regulation (fostered CC)   |
| underprovisi<br>on/ PG loss<br>due to land |      | vitality) jointly with the public bad<br>soil erosion in a context of a very<br>high risk of abandonment                                    |   |  |
| abandonme<br>nt)                           | FR-1 | Analyse the provision of public   | Water (quality)                           | AES  |
| ,  |      | context of abandonment  | Biodiversity                              | PES  |
|  |      |   | FIOOD FISK                                | Regulation (CC)  |
|  |      |   |   | retirement) and direct   |
|  |      |   |   | management by local or public authority  |
|  | IT-1 | Effect of generic income support  | Rural vitality                            | First pillar and cross compliance  |
|  |      | provision of a bundle of PG and PB.   | Soil functionality                        | Second pillar, for instance  |
|  |      | synergies and trade-offs at the territorial level   | Cinnale Stability                         | compensatory payments in<br>mountain areas" of the E-R RDP                               |
|  |      |   |   | Second pillar actual or potential<br>measures for the management<br>of abandoned land or |

| Table 11: Most | promising | governance | mechanisms i | in the c | context o | f the sind | ale hotsp | ot stories |
|----------------|-----------|------------|--------------|----------|-----------|------------|-----------|------------|
|                |           | 3          |              |          |           |            |           |            |

| Cluster | Code Storyline | Public goods | Most promising Governance<br>Mechanisms |
|---------|----------------|--------------|---|
|         |                |              | reforestation                           |

| CLU3.<br>Urban-rural<br>relationship<br>s (with the<br>focus on<br>scenery and<br>recreation) | CZ-2<br>NL-1 | Provision of recreational services<br>steaming from landscape/<br>agricultural and forest land. The<br>provision of these services is<br>supposed to be promoted by the<br>establishment of a geopark which<br>also shall bring opportunities for<br>local business and employment<br>Analyse outdoor recreation in non-<br>urban landscapes as a result of ES<br>provision | Scenery and recreation<br>Rural vitality<br>Scenery and recreation            | Local regulation (Protected<br>Landscape Area & Natura 2000)<br>Collective action (Geopark)<br>Public-private partnership<br>Location advantage- tax   |
|---|--------------|---|---|--|
| CLU4.<br>Extensive<br>agricultural<br>systems   | BG-1         | Analyse agricultural systems that<br>provide and/or protect<br>environmental PGs  | Water (quality)/<br>(availability)<br>Food security<br>Scenery and recreation | Regulation<br>Quality product certification<br>AES   |
| (PGs<br>provided in<br>low<br>intensive<br>AFS )  | CZ-1         | During the recent years the CZ is<br>increasingly exposed to weather<br>extremes, including extended<br>periods of drought. There is need<br>for improving water retention of<br>landscape (mitigation) and<br>changing farming practices to cope<br>with climate change (adjustment)   | Water (availability)<br>(ground water)  | Collective action (self-<br>governance of commons)<br>Non-productive RDP measures<br>Operational group of RDP (EIP)  |
|   | FR-2         | Analyse the effect of agriculture on<br>wildfire prevention (and thus<br>carbon emission) and the<br>effectiveness of target and general<br>subsidies on wildfire prevention  | Wildfire risk<br>Climate stability<br>Rural vitality                          | Fostered cross-compliance (<br>RDP measures such as grassland<br>premium and natural handicap<br>compensation subsidy<br>AES (other RDP measures not<br>included in GM2)<br>Specific wildfire prevention<br>policy |
|   | RO-1         | Smart provision of PGs from AFS<br>under the pressure of urbanization<br>and diverse intensive activities in<br>the region  | Scenery and recreation<br>Water (quality)<br>Rural vitality                   | AES<br>Education/information and<br>consultancy services<br>Quality product certification<br>(e.g. ecolabel)   |
| CLU5.<br>Forest<br>landscapes<br>(forests<br>landscapes<br>and nature<br>based                | EE-1         | Analyse the PG scenery and<br>recreation provided by forestry<br>systems in a context of high risk of<br>large scale clear cutting<br>deteriorating the living<br>environment around densely<br>populated settlements   | Scenery and recreation  | Spatial planning<br>Financial relief scheme for the<br>state-owned forest<br>management<br>Payments for ecosystem<br>services (PES)  |
| tourism)  | FI-1         | Analyse how to enhance recreation<br>benefits provided by timber<br>production –private– forests, to<br>benefit wider public and in<br>particular nature-based tourism in   | Scenery and recreation<br>Biodiversity<br>Rural vitality                      | Payments for ecosystem<br>services (LRVT)<br>Technical assistance (guidelines<br>and guidance)   |

| Cluster | Code | Storyline           | Public goods | Most promising Governance<br>Mechanisms |
|---------|------|---------------------|--------------|---|
|         |      | a Finnish hill area |              |   |

3.4.2 Detailed description of promising governance mechanisms in the context of the local hotspot issues

- 3.4.2.1 Cluster 1: Most promising governance mechanisms to counteract PG under-provision in intensive and mixed agricultural regions
- 3.4.2.1.1 AT: Improving soil functionality and landscape diversity in an intensive arable region

In the Austrian CSR AT-1, the intensive management of arable land, which to large parts can take place only under the precondition of irrigation, has a strong influence on a variety of public goods, such as the diversity of agricultural landscape, biodiversity and many other public goods related to soil functionality, such as ground water quality and soil biodiversity. The most promising governance mechanisms, to influence the agricultural system towards an improvement of the provision of public goods is seen in a mix of regulations, agrienvironmental schemes and private market initiatives and partnerships. As regards regulations, mainly existing regulations of soil and water protection will be checked and improved targeting options will be elaborated. As regards agri-environmental schemes, better targeting in the context of objectives as well as in the context of spatial explicity should be fostered. A promising option seems to be the mechanisms of collective bonus, especially as in the area many collaborative approaches between farmers already exist (e.g. electrification of irrigation) and the exchange of knowledge and information between farmers is already based on a stable system of advice services. As regards private market initiatives, this mechanism is regarded to be potentially effective in the region, as the collaboration between companies and businesses of the value chain and the farmers is already very strong and close, many farmers have direct contracts with marketing companies, which could be enriched by "environmental PES". In some cases, such strategies/cooperations are already implemented (e.g. between the supermarket chain SPAR and WWF for humus-built-up). In the context of private market initiatives, also the nearness to the two big cities Vienna and Bratislava might be an advantage.

# 3.4.2.1.2 DE-1: Possibilities for better PG provision in grassland areas through improved water table management and related land use management

In the German CSR, agri-environmental schemes in combination with opportunities for farm coordination are assumed to be the most promising governance mechanisms to enhance climate stability (and biodiversity) through water logging on peatland soils. As regards AES, new agri-environmental and climate protection measure for peatland protection through water logging (Moorschonende Stauhaltung (IID4)) on grasslands was established in the German Federal State Brandenburg. The aim is on the one hand to protect and re-establish peatlands and to keep water in the landscape system, but on the other hand to allow farmers to manage their land, and to maintain their business activities. Also in the narrow case study Märkische Schweiz, peatland areas have been identified as hotspot of PG provision, including cultural landscape, biodiversity, soil and water function and climate stability by regional stakeholders. Until now, only limited knowledge and experiences are available about measure uptake, effectiveness and optimal measure design. Furthermore, other Federal States in Northern Germany with extensive peatland areas have not yet opened the measure. The investigations aim at assessing the willingness to accept (WTA) different measure designs and configurations, not only in the CSA, but also beyond. As regards the integration of better farm coordination opportunities it is obvious that the effectiveness of water logging measures requires an implementation at larger functional, hydrological scales, such as the scale of the watershed or the landscape scale, which often go far beyond farm scale which makes coordination between farmers indispensable. Therefore, the investigations will consider perceptions and openness of farmers to coordinate and agree with neighbouring land user for a common measure implementation. During the stakeholder participation especially the requirement of timely information sharing and coordinated action in case of changed water management was picked out as a central theme.

### 3.4.2.1.3 IT-2: Optimal mix of policy tools to manage water quality, especially concerning agricultural nitrogen emissions to groundwater used to drinking water

In the Italian CSR IT-2, an optimal mix of regulation, financial incentives and an ambient mechanism are seen as the most promising governance mechanisms to enable a better management of the water quality in an intensively used region in the region Emilia-Romana. Particularly solved by the mechanisms shall be the problem of agricultural nitrate emissions

to groundwater which is used as drinking water. As regards regulation, it is seen as a key measure dealing with the pollution from agricultural areas and as such cannot be ignored. However, in the course of Task 5.3, better enforcement and targeting of existing regulation will be focussed. As regards the ambient mechanism, this represents a nitrate directive set at farm level in combination with a collective payment (or tax) if certain ambient/collective requirements are met. Potential specificities of this mechanism is a group premium, which is granted to group of farmers if they apply efforts above the Nitrate Directive. The MPR can be set at the number of farms. This setting is likely to be closest to the collective incentives that have been applied in Emilia Romana. Another specification would be an ambient premium, which is granted if an aggregated effort is applied at the watershed level.

## 3.4.2.1.4 PL-1: governance mechanisms for the provision of public good in a river valley agricultural system

In the Polish CSR PL-1, the abandonment of traditional agricultural practices and the intensification of agricultural land use in a river valley agricultural system influence on biodiversity and other valuable public environmental goods. The most promising governance mechanisms to safeguard the provision of these goods is seen in a mix of agri-environmental schemes in form of AES and education/information measures. As regards AES, in the CSR most of the area is under Natura 2000, where contracts on following farming practices are required: improved utilization of fertilisers, catch crops, crop diversification, crop rotation and ploughing manure, extensive mowing and grazing, protection of peatlands, water-logged meadows, grasslands. Amongst them the most important seems to be extensive mowing and grazing. As regards education/information, a campaign for farmers that provides factual information on selected agricultural practices, and explains why a specific practice is introduced is necessary.

3.4.2.1.5 UK-1 Governance Mechanisms for a semi-intensive agricultural system (crop cultivation and livestock) which provides PGs (food, rural vitality) but has also some negative impacts on the environment (mainly in terms of water pollution and pressures on biodiversity)

In the Scottish CSR UK-1, the semi-intensive mixed agricultural system has negative impacts on the quality of surface water (rivers) and on biodiversity. Here, improvements of the existing agri-environmental schemes and a modification of an existing payment for ecosystem services approach, aiming at water protection, is seen as a promising way to overcome these issues. Moreover, Marketing & branding initiatives, Knowledge exchange and education and changes in regulations to promote organic farming practices are seen as a promising way to better PG provision. As regards AES, in the UK this scheme operates on the basis of a points-based system, where farmers need to implement several measures each earning them a certain number of points. They become eligible for payments only once they have reached a certain level of points. According to the participants in the stakeholder workshop there are a number of problems associated with this design: Firstly, it means that farmers feel that they sometimes have to implement measures just in order to earn enough points regardless of whether it makes sense from an environmental point of view or not, as they cannot just implement (and get rewarded) for single measures, but always need to implement multiple things. Secondly, participants experienced the rules and selection criteria as complex, unclear and frequently changing. This meant that participants felt there was great uncertainty in the outcome of applications at the same time as the application procedure required a large amount of resources. Thirdly, the complicated rules also meant that participants felt that it was virtually impossible not to end up breaking some of the rules associated with AES with the risk of losing the grant again. This was also linked to a perception of the relevant authorities having a 'policing' approach rather than a 'supporting' approach when carrying out inspections (hence this point was linked more to how the governance mechanism is implemented rather than how it is designed). While AES are not new, stakeholders see them as one of the most important albeit problematic current governance mechanism. Despite the uncertainty created by BREXIT most of the UK CSR stakeholder group at the moment still feel convinced that AES will continue in one form or another into the future. It is therefore relevant to explore how AES schemes could be improved to better be able to deliver environmental public goods and fit in with farmers' ways of operating. Options could include cooperation based AES schemes (e.g. collective bonus, environmental cooperatives) and output based AES schemes.

As regards the *PES-like scheme*, this approach was implemented in the study area by the water company operating in the area in response to problems with the water quality. The main problem in relation to the use of the water for human consumption was seen to be contamination with pesticides. Existing regulation and AES were mainly aimed at reducing sediment influx rather than pesticides (which in the current concentrations do not present problems to biodiversity but only in relation to human consumption). The scheme refunded

100% of management costs and 75% of capital costs associated with changes in farm practices. In the applications, farmers themselves proposed the measures they wanted to implement (after consultation with the Scottish Environmental Protection Agency). In order to make the scheme more attractive to farmers, it had been designed to have a simple application procedure, fast reimbursement of costs and so as not to entail any long term obligation for the farmer. Uptake was generally lower than expected, and those farmers who did apply mainly applied for measures that were more relevant in relation to biodiversity rather than drinking water. In addition, most of the applicants were not from the target group (arable farmers), who had been identified as the main cause of the problem. The water company is therefore not going to continue the scheme in its current form but is reconsidering how they could change it so that it will more effectively contribute to reduce pesticide levels in the river and thereby help to reduce the costs associated with water treatment (which is currently needed in order to make the water safe for human consumption). The PES like scheme has been repeatedly mentioned by workshop participants and others as an example of an 'alternative' governance mechanism (compared to AES and regulation). As regards marketing & branding of agricultural products (in relation to the environment and/or the locality), such mechanisms currently play no major part in the focus area. However, there are examples from other parts of Scotland where farmers are trying to sell their products as 'environmentally friendly' or 'low carbon' or in relation to the place of origin. As regards knowledge exchange and education, this was mentioned by stakeholders in the second regional workshop as another governance mechanism to promote greater awareness of biodiversity and practices which promote or harm biodiversity.

3.4.2.2 Cluster 2: Most promising governance mechanisms to counteract land abandonment and the related risk of PG underprovision/PG loss

3.4.2.2.1 ES-1: Governance mechanisms for mountain olive groves of Andalusia which provide the PGs biodiversity and rural vitality jointly with the public bad soil erosion in a context of a very high risk of abandonment

In the Spanish CSR ES-1, the agricultural system of mountain olive groves provide the PGs "biodiversity" and "rural vitality" jointly with the public bad "soil erosion" in a context of a very high risk of abandonment. The most promising governance mechanisms in this context are assumed to be targeted agri-environmental schemes, fostered cross-compliance and a

support through targeted technical assistance. As regards *AES*, they are implemented by the regional governments and are based on 5-years contracts. Following the suggestions of the stakeholders, in the AES moderate to very high levels of stringency will be investigated, including the extreme case of farm abandonment, as well as the implementation of results-based schemes. As regards *fostered cross-compliance* (CC), they are implemented in the form of one-year 'contract' commonly by national governments (entirely financed by the EC though), although each region may refine the requirements depending on their characteristics of their agricultural sector. In the CSR, almost all the farmers receive this type of payments (now in the form of basic and green payment, and in the past in the form of single payment). The stakeholders pointed out that these payments are often misused, showing low efficiency due to its poor targeting and tailoring. Thus, they claimed that cross compliance should be more 'fostered' to be able to achieve effective improvements in the provision of PGBs. So, fostered CC especially refers to CC including requirements with higher levels of stringency –although not as high as for AES– than the usual CC.

# 3.4.2.2.2 FR-1: Governance mechanisms for the maintenance of the provision of public goods by agricultural wetlands in a context of abandonment

In the French CSR FR-1, the ongoing abandonment of agricultural wetlands leads to a loss of public goods such as water quality, biodiversity and the prevention of flood risks. The most interesting governance mechanisms to be investigated in the context of counteracting this development are agri-environmental schemes, payments for ecosystem services, fostered cross compliance and Land public purchase. As regards AES, in general the respective contracts assure the provision of a fixed amount of public good. The public goods will be located in the more effective part of the landscape. However, as the well-being of society depends on wetland localisations, this tool will not lead to the highest social well-being. Nevertheless, AES are state of the art in the current European policy and will therefore be used as the reference basis in the analysis. It appears for the moment that AES are not combinable with other environmental subsidies. As regards PES, this scheme will be implemented in order to maximise the society welfare value. Utility of farmers depend on their profit and thus on the price of the environmental services (and on agricultural production). Utility of society (environmental service consumers) depends on the distance to the public good. For PES it is assumed that some local buyers (maybe the local region) would like to pay farmers for the provision of some environmental services. Contrary to AES, it is assumed that buyers would rely more on the demand side and how to offer a sufficient incentive to the supply side. The advantage of the PES in comparison with the AES is that it allows exiting the debate on the budget constraints: several buyers can pay for the same service. As the current subsidies appears too low to incite farmers to maintain wetlands, the possibility to pay several times for the same services may increase the well-being. Moreover, based on the "distance decay" assumption, WTP is assumed to be a function of the distance between the buyer (main city) and the farmer (or the land). Indeed, some of the environmental services provide by the farmers are local public goods, whom value depend on the local demand. The AES selection based on forgone profit (supply side) is not the best measure to improve the social wellbeing when localisation matters. As regards regulation (CC), in the investigations this mechanisms is modelled as constraints for each farmer (maintain x% of the initial wetlands). This is similar to a forgone profit for each farmer. In general, CC is the natural idea of most of the interviewed stakeholders. It will be seen in which conditions this CC approach can be effective. As regards land public purchase (land retirement) and direct management by local or public authority, these mechanisms are similar to the PES scheme. The only difference is that buyers invest rather than rent in the environmental service. There are some papers discussing the suitable strategy. The investigations in the French CSR-1 will contribute to this discussion. However, as the land price is artificially low in the CSR, it can be expected that this latter strategy is more effective. This strategy may however not be a famous policy measure as it supposes expropriation. The comparison between the two measures will depend on the choice of the discount parameter and the planning horizon.

# 3.4.2.2.3 IT-1: Effect of generic income support measures (CAP first pillar) on the provision of a bundle of PG and PB, synergies and trade-offs at the territorial level

In the Italian CSR IT-1, abandonment of agricultural land threatens the provision of public goods "Rural vitality", "Soil functionality" and "Climate stability". The most promising governance mechanisms to prevent this development are assumed to be mechanisms related to the 1<sup>st</sup> pillar and cross compliance and to the second pillar, for instance operation "13.1.01 – compensatory payments in mountain areas" of the E-R RDP, and actual or potential measures for the management of abandoned land or reforestation. In case of the CSR IT-1, the stakeholders have highlighted the importance of financial incentives for the provision of PGs with respect to regulation. While not being explicitly indicated by the

stakeholders, the first pillar of the CAP is the main policy scheme supporting agricultural income hence counteracting abandonment and the alleged indirect effects on public goods are very often used in discussion about income support, though never demonstrated.

# 3.4.2.3 Cluster 3: Most promising governance mechanisms to steer the provision of public goods with a focus on recreation

# 3.4.2.3.1 CZ-2: Governance mechanisms for the provision of recreational services steaming from landscape/ agricultural and forest land.

In the Czech CSR CZ-2, public goods provided in a former military area shall be made useable for recreation by guaranteeing a balanced supply and demand. The area has a special history. When the original German population was forced to leave the area after WW2 the deserted area was designated to military purposes (military airport Hradcany and military research centre in Brehyne). Actually only a small part of the area was utilised by the armed forces, most of the area were protection zones closed to public. Low level; of human activities provided habitat for wildlife. It was recognised already in the 1960s and biodiversity protection territories were gradually established. Military activities of the occupation Soviet Army caused serious damages on forests and polluted soils in some parts of the forests in the military area, however most natural values continued to enjoy relatively quiet conditions for their preservation and development. After political changes and withdrawal of the Soviet army the region suffered uncertainty of its future. On one hand, the Czech Army started decontamination of the polluted parts (it included pyrotechnical and chemical decontamination which lasted roughly more than 10 years). In meantime it was clear that the area no longer will be used by the army. There were some attempts to privatize the forests, the regional government (Libercky kraj), and local municipalities were but interested in getting the forests in their ownership. Finally, the government decided to keep most of the former military are in the state ownership under the supervision and cultivation of the Military Forests and Estates company (an enterprise of the Ministry of Defence).

