



InnoForEST

Smart information, governance and business innovations for sustainable supply and payment mechanisms for forest ecosystem services

GA no. 763899

D5.1: Interim Ecosystems Service Governance Navigator & Manual for its Use

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Executive summary

Deliverable 5.1 presents an interim Navigator to be used as an internal practical tool for project partners (at this stage). It serves as a guidance to improve understanding on Forest Ecosystem Services (FES) governance innovations. As a matter of fact, the Navigator comprises the **InnoForEst approach**, as it is currently emerging in course of innovation action. The Navigator entails a compendium of “heuristics” understood as a set of practical tools (yet rooted in theory) integrating the project knowledge generation and communication approach to forest ecosystem services (project glossary, analytical framework, fact sheets, typologies, workshops, etc.). It aims at giving orientation, not setting hard rules. The interim Navigator can, of course, also be read by the interested public outside this project for a first impression of the InnoForEst approach.

This deliverable, elaborated under WP5 leadership, has been co-authored with colleagues from the entire project and is thus a true **joint deliverable**. It draws information from the other InnoForEst work packages by integrating their analytical approaches, tools, and methods employed. It reflects on possibilities and limitations, options and alternatives of the elements currently in use. It also builds