Establishing a meaningful use of the area and providing recreational services steaming from forest land is assumed to be reachable through an optimised combination of mechanisms. The establishment of a *collective action (Geopark)* which also shall bring opportunities for local business and employment is a local initiative (Geopark, established in 2016) which aims at enabling people to use the forests for recreational activities while providing the benefit

for local businesses. Beside the Geopark the *public-private-partnership* micro region initiative (of (currently) 27 municipalities, established 2000) covers the case study area. In its framework, public/private partnership projects have been promoted and supported concerning the development of tourism (and tourism infrastructure) in the area. Moreover, *local regulation* is a continuation of the former protection, now with new tasks, since the area has been opened to public. To present high natural values to the public while tourism and recreational activities have to be regulated to protect natural values. The governance mechanism assumed to best balance demand and supply is a combination of the three structures above. It is deemed that the collective action – Geopark – takes the coordination role in the development of tourism: both enabling better access to forests, more ways of enjoying them, and motivating, promoting and coordinating private businesses (including the state owned Military Forests and Farms [VLS]). This is in contrast to the current structures without clear coordination. Thus overlapping structures exercise power in their domains sometimes for the benefit of broader public sometimes only for their private interests.

# 3.4.2.3.2 NL-1: Governance mechanisms for balanced outdoor recreation in non-urban landscapes as a result of ES provision

In the Dutch CSR NL-1, public goods provided in an agricultural peri-urban area are increasingly used by urban recreationists. This use in parts causes tensions between recreationists and farmers, moreover, some of the public goods are perceived to be overused. As a promising governance mechanism internalising the public goods provided in the agricultural landscape, a so-called *location advantage- tax* is suggested: Facilities that enjoy an economic advantage due to their location do currently not pay for the management of these locations (e.g. forests, parks). Management is mainly done by governmental organizations (e.g. Staatsbosbeheer, manages a sizeable amount of the nature reserves in the Netherlands). Payment for management relies strongly on local/ provincial governments originating from general tax money. However, there is currently a mismatch between the general tax and where this money is distributed to. The location advantage- tax would contribute to the local management + payments for nature management using the 'polluter pays' principle.

# 3.4.2.4 Cluster 4: Governance mechanisms for the provision of public goods provided in low intensive Agricultural and Forestry systems

# 3.4.2.4.1 BG-1 Governance mechanisms to provide and/or protect environmental PGs in a Bulgarian CSR

In the Bulgarian CSR BG-1, governance mechanisms are needed to maintain and protect the public goods water quality, water availability, rural vitality and scenery and recreation, provided in a low intensive agricultural system. The most promising governance mechanism to reach this objective are assumed to be an implementation of the Nitrate Directive, quality product certification and agri-environmental schemes. As regards the implementation of the Nitrate Directive, it will be set at farm level in combination with a collective payment (or tax) if certain ambient/collective requirements are met. As regards the quality product certification (e.g. ecolabel, PDO, etc.), costs to join to the QPC and benefits from this will be analysed. The agri-environmental scheme shall be implemented in form of a results-based program aimed on an enhancement of scerery and recreation.

#### 3.4.2.4.2 CZ-1: Governance mechanisms for an improvement of water retention

In the Czech CSR CZ-1, low precipitation and insufficient systems of water retention lead to water shortages which are assume to aggravate due to climate change in the future. Concerning water availability, the area depends entirely on precipitation. Thus it is of interest of local actors (farmers, foresters as well as inhabitants) to maintain most of precipitation in soil, particularly in times of huge weather (precipitation) variability due climate change. The governance mechanisms chosen to improve the water retention capacity of the landscape can be improved (mitigation) and to inform on farming practices can be changed (adjustment) to better cope with water shortage/flooding due to climate change are assumed to be collective action, operational groups of RDP (EIP) and nonproductive investment measure of RDP and the operational Programme for Environment. As regards collective action, the level of ground water depends on the retention capacity of the landscape. Thus, the participation of a majority of actors is needed. It will be investigated, if there are preconditions for initiating collective action "Association for water retention", following Ostroms' principles. As regards the operational group of RDP (EIP) the idea is utilising the results from the above investigations and propose to farmers to establish an operational group on the subject of water availability under the effects of climate change (more frequently appearing drought (declining ground water level). As regards the nonproductive investment measures of RDP and the Operational Programme for Environment it for past and current measures it will be investigated if they can be applied in the region and under which terms.

The mechanisms collective action and operational groups overlap, while the operational groups and the non-productive investment measures of RDP are thought as optional instruments of the existing policy which can be used to achieve objectives of the collective action.

### 3.4.2.4.3 FR-2: Governance mechanisms for the prevention of wildfires through agricultural management

In the French CSR FR-2, agricultural management has an important role in wildfire prevention. The farming systems located in the area where the fire risk is important are mainly livestock farming systems or Mediterranean agriculture (as vineyards and olive and irrigated crops). They are very dependant to CAP subsidies. The income of the farming systems are very dependant to the public subsidies, particularly CAP measures as a whole with a result very unclear to the fire risk control. Most promising governance mechanisms to maintain and improve fire-preventive agricultural management are assumed to be fostered cross-compliance, RDP measures, agri-environmental schemes and a specific wildfire prevention policy. As regards fostered cross-compliance, at the moment cross compliance concerning fire prevention in the endangered areas of France (Southern part) is very general and brings only compliance with the general regulation (coping with the date of prohibition of the fire use). Any improvement of this general basis toward positive action could be an issue. As regards RDP measures, particularly LFA are of importance in this area and the first pillar subsidies as well. But their amount per hectare is low and they can't hamper the general trend towards the disappearance versus enlargement of farms. The last reform of CAP for a major greening of the first pillar subsidies can be an improvement. As regards agrienvironmental schemes, they are generally not designed for the fire risk prevention except where the general linked between farming and fire risk has been accepted by the local authority (Corsica). But even there measures are targeted for the development of meadows that make then look like a grassland premium. As regards *specific wildfire prevention policy*, this mechanism can be implemented in areas where local authorities decide to target particular area (generally around village) to settle green anti-fire belts. But the implication of farmers in this type of experience is low.

# 3.4.2.4.4 RO-1: Governance mechanisms for the provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region

In the Romanian CSR RO-1, the low intensity Agriculture and Forestry System provides manifold public goods (scenery, forests, clean and plentiful water resources, mineral waters for health, stable climate, fresh air) promise potential in attracting people for various kinds of tourism (leisure, health, summer and winter sports etc.). Nevertheless, illegal deforestation in the area and insufficient financial resources for the development of the area to its full economic potential represents problems that need to be overcome by new governance mechanisms. The most promising governance mechanisms are assumed to be AES, Education/information and consultancy services and quality product certification (e.g. ecolabel).

# 3.4.2.5 Cluster 5: Governance mechanisms for the provision of recreational public goods in forest landscapes

3.4.2.5.1 EST-1: Analyse the PG scenery and recreation provided by forestry systems in a context of high risk of large scale clear cutting deteriorating the living environment around densely populated settlements

In the Estonian CSR EST-1, intensive forest management and particularly clear-cutting is seen as a factor threatening the landscape's potential to provide public goods and is cause to a decrease of recreational possibilities and the variety of recreational / nature tourism services, the deterioration of living environment, the decrease in landscape value in terms of ecological diversity as well as in esthetical / cultural terms and the decrease in terms of protection from noise and pollution. However, the severity of the problem and the understanding of the extent of the public bad depend largely on stakeholder perspective from which to look at it. While local inhabitants, summer guest, tourist and entrepreneurs offering (nature) tourism see the forest as an important characteristic of (living) environment quality, the private forest owners consider restrictions to (clear) cutting as limitations to their ownership rights. Also, forest cutting may increase ecological diversity and the loss in forests may open new possibilities for recreation. Promising governance mechanisms to better balance the demand and supply of public goods in this context are assumed to be spatial planning, financial relief schemes for state owned forest management and payments for ecosystem services. As regards spatial planning, this represents a countywide thematic spatial plan, being a functioning public transparent governance mechanism suitable for establishing zones eligible for implementing financial GMs. As regards financial relief scheme for the state-owned forest management, this mechanisms is a compensatory reduction of annual dividends from the State Forest Management Centre to the government. Technically the implementing of a relief scheme is relatively easy, also as the State Forest Management Centre manages about ½ of forests in Estonia. As regards the PES, it represents agreements between private forest owners and local government. It is a hypothetical annual EU environmental (forestry) grant. Local governments seem to be the most suitable institutions for representing the local community level public interest.

#### 3.4.2.5.2 FIN-1: Governance mechanisms for the provision of recreational public goods

In the Finnish CSR FIN-1, forest management affects the forest landscape which is important for nature-based tourism. Due to the increased number of visitors, the role of commercially managed forests in recreational use has increased. However, landscape-oriented forest management causes economic losses in wood production. At present forest owners are not compensated for landscape-oriented forest management and apply management techniques such as clear cutting which are seen critically by promoters of nature based tourism. Promising governance mechanisms to promote a more nature based forest management are assumed to be payments for ecosystem services and technical assistance. As regards PES, the growth of nature-based tourism has created (mainly local) demands to modify current forest management practices for maintaining and increasing recreational amenities, e.g. pleasant landscape. In addition, forests near recreational places should not be managed so that sudden negative changes due to clear-cutting take place. In order to be beneficial for both parties, there is a need for a direct contractual PES-mechanism, between the users (e.g., tourists/tourism entrepreneurs) and providers (forest owners). Typically, the provision of public goods is ensured by using governmental regulation in Finland, but this approach would likely cause severe conflicts between the authorities and forest owners when used to enhance forest amenity services. Therefore, a payment mechanism is more suitable. However, increasing governmental payments is not possible in the current economic situation, and therefore, a payment mechanism between private actors is needed. The PES will take the form of a Landscape and Recreational Values Trading (LRVT) scheme providing contracts with forest owners aiming at enhancing the provision of landscape and recreational values in their own forests and receive monetary compensations. Funds for the mechanism will be collected from the visitors of a nature tourism area. For organising the LRVT an independent mediator/operator will be established. In order to evaluate the potential performance of this mechanism it is highly important to assess the acceptability and the reserve price of private forest owners for participating in the payment scheme. However, the financial and payment mechanisms of this many-to-many type PES need to be examined in more detail. I.e. how the funds will be collected from users and how they are allocated to forest owners. As regards *technical assistance* guidelines and guidance will be needed to change the actual forest management. Although, there is a clear need for LRVT the idea is new and untested. In particular, forest owners will/would need assistance on how to manage their forests in this new situation. I.e. it is not the idea to prohibit all forest management in the hotspot area, but to change it to a less harmful direction. In addition, some forest management may indeed improve the landscape and recreational possibilities.

### 4 Methodology adaptation

In the upcoming Task 5.3 of WP5, effects of the locally developed governance strategy on public good provision will be evaluated. Different qualitative and quantitative evaluation tools will be selected with regard to their applicability in the case study and the respective public good context. The report on methodological adaptation gives a first overview on evaluation aspects and the draft methodological approaches chosen to evaluate the mix of governance instruments in the single PROVIDE CSRs. Particularly considered are policy parameters to be integrated in the modelling approaches, data requirements and sources, scenario variables as well as information on expected policy relevance of the evaluation, expected outputs and on possibilities for coordination and collaboration with other PROVIDE CSRs.

#### 4.1.1 Cluster 1

#### 4.1.1.1 AT-1: Specification of the WP5 exercise in the CSR AT-1

The analysis is aimed at assessing the optimal mix of policy schemes to improve soil functionality in an intensively cultivated arable region. Soil functionality is an important asset for ecosystem survival, but is typically under pressure in intensively used arable regions. Soil functionality shows strong interrelations with other public goods: In the Marchfeld region these are e.g. water quality and biodiversity. The study focusses classical European agri-environmental programmes, however it also takes into account mechanisms fostering cooperation among farmers as well as between farmers and the food sector.

**Objective:** Assessment of the optimal policy mix of governance mechanisms for the improvement

of soil functionality in an intensive arable region

Public good considered: Soil functionality

### Governance mechanisms considered:

- Regulation (soil and water protection)
- Targeted AES (e.g. implemented in form of a collective bonus)
- Private market initiatives: payment for public-good provision oriented management

### Policy parameters to be considered in the evaluation/modelling exercise

- Regulation requirements
- Payment levels
- Area thresholds for collective bonus

### <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

We are currently considering different options:

- Structural Network Analysis of the interplay between governance mechanisms, changes in management techniques and resulting public good provision under consideration of scenarios. Modelling technique could be e.g. the Bayesian Belief Network which is a probabilistic graphical model for representing causal relationship among variables (Pearl, 1985
- Mathematical programming model. With this model the efficient organisation of agricultural production under different scenarios and policy parameters of the governance mechanisms could be investigated.
- Spatial explicit analysis of the impact of the demand structure on the public good provision through agriculture (based on WP4 results, using GIS)

#### Data requirements and sources:

- Crops and crop rotation, yield levels, basic information on farm data (from secondary data sources, probably FADN statistics)
- Expert knowledge on network relations
- Spatial explicit data on agricultural production

### Area of application:

Focus on selected municipalities within the Marchfeld region, particularly where high potentials/implementation of intensive cultivation and apparent conflicts with regard to public good provision are given

### Expected output:

Depending on the methodology finally chosen: network information, effectiveness of agricultural measures, spatial explicit characteristic of PG providing agricultural production.
#### Policy Relevance:

Insights are relevant to a) foster innovative solutions for soil functionality improvement; b) gain insights about the formulation of collaborative solutions for the provision of PG from agriculture.

#### Scenarios variables:

- Prices of agricultural products (vegetables, cereals),
- Commitment of farmers and the private sector to collaborative partnerships
- Demand of society for PG
- Level of government subsidies

**Interest for twinning cases in other HS**: other studies in CLUSTER 1, e.g. the Italian or UK case study: it would be interesting to apply the same analysis to a different set of PG/PB.

# 4.1.1.2 DE-1: Specification of the WP5 exercise in the CSR DE-1

The study will assess design options of an agri-environmental measure targeted at climate protection. The willingness of farmers to uptake that measure is affected by the characteristics of the scheme, such as e.g. length of contract, help with the communication and coordination with farming neighbours, the effort to uptake the measure, and financial compensation. Therefore a survey among farmers is set up that addresses these measure characteristics in a discrete choice experiment. 3000 farm holdings are contacted to take part in the survey.

**Objective**: Assessment of how a targeted climate protection agri-environmental scheme enhances climate-friendly peatland management

Public good considered: Climate stability through water logging on peatland soils, Biodiversity

#### Governance mechanisms considered:

AES: A new agri-environmental and climate protection measure to peatland protection through water logging (Moorschonende Stauhaltung (IID4)) on grasslands was established in the German Federal State Brandenburg. The aim is on the one hand to protect and re-establish peatlands and to keep water in the landscape system, but on the other hand to allow farmers to manage their land, and to maintain their business activities. Also in the narrow case study Märkische Schweiz, the peatland areas have been identified as hotspot of PG provision, including cultural landscape, biodiversity, soil and water function and climate stability by regional stakeholders. Until now, only limited knowledge and experiences are available about the measure uptake, effectiveness and optimal measure design. Furthermore, other Federal States in Northern Germany with extensive peatland areas have not yet opened the measure. Therefore, we will investigate the willingness to accept (WTA) for different measure designs and configurations, not only in the CSA, but also beyond.

Farm coordination opportunities: Effectiveness of the measure requires implementation at larger functional, hydrological scales, e.g. watershed, landscape scale, beyond farm scale. Therefore, coordination between farmers is conditional. Therefore, we will investigate the perception and openness of farmers to coordinate and agree with neighbouring land user for a common measure implementation.

#### Policy parameters to be considered in the evaluation/modelling exercise

# AES

Level of financial, material and area compensation, level of management intensity, contract lengths and flexibility, time needed to register, organise and manage the AES and opportunities for support with the communication and coordination with neighbours.

Our study reflects the parameters of the AES scheme, which is already in place, incl. management requirements, e.g. water level (10-30 cm below surface) and temporal management requirements (allowance of lower water levels in summer time) as well as financial compensation (387 €/ha/year).

Beyond that, we and includes additional parameters, such as area and material compensation (e.g. fodder stock as community resourcesources). These different policy parameters are evaluated and ranked by their importance by farmers as well as by concerned administration and science. The most important parameters are then operationalised as attributes in a choice experiments among farmers

#### Farm coordination opportunities:

We also investigate the possibilities to foster communication, coordination and cooperation between farmers in neighbouring plots of the same peatland area. These elements are included as further parameters in the choice experiment in form of a cooperation bonus incentive for participating farms.

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

Extensive literature review and study of already existing data.

The results of the review on the demand for public goods by peatland areas will be compared to the results from the supply side valuation study to foster better match between demand and supply of PGs provided by peatlands. The comparison will help to analyse who is the target group of governance mechanisms designed for better PG provision through peatlands (e.g., private actors, because the demand of them for carbon compensation is high; or public authorities, because they can better foster bundles of PG provision like carbon sequestration, biodiversity goals and rural vitality together, etc.)

Supply: The choice experiment carried out in the case study region focusses on the specific design of a peatland payment scheme. Choice attributes include not only financial compensation levels (as economic value), but also other non-monetary elements of a (possible) scheme design, such as flexibility in the management, area pooling, cooperation within the farming community (neighbours). We further investigate limiting and supporting framework conditions, which resonate with the scenario settings. We plan to carry out the study among farmer across Northern Germany (not only in the CSA), with an estimated sample size around 200-300.

The effect of this governance mechanism (which could be an agri-environmental scheme but also a PES) on the public goods provision will be estimated by an extensive literature review and already existing data from the region under consideration.

Additionally, if data-sets are available in the needed quality, we will estimate the public goods provision under different scenarios by applying modelling approaches in InVEST (Carbon Storage and Sequestration model, Habitat Quality model)

#### Performance indicators:

- Horizontal integration: Testing for possibility of cooperation between neighbouring farmers
- Simplicity: AES under consideration defines few, very clear conditions.
- Targeted: The participation of the AES is restricted to specific soil situations (peat soils and peaty mineral soils).
- Adequate compensation of expenses: Tested through financial compensation attributes

*Minimal implementation*: analysis of the sampled data with simple model estimations such as multinomial logit models to investigate the importance of single attributes; and comparison with literature

*More advanced options*: differentiation of different farm types (family business, large scale farms, etc.) in the analysis; interaction model (with explanatory variables) with special focus on cooperation

<u>Scenarios variables</u>: we will discuss the results with a group of experts and describe the impact under different scenarios that are relevant to the development of peat soils

#### Data requirements and sources:

Empirical primary data that are representative with: information on the measure design characteristics, socioeconomic information, self-assessment, information on influence of cooperation (already existing and future possible cooperation)

Area of application: Please define the spatial area, for which your analysis will be standing

Northern Germany in regions with a lot of peat soils (Mecklenburg-Vorpommern, Brandenburg, Schleswig Holstein, Niedersachsen and parts of Sachsen-Anhalt)

# Expected output:

From the expected 150 - 300 responses the main results will reveal the importance of the different measure characteristics for the uptake of the measure. The very new scheme targeted at climate protection can therefore than be adjusted and better tailored to the different farm types.

# Policy Relevance:

- policy evaluation of the already existing program in the federal state of Brandenburg
- adjust the measure for enhanced uptake of the measure by farmers
- possibility to start the measure also in other federal states with a cost efficient design

Interest for twinning cases in other HS: other lowland areas with peat soils, probably in Poland

# 4.1.1.3 IT-2: Specification of the WP5 exercise in the CSR IT-2

The analysis is aimed at assessing the optimal mix of policy schemes to improve water quality in

rural areas. Water quality is typically the subject of a variety of policy instruments in Europe, being affected by different regulations (Nitrate Directive, Water Framework Directive) and financial incentives (first and second pillar of the CAP). In the analysis we start from this benchmark setting (dominated by the ND and by the RDP), but we also explore novel and qualitatively different policy schemes.

**Objective:** assessment of the optimal policy mix for the improvement of water quality

Public good considered: water quality (groundwater)

#### Policies considered:

- Regulation: nitrate directive
- Financial incentives: RDP
- Ambient mechanism: nitrate directive set at farm level in combination with a collective payment (or tax) if certain ambient/collective requirements are met. Potential specificities:
  - Group premium. The premium is granted to group of farmers if they apply efforts above the ND. The MPR can be set at the nr of farms. This is probably the setting that is closest to the collective incentives that have been applied in E-R.
  - Ambient premium. The premium is granted if an aggregated effort is applied at the watershed level. (unless we consider uncertainty in monitoring, or unless we use an hydrological model, effort is equal to performance).

#### Policy parameters to be considered:

- nitrate directive levels,
- payment levels
- MPR: threshold levels above which the payment is granted. The actual parameter is to be decided according to is a group or an ambient premium.
- (maybe even size of the area to which the ambient premium is offered)

**Policy Relevance:** insights may be relevant to a) promote discussion about innovative solutions for nitrogen reduction with water management authorities; b) gain insights about the formulation of collaborative solutions for the provision of PG from agriculture.

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods</u>

*Minimal implementation*: Mathematical programming model. The basics would be 1) formulating a mathematical programming model with global objective function (maximizing sum of the profits of the individual farms), 2) comparing the outcome of a) farm-based constraints/payment, with b) ambient constraints/payment.

*More advanced options*: Introducing in the analysis a game theoretic framework or a club framework. A more advanced assessment would include the assessment of the stability of the group of people cooperating In addition, transaction costs could be included to account for different trade-offs between instruments

• Group premium. Such a setting implies a "club" framework, where there are congestion/coordination costs, and the premium is exclusive to members. In case water

quality affects also the agricultural sector, we are in a club with positive spillovers. Issue of the membership of the club: open vs closed: that affects the stability concepts to be used. Also: single or multiple clubs also affects the stability concepts to be used.

• Ambient premium. Such a setting creates a free-riding issue, where some players are likely to reduce the nitrogen applications, and others will not and nonetheless will enjoy the premium in case the MPR is met. Membership is here open, and there is only a single club.

The second option requires a two steps procedure. 1) Formulation of a mathematical programming model for a range of groups of cooperating farmers, differentiated by size and compositions (if we maintain a certain heterogeneity in players). 2) Assessment of the stable groups. (3- Comparison of the performance of these mechanisms with the more classic policy schemes) The second step is particularly relevant in case there is a free-riding issue, namely in the "club with spillover" framework and in the ambient mechanisms.

#### Data requirements and sources:

- Typical crop per farm, differentiation of farms per typologies (from secondary data sources E-R statistics)
- Nitrogen use / response to nitrogen per crop (techno and scientific literature)
- Transaction costs
- Cost of denitrification

<u>Area of application</u>: to be defined, but relatively small catchment used for the abstraction of potable water

Expected output: relative performance of different tools

Scenarios variables: prices of agricultural products (milk, pork). Increase in urban population???

**Interest for twinning cases in other HS:** potential use in other high intensity cases; it would be interesting cross-feeding with situations in which the studied instruments are already in place, or to apply the same analysis to a different set of PG/PB.

# 4.1.1.4 UK-1: Specification of the WP5 exercise in the CSR UK1

The evaluation exercise is aimed at assessing the potential of different governance mechanisms to enhance biodiversity and water quality in a semi-intensive agricultural system which provides PGs in the form of rural vitality and food, but which also produces public bads in the form of water pollution (mainly through leaching of pesticides) and lowered biodiversity. The governance mechanisms to be compared will include existing mechanisms such as agri-environmental schemes and payments for ecosystem services in their current form and in potentially improved forms, as well as mechanisms which are currently not widely used in the area, such as branding and marketing.

**Objective**: assessment of the potential implications of different governance mechanisms

Public good considered: biodiversity, water quality

Governance mechanisms considered:

- Agri-environmental schemes
- PES-like scheme
- Marketing & branding initatives
- Knowledge exchange and education
- Changes in regulations to promote organic farming practices.

#### Policy parameters to be considered in the evaluation/modelling exercise

- Minimum number of participants in an area/coordination amongst neighbouring land owners
- Output/results based payments
- Points based system vs. single measure options
- Regulations following organic farming standards

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

We are currently considering different options:

- Fuzzy cognitive mapping Building on the cognitive map developed in workshop 2 and employing fuzzy cognitive mapping could be used to evaluate how the different governance mechanisms might influence variables and what would be the outcomes under different scenarios. This would require running a number of workshops and/or interviews to refine the cognitive map in terms of the governance systems and interactions with other variables in the social-ecological system.
- Games using either role playing games or more formal games could be another way of exploring how behaviours may change under the influence of different governance mechanisms and what would be the outcomes for biodiversity and water quality. Games could be particularly suitable to explore different collective action options in relation to PES and AES.
- Multi-criteria decision making analysis This would provide stakeholders' evaluation of the different governance mechanisms in relation to chosen criteria and outcomes for biodiversity and water quality.

#### Performance criteria/indicators

- Efficiency (low socio-economic costs, doesn't duplicate efforts, easy application and implementation)
- Equitability/fair (including costs/impacts for different stakeholders)
- Effectiveness (produces results)
- More holistic approach (side-effects are considered, looks at the whole system/all sectors, takes a long-term approach)
- Targeted
- Acceptability

*Minimal implementation*: single workshop with stakeholders followed by researcher led analysis *More advanced options*: series of iterative workshops and interviews to develop fuzzy cognitive maps, run participatory scenarios and conduct experimental games.

#### Scenarios variables:

- climate
- price variability
- demography

# Data requirements and sources:

- System representation (for fuzzy cognitive mapping and games) from 2nd regional workshop and further workshops
- Information on current AES from SRDP website
- Information on organic farming standards from organic farmers' association website
- Climate predictions from IPCC, Met Office

# Area of application:

The analysis will focus on the catchment area of the river Ugie in north-eastern Aberdeenshire.

# Expected output:

The evaluation will provide us with a better understanding of perceived pros and cons of different governance mechanisms as well as the potential impacts on biodiversity and water quality levels. It will also provide insights to improve the design of existing schemes in the area.

# Policy Relevance:

- more collaboration based approaches, focusing on the landscape scale, which might be necessary e.g. in relation to create biodiversity corridors and improve connectivity
- promotion of organic farming methods through a mixture of information, prices and regulation
- information and branding based approaches to supplement subsidy and regulation based approaches
- results/output based subsidy systems

# 4.1.1.5 PL-1: Specification of the WP5 exercise in the CSR PL1

The evaluation exercise is aimed at assessing how a governance mix of agri-environmental schemes and education/information measures can safeguard the provision of PGs by a river valley agricultural system (mainly biodiversity, with unique species of birds) in a context of intensification of agricultural land use (and abandonment of traditional agricultural land use).

**Objective**: assessment of the optimal and cost-efficient policy mix for improvement of biodiversity

Public good considered: Biodiversity, agricultural landscape

# Governance mechanisms considered:

• AES: AES are subsidies for farmers for introduction of specific environment-friendly practices, which improves provision of farming-related PGBs. They are implemented by governments throughout the EU, co-financed between the European Commission (EC) and

EU member States, and are based on 5-years contracts. Current payments vary between 40 and 700 euro. In our case study most of the area is under Natura 2000, where contracts on following farming practices are required: improved utilization of fertilisers, catch crops, crop diversification, crop rotation and ploughing manure, extensive mowing and grazing, protection of peatlands, water-logged meadows, and grasslands. Amongst them the most important seems to be extensive mowing and grazing.

• Education/information: An education/information campaign for farmers that provides factual information on selected agricultural practices, and explains why a specific practice is introduced.

#### Policy parameters to be considered in the evaluation/modelling exercise

For both GMs we will mainly analyse the cost side that is farmers' willingness to accept for selected farming practices. Additionally we shall be able to identify participation rates.

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods</u>

- Stated preference methods, namely discrete choice experiment, to assess costs of GM implementation. The results will present minimum cost of implementation of the policy and show characteristic that reduce this cost.
- Literature review the results will be compared with existing literature to see what is specific for the region and for selected agri-environmental schemes
- Individual consultations and focus groups with local stakeholders and local agricultural advisors will be used to validate and discuss the results, with specific emphasis on social acceptance and costs of adoption.

Valuation results from WP4 will be implemented into the evaluation by monetary assessments. It will enable us to show how participation in AESs changes for different budgets.

# Performance criteria/indicators

- Cost efficiency
- Social acceptance

#### Scenarios variables:

• CAP budgeting (using costs from WP4)

#### Data requirements and sources:

• Current participation rates in AESs - the Agency for Restructuring and Modernisation of Agriculture

# Area of application:

We analyse two Natura 2000 sites in Biebrza Valley, partly located in Biebrza National Park: Ostoja Dolina Biebrzy and Ostoja Biebrzańska. The results could be used for river valleys that require extensification of farming practices.

# Expected output:

Funding required for implementation of practices on desirable area of Natural 2000, characteristics of the contracts preferred by farmers

# Policy Relevance:

- promote discussion about farmers information needs
- promote cooperation between local stakeholders and a need for trust between interested parties (environmentalists, farmers, foresters) about the formulation of collaborative solutions
- gain insights about characteristics of AES preferred by farmers
- accurate assessment of costs of AESs and funding needs

**Interest for twinning cases in other HS**: potential use in other cases where extensification is required: Germany, Scotland; and also in case studies that consider similar instrument: Spain

# 4.1.2 Cluster 2

# 4.1.2.1 ES-1: Specification of the WP5 exercise in the CSR ES1

The evaluation exercise analyses the effects of different targeted governance mechanisms on the provision of the public goods biodiversity and rural vitality provided in mountain olive groves in Andalusia and the public bad soil erosion in a context of a very high risk of abandonment. We will focus the analysis on the design of AES, especially on the levels of monitoring and compliance and the sanctioning system.

**Objective:** assessment of the design of smart GMs towards the improvement of PGBs provision by mountain olive groves

Public good considered: soil functionality, biodiversity, rural vitality

Governance mechanisms considered:

AES: AES are payments given to farmers and foresters for improving their provision of PGBs. They are implemented by governments throughout the EU (for the case of Spain, particularly regional governments), co-financed between the European Commission (EC) and EU member States, and are based on 5-years contracts. For our case study, following STKs suggestions, we analyse AES from moderate to very high levels of stringency, including the extreme case of farm abandonment, as well as the implementation of results-based schemes

It has to be decided whether we will include fostered cross-compliance in the evaluation exercise or  $not^2$ .

#### Policy parameters to be considered in the evaluation/modelling exercise

AES: The main policy parameters that will focus the analysis will be the level of payment, which

<sup>&</sup>lt;sup>2</sup> Definition of fostered cross-compliance: Cross-compliance (CC) are requirements, usually low stringent, included in widely implemented multi-objective agricultural measures (mixing agricultural support with environmental care) which have to be addressed in order to receive the related payments. They are one-year 'contract' commonly implemented by national governments (entirely financed by the EC though), although each region may refine the requirements depending on their characteristics of their agricultural sector. In the CSR, almost all the farmers receive this type of payments (now in the form of basic and green payment, and in the past in the form of single payment). The STKs pointed out that these payments are often misused, showing low efficiency due to its poor targeting and tailoring. Thus, they claimed that this GM should be 'fostered' to be able to achieve effective improvements in the provision of PGBs. So, Fostered CC especially refers to CC including requirements with higher levels of stringency –although not as high as for AES– than the usual CC.

will implicitly enclose farmers' opportunity costs, the level of stringency of the requirements, the monitoring compliance levels and the sanctioning system.

# Methodology to evaluate the effects of an implementation of the governance mechanisms on the provision of public goods:

*Minimal implementation*: Mathematical programming model (most probably a principal-agent model). The model will aim at modelling farmers' adoption of AES depending on different policy design options (levels of payments, stringency, monitoring and compliance). The model will be fed with the results obtained for the supply-side valuation assessment of the implementation of AES (done in WP4) as well as other information obtained from secondary sources and experts.

*More advanced options*: Still to be defined but the idea would be to analyse different types of AES (e.g. using variable and/or collective incentives).

#### Scenarios variables:

- Different scenarios of agricultural prices (especially of olive oil) (which can be related either to B.1 and B.4, if prices increase, or another scenario of decreasing prices)
- C.2. Strong reduction of resources for CAP
- C.4. Changes in society's demand towards AFS's provision of PGBs

#### Data requirements and sources:

- Compliance costs of using agri-environmental practices (from the choice experiment used in WP4)
- Structural data of farms and farmers (using the survey of WP4)
- Production costs of olive oil (partly using the survey mentioned above and partly using secondary sources of information -Census and technical report- and experts' knowledge.

# Area of application:

Mountain olive groves farms

# Expected output:

Relative performance of different policy options

# Policy Relevance:

- Better design AES at regional and European scale, especially focusing on the smart provision of PGBs
- Related to this, specific points of policy relevance would be insights for the better design of monitoring and sanctioning systems.

**Interest for twinning cases in other HSs:** There is a great potential to collaborate using the same approach for those HSs where AES focuses the analysis and where partners have used stated preference methods to carry out their supply-side valuation assessment within WP4.

# 4.1.2.2 FR-1: Specification of the WP5 exercise in the CSR FR-1

The evaluation exercise aims to assess a mix of governance mechanisms to maintain the provision

of public goods by agricultural wetlands in a context of abandonment. We model a landscape at a watershed scale with several farmers (PG suppliers) and the main city of the watershed. The originality is that the regulator optimizes total welfare based on (i) farmers' opportunity costs, (ii) value of wetlands based on distance between wetlands and the regulator (wetlands support local and global PG) and (iii) different policy instruments.

**Objective**: Assessment of the effects of an improved mix of governance instruments implemented in order to enhance welfare linked to the provision of Water quality, Biodiversity, Carbon Sequestration and Flood risk linked to agricultural wetland management.

**<u>Public good considered</u>**: Water quality (local PG), Fishing (local PG), Biodiversity (global PG), Carbon Sequestration (global PG) and Flood risk (local PG)

# Governance mechanisms considered:

Economic incentive AES: Spend the budget on the farmers who present the least costs. The contract assures the provision of a fixed amount of environmental services that will more or less contribute to the targeted public good. The public goods will be located in the least cost location of the landscape. However, as we assume that the well-being of society depends on wetland localisations, this tool will not lead to the highest social well-being.

- Economic incentive PES: The PES will be implement in order to maximise the society welfare value. Utility of farmers depend on their profit and thus on the price of the environmental services (and on agricultural production). Utility of society (PG consumers) depends on the distance to the sources of environmental services contributing to the public good. We will see how the landscape will be modified.
- Regulation (CC): We model the regulation as constraints for each farmer (maintain x% of the initial wetlands). This is similar to a forgone profit for each farmer.
- Land public purchase (land retirement) and direct management by local or public authority: Similar to PES scheme. The comparison between the two measures will depend on the choice of the discount parameter and the planning horizon.

#### Policy parameters to be considered in the evaluation/modelling exercise

- Level of payment
- Localisation of the regulator (the main city of the watershed)
- Localisation of wetlands with different local public good value. The value of the wetland depends on the distance between the regulator and the wetland. The more distant the wetland is, the less the local public good is valued and thus, the less the regulator would be willing to pay for wetland management.

# Methodology to evaluate the effects of an implementation of the governance mechanisms on the provision of public goods:

We plan to adapt a spatial multi-agent based model. We consider several kinds of agents: the main city and different types of farmers. The spatial dimensions should represent a landscape with heterogeneous parcel units. We assume that the objective function for the farmers are their profit (sell of agricultural goods and environmental services). Farmers have two kinds of land: agricultural land and agricultural wetlands. The second one has a lower productivity than the first

one but provide environmental services to society when they are managed. The farmers have to manage these two types of land under the constraints of their fixed inputs. The current situation is that some of the farmers abandon wetlands because they are not enough profitable. However, abandoned wetlands provide less PG than managed ones. We model a land market to model the abandonment. According to the scenario, the stress on fixed input dotation will change.

For the main city, we assume that its utility depends on the exogenous consumption of manufactured goods and the consumption of public goods from agriculture. The city should thus incite farmers to manage the wetlands. For some functionalities (local PG), the closer are the public goods (on a field), the higher is the city utility. For some other (global PG), the consumption does not depend on the distance. The objective for the consumer is to maximize their utility under the constraints of their total revenues. As the PG have a value (demand function from WP4), we can maximize their utility (marginal cost = marginal benefits). We thus have a classic function maximization under constraint. Some of the functions will depend on the distance (local PG) whereas the others will only depend on the cost (global PG). In addition, each GM will have specific transaction costs. We thus assume that we will have an optimal instrument set of policy measures which can maximize total welfare.

*Minimal implementation*: agent-based model implemented under GAMS. The basics would be 1) to model a global objective function (maximizing the sum of the profit utility of the individual farms and the utility of the main city), 2) to compare the outcome under each of the different GM and 3) to determine the optimal mix of GM mechanisms.

*More advanced options*: multi-agent based model implemented under NETLOGO. Similar basics than in the minimal implementation. The difference will be on the implantation of several profit function for each farms.

#### Scenarios variables:

• Increase in urban population (demand for PG increases)

# Data requirements and sources:

- Distribution of farm profitability and productivity
- Demand function of the main city based on distance
- Transaction costs of GMs

Area of application: Please define the spatial area, for which your analysis will be standing

The Odet watershed (see D3.2)

**Expected output:** what will be the main results to be expected from your evaluation regarding the performance of your governance mechanisms

- Relative performance of different tools
- Optimal instrument mix of policy measures which can maximize total welfare

**Policy Relevance:** The insights from your evaluation exercise may be relevant to:

- a) Highlight the potential of local authorities (and local PG consumers) to influence PG provision
- b) Determine the "right" contribution of European Union to the provision of global PG

Interest for twinning cases in other HS: useful for HS with a distinction of local/global PG

# 4.1.2.3 IT-1: Specification of the WP5 exercise in the CSR IT1

The evaluation exercise is aimed at assessing the effect of generic income support measures (CAP first pillar) on the provision of a bundle of PG and PB (rural vitality, soil functionality, and climate stability), synergies and trade-offs at the territorial level.

**Objective**: assessment of the impact of income support measures on the provision of PG

Public good considered: rural vitality, soil functionality, climate stability

#### Governance mechanisms considered:

- first pillar and cross compliance;
- second pillar, for instance operation "13.1.01 compensatory payments in mountain areas" of the E-R RDP
- second pillar actual or potential measures for the management of abandoned land or reforestation

#### Policy parameters to be considered in the evaluation/modelling exercise

- First pillar: level of the single farm payment and level of CC/greening constraints
- Second pillar: level of the payment & type of prescriptions

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

Regional mathematical programming model with attached downstream indicators related to public goods. Output will be also feeded in the INVEST model to simulate downstream impacts in terms of erosion and CO2 emissions. This would also feed back the economic part and yield an estimation of total VET based on WP4 monetary values

*Minimal implementation*: linear mathematical programming model at the municipalities scale.

*More advanced options*: the mathematical programming model will be formulated according to the "positive mathematical programming" procedure, whereas the actual specificities will be selected according to the up-to-date scientific literature.

#### Scenarios variables:

- market price
- Single farm payment level
- Bio-economy scenario: increase in the price of energy crops and timber

#### Data requirements and sources:

- crop plan at the municipality level
- price, yields an cost of the most relevant crops

#### Area of application:

Hilly and mountain areas of the Bologna province

#### Expected output:

Level of PG provided in case of farm income support, possible estimates of the level of PG in the absence of first pillar of the cap.

#### Policy Relevance:

The stakeholders have highlighted the importance of financial incentives for the provision of PGs with respect to regulation. While not being explicitly indicated by the stakeholders, the first pillar of the cap is the main policy scheme supporting agricultural income hence counteracting abandonment and the alleged indirect effects on public goods are very often used in discussion about income support, though never demonstrated.

# 4.1.3 Cluster 3

# 4.1.3.1 CZ-2: Specification of the WP5 exercise in the CSR CZ2

The evaluation exercise is aimed at assessing how recreational services steaming from forest land can be provided through the establishment of a collective action (geopark) which also shall bring opportunities for local business and employment. It is deemed as a sustainable option (governance mechanism) for delivering public goods outside protected areas. A question is if privatisation of forests and growing demand for timber might undermine this mechanism or if it is has capacity to withstand such a threat.

**<u>Objective</u>**: Assessment of how a mix of parallel governance mechanisms effects on the public goods scenery and recreation and rural vitality in a formerly protected area.

**Public good considered**: Scenery and recreational services of forests, natural protection (as enhancing recreational attractiveness of forests), rural vitality – product of an exploitation of recreational functions of forests.

#### Governance mechanisms considered:

- Collective action (Geopark): The local initiative (Geopark, established in 2016) aims at enabling people to use the forests for recreational activities while providing the benefit for local businesses.
- Public private partnership: Beside the Geopark the micro region initiative (of (currently) 27 municipalities, established 2000) covers the case study area. In its framework, public/private partnership projects have been promoted and supported concerning the development of tourism in the former military area.
- Local regulation: It is a continuation of the former protection, now with new tasks, since the area has been opened to public. To present high natural values to the public while tourism and recreational activities have to be regulated to protect natural values.

The governance mechanism is a combination of the three structures above. It is deemed that the collective action – Geopark – takes the coordination role in the development of tourism: both enabling better access to forests, more ways of enjoying them, and motivating, promoting and coordinating private businesses (including the state owned Military Forests and Farms [VLS]).

This is in contrast to the current structures without clear coordination. Thus overlapping structures

exercise power in their domains sometimes for the benefit of broader public sometimes only for their private interests.

# Policy parameters to be considered in the evaluation/modelling exercise

- Level of support to investment in tourist infrastructure
- The nature of the geopark framework recognition of autonomic decision making by public administration and policies
- The intention to privatize state forests
- The intention to bring industry (other than tourist services and forestry) in the area

<u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

- Simple model providing distribution of costs and benefits in the current and alternative government mechanism
- The match or discrepancy between the demand for recreational services and the supply will be showed and compared between scenarios (deploying the results of WP4)
- An assessment of transaction costs (rather qualitative)
- A qualitative assessment of sharing values (recreational, natural) among actors, the process of finding a compromise [also referring to b) transaction costs]

The points c) and d) will be done in focus groups of experts and stakeholders. (a qualitative assessment of scenarios).

As a basic we consider to assess under which terms the eight principles for collective action are fulfilled; plus the capacity of local people and businesses for collective action. The latter might vary with the level of privatization of forests and with timber prices.

# Performance indicators:

- Inclusiveness/participation in Geopark decision making.
- Fairness of the distribution of benefits (local businesses, property owners, but the effects on inhabitants e.g. increase of property prices).
- The way costs are covered in activities of Geopark (fund raising, sharing resources of members).
- If Geopark contributes to enhancing social capital.
- Effectiveness and efficiency: Inflow of tourists (number of visitors, nights spent by tourists), investment activity in new or countryside houses, investment in tourist accommodation facilities (number of beds), the length of hiking and cycling tracts, income of local business and inhabitants.
- Sustainability: probably depends on the commitment of members and collaborating organisations to pursue activities of course under the assumption that benefits are fairly distributed.
- The effect on housing prices

Minimal implementation: Geopark is a loose coordination mechanism

More advanced options: Geopark is the main coordination mechanism for the provision of

#### recreational services

#### Scenarios variables:

- The development of timber prices and wooden products
- Trends in tourism and recreation
- Privatisation of state forests
- Alternative ways of the use of the former military airport.

#### Data requirements and sources:

- Opinions, positions of stakeholders a survey, interviews and focus groups
- Timber price projection Forest Management Institute, Czech University of Life Sciences
- Projections of overall demand for recreation in the country and in the forest areas especially (Mendel University Brno, CzechToursit, Association Czech Tourists)
- Housing price projections (for assessing the effect on housing prices.

#### Area of application:

The area of Geopark Ralsko

#### **Expected output:**

- We will show how the current parallel governance mechanisms co-exist; i.e. if they complement each other or compete.
- We will show the benefit of coordination by the collective action Geopark Ralsko.
- The match or discrepancy between the demand for recreational services and the supply will be showed and compared between scenarios

#### **Policy Relevance:**

- To have a mechanism to preserve nature outside protection areas with combined with tourism. It also contributes to rural vitality.
- An option for a sustainable mechanism not deeply dependent on public intervention
- Too consider private public partnership as possible mechanism for delivering public goods.

#### Interest for twinning cases in other HS:

Finnish case (underused x overused forests in terms of tourism and recreation)

# 4.1.3.2 NL-1: Specification of the WP5 exercise in the CSR NL-1

The analysis is aimed at analysing outdoor recreation in non-urban landscapes as a result of ES provision. The analysis will especially focus on recreationists' preferences for specific landscapes and landscape elements. It needs to be taken into account that landscape preferences are likely to differ between recreational user groups. Due to an increase in the amount of recreationists, the demand for landscape management & maintenance, aimed to improve the touristic infrastructure and attractiveness of landscapes for outdoor recreationists, is likely to increase. It is strongly desired, that costs for landscape management & maintenance will be covered through marked-

based financing. However, the WTP of recreationists regarding different marked-based financing mechanisms, is likely to differ among recreational user groups. Furthermore, an attractive landscape for outdoor recreation is also connected to other PGs in the landscape (e.g. agriculture, AECM uptake) and therefore the local and regional spatial planning can affect the provision of landscapes' that are attractive for outdoor recreation.

#### **Objective:**

- Assessment of landscape preferences of different recreational user groups in the CSR Kromme Rijn
- Assessment of the effects of a location advantage tax and other market based instruments in order to enhance scenery and recreation
- Assess different possible future options (scenario-based) regarding local/regional planning and their influence on the landscapes' attractiveness for outdoor recreation.

#### Public good considered:

Scenery and Recreation

#### Governance mechanisms considered:

#### Economic incentives for landscape management & maintenance (Market-based mechanisms):

With increasing demand for outdoor recreation, the need for landscape management and maintenance in order to maintain or improve the touristic infrastructure as well as the quality of landscapes attractive for outdoor recreation also increases (BCI, 2012). Management is mainly done by governmental organizations (e.g. Staatsbosbeheer, manages a sizeable amount of the nature reserves in the Netherlands). Payment for management relies strongly on local/ provincial governments. In the CSR Kromme Rijn, as well as in all municipalities of the Netherlands, a current method to cover these externalities regarding the need for "landscape management & maintenance" concerns a tourist tax on accommodation stays within the CSR. However, as a result of the economic crisis, financial cuts and decentralization, the dependence of the Dutch government on the citizen raises steadily, especially when considering increasing demand for landscape management and maintenance. Governing bodies assume that citizens and private parties tend to be better informed about policy and want to exercise a direct contribution or take the initiative for developments that were previously the exclusive domain of the local, regional and national government (LOS, 2016). Due to lesser public financing options but a high demand for a well-developed touristic infrastructure and attractive landscapes for outdoor recreation, a transition from public financing to 'market-based' financing is strongly desired (BCI, 2012).

#### Spatial planning:

Planning at local and regional level has a strong influence on the provision of different PGs and on the landscape quality. The Netherlands has a very planning-based system, where spatial planning processes affect the rural landscape, e.g. through authorisation and enforcement of the spatial regulation (*Ruimtelijke Ordening*) and the municipal spatial zoning plan (*Bestemmingsplan*), which is necessary for farm enlargement, farm side activities etc. The province checks if the municipal plans are in line with the provincial planning vision (Provinciale Ruimtelijke Structuurvisie) and the provincial spatial regulations (*Provinciale Ruimtelijke Verondering*).

#### Policy parameters to be considered in the evaluation/modelling exercise

- Parameters used regarding recreationists' stated preferences concern the 'willingness to pay' for landscape management & maintenance analysed for a variety of market-based mechanisms.
- Other parameters used concern the revealed preferences of recreationists (e.g. spending at facilities, frequency of visit, yearly amount of recreationists).

# Policy Relevance:

- Identify conflicts that might arise due to the use of one and the same landscape by different recreation user groups, that are likely to negatively influence the provision of outdoor recreation opportunities as a Public Goods (Pröbstl et al. 2010)
- Analyse the revenue that could be generated from market based financing per season, as it can be assumed that the presence of certain user groups is dependent on the prevailing season.

# Methodology to evaluate the effects of an implementation of the governance mechanisms on the provision of public goods:

# Minimal implementation: Market-based focussed

Qualitative:

- We plan to do a qualitative assessment based on interviews with policy makers regarding evaluation of current market-based policy measures related to recreation and landscape management and the pros and cons of possible future market-based measures.

Quantitative:

 Assess for different recreation user groups their landscape preferences and WTP for landscape maintenance & management through market-based financing mechanisms, including questions that link to different possible future developments (linked to future scenario storylines, as co-developed by stakeholders).

# More advanced options: Spatial planning-focussed

Qualitative:

Developing different scenarios related to a common storyline (which includes both qualitative and quantitative parameters). A storyline is a qualitative narrative of possible future developments including GDP growth, population growth, amount of recreationists, land use affecting policies e.g. Common Agricultural Policies, Habitats directive.

Quantitative:

We plan to use a multi-objective optimization modelling framework to model different PGs in the Kromme Rijn area and the trade-offs between them. Suitability for outdoor recreation is one PGs in the modelling framework. We plan to use the different options for a more "optimal" planning (which is the output of the modelling framework) as input for a planning dialogue with relevant stakeholders, to be able to identify possible improvements in the local planning (linking back to the stakeholders).

Data requirements and sources:

- Data on revealed and stated preferences of recreationists
- Spatial data necessary to set-up modelling framework. Data includes information on land cover, administrative borders etc.

Area of application: CSR Kromme Rijn

# Expected output:

- Suitability of the GM as a mechanism helping to cover the externalities caused by different recreation user groups regarding the demand for landscape management & maintenance.
- The possibilities and limitation of regional/local planning on the improvement of attractiveness of the landscape for outdoor recreation (while at the same time not negatively influencing other PGs in the rural landscape).

#### Scenarios variables:

- GDP growth
- Population growth
- Amount of recreationists
- Policies that affect land use, especially developments related to the CAP.

Interest for twinning cases in other HS: Marked- based financing in Finnish CSR

#### 4.1.4 Cluster 4

#### 4.1.4.1 BG-1: Specification of the WP5 exercise in the CSR BG1

The evaluation exercise is aimed at assessing how a mix of collective action, AES and quality product certification a can safeguard the provision of PGs in a low intensive agriculture area. Water quality is typically the subject of a variety of policy instruments in Europe, being affected by different regulations (ND, WFD). Quality product certification encourage membership by farmers who can help build consumer confidence and gain new market opportunities for produce through required standards. Maintaining the landscape provide added value of scenery and recreation.

**Objective:** assessment of the optimal policy mix for the improvement of PGs

Public good considered: water quality and availability, food security and scenery and recreation

#### Governance mechanisms considered:

- Nitrate Directive nitrate directive set at farm level in combination with a collective payment (or tax) if certain ambient/collective requirements are met
- Quality product certification (e.g. ecolabel, PDO, etc.) costs to join to the QPC and benefits from this
- Scenery and recreation we analyse AES impose on landscape, as well as the implementation of results-based schemes

#### Policy parameters to be considered in the evaluation/modelling exercise

- Our study reflects the restrictions from ND and parameters of the AES scheme, which is already in place, incl. management requirements as well as financial compensation
- We also investigate the possibilities to foster communication, coordination and

cooperation between farmers for joint to the QPC. These elements are included as further parameters in the choice experiment in form of a cooperation bonus incentive for participating farms.

• AES: The main policy parameters that will focus the analysis will be the level of payment, which will implicitly enclose farmers' opportunity costs, and the level of shortage.

# Methodology to evaluate the effects of an implementation of the governance mechanisms on the provision of public goods:

Extensive literature review and study of already existing data.

Demand: The results of the review on the demand for public goods by low intensive agriculture areas will be compared to the results from the supply side valuation study to foster better match between demand and supply of PGs. The comparison will help to analyse who is the target group of governance mechanisms designed for better PG provision (e.g., private labels, collective actions, because they can better foster supply of PG like scenery and recreation together, etc.)

*Minimal implementation*: Economic model. The basics would be 1) Partial budget 2) comparing the outcome of a) farm-based constraints/payment, with b) farm costs/payment.

*More advanced options*: Using of sensitivity analysis based on BOCR model of ANP and Gross Margin model. A more advanced assessment would include the assessment of the stability of the GMs.

# Scenarios variables:

• Prices of agricultural products (inputs and outputs)

# Data requirements and sources:

- Cost of denitrification
- GM per three type farms
- Transaction costs / certification cost
- Compensation of expenses
- Effectiveness
- Cost of adoption

# Area of application

Semi-mountain area in BG-1

# Expected output:

Economic performance of different tools

# Policy Relevance:

- Increase efficiency of public support
- Stimulate collective action of local food producers
- Increase secondary-effect of GM

**Interest for twinning cases in other HS:** it would be interesting cross-feeding with situations in which the studied instruments are already in place, or to apply the same analysis to a different set

# 4.1.4.2 CZ-1: Specification of the WP5 exercise in the CSR CZ1

The evaluation exercise is aimed at assessing how water retention of landscape can be improved (mitigation) and how farming practices can be changed (adjustment) to better cope with water shortage/flooding due to climate change.

Concerning water availability the area depends entirely on precipitation. Thus it is of interest of local actors (farmers, foresters as well as inhabitants) to maintain most of precipitation in soil, particularly in times of huge weather (precipitation) variability due climate change.

**Objective**: to assess alternative governance mechanisms to improve water retention and climate change adaptation capacity of farms

**Public good considered**: water availability (ground water) – corresponding service: retention capacity of landscape

#### Governance mechanisms considered:

Current mechanism lacking coordination and transparent distribution of responsibilities. It seems that changes/actions need to be initialised by municipalities and are restricted only to the cadastre of the municipality. Against it we put a mechanism built on collective action:

- Collective action: we will investigate if there are precondition for initiating collective action "Association for water retention", following Ostroms' principles.
- Operational group of RDP (EIP): The idea is utilise the results from the above investigations and propose to farmers to establish an operational group on the subject of water availability under the effects of climate change (more frequently appearing drought (declining ground water level).
- Non-productive investment measures of RDP and the Operational Programme for Environment: we will investigate the past and the current s measures, if they can be applied in the region and under which terms.

The points a) and b) overlap; b) and c) are thought as optional instruments of the existing policy which can be used to achieve objectives of the collective action.

#### Policy parameters to be considered in the evaluation/modelling exercise

- requirements of minimum number of participants and clear boundaries of membership in the "Association" (condition 1 of Ostrom)
- recognition of the rule-making rights of "Association" members by outside authorities and support programmes (RDP, OP Environment) -(condition 4 of Ostrom)
- We need to investigate the other 6 conditions of Ostrom too.
- Level of support (in the considered policies) in the context of the capacity of the "Association" to raise other funds including membership fee.
- A recommended technical solution is to replace some grassland by fodder crops with deep roots on arable land. The issue is to which extent it is acceptable by the policy (e.g. greening)

<u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

We plan more qualitative assessment since the investment and running costs will be very similar under the current and alternative (collective action) mechanism. The difference will be mainly in transaction costs and sustainability (the current system depends on policies which change at least each 7 years).

Concerning the collective action we have to investigate Ostroms' 8 conditions for self-governance of commons, and the capacity of local actors to gather in collective action (trust among actors/ reputation of some actors might be a problem) – necessary precondition for this governance structure (GS).

*Minimal implementation:* Operational group to address the issue of water availability and retention capacity of landscape under climate change

*More advanced options*: Association for water retention in the Sluknov region (collective action for managing commons)

# Scenarios variables:

- Price of beef
- Flexibility in converting grasslands in arable land
- Withdrawal/reduction of grassland maintenance, LFA and direct payments.
- Acceptability of self-governing bodies in the national implementation of EU programmes, recognition of them by the administration dealing with agriculture and water management.

# Data requirements and sources:

- Policy parameters: Ministry of Agriculture
- The potential of technical measures and agricultural practices to solve water retention problem: Cyech Universitz of Life Sciences, T.G. Masryk Water Research Institute, Technical University Brno, Lesy CR Water Management division (Teplice).
- Transaction costs calculations FP6 project ITAES
- Transaction cost survey: own survey to be carried out.

# Area of application:

Sluknov region (North Bohemia), delimited by Luzicke hory (mountains) from the south and by the border with Germany from west over north to east.

# Expected output:

- Collective action can be a sustainable solution for the region, however depending on the capacity of actors to collaborate and trust each other.
- Collective action is a way in the case under the absence of coordinating public administration body.
- Policies which will not sufficiently recognize this possibility and transfer at least part of decision making on the Association of actors will undermine its effectiveness and existence.

# Policy Relevance:

- An alternative way how to implement policies for delivering public goods
- Mobilisation of local capacities
- Reduction of transaction costs
- Narrowing gap between policies and actors

Interest for twinning cases in other HS: DE - Märkische Schweiz.

# 4.1.4.3 FR-2: Specification of the WP5 exercise in the CSR FR-2

We first determine the impact of agriculture on both wildfire departure and burnt area. In a second step, we determine the additional effect of the current CAP on wildfires. We focus (i) on the decoupled subsidies, (ii) on the "classic" agro-environmental schemes (notably the natural handicap compensation subsidy and grassland premium), (iii) on the specific agro-environmental schemes which focus on wildfire prevention (notably the 226C AEM in France).

**<u>Objective</u>**: Assessment of the effects of an improved mix of agricultural governance instruments implemented in order to enhance welfare linked to the provision of wildfires prevention

Public good considered: Fire risk (local PG) Carbon Sequestration (global PG)

#### Governance mechanisms considered:

The farming systems located in the area where the fire risk is important are mainly livestock farming systems or Mediterranean agriculture (as vineyards and olive and irrigated crops). They are very dependant to CAP subsidies. The income of the farming systems are very dependant to the public subsidies, particularly CAP measures as a whole with a result very unclear to the fire risk control. Our hypothesis is that some farming types are friendlier to the fire risk spec. to prevent big fires. Some previous works show that dairy farming and small agriculture have major positive effects. The RDP measure, particularly LFA are of fist importance in this area and the first pillar subsidies as well. But heir amount per hectare is low and can they cannot hamper the general trend towards disappearance versus enlargement of farms. The last reform of CAP for a major greening of first pillar subsidies can be an improvement

Our contribution could be a contribution for the proposal of a smart redesign of subsidy schemes.

#### Policy parameters to be considered in the evaluation/modelling exercise

- Level of payment
- Type of farming system
- Localisation of farming systems respect to inflammable areas and habituated areas

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

In a first step we assess the probability of the relationship between the occurrence and intensity of wildfires and the presence of multiple types of agricultural activity (breading, viticulture, large scale agriculture, etc.) in Languedoc Provence and Corsica. Following this descriptive analysis the several types of agricultural activity will be grouped in categories by levels of wildfire risk (as for decreasing the risk). Public policy concerning these risk categories, such as direct payments, LFA, grasslands premium and subsidies for less productive viticulture, will also be targeted. Besides, the probabilities estimated for each type of agricultural activity will enable the formulation of an

aggregated indicator of risk that is based on the spatial pattern of land use at multiple scales (municipality, forest areas and the like).

In a second step we will propose public policy scenarios (e.g. extensive livestock breading, elimination of subsidies, etc.) convenient to assess the effects of such policies on the levels of wildfire risk as measured by the proposed indicators. These scenarios aim to suggest an optimal organization of land use taking into account the wildfire risk and the corresponding costs that each scenario of public policy may imply (calculated on the basis of current subsidies).

# Scenarios variables:

- Decrease of CAP subsidies
- Modulation of CAP Subsidies / farm types

# Data requirements and sources:

- Distribution of farm profitability and productivity and CAP uptakes
- Distribution of fires

# Area of application:

The Agreement for the Mediterranean Forest area ("Entente pour la protection de la forêt Méditerranéenne" area : 14 Nuts III level entities)

# Expected output:

Optimal instrument mix of policy measures which can maximize total welfare

**Policy Relevance:** Determine the "right" contribution of European Union to the provision of global PG

Interest for twinning cases in other HS: useful for HS with a distinction of local/global PG

# 4.1.4.4 RO-1: Specification of the WP5 exercise in the CSR RO-1

The evaluation exercise is aimed at assessing how a mix of agri-environmental schemes and information/education and consultancy services can foster the provision of PGs from AFS under the pressure of urbanization and diverse intensive activities in the region.

The primary public good to taken into consideration is the quality of the landscape – an asset that is highly important for the quality of natural resources used by AFS, as well as being a significant cornerstone for the development of the tourism sector. Landscape is also often associated with a better quality of life, natural resources and with overall prosperity.

Objective: assessment of the optimal policy mix for the improvement of natural landscape

Public good considered: natural landscape

# Governance mechanisms considered:

- AES
- Education/information and consultancy services

#### Policy parameters to be considered in the evaluation/modelling exercise

- Level of payment
- Structure of activities targeted through AES

- Required conditions to qualify for payments
- Level of use of consultancy/information services

# Methodology to evaluate the effects of an implementation of the governance mechanisms on the provision of public goods:

Sensitivity analysis based on scenarios – local relevant stakeholders, as well as other practitioners and specialists aware of the issues in the hotspot area will be interviewed in order to determine: how the variations in the policy parameters (stated above) could affect the efficiency of the two governance policies/mechanisms, how the changes in policy efficiency can impact the provision of the public good taken into consideration (landscape). The variation of the parameters will follow the patterns observed within the hotspot region. Based on the integration of secondary data, the scenarios will be constructed and the sensitivity analysis will be performed.

*Minimal implementation*: The data collected from interviews and secondary sources will be used to identify patterns of influence between the policy parameters and the level of provision of the public good. Initially, we aim to construct the assessment of the impact of each policy parameter, taken one at a time.

*More advanced options*: If possible, the analysis will be extended in order to assess the impact of groups of policy parameters on the provision of the public good. Furthermore, the study could be developed in order to identify synergies between the various parameters (e.g. ones that tend to form a group).

<u>Scenarios variables</u>: commodity/agricultural products prices, Pillar I and cross-compliance, introduction of new regulations/legislation regarding deforestation

#### Data requirements and sources:

- Primary data collected from stakeholders/specialists via stakeholder workshop
- Primary data collected via survey included in WP4
- Secondary data

#### Area of application:

The spatial area will cover the entire Dorna region, which has a relative homogeneity with regard to the types of activities and resources.

**Expected output:** estimative performance of the different policy parameters

#### **Policy Relevance:**

- Identification of the policy parameters with the highest impact on public goods provision can be used to design and implement new policies more efficiently and with a more precise targeting
- The assessment could prove useful to help policy makers in improving the design of protocols of constructing, promoting and implementing the policies effectively

Interest for twinning cases in other HS: potential use in other HS with a high level of natural landscape quality

# 4.1.5 Cluster 5

# 4.1.5.1 EST-1: Specification of the WP5 exercise in the CSR EST-1

The evaluation exercise is aimed at assessing how a mix of governance mechanisms can maintain or enhance scenery and recreation qualities of forest land in a context of high risk of large scale clear cutting of forest deteriorating the living environment around densely populated settlements. The evaluation will be made by modelling the dynamics of recent (3-5 years period) clear-cut forest areas and the change of its share of the total forest area in case of implementing the governance mechanism in different scenarios.

**Objective**: The main objective is to find the optimal contract length and budgetary burden for compensation mechanism for clear-cut restriction.

Public good considered: scenery and recreation

<u>Governance mechanisms considered:</u> Please describe the governance mechanisms you plan to consider in detail. Please reconsider in which way these governance mechanisms are innovative/specifically suited to answer to the PGPB problem in your CSR

Financial relief scheme for the state-owned forest management: It is a compensatory reduction of annual dividends from the State Forest Management Centre to the government.

Contract of annual environmental support to forest owners based on agreements between private forest owners and local government.

None of the mechanisms have been implemented before. The closest analogue is NATURA 2000 support for forest areas.

#### Policy parameters to be considered in the evaluation/modelling exercise

- political acceptability of the decrease of revenues from the clear cutting in eligible zones of state forest by the government;
- possibility to fit the environmental support for private forest owners into the CAP measures;
- acceptance of operating the support contracts by local governments,
- establishment of thematic county plans for the balanced use of forests

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods</u>

Presumption is that previous policy parameters are accepted. The model describes the annual budgetary burden for state on the one hand, and the dynamics of the clear-cut forest areas next to the settlements in 10-20 years on the other hand. The rate of state forest dividend support per hectare and the contract period is equal to the rate and period of the private sector environmental support.

The comparison is planned to take place between the continuity scenario (base scenario), where the clear-cutting next to settlements is not restricted and cutting of the mature forest continues both in state and private forests. The next level comparison describes the differences appearing from implementing different rates and contract periods for private forest owners. If possible, the changes in CAP policy are considered in different scenarios.

The most difficult aspect of the modelling is the estimation about the attractiveness of the support contracts for the private owners – this will determine the joining with the scheme and its final result. Presumably the attractiveness is different in different scenarios.

*Minimal implementation*: base scenario (continuity scenario) and 4 scenarios: low or high support rate, 5 or 10 years contracts.

More advanced options: not clear yet

#### Scenarios variables:

- annual support rate for a private owner = annual decrease in dividend income for state (euro/ha)
- contract length for a private owner and state (years)
- annual financial impact for state budget (euros)
- annual CAP environmental support expenses (euros)
- annual clear-cut areas (ha)

#### Data requirements and sources:

- the age structure of the forest stand in densely populates areas (previous analysis, expert opinions)
- support rates (previous analysis, questionnaire survey of private forest owners, expert opinions)
- contract length (previous analysis, questionnaire survey of private forest owners, expert opinions)
- the attractiveness of the support scheme for private owners (questionnaire survey of private forest owners, expert opinions)

#### Area of application:

Harju County

#### **Expected output:**

Optimal length and annual budgetary burden of the compensation mechanism about restricting the clear-cutting in densely populated areas.

Policy Relevance:

- compilation of the next rural development plan of Estonia
- instructions for compilation of the county thematic plans for the balanced use of forests

# 4.1.5.2 FIN-1: Specification of the WP5 exercise in the CSR FI-1

The evaluation exercise is aimed at assessing how recreation benefits can be enhanced in private forests together with timber production, so that wider public and in particular nature-based tourism can benefit. In work under WP5, we will review alternative and potentially suitable payment and financing mechanisms for the planned PES from existing PES systems. From these, we will specify 2-4 alternatives for the evaluation of stakeholders. The evaluation will be carried

out with MCA method by applying a small set of evaluation criteria.

**Objective:** To analyse alternative payment and financing mechanisms for LRVT system and find out the best ones.

# Public good considered: scenery and recreation, biodiversity, rural vitality

# Governance mechanisms considered:

PES (LRVT): In Landscape and Recreational Values Trading, forest owners make contracts for enhancing the provision of landscape and recreational values in their own forests and receive monetary compensations. Funds for the mechanism will be collected from the visitors (or all people who benefit from scenery) of a nature tourism area. For organising LRVT an independent mediator/operator will be established.

Technical assistance (guidelines and guidance): Supplementing guidelines and guidance needed to change the actual forest management. I.e. it is not the idea to prohibit all forest management in the hotspot area but to change it to a less harmful direction. In addition, some forest management operations may indeed improve the landscape and recreational possibilities. Technical assistance will also be given related to the construction of financing and payment mechanism as well as establishment of the mediator/operator.

# Policy parameters to be considered in the evaluation/modelling exercise

- Level of the payment that visitors would pay to the system (how much is the potential)
- Receivers of the payments and payment levels that would be payed to forest owners (these depend on the arrangement of LRVT)

# <u>Methodology to evaluate the effects of an implementation of the governance mechanisms on</u> <u>the provision of public goods:</u>

In order to evaluate the potential performance of the LRVT mechanism it is highly important to assess the acceptability and the reserve price (willingness to accept) of private forest owners for participating in the payment scheme. This has been partly clarified in WP4 surveys. However, the financial and payment mechanisms of this many-to-many type PES need to be examined in more detail. How, for example, the funds will be collected from users and how they are allocated to forest owners. These examinations will be carried out as follows:

Review of available financing and payment mechanisms for many-to-many PES situation from internet and articles

Analysis of these mechanisms from the perspective of situation in our hot-spot area in Ruka-Kuusamo

Further development of small number (2-4) of potentially suitable payment and financing mechanisms for the hotspot area

Stakeholder evaluation (with respect defined criteria, such as acceptability, efficiency etc.) of the developed alternatives with MCA

The MCA analysis can be planned to include 2-3 future scenarios if needed

Recommendation for a potentially suitable payment and financing mechanisms for Ruka-Kuusamo area

# Hopefully this will also result in scientific paper (manuscript) during project

# Performance criteria/indicators (potential)

The MCA approach limits the number of criteria and indicators. In addition, if the analyses are done under 2-3 scenarios, this further limits the number of criteria and indicators. However, at least the following seem important:

- Acceptability (by forest owners and visitors and entrepreneurs),
- Efficiency of the payment mechanism (can be break down into indicators)
- Efficiency of the financing mechanism
- Coverage of the financing mechanism, i.e. how large proportion of visitors can be charged (If the coverage is high it is possible to make contracts over wider areas or to limit the charges of a single visitor to a reasonable amount.)

# Scenarios variables:

Future development of tourism demand, i.e. increasing number of incoming visitors: the area the local tourism industry needs to be increased, more forests should be included into LRVT contracts, more money for the contracts are needed, more visitors coming to the area and to charge

Increasing demand of raw wood and raising wood prices: this may increase the forest owners' compensation claims for contracts

#### Data requirements and sources:

- Payment and financing systems of existing PES through a review (internet, articles)
- Evaluation criteria (from list)
- Stakeholder preference information will be collected in a stakeholder meeting late spring 2017.

# Expected output:

The study helps to assess the several aspects of possibilities to implement the many-to-many PES system LRVT in practice including identifying

- the way of increase the acceptability of LRVT among forest owners and entrepreneurs
- the characteristics that are important for an efficient payment mechanism
- the characteristics that are important for an efficient financing mechanism
- the means and measures to expand the coverage of the financing mechanism among as large proportion of visitors as possible

#### **Policy Relevance:**

- association of forest owners
- association of tourism companies
- municipal public authorities
- other regional decision makers

Interest for twinning cases in other HS: HS from Estonia (EE-1) analyses scenery and recreation provided by a forestry system.

# 5 Guidelines for the evaluation of governance strategies for PG delivery (Task 5.2)

For the practical evaluation of governance strategies on case study level, in **Task 5.2** guidelines are set up. These guidelines support the implementation of WP5 Task 5.3 and, to some extent also Task 5.4.

**Task 5.3** aims at the practical evaluation of the potential success or trade-offs of the most promising governance strategies at case study level. The task is divided into the two Subtasks 5.3.1 and 5.3.2. **Subtask 5.3.1** deals with the *definition of case study targets on public good provision* and with the *formulation of an appropriate mix of governance instruments,* the so-called governance strategy. **Subtask 5.3.2** implements an *evaluation exercise,* in which the effects of the locally developed governance strategies on public good provisions are assessed. **Task 5.4** carries out the *analysis of the practicability and transferability* of the governance strategies at programming and EU level. The tasks described above interlock as follows:

|  | Task 5.1     | Local Stakeholder-Workshops<br>EU level Stakeholder-Workshops          | PGBs issues<br>Criteria of good GM<br>Potential GM  |
|--|--------------|--|---|
|  | Task 5.1/WP4 | Desk-research  | Selection of most promising GMs   |
|  | Task 5.2     | Guidelines for Task 5.3.1<br>and Task 5.3.2                            | Information on how to participatory elaborate<br>GMs<br>Information on the objectives of modelling<br>Information of criteria and scenarios   |
|  | Task 5.3.1   | Local Stakeholder-Workshops  | Rediscussion of most promising GMs<br>Definition of Public good targets<br>Formulation of fine-tuned governance strategy                      |
|  | Task 5.3.2   | Modelling exercise   | Modelling of implementation of fine-tuned<br>strategy<br>Effects of implementation of governance<br>strategy on the provision of public goods |
|  | Task 5.4     | Local Stakeholder-Workshop<br>SWOT analysis<br>EU stakeholder workshop | Enabling factors and barriers for uptake<br>Strenghts and weaknesses of strategies<br>Transferability of strategies                           |

Based on the information from Task 5.1 (Participatory selection of good governance mechanisms) and on the results of the further development of the most promising mechanisms in line with WP4, the guidelines prepare the further elaboration and the

evaluation of real-world governance strategies in tasks 5.3.1 and 5.3.2. Task 5.3.1 targets a re-discussion of the most promising mechanisms in form of local stakeholder-workshops. In this re-discussion, public good targets for the single CSRs are identified and a fine-tuning of the mix of governance mechanisms will take place. The outcome of this first re-discussion process will be a well-defined and individual governance strategy on how to enhance the hotspot public goods in the single CSRs. The well-defined governance strategy presents the basis for the modelling exercise in Task 5.3.2. Here, the effects of the implementation of the governance strategy are evaluated. In Task 5.4, the outcomes of Task 5.3, and particularly the outcome of the modelling exercise is again re-discussed with the local stakeholders, to the aim of identifying enabling and barrier factors for uptake and further information for the analysis of strengths and weaknesses and the transferability of the strategies.

The guidelines at hand accompany the activities particularly of task 5.3 and its subtasks 5.3.1 and 5.3.2. In detail, the guidelines define practical steps to detect and fine-tune optimal stakeholder-driven governance strategies on case study level. Also, they suggest quantitative tools for the evaluation of the effects of the implementation of the regional governance strategies on PG provision. Additionally, most probable and relevant scenarios on socio-economic and natural development and a qualitative criteria set for the comparative evaluation of the governance strategies are provided.

# 5.1 Guidelines for carrying out task 5.3.1: Practical steps to detect optimal stakeholder driven governance strategies and to define case study target on public good provision

Task 5.3.1 contains the process of specification and detailing (or maybe the development of alternatives) of the most promising governance mechanisms, which have been predefined in WP5 task 5.1 and in the course of the WP4 valuation exercise. In the specification process in task 5.3.1, of particular importance is the elaboration of the interplay between the different predefined mechanisms, as it is obvious that optimizing the provision of public goods from European AFS has to demand an aligned mix of government instruments rather than different standalone policy measures. Moreover it is clear that instruments and mechanisms combined in such a sound "governance strategy" have to complement (not contradict) each other – in order to be efficient.

As regards the development of governance strategies in task 5.3.1, besides the optimal orchestration of the different mechanisms, particularly the elements of local coordination and citizen action shall be sharpened and the connections between governance mechanisms, public good provision, product chains and the roles of institutions, consumers and citizens in their implementation shall be defined and elaborated. In order to design "real-world" governance strategy solutions and to ensure that these are optimally adapted to local basic conditions and PG contexts, this process is distinctively participatory and has to involve the inclusion of all relevant actors (local government, civil society and relevant businesses).

#### Objectives of defining public good targets and detection of governance strategies

The main objectives of the stakeholder-driven detection of governance strategies of PGBprovision in task 5.3.1 are:

- 1) Defining target levels of public good provision
- 2) Designing *practical, real world* governance strategies considering the combination of mechanisms specifically considering relevant *policy parameters* and *local applicability*
- 3) Setting scenario narratives into the context of local conditions

Task 5.3.1 will be implemented by all PROVIDE partners in the form of stakeholder laboratories/workshops or another participatory format once it is guaranteed that the objectives of the task will be reached. It is clear, that the 3 objectives can be reached in 1 single event, the differentiation into 3 objectives shall not suggest to run three different workshops/laboratories but shall serve as a simplification for better understanding of the task 5.3.1.

The timeframe of the participatory process of defining governance strategies and case study targets on public good provision reaches from the beginning of April to the end of May.

#### Objective 1): Definition of target levels of public good provision

In the WP4 valuation exercise, the supply and/or demand side of changes in public good provision were evaluated. To do so, initial and target levels of public good provision have been defined - mainly based on expert knowledge and literature. In Task 5.3.1, these target levels have to be re-discussed with all relevant actors and set in the context of the governance strategies. It is obvious, that the integration of the interests of all affected and

involved actors will elaborate WP4 levels such as e.g. the maximal provision levels into socially and environmentally acceptable levels, being envisaged by the governance strategy.

As regards methodological approaches of defining target levels of public good provision, there are manifold solutions conceivable. Possible methods could be public good games, future conference/workshop, World café, or Delphi studies.

#### Inputs Objective 1: (from WP-Leader to CSR Partner)

- In preparation of the participatory exercise on Task 5.3.1 Objective 1, detailed guidelines will be provided by BOKU and JHI during the 2<sup>nd</sup> half of M19 (March 2017). As regards Task 5.3.1 Objective 1), these guidelines will suggest selected suitable methodological approaches for the definition of target levels on public good provision as well as a suggestion on the timing of the exercise. In the guidelines partners will be asked to adapt the suggested methodology to the respective CSR situation. It will be up to the partners to choose the most suitable method(s), make adaptations or chose a comparable approach, provided there are reasons and the expected outcomes are reached.
- BOKU and JHI will provide the reporting template on the participatory process finally chosen by the partners to reach Task 5.3.1, Objective 1, as well as on the respective results by the end of M19 (March 2017). For Objective 1, this template will contain 2 sections: The first section will leave room to describe the methodological approach finally applied. In case of deviations and adaptations of the suggested approaches, these will be reported as well. The second section will be devoted on reporting the outcomes regarding Task 5.3.2 Objective 1.

#### **Output Objective 1:** (from CSR-Partner to WP-Leader)

 After carrying out the participatory process, all PROVIDE partners report on methodological approach, as well as the outcomes of Task 5.3.1 objective 1, using the reporting template provided by BOKU and JHI. Reporting on objective 1 will be finished at the end of Month 21 (May 2017).

# <u>Objective 2): Designing practical, real world governance strategies considering the</u> <u>combination of mechanisms</u>

In WP5 Task 5.1 and in the course of the development of the valuation exercise in WP4, governance mechanisms for the provision of public goods and the avoidance of public bads have been identified and narrowed down to the most promising options in the context of the CSR PG hotspot issues. In Task 5.3.1, these most promising governance mechanisms have to be re-discussed with all relevant actors and be elaborated into practical, real world governance strategies, taking into account the differing interests of all stakeholders affected, the compliance with the main criteria of good governance (see Chapter **Errore. L'origine riferimento non è stata trovata.**), as well as the different policy parameters to be considered when measuring the performance of the strategy as regards public good provision.

As regards the methodological approaches for the design of optimal governance strategies different approaches are conceivable. Possible methods could be policy games, systemic consensus, future conference/workshop, World café or Delphi studies.

The expected outcome of the process of governance strategy design will be targeted, optimal orchestrated and detailed governance strategies, taking into account the major criteria of good governance and involving different, synergising mechanisms and their embedding into the appropriate governance structure.

#### Inputs Objective 2: (from WP-Leader to CSR Partner)

- In preparation of the participatory exercise on Task 5.3.1 Objective 2), detailed guidelines will be provided by BOKU and JHI during the 2<sup>nd</sup> half of M19 (March 2017). As regards Task 5.3.1 Objective 2), these guidelines will suggest selected suitable methodological approaches for the detection of optimal governance strategies as well as a suggestion on the timing of the exercise. In the guidelines partners will be asked to adapt the suggested methodology to the respective CSR situation. It will be up to the partners to choose the most suitable methodological approach, make adaptations or chose a comparable approach, provided there are reasons and the expected outcomes are reached.
- As regards the list of indicators for good governance, it is provided in Chapter Errore.
  L'origine riferimento non è stata trovata. of the Deliverable D5.1 at hand. Moreover,

the list of indicators will be send out again together with the specific guidelines on Task 5.3.1, Objective 2 again.

BOKU and JHI will provide the reporting template on the participatory process finally chosen by the partners to reach Task 5.3.1, Objective 2, as well as on the respective results by the end of M19 (March 2017). For objective 2, this template will contain 2 sections: The first section will leave room to describe the methodological approach finally applied. In case of deviations and adaptations of the suggested approaches, these will be reported as well. The second section will be devoted on reporting the outcomes regarding Task 5.3.2 Objective 2.

#### **Output Objective 2:** (from CSR-Partner to WP-Leader)

 After carrying out the participatory process, all PROVIDE partners report on methodological approach, as well as the outcomes of Task 5.3.1 Objective 2, using the reporting template provided by BOKU and JHI. Reporting on objective 2 will be finished at the end of Month 21 (May 2017).

#### **Objective 3): Setting scenario narratives into the context of local conditions**

The evaluation of the performance of the final governance strategies in task 5.3.2 will consider probable and relevant scenarios on socio-economic and natural development. The scenario development in PROVIDE involved all partners and is reported in Chapter 5.2 of Deliverable D5.1 at hand.

The PROVIDE "scenarios" consist of 3 major scenario narratives, describing possible future social, economic, technological and policy pathways. Besides a "Business As Usual scenario" (BAU), the second scenario considers a future where the provision of environmental public goods is rather neglected, while in the third scenario, the provision of environmental public goods is in the focus of development. These scenarios are defined by specific characteristics of 5 parameters, which are "climate change", "consumption patterns and public good demands", "price volatility/markets", "Technical progress", and "prices of natural resources, in particular oil" (see Chapter 5.2).

In Task 5.3.1, these general narratives have to be discussed with the relevant actors and be translated into region-specific scenarios under the precondition of the overall pathways described in the PROVIDE scenario narratives.

The expected outcome of the process of scenario definition will be locally adapted characteristics of the PROVIDE scenario narratives, which are suited to be directly integrated into the evaluation exercise in Task 5.3.2.

#### **Inputs Objective 3:**

- In preparation of the participatory exercise on Task 5.3.1, Objective 3, detailed guidelines will be provided by BOKU and JHI during the 2<sup>nd</sup> half of M19 (March 2017). As regards Task 5.3.1 Objective 3), these guidelines will include the suggestion of a stakeholder exercise, facilitating the participatory definition of scenario parameters. It will be up to the partners to choose the suggested method, however, also other forms of discussion are accepted, provided the expected outcomes are reached.
- As regards the description of the PROVIDE scenario narratives, they are provided in Chapter 5.2 of the Deliverable D5.1 at hand. Moreover, the scenarios will be send out together with the specific guidelines on Task 5.3.1, Objective 3 again.
- BOKU and JHI will provide a reporting template on the participatory process finally chosen by the partners to reach Task 5.3.1, Objective 3, as well as on the respective results by at the end of M19 (March 2017). For objective 3, this template will contain 2 sections: The first section will leave room to describe how the scenario parameters have been defined. The second section will be devoted on reporting the outcomes regarding Task 5.3.2 Objective 3.

#### **Output Objective 3:** (from CSR-Partner to WP-Leader)

 After carrying out the participatory process, all PROVIDE partners report on the outcomes of Task 5.3.1 objective 3, using the reporting template provided by BOKU and JHI. Reporting on objective 3 will be finished at the end of Month 21 (May 2017).

# 5.2 Guidelines for carrying out task 5.3.2: The evaluation of the effects of the implementation of the derived, regional governance strategy on PG provision.

In Task 5.3.2 of WP5, the potential effects of the locally developed governance strategy on public good provision are evaluated. In general, for the evaluation of governance mechanism quantitative as well as qualitative approaches can be considered. Obviously, the range of methods potentially relevant and suitable for the evaluation exercise in Task 5.3.2 is very wide, depending on the strategies/mechanisms to be evaluated and the related scale.
Amongst others, conceivable methodological approaches could be farm/forestry models, agent-based models, principal agent models, bio-economic ecologic models, coupling of biophysical and bio-economic modelling, field experiments/prototyping, PG games, stakeholder/deliberation as well as socio-psychological approaches. From these options and beyond, partners have been expected to select and adapt evaluation tools and models with regard to their applicability in the case study and the respective public good context. This selection and adaptation process in parts has already been done and is reported in Chapter 4 "Methodological adaptation"

The final selection as well as the fine-tuning of the methodological evaluation approach is only possible after the successful implementation and accomplishment of Task 5.3.1, based on the best ability to meet the evaluation requirements identified through the definition of public good targets and the selection of the final governance mechanisms and strategies. This "open" approach of choice of methods avoids a lock-in situation in which methods and tools dictate the research approach and emerging issues in the trans-disciplinary process cannot adequately be addressed. Rather, in its open form the selection of useful methodological approaches for evaluation is targeted to align to real life decision-making related to PG provision and the avoidance of PBs.

#### **Objective of the evaluation of governance strategies**

Task 5.3.2 will be implemented by all PROVIDE partners in the form of evaluation/modelling exercises. The choice of the methodological approaches to evaluate the governance strategies is free for the partners, once it is guaranteed that the objectives of the task will be reached.

The aim of the evaluation of governance strategies is to (quantitatively) model/measure the effects of the implementation of the governance strategy on the levels of provision of public goods, respectively the levels of avoidance of public bads. Thereby, the evaluation will **measure effectiveness and efficiency of the strategies as regards PG provision**. Literally, models should be able to calculate whether it is possible to achieve the public good targets level with the chosen governance strategy and at which costs (Costs of adoption, investment costs, income forgone, administrative costs). If model results show that targeted levels of PG provision are not achieved, the model should allow considering alternative measures

necessary to reach the initial goal. In this context the PROVIDE performance criteria (see chapter 5.4) have to be considered.

Furthermore, models should be **capable to directly integrate the region-specific scenarios** which have participatory been developed in Task 5.3.1, on basis of the PROVIDE scenario narratives (see Chapter 5.3). The models have to be able to measure the impacts of these scenarios on PG provision and respective cost.

As discussed in the 4<sup>th</sup> PROVIDE project meeting, partners should aspire to develop models which **enable the direct collaboration with other CSRs**. Collaboration should be elaborated on basis of the working group discussion at the 4<sup>th</sup> PROVIDE meeting and the current suggestions on methodological approaches. Table 12 gives a short overview on the current status of methodological approaches for the evaluation of GMs already identified.

| Cluster                         | Code  | Governance Mechanisms              | Tools for evaluation                    |
|---------------------------------|-------|------------------------------------|---|
| CLU1. Intensive AT-1 Regulation |       | Regulation                         | Structural Network Analysis             |
| and mixed                       |       | Targeted AES                       | Mathematical programming model          |
| agriculture (PG                 |       | Private market initiatives         | Spatial explicit analysis               |
| under-provision                 | DE-1  | Agri-environmental schemes (AES)   | Extensive literature review             |
| and mixed                       |       | Farm coordination opportunities    | Data analysis                           |
| agricultural                    | IT-2  | Regulation (CC)                    | Mathematical programming model          |
| production)                     |       | Rural development programs (RDP)   |   |
|                                 |       | Ambient mechanism                  |   |
|                                 | PL-1  | Agri-environmental schemes (AES)   | Stated preference methods               |
|                                 |       | Education/ information             | Literature review                       |
|                                 |       |                                    |   |
|                                 | UK-1  | AES                                | Fuzzy cognitive mapping                 |
|                                 |       | PES                                | Games                                   |
|                                 |       | Marketing and branding initiatives | Multi-criteria decision making analysis |
|                                 |       | Knowledge exchange and             |   |
|                                 |       | education                          |   |
|                                 |       | Changes in regulation              |   |
| CLU2. Land                      | ES-1  | Agri-environmental schemes (AES)   | Mathematical programming model (most    |
| abandonment                     |       | Regulation (fostered CC)           | probably a principal-agent model        |
| (Risk of PG                     | ,     |                                    |   |
| PG loss due to                  | FD 1  |                                    | Costial multi agent based model         |
| land                            | FK-1  |                                    | Spatial multi-agent based model         |
| abandonment)                    |       | PES<br>Regulation (CC)             |   |
|                                 |       | Regulation (CC)                    |   |
|                                 |       | Land public purchase (land         |   |
|                                 |       | management by local or public      |   |
|                                 |       | authority                          |   |
|                                 | ••••• |                                    |   |

Table 12: Current status of methodological approaches for the evaluation of GMs

| Cluster  | Code         | Governance Mechanisms  | Tools for evaluation  |
|--|--------------|--|---|
|  | IT-1         | First pillar and cross compliance<br>Second pillar, for instance<br>operation "13.1.01 – compensatory<br>payments in mountain areas" of<br>the E-R RDP<br>Second pillar actual or potential<br>measures for the management of<br>abandoned land or reforestation | Regional mathematical programming model<br>INVEST model                             |
| CLU3. Urban-<br>rural<br>relationships<br>(with the focus<br>on scenery and<br>recreation) | CZ-2<br>NL-1 | Local regulation (Protected<br>Landscape Area & Natura 2000)<br>Collective action (Geopark)<br>Public-private partnership<br>Location advantage- tax   | of costs and benefits modelling<br>scenario analysis                                |
| CLU4. Extensive<br>agricultural<br>systems (PGs  | BG-1         | Regulation<br>Quality product certification<br>AES   | Extensive literature review and study of already existing data                      |
| provided in low<br>intensive AFS )   | CZ-1         | Collective action (self-governance<br>of commons)<br>Non-productive RDP measures<br>Operational group of RDP (EIP)   | Qualitative assessment following Ostrom   |
|  | FR-2         | Fostered cross-compliance<br>RDP measures such as grassland<br>premium and natural handicap<br>compensation subsidy<br>AES (other RDP measures not<br>included in GM2)<br>Specific wildfire prevention policy  | Structural (data?)<br>Reduced adoption equation<br>Spatial Econometrics/Simulations |
|  | RO-1         | AES<br>Education/information and<br>consultancy services<br>Quality product certification (e.g.<br>ecolabel)   | Sensitivity analysis based on scenarios   |
| CLU5. Forest<br>landscapes<br>(forests<br>landscapes and<br>nature based                   | EE-1         | Spatial planning<br>Financial relief scheme for the<br>state-owned forest management<br>Payments for ecosystem services<br>(PES)   | Economic model  |
|  | FI-1         | Payments for ecosystem services<br>(LRVT)<br>Technical assistance (guidelines and<br>guidance)   | Multi-criteria analysis   |

# **Inputs:** (from WP-Leader to CSR Partner)

• BOKU and UNIBO will provide the reporting template on the evaluation process finally chosen by the partners to reach Task 5.3.2, as well as on the respective results by the end of M20 (April 2017). To facilitate publishing, the structure of this template

will be twofold: Firstly, we will ask for a report with the structure of a classical scientific paper: This paper will inform on the finally chosen methodological approach, as well as on the outcomes. Secondly, there will be a brief report section, asking for further information as e.g. cooperation with other case CSRs

# **Output Objective 1:** (from CSR-Partner to WP-Leader)

- After carrying out the evaluation, all PROVIDE partners report on the methodological approach, cooperation with other case CSRs as well as the outcomes of Task 5.3.2, using the reporting template provided by BOKU and UNIBO. Reporting on objective 1 will be finished at the end of Month 26 (November 2017).
- 5.3 Probable and relevant scenarios on socio-economic and natural development

# 5.3.1 Sensitive aspects for the development of scenarios in the context of the PROVIDE CSRs

The selection of probable and relevant scenarios on socio-economic and natural development in the context of the PROVIDE CSRs involved all partners: First, a literature-based draft list of possible aspects to be considered for the development of scenarios provided by BOKU, UNIBO and ZALF was sent out to all partners. Using this list, all partners checked the general relevance of the suggested aspects, amended which sensitive aspects are missing particularly in the context of the CRS hotspot issues. The outcome of this process is shown in Table 13.

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|--------------------------------------|--|--|----------------------------|
| πηρ. Γ.Υ. Κριρναής οι επαιρετρά εςρι | ατίος τη τηρ ςτηπιρτ Χκτ   | realons/Δmenaments to t  | ηρ ςιιααρςτρα μςτ          |
|                                      | and and and and and a single contracted and a single c |  |                            |

| Sei | nsitive aspects for scenario development  | Relevant in:                      |
|-----|---|-----------------------------------|
| As  | pects mostly driven by external sources   |                                   |
| •   | Extreme population growth (putting more pressure for production of food etc.) (9.7 billion until 2050)  | AT1, IT2, UK1, FR1, IT1, FR2      |
| ٠   | Climate change scenario (extreme)   | AT1, DE1, UK1, FR1, CZ1, FR2, FI1 |
| ٠   | Population development in EU: strong urban growth, rural decline  | UK1, FR1, NL1, FR2, FI1           |
| •   | Changing consumption; energy dense diets based on meat and<br>dairy products become more prominent, increasingly also in<br>developing and transition countries | DE1, UK1                          |
| An  | nendments:  |                                   |
| ٠   | Progressive privatization of forests  | CZ2                               |
| ٠   | Industrial revitalization of the area   | CZ2                               |
| •   | Increasing wealth of people in developing countries, especially in China  | FI1                               |
| •   | Increasing environmental pollution in developing countries, especially in China   | FI1                               |
| ٠   | Substantial increase in oil prices or another economic slump  | UK1                               |
| •   | Volatile commodity market situation   | DE1                               |
| •   | Increasing consumer demand for GM-free dairy products, which  | DE1                               |

includes fodder sources, such as soy

| Asj | pects mostly driven by European policy   |   |
|-----|--|---|
| •   | Clear enhancement of subsidies to promote renewable energy or similar (answering to the Paris Climate agreement)           | AT1, DE1, CZ2, FI1                        |
| •   | Strong reduction of resources for CAP (e.g. 30% reduction of money due to Brexit, refugee programs, European army, etc.)   | AT1, DE1, UK1, ES1, FR1, CZ1, FR2,<br>EE1 |
| ٠   | Ceasing of 2nd Pillar  | AT1, UK1, FR1, NL1, FR2, EE1              |
| Am  | endments:  |   |
| ٠   | Locally led result-oriented agri-environmental schemes like the  | DE1                                       |
|     | Burren programme.  |   |
| •   | Deregulation on the environment in relation to Brexit as the UK government seeks to increase the country's competitiveness | UK1                                       |
| ٠   | Changes in society's demand: more intense preferences towards  | ES1                                       |
|     | PGBs provided by AFS (rather external source?)   |   |
| ٠   | Strengthening of 2nd pillar at the expense of 1st pillar (CAP  | EE1                                       |
|     | change supporting more the structural shift and environmental  |   |
|     | services in agriculture and forestry )   |   |

Second, the partners estimations and suggestions on aspects for scenario development were re-discussed in the roundtable discussion at the 4<sup>th</sup> PROVIDE project, and taken up for the cluster-wise discussion in the working group session. In the working groups, the most relevant common scenario aspects in the context of the single PROVIDE clusters were identified and discussed. The result of the working groups' discussion is shown in Table 14.

| CLUSTER      | Most relevant/interesting common aspects/trends                    |
|--------------|--|
| Cluster 1:   | Climate change   |
|              | Volatility of prices   |
|              | Technology and big data  |
| Cluster 2:   | Changes in social preferences regarding:                           |
|              | <ul> <li>Environmental PGs</li> </ul>                              |
|              | <ul> <li>Social PGs</li> </ul>                                     |
|              | <ul> <li>Changes in the budget to promote PGs provision</li> </ul> |
|              | Restructuring of farms   |
| Cluster 3/5: | Increasing recreation demand                                       |
|              | Changes in biofuel policies  |
|              | Structural changes of the CAP                                      |
| Cluster 4:   | Commodity prices   |
|              | Pilar 1 & cross compliance   |
|              | Input & energy prices  |

Table 14: Most relevant common scenarios in the PROVIDE clusters (from working group discussions at 4<sup>th</sup> project meeting)

Based on the estimations on the list of aspects for scenario development, the amendments by the partners and the results of the working groups' discussion at the 4<sup>th</sup> project meeting, different thematic foci were identified to be most relevant in the specific context of the single CSRs. The main foci are listed below:

- Climate change
- Population growth
- Consumption behaviour/Demand for public goods
- Demand for agricultural products
- Prices of oil and other fundamental resources
- Price volatility
- Bio energy
- Regionalisation of agri-environmental schemes
- Decreasing CAP funds
- Decreasing/increasing regulation

## 5.3.2 Aspects for the development of scenarios – state of the art

It is obvious that clear statements on how the future will look like are impossible. As Nakicenovic et al. (2000) put it in a nutshell, "by 2100 the world will have changed in ways that are difficult to imagine, as difficult as it was at the end of the 19<sup>th</sup> century to imagine the changes of the 20<sup>th</sup> century." However, as regards the provision of public goods from agriculture and forestry systems, in literature a broad variety of useful scenarios on most expected trends and scenarios of future global and European socio-economic and natural developments are provided, which were consulted in the context of PROVIDE and could be further used to specify scenario parameters in task 5.3.2. Literature provides e.g. foresights such as trends of biodiversity and ecosystem service changes (IEEP, 2009), climate change impact projections (EEA, 2015), world population projections (UN, 2014; UN, 2015), consumption and production trends (Ewert et al., 2005; Thornton, 2010; Ray et al., 2012), land availability (Eitelberg et al., 2015), land use change (Popp et al., 2014), urbanisation trends (Seto et al., 2011) or emission scenarios (Nakicenovic and Swart, 2000).

In parts these scenarios are very specific, however, the general and major drivers of the single scenarios developments are basically the same: Major scenario driving forces have already been identified on the basis of a comprehensive overview of scenario literature in the IPCC "Special report on emission scenarios" by Nakicenovic et al. (2000), who described these driving forces as demographic, social and economic conditions, energy and technology as well as policy and governing structures. On basis of the driving forces, Nakicenovic et al. (2000) developed scenario narratives, taking into account differing characteristics of the driving forces under the preposition of possible global development directions, which in short can be summarised as "globalisation versus localism/regionalisms" in combination with "economic versus environmental development". In general, this approach leads to 4

groups of narratives roughly to be described as a global-economic pathway, a localeconomic pathway, a global-environmental pathway and a local-environmental pathway.

This basic idea of the scenario narratives of Nakicenovic et al. (2000) has been broadly accepted and used as a basis for further elaborations, e.g. by adding further narratives such as status quo ("Middle of the road") (O'Neill et al., 2017) or by developing special foci on e.g. land use (Ewert et al., 2005) or agricultural management (EPRS, 2016).

## 5.3.3 Combining PROVIDE Scenario aspects with current major scenario pathways

Based on the major scenario narratives provided by Nakicenovic et al. (2000), Ewert (2005) EPRS (2016) and O'Neill et al. (2017), and involving the results of the common screening of scenario foci in the PROVIDE CSRs, in the WP5 evaluation exercise 3 major scenario narratives will be taken into account. First, we consider a business as usual scenario (BAU), inspired by O'Neill et al.'s (2017) "Middle of the road" scenario. Moreover, we will consider one scenario where the provision of environmental public goods is rather neglected (economic) and one scenario, where the provision of environmental public goods is in the focus of development (environmental). We disregard the development directions of global and local for PROVIDE overall scenarios, but CSRs could re-introduce them as preferential dimensions for sub-scenarios if relevant in the respective CSR. Furthermore, we don't consider scenarios on the development of the Common Agricultural Policy – as the aim of the exercise is to learn, how policy has to react under the conditions of the single scenarios. Table 15 comprises the 3 PROVIDE scenario narratives. The scenarios are designed for a medium term perspective (10-20 yrs). The general PROVIDE scenario narratives will be translated into local scenarios in Task 5.3.1.

| Szenario  | Business as Usual (BAU)                                  | Sustainability driven<br>(Sust_Driven)          | Market driven<br>(Market_Driven)           |
|---|--|---|--|
| Climate change  | as given<br>(two degree increase will be<br>missed)      | max two degree increase                         | significantly more than<br>two degree      |
| Population increase   | as given (moderate)                                      | low   | high                                       |
| Consumption<br>patterns and<br>willingness to pay for<br>public goods | as given<br>(low willingness to pay for<br>public goods) | significant willingness to pay for public goods | no willingness to pay for<br>public goods  |
| Prices of natural resources, in particular oil                        | as given<br>(moderate)                                   | high, clearly reflecting<br>scarcity            | low, not reflecting long-<br>term scarcity |
| market price<br>volatility  | as given<br>(high)                                       | moderate  | extreme                                    |

Table 15: PROVIDE narratives on socio-economic and natural development

| Technical progress | as given<br>(without fundamental<br>breakthroughs) | significantly, clearly<br>environmental oriented | extraordinary, clearly<br>market oriented |
|--------------------|--|--|---|
|--------------------|--|--|---|

In order to give a deeper insight into the underlying rationality of our scenarios we offer in the following two pages brief narrative descriptions of our scenarios.

# Scenario narrative 'Business as Usual' (BAU)<sup>1)</sup>

'The world follows a path in which social, economic, and technological trends do not shift markedly from historical patterns. Most economies are politically stable. Globally connected markets function imperfectly. Global and national institutions work toward but make slow progress in achieving sustainable development goals, including improved living conditions and access to education, safe water, and health care. Technological development proceeds apace, but without fundamental breakthroughs. Environmental systems experience degradation, although there are some improvements and overall the intensity of resource and energy use declines. Even though fossil fuel dependency decreases slowly, there is no reluctance to use unconventional fossil resources. Global population growth is moderate and levels off in the second half of the century as a consequence of completion of the demographic transition.'

<sup>1)</sup> quoted and italic marked text taken from the scenario narrative 'Middle of the road'', published by O'Neill et al. (2017))

# Scenario narrative 'Sustainability driven' (Sust\_Driven)<sup>2)</sup>

'The world shifts gradually, but pervasively, toward a more sustainable path, emphasizing more inclusive development that respects perceived environmental boundaries. Increasing evidence of and accounting for the social, cultural, and economic costs of environmental degradation and inequality drive this shift. Management of the global commons slowly improves, facilitated by increasingly effective and persistent cooperation and collaboration of local, national, and international organizations and institutions, the private sector, and civil society. Educational and health investments accelerate the demographic transition, leading to a relatively low population.' Measures to reach the common global climate change goals on emission mitigation are consequently implemented, the maximum of two degree increase in temperature is paradigm. 'Consumption is oriented toward low material growth and lower resource and energy intensity'. Technical progress is clearly oriented on the 'development of environmentally friendly technologies'. Due to internalization of external effects prices of natural resources, in particular of fossil fuels, are high and clearly express scarcity. Clear regulations and international agreements structure markets and reduce price volatilities.

<sup>1)</sup> quoted and italic marked text taken from the scenario narrative 'Sustainability-Taking the green road', published by O'Neill et al. (2017))

# Scenario narrative 'Market driven' (Market\_Driven)<sup>3)</sup>

'Driven by the economic success of industrialized and emerging economies, this world places increasing faith in competitive markets [...] to produce rapid technological progress [...]. Global markets are increasingly integrated, with interventions focused on maintaining competition'. The 'push for economic and social development is coupled with the exploitation of abundant fossil fuel resources and the adoption of resource and energy intensive lifestyles around the world. All these factors lead to rapid growth of the global economy.' 'Market dynamics play a central role [...] and the economy is booming. People rely heavily on technology and witness rapid technological developments'. Since the rapid technological progress also enhances the possibilities to exploit natural resources, prices of fossil fuels and other resources stay low or even decrease (at least within the next decade). As a consequence, carbon dioxide emissions are significantly increasing and the goal of a maximal two degree increase in temperature is clearly risked to be missed. Global population increase will continue, although it may peak and decrease later on. There is a high demand for agricultural products, but the willingness to pay for public goods is almost not given, since people 'place trust in technological development and the mechanisms of the market to solve problems'.

<sup>1)</sup> quoted and italic marked text taken from the scenario narrative 'Economic optimism/Fossil-fueled development—Taking the highway', published by O'Neill et al. (2017)) and from the scenario narrative 'Scenario 1 – Economic Optimism', published by EPRS (2016)

## 5.4 Criteria set for the comparative evaluation of governance strategies

The selection of criteria for the comparative evaluation of governance strategies was based on a literature review, on the results of the 2<sup>nd</sup> CSR stakeholder workshops, the European level workshop held in connection to the 3<sup>rd</sup> project meeting as well as on the project intern discussions at the 4<sup>th</sup> PROVIDE project meeting.

## 5.4.1 Governance criteria in literature

A huge body of literature describes aspects and related criteria and indicators of good governance. Here, a major focus is on the general frameworks under the precondition of

which governance is carried out. Main criteria for "good" governance frameworks are functioning institutions, the accountability of decision makers to the public, transparency of governance processes for the public through adequate and accessible information and rule of law meaning that legal frameworks are fair and enforced impartially and decisions are taken according to the law. Another focus of literature is on the design process of governance instruments: Here, inclusive and participative governance design, consensus orientation leading to legitimate governance instruments, procedural and distributive justice and fairness/equity in the design process itself, as well as transparency of the design process are assumed to be key. As regards the characteristics of governance instruments, main criteria are the consistency of clear and quantifiable goals and the consideration of ancillary costs and benefits, meaning that major side effects (positive and/or negative) are taken into account. Also *flexibility* to revise and adapt instruments is as well as criteria of vertical and horizontal integration are important. As regards the performance of governance and governance instruments, acceptability, effectiveness and efficiency are the key criteria to be evaluated. Table 16 gives an overview on the major criteria of good governance described in literature.

| Type of criteria        | Criteria   | Description/Example   | Literature   |
|-------------------------|--|---|--|
| Governance<br>framework | Functioning institutions<br>Accountability           | Management capacities of public institutions are sufficient<br>Decision-makers in government, the private sector and civil society<br>organizations are accountable to the public, as well as to institutional<br>stakeholders (vertical and horizontal accountability)                                 | (OECD 2010)<br>(Gale, 2008; Cashore, 2009; FAO, 2011;<br>Kaufmann et al., 2011)                      |
|                         | Transparency   | Actions are revealed so that outsiders can scrutinize them. Access to<br>information in order to inform and engage public constituents is given.<br>Information is comprehensive, timely, available efforts are made to make<br>sure information reaches affected and vulnerable groups as appropriate. | (Graham et al., 2003) (Gale, 2008; Cashore,<br>2009)   |
|                         |  | Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.  |  |
|                         | Rule of law  | Legal frameworks are fair and enforced impartially, decisions are made according to the law, well-defined rights and duties, as well as mechanisms for enforcing them, and settling disputes in an impartial manner   | (Graham et al., 2003; FAO, 2011; Kaufmann<br>et al., 2011)   |
| Governance<br>design    | Inclusiveness/Participation/<br>Communicative action | All persons/groups/institutions affected have a voice in decision-making,<br>either directly or through legitimate intermediate institutions that<br>represent their intention.   | (Ehler, 2003; Graham et al., 2003; Cashore,<br>2009; Healey, 2010; FAO, 2011; Secco et al.,<br>2014) |
|                         | Legitimacy/Consensus<br>orientation                  | Differing interests are mediated to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures  | (Graham et al., 2003; Healey, 2010; FAO,<br>2011)  |
|                         | Procedural and distributive                          | All men and women/ all interest groups have an equal voice  | (Graham et al., 2003; Prager and Freese,   |

## Table 16: Criteria of good governance – a literature review

justice, Fairness/Equity

|                                | Objective, Science-based                   | Cause-effect relationships are substantiated by scientific knowledge, priorities are objectively given to economic, social and environmental factors. | Gale 2008, pp. 267–272                          |
|--------------------------------|--|---|---|
|                                | Clarity/Transparency of the design process | All persons/groups/institutions affected are informed about all details.  | OECD: Regulatory Impact Assessment<br>Guideline |
|                                | Timeliness and facilitation<br>efforts     |   | (Conrad et al., 2011)                           |
| Characteristics of instruments | Consistency of goals,<br>Coherence         | Clear goals, quantifiable objectives  | (Ehler, 2003)                                   |

2009)

| Type of criteria | Criteria                             | Description/Example   | Literature                |
|------------------|--------------------------------------|---|---------------------------|
|                  | Low ancillary costs                  | Trade-offs, negative side effects are low. (Negative Ancillary impacts may e.g. be environmental and/or economic and/or other (e.g. influencing other public goods)   | (OECD, 2010b)             |
|                  | Ancillary benefits                   | Mechanism creates synergies (win-win situations) which means it has<br>beneficial effects on other positive ecosystem services (Ancillary impacts<br>may e.g. be environmental and/or economic and/or other (e.g. influencing<br>other public goods). Has additional beneficial monetary effects for involved<br>actors | (OECD, 2010b)             |
|                  | Flexibility                          | The capability of GMs to adapt to different contexts (e.g. AFS).  | (Ehler, 2003)             |
|                  | Equity and fairness (GM-<br>related) | Equity of the distribution of economic costs and benefits between/among the groups affected   | (OECD 2010)               |
|                  | Vertical integration                 | High level of communication between policy-making decision units and farmers/foresters?   | (Bauer and Steurer, 2014) |
|                  | Horizontal integration               | High level of communication amongst farmers/foresters?  | (Bauer and Steurer, 2014) |
| Monitoring       | Measurability                        | Even though usually applied for the instruments, also for governance strategy those might be apply? : coherence, relevance and European added value: can be qualitatively assessed  | (Ehler, 2003)             |
|                  | Participatory monitoring             | citizen science   | (Ehler, 2003)             |
|                  | Coherence of monitoring              | Monitoring is designed in a way that is consistent with the achievement of goals (e.g. by not precluding farmers' participation).   | (Ehler, 2003)             |
|                  | Effectiveness                        | The instrument has the capacity to achieve the PG goals or targets of practice; The aspired socioeconomic and environmental outcomes are reached  | (OECD, 2010b)             |
|                  | Efficiency                           | The marginal benefits and the marginal costs of achieving the environmental objectives should balance well. Whatever goal is set, the goal should be reached at least cost  | (OECD, 2010b)             |

## 5.4.2 Governance criteria from the CSR and European stakeholder workshops

Criteria for good governance derived from the stakeholder workshops on CSR and European level differ from the criteria from literature in the sense that they deal with rather "tangible problems" of governance failure. Nevertheless, the information from workshops in many parts reflects the aspects described in literature (see chapter 3.1 and 3.2). For the stakeholders, major criteria to evaluate governance instruments are effectiveness, efficiency, the basis for governance design and a system approach, good monitoring, good controllability, good targeting, participation (design process and participatory instruments), trust, fairness and equitability, simplicity, flexibility, sustainability transparency. Table 17 lists the major information from the 2<sup>nd</sup> stakeholder workshops in the 13 PROVIDE CSR countries (June 2016), the European level stakeholder workshop (July 2016) and the project discussions at the 4<sup>th</sup> Provide meeting (January 2017) that amend the overview on criteria that can be derived from literature.

| Type of criteria        | Criteria   | Description/Example   |
|-------------------------|--|---|
| Instruments             | Targeted to the topic                            | Answers to the problem  |
| characteristics         | Spatially targeted                               | place specific (e.g. measures for arable farming in<br>arable area, measures for water quality in region<br>with low water quality)   |
|                         | Targeted to the group responsible                | Targeted to right beneficiaries (compensates the<br>"right" persons, sectors, groups)   |
|                         | Simplicity/Practicability                        | Easy to understand, easy to apply   |
|                         | Adequate compensation of<br>expenses             | The costs of the measures are covered (in case of financial incentives)   |
|                         | Flexibility                                      | The capability of GMs to adapt to different contexts (e.g. AFS).  |
|                         | Builds trust between actors<br>horizontally      | land manager to land manager, social capital, communicative   |
|                         | Builds trust between admin<br>bodies and farmers |   |
| Monitoring              | Measurability                                    | Even though usually applied for the instruments,<br>also for governance strategy those might be<br>apply? : coherence, relevance and European<br>added value: can be qualitatively assessed |
|                         | Participatory monitoring                         | citizen science   |
|                         | Coherence of monitoring                          | Monitoring is designed in a way that is consistent<br>with the achievement of goals (e.g. by not<br>precluding farmers' participation).   |
| Performance<br>criteria | Acceptance                                       | Acceptance amongst farmers / beneficiaries;<br>Acceptance among general public  |

Table 17: Amendments to the literature based criteria list based on the information from workshops and project discussions

# 5.4.3 Combining PROVIDE governance criteria from the CSR and European stakeholder workshops with literature with major scenario criteria from literature

Combining the results of the project-intern process of identification of relevant criteria together with the major governance criteria from literature, the final PROVIDE criteria set includes 5 major criteria groups which are criteria on 1) *Governance framework*, 2) *Governance design*, 3) *Characteristics of governance instruments*, 4) *Monitoring* and 5) *Performance*.

| Type of criteria | Criteria   |
|------------------|--|
| Governance       | Functioning institutions                             |
| framework        | Accountability                                       |
|                  | Transparency   |
|                  | Rule of law  |
| Governance       | Inclusiveness/Participation/Communicative action     |
| Mechanism design | Legitimacy/Consensus orientation                     |
|                  | Procedural and distributive justice, Fairness/Equity |
|                  | Objective, Science-based                             |
|                  | Clarity/Transparency of the design process           |
|                  | Timeliness and facilitation efforts                  |
| Governance       | Consistency of goals, Coherence                      |
| Mechanisms       | Objective, Science-based                             |
| Characteristics  | Targeted to the topic                                |
|                  | Spatially targeted                                   |
|                  | Targeted to the group responsible                    |
|                  | Simplicity/Practicability                            |
|                  | Adequate compensation of expenses                    |
|                  | Ancillary costs                                      |
|                  | Ancillary benefits                                   |
|                  | Flexibility  |
|                  | Partnerships between players                         |
|                  | Trust between actors horizontally (land manager to   |
|                  | land manager)  |
|                  | Trust between admin bodies and farmers               |
|                  | Equity and fairness (GM-related)                     |
|                  | Vertical integration                                 |
|                  | Horizontal integration                               |
| Monitoring       | Measurability  |
|                  | Who measures/monitors? (citizen science)             |
|                  | Coherence of monitoring                              |
|                  | Acceptance   |
| Performance      | Effectiveness  |
|                  | Efficiency   |

Table 18: Provide set of evaluation criteria

## 5.4.4 Development of indicators on basis of the PROVIDE set of criteria

Based on the PROVIDE set of criteria, at different stages of WP5 indicators will be developed and measured. Further selection, specification and finally the measurement of criteria and CSR-specific indicator will take place in both subtasks of Task 5.3, as well as in Task 5.4.

As regards task 5.3.1, the participatory development of the final governance strategy demands the consideration of indicators capable to describe the region specific characteristics of the PROVIDE criteria.

As regards task 5.3.2, indicator specification has to consider the type of model chosen for evaluation and allow for measuring effectiveness and efficiency. These two dimensions will be those mainly considered here as they are those that can be most easily attached to models. Specific indicators will be co-developed with the models themselves. Potential for harmonisation across CSR using comparable models will be considered and exploited as much as possible in the process. Besides effectiveness and efficiency, other indicators that can benefit from "hard" quantitative measurements will be considered at this stage, such as income distribution linked to equity considerations.

As regards task 5.4, indicators depicting the strengths and weaknesses of the mechanisms have to be developed allowing for a comparative analysis of the transferability and practicability of the mechanism. In this stage we expect to benefit of interaction with stakeholders at the fourth round of local and EU-level stakeholder workshops. We expect that indicators developed and measured at this stage will be more qualitative in nature and focusing on the evaluation of the instruments, the design and implementation process, and, in general, "soft" aspects of governance mechanisms for PG provision.

# 6 Literature

- L. Bamière, M. David and B. Vermont (2013), 'Agri-environmental policies for biodiversity when the spatial pattern of the reserve matters', Ecological Economics 85: 97-104.
- A. Bauer and R. Steurer (2014), 'Multi-level governance of climate change adaptation through regional partnerships in Canada and England', Geoforum 51: 121-129.
- R. Borg, A. Toikka and E. Primmer (2015), 'Social capital and governance: a social network analysis of forest biodiversity collaboration in Central Finland', Forest Policy and Economics 50: 90-97.
- A. Buckwell (2009), 'Public goods from private lands', in Foundation, R., ed.
- B. Cashore (2009), 'Key components of good forest governance in ASEAN Part I: overarching principles and criteria.', Exlibris 6: 1-8.
- K. Collins and R. Ison (2009), 'Jumping off Arnstein's ladder: social learning as a new policy paradigm for climate change adaptation', Environmental Policy and Governance 19(6): 358-373.
- B. o. A. a. N. R. Committee on Twenty-First Century Systems Agriculture, Division on Earth and Life Sciences (2010), Toward Sustainable Agricultural Systems in the 21st Century, Washington, D.C.: National Academies Press.
- E. Conrad, F;, L. Cassar, M. Jones, S. Eiter, Z. Izaovičová, Z. Barankova, M. Christie and I. Fazey (2011), 'Rhetoric and Reporting of Public Participation in Landscape Policy.', Journal of Environmental Policy & Planning 13(1): 23-47.
- T. Cooper, K. Hart and D. Baldock (2009), 'Provision of Public Goods through Agriculture in the European Union ', in, London: Institute for European Environmental Policy.
- M. Delmas and O. Young (2009a), 'Governance for sustainable development in a world of rising interdependencies', in Delmas, M. and Young, O., eds., Governance for the environment. New perspectives, Cambridge, United Kingdom: Cambridge University Press.
- M. Delmas and O. Young (2009b), 'Introduction: new perspectives on governance for sustainable development', in Delmas, M. and Young, O., eds., Governance for the environment. New perspectives, Cambridge, United Kingdom: Combridge University Press.
- ECNL (2015), 'Current Trends in Self-Regulation of Civil Society organisations in Europe a general overview', in, Budapest: Europena Center for Not-for-Profit Law.
- EEA (2010), 'EU 2010 Biodiversity Baseline, EEA Technical report No 12/2010', in EEA Technical report European Environment Agency: EEA.
- EEA (2015), 'Climate change impacts and adaptation'.
- I. e. a. eftec (2010), 'The use of market-based instrument for biodiversity protection The case of habitat Banking', in.
- C. N. Ehler (2003), 'Indicators to measure governance performance in integrated coastal management', Ocean & Coastal Management 46: 335-345.
- D. A. Eitelberg, J. van Vliet and P. H. Verburg (2015), 'A review of global potentially available cropland estimates and their consequences for model-based assessments', Global Change Biology 21(3): 1236-1248.
- S. Engel, S. Pagiola and S. Wunder (2008), 'Designing payments for environmental services in theory and practice: An overview of the issues', Ecological Economics 65(4): 663-674.
- ENRD (2010), Thematic Working Group 3: Public Goods And Public Intervention, Final Report, Brussels.
- EPRS (2016), 'Precision agriculture and the futire of farming in Europe Scientific foresight study', in, Brussels.
- F. Ewert, M. D. A. Rounsevell, I. Reginster, M. J. Metzger and R. Leemans (2005), 'Future scenarios of European agricultural land use: I. Estimating changes in crop productivity', Agriculture, Ecosystems & Environment 107(2–3): 101-116.
- FAO (2011), 'Good agricultural governance A resource guide focussed on smallholder crop production', in, Bangkok.
- J. R. a. H. Fooks, Nathaniel Alan and Messer, Kent D. and Duke, Joshua M. and Hellerstein, Daniel and Lynch, Lori (2016), 'Conserving Spatially Explicit Benefits in Ecosystem Service Markets:

Experimental Tests of Network Bonuses and Spatial Targeting ', American Journal of Agricultural Economics: 1-21.

- F. Gale (2008), 'Tasmania's Tamar Valley Pulp Mill: A Comparison of Planning Processes Using a Good Environmental Governance Framework', The Australian Journal of Public Administration 67(3): 261-282.
- A. Gamble (2000), 'Economic governance', in J., P., ed., Debationg governance: authority, steering and democracy, Oxford: Oxford University Press, 110-137.
- P. Glasbergen (2011), 'Understanding partnerships for sustainable development analytically: the ladder of partnership activity as a methodological tool', Environmental Policy and Governance 21(1): 1-13.
- J. Graham, B. Amos and T. Plumtre (2003), 'Principles for good governance in the 21st century ', in, Ottawa, Canada.
- G. Grolleau and L. M. J. McCann (2012), 'Designing watershed programs to pay farmers for water quality services: Case studies of Munich and New York City', Ecological Economics 76: 87-94.
- A. Hailu and S. Thoyer (2010), 'What Format for Multi-Unit Multiple-Bid Auctions?', Computational Economics 35(3): 189-209.
- K. Hart, Baldock, D., Weingarten, P., Osterbrug, B., Povellato, A., Vannie, F., Pirzio-Biroli, C., Boyes, A. (2011), 'What tools for the European Agricultural Policy to Encourage the Provision of Public goods, Study for the European Parliament', in, Brussels: European Parliament.
- P. Healey (2010), Making Better Places: The Planning Project in the Twenty-First Century, Basingstoke: Palgrave Macmillan.
- A. IEEP, Ecologic, PBL and UNEP-WCMC (2009), 'Scenarios and models for exploring future trends of biodiversity and ecosystem services changes-Final report to the European Commission, DG Environment on Contract ENV.G.1/ETU/2008/0090r.', in: Institute for European Environmental Policy, Alterra Wageningen UR, Ecologic, Netherlands Environmental Assessment Agency, United Nations Environment Programme World Conservation Monitoring Centre.
- D. Kaufmann, A. Kraay and M. Mastruzzi (2011), 'The Worldwide Governance Indicators: Methodology and Analytical Issues', Hague Journal on the Rule of Law 3(02): 220-246.
- L. Kuhfuss, Preget, R., Thoyer, S., Hanley, N. (2015), 'Nudging farmers to sign agrienvironmental contracts: the effects of a collective bonus', European Review of Agricultural Economics online.
- U. Latacz-Lohmann and C. P. C. M. Van der Hamsvoort (1998), 'Auctions as a Means of Creating a Market for Public Goods from Agriculture', Journal of Agricultural Economics 49(3): 334-345.
- M. C. Lemos and A. Agrawal (2009), 'Environmental governance and political science', in Delmas, M. Y., O.R., ed., Governance for the environment. New perspectives, Cambridge, United Kingdom: Cambridge University Press, 69-97.
- V. Marconi, M. Raggi, M. Zavalloni and D. Viaggi (2016), 'Report synthesizing the findings of the CSR level mapping of public good demand and supply, its underlying determinants, producers and beneficiaries Deliverable 3.2 of the Provide Project', in.
- L. Mazza, Bennett, G., De Nocker, L., Gantioler, S., Losarcos, L., Margerison, C., Kaphengst, T., McConville, A., Rayment, M., ten Brink, P., Tucker, G., van Diggelen, R (2011), 'Green Infrastructure Implementation and Efficiency. Final report for the European Commission, DG Environment on Contract ENV.B.2/SER/2010/0059', in, Brussels and London.
- S. L. Morgan (2011), 'Social Learning among Organic Farmers and the Application of the Communities of Practice Framework', The Journal of Agricultural Education and Extension 17(1): 99-112.
- N. Nakicenovic, J. Alcamo, G. Davis, B. de Vries, J. Fenhann, S. Gaffin, K. Gregory, A. Gräbler, T. Yong Jung, T. Kram, E. L. La Rovere, L. Michaelis, S. Mori, T. Morita, W. Pepper, H. Pitcher, L. Price, K. Riahi, A. Roehrl, H.-H. Rogner, A. Sankovski, M. Schlesinger, P. Shukla, S. Smith, R. Swart, S. van Rooijen, N. Victor and Z. Dadi (2000), 'Special Report on Emissions Scenarios: A Special Report of Working Group III of the Intergovernmental Panel on Climate Change', in, Cambridge.
- N. Nakicenovic and R. Swart (2000), 'Special Report on Emissions Scenarios', in Swart, N. N. a. R., ed., Cambridge.

- P. Novo;, B. Slee;, A. Byg;, R. Creaney; and M. Faccioli; (2015), 'Conceptual paper on the 'unpacked' notion of public goods Deliverable D2.2 of the project PROVIDE', in, <u>http://www.provide-project.eu/#publications-section:</u> The James Hutton Institute, Aberdeen, Scottland.
- B. C. O'Neill, E. Kriegler, K. L. Ebi, E. Kemp-Benedict, K. Riahi, D. S. Rothman, B. J. van Ruijven, D. P. van Vuuren, J. Birkmann, K. Kok, M. Levy and W. Solecki (2017), 'The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century', Global Environmental Change 42: 169-180.
- OECD (2010a), 'Agri-environmental policies in OECD countries', in Guidelines for Cost-effective Agrienvironmental Policy Measueres: OECD Publishing.
- OECD (2010b), 'Objectives of agri-environmental policy instruments and criteria for policy evaluation', in Guidelines for cost-effective Agri-environmental policy measures, Paris: OECD Publishing.
- OECD (2010c), 'Tailoring environmental standards, environmental taxes and tradeable permits ', in Guidelines for Cost-effective Agri-environmental Policy Measures, Paris: OECD Publishing.
- OECD (2010d), Taxation, Innovation and the Environment: Oecd Publishing.
- OECD (2013), Providing Agri-environmental Public Goods through Collective Action: OECD Publishing.
- OECD (2015), 'Policy measures for the delivery of agri-environmental public goods', in Public goods and externalities: Agri-environmental policy measures in selected OECD countries, Paris: OECD Publishing.
- G. M. Parkhurst, J. F. Shogren, C. Bastian, P. Kivi, J. Donner and R. B. W. Smith (2002), 'Agglomeration bonus: an incentive mechanism to reunite fragmented habitat for biodiversity conservation', Ecological Economics 41(2): 305-328.
- J. Popp, Z. Lakner, M. Harangi-Rákos and M. Fári (2014), 'The effect of bioenergy expansion: Food, energy, and environment', Renewable and Sustainable Energy Reviews 32: 559-578.
- K. Prager and J. Freese (2009), 'Stakeholder involvement in agri-environmental policy making Learning from a local- and a state-level approach in Germany', Journal of Environmental Management 90: 1154-1167.
- D. K. Ray, N. Ramankutty, N. D. Mueller, P. C. West and J. A. Foley (2012), 'Recent patterns of crop yield growth and stagnation', Nature Communications 3: 1293.
- S. Scheurer (2005), EU Environmental Policy handbook A critical Analysis of EU Environmental Legislation, Brussels: European Environmental Bureau (EEB).
- L. Secco, R. Da Re, D. M. Pettenella and P. Gatto (2014), 'Why and how to measure forest governance at local level: A set of indicators', Forest Policy and Economics 49: 57-71.
- K. Seto, M. Fragkias, B. Güneralp and M. Reilly (2011), 'A Meta-Analysis of Global Urban Land Expansion', PLoS ONE 6((8)).
- R. Steurer (2013), 'Disentangling governance: a synoptic view of regulation by government, business and civil society', Policy Sciences 46(4): 387-410.
- P. K. Thornton (2010), 'Livestock production: recent trends, future prospects', Philosophical Transactions of the Royal Society B: Biological Sciences 365(1554): 2853-2867.
- L. Tyrväinen, E. Mäntymaa and V. Ovaskainen (2014), 'Demand for enhanced forest amenities in private lands: The case of the Ruka-Kuusamo tourism area, Finland', Forest Policy and Economics 47: 4-13.
- UN (2014), World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352): United Nations, Department of Economic and Social Affairs, Population Division.
- UN (2015), 'Worlds Population Prospects. The 2015 revision', in.
- S. Warren and R. Lloyd (2009), 'Civil Society Self-Regulation the global picture', in Briefing Paper number 119, London: one world trust.
- S. Wunder (2005), 'Payments for environmental services: Some nuts and bolts', CIFOR Occasional Paper No. 42.

# 7 Annexes

# 7.1 Annex 1: Scenario narratives by Nakicenovic et al. (2000)

The A1 storyline and scenario family describes a future world of very rapid economic growth, low population growth, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building, and increased cultural and social interactions, with a substantial reduction in regional differences in per capita income. The A1 scenario family develops into four groups that describe alternative directions of technological change in the energy system.<sup>1</sup>

The A2 storyline and scenario family describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in high population growth. Economic development is primarily regionally oriented and per capita economic growth and technological change are more fragmented and slower than in other storylines.

The B1 storyline and scenario family describes a convergent world with the same low population growth as in the A1 storyline, but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies. The emphasis is on global solutions to economic, social, and environmental sustainability, including improved equity, but without additional climate initiatives.

The B2 storyline and scenario family describes a world in which the emphasis is on local solutions to economic, social, and environmental sustainability. It is a world with moderate population growth, intermediate levels of economic development, and less rapid and more diverse technological change than in the B1 and A1 storylines. While the scenario is also oriented toward environmental protection and social equity, it focuses on local and regional levels.

## 7.2 Annex 2: Scenario narratives by O'Neill et al. (2017)

## Middle of the road:

The world follows a path in which social, economic, and technological trends do not shift markedly from historical patterns. Development and income growth proceeds unevenly, with some countries making relatively good progress while others fall short of expectations. Most economies are politically stable. Globally connected markets function imperfectly. Global and national institutions work toward but make slow progress in achieving sustainable development goals, including improved living conditions and access to education, safe water, and health care. Technological development proceeds apace, but without fundamental breakthroughs. Environmental systems experience degradation, although there are some improvements and overall the intensity of resource and energy use declines. Even though fossil fuel dependency decreases slowly, there is no reluctance to use unconventional fossil resources. Global population growth is moderate and levels off in the second half of the century as a consequence of completion of the demographic transition. However, education investments are not high enough to accelerate the transition to low fertility rates in low-income countries and to rapidly slow population growth. This growth, along with income inequality that persists or improves only slowly, continuing societal stratification, and limited social cohesion, maintain challenges to reducing vulnerability to societal and environmental changes and constrain significant advances in sustainable development. These moderate development trends leave the world, on average, facing moderate challenges to mitigation and adaptation, but with significant heterogeneities across and within countries.

#### Sustainability—Taking the green road

The world shifts gradually, but pervasively, toward a more sustainable path, emphasizing more inclusive development that respects perceived environmental boundaries. Increasing evidence of and accounting for the social, cultural, and economic costs of environmental degradation and inequality drive this shift. Management of the global commons slowly improves, facilitated by increasingly effective and persistent cooperation and collaboration of local, national, and international organizations and institutions, the private sector, and civil society. Educational and health investments accelerate the demographic transition, leading to a relatively low population. Beginning with current high-income countries, the emphasis on economic growth shifts toward a broader emphasis on human well-being, even at the expense of somewhat slower economic growth over the

longer term. Driven by an increasing commitment to achieving development goals, inequality is reduced both across and within countries. Investment in environmental technology and changes in tax structures lead to improved resource efficiency, reducing overall energy and resource use and improving environmental conditions over the longer term. Increased investment, financial incentives and changing perceptions make renewable energy more attractive. Consumption is oriented toward low material growth and lower resource and energy intensity. The combination of directed development of environmentally friendly technologies, a favorable outlook for renewable energy, institutions that can facilitate international cooperation, and relatively low energy demand results in relatively low challenges to mitigation. At the same time, the improvements in human well-being, along with strong and flexible global, regional, and national institutions imply low challenges to adaptation.

#### Economic optimism/Fossil-fueled development—Taking the highway

Driven by the economic success of industrialized and emerging economies, this world places increasing faith in competitive markets, innovation and participatory societies to produce rapid technological progress and development of human capital as the path to sustainable development. Global markets are increasingly integrated, with interventions focused on maintaining competition and removing institutional barriers to the participation of disadvantaged population groups. There are also strong investments in health, education, and institutions to enhance human and social capital. At the same time, the push for economic and social development is coupled with the exploitation of abundant fossil fuel resources and the adoption of resource and energy intensive lifestyles around the world. All these factors lead to rapid growth of the global economy. There is faith in the ability to effectively manage social and ecological systems, including by geo-engineering if necessary. While local environmental impacts are addressed effectively by technological solutions, there is relatively little effort to avoid potential global environmental impacts due to a perceived tradeoff with progress on economic development. Global population peaks and declines in the 21st century. Though fertility declines rapidly in developing countries, fertility levels in high income countries are relatively high (at or above replacement level) due to optimistic economic outlooks. International mobility is increased by gradually opening up labor markets as income disparities decrease. The strong reliance on fossil fuels and the lack of global environmental concern result in potentially high challenges to mitigation. The attainment of human development goals, robust economic growth, and highly engineered

infrastructure results in relatively low challenges to adaptation to any potential climate change for all but a few.

#### <u>Regional rivalry—A rocky road</u>

A resurgent nationalism, concerns about competitiveness and security, and regional conflicts push countries to increasingly focus on domestic or, at most, regional issues. This trend is reinforced by the limited number of comparatively weak global institutions, with uneven coordination and cooperation for addressing environmental and other global concerns. Policies shift over time to become increasingly oriented toward national and regional security issues, including barriers to trade, particularly in the energy resource and agricultural markets. Countries focus on achieving energy and food security goals within their own regions at the expense of broader-based development, and in several regions move toward more authoritarian forms of government with highly regulated economies. Investments in education and technological development decline. Economic development is slow, consumption is material-intensive, and inequalities persist or worsen over time, especially in developing countries. There are pockets of extreme poverty alongside pockets of moderate wealth, with many countries struggling to maintain living standards and provide access to safe water, improved sanitation, and health care for disadvantaged populations. A low international priority for addressing environmental concerns leads to strong environmental degradation in some regions. The combination of impeded development and limited environmental concern results in poor progress toward sustainability. Population growth is low in industrialized and high in developing countries. Growing resource intensity and fossil fuel dependency along with difficulty in achieving international cooperation and slow technological change imply high challenges to mitigation. The limited progress on human development, slow income growth, and lack of effective institutions, especially those that can act across regions, implies high challenges to adaptation for many groups in all regions.

# 7.3 Annex 3: Scenario narratives by EPRS (2016)

# Scenario 1 – Economic Optimism

- main objective: economic growth;
- very rapid economic growth;
- rapid technological development;
- rather slow population growth;
- increasing worldwide trade globalisation/free trade;
- PA (Precision agriculture) and other technologies are implemented for the sole goal of higher efficiency;
- PA develops fully, up to the point of autonomous robots and controlling farms (resulting in loss of jobs); and
- policy and legislation create open markets.

Market dynamics play a central role, trade is free and ever more global, and the economy is booming. People rely heavily on technology and witness rapid technological developments. They place trust in technological development and the mechanisms of the market to solve problems, now and in the future. New technologies see fast breakthroughs, meeting little resistance, and technological innovation mainly takes place in the private sector. The market mechanisms govern developments, and bring about increasing risks and phenomena of economic and social inequality. Although there is free trade, the resulting differences in income determine the global access to technology. However, people have faith that technology will in the end – in combination with the market mechanisms – be able to solve issues in the environment as well as social and economic inequality. For example, global food security has improved. And, as long as they show return on investment, technological applications will continue to break through and be rolled out.

A lot of agriculture has moved outside Europe and new 'free' locations are being used. Agriculture left in Europe is fully automated, up to the point of autonomous robots and controlling farms, and PA and other technologies are implemented for the sole goal of higher efficiency

# Scenario 2 - Global sustainable development

- main objective: global sustainability;
- strong economic growth;
- (relatively) slow (global) population growth;
- medium rapid technological development;
- worldwide trade/globalisation/free trade;
- strong global governance government sets sustainability frameworks and targets;

- increasing regulation intensity;
- governments push for behavioural change;
- PA breakthroughs relate to sustainability and equality issues; and
- PA develops fast, semi-autonomous technologies on most farms (cannot take jobs farmers in role of sustainability shepherds).

The protection of the environment and the combat of inequality are of highest importance. These targets are achieved through global cooperation, clear political frameworks, efficient technology and sometimes even behavioural change aimed at sustainability. Sustainability, equality and justice are at the core. Technology contributing to these targets will be adopted. People will therefore be mainly looking for and investing in technologies contributing to "a better world" according to these criteria. There is global governance by strong international institutions and legislation, but applied as frameworks and targets that are then realised by the actors "on the ground".

PA is pushed forward and developing rapidly where it clearly drives sustainability of agriculture forward, and is strongly regulated. It can be found in the city, in the shape of vertical farms, and in the countryside, where every plot of land is attributed to a specific use, be it food production or conservation of nature and biodiversity.

# Scenario 3 - Regional competition

This third fictive scenario, developed as an exploration tool, has the following main characteristics:

- main objective: security;
- slow economic growth;
- rapid population growth;
- slow technological development;
- trade barriers;
- strong national governments;
- to save time and produce more, technology is pushed and accepted in PA;
- we want 'real' products, but when needed, to be self-sufficient, modification is allowed; and
- farmers are seen as important members of the community.

Regions (groups of countries, countries or regions within countries) have taken over. They concentrate on their own direct interests and regional identity, which has caused some interregional or intercultural tension and has made exploiting advantages of scale impossible. Security is paramount and technologies that have not proved themselves in this respect, or technologies promising fast and large-scale change, are not adopted. Instead, technology for efficiency and security is invested in heavily. The local food supply is, for

example, based on the principle of national or local independence, with the environment in second place. PA is utilised to stimulate regional growth and production. Because of the regional scale being dominant, and because of society's demand for food security, some genetic manipulation of plants, soil and weather is accepted, but only when highly monitored. Farmers are regarded as the main assets to make sure we are self-sufficient as a region.

# Scenario 4 - Regional sustainable development

This fourth fictive scenario, developed as an exploration tool, has the following main characteristics:

- main objective: regional sustainability;
- medium to slow economic growth;
- medium population growth;
- slow technological development;
- trade barriers;
- local management, local actors; and
- PA used for food security and sustainability goals.

For problems with the environment and social inequality, solutions are sought at the regional level. The key is a drastic change of lifestyle and decentralisation of government. Everywhere, the main focus is on one's own region – because everyone believes that this is where sustainability can be realised. Decisions arise from idealism rather than fear, the communities are strong and tightly knit. Overall, the paradigm is about small-scale change, and while this has been successful in many respects, the advantages of large (international) scales could not be realised. PA is employed to produce more sustainably and to decrease environmental impact. It has made progress, but farms are not fully automated, due to lack of scale and a generally slower technology progress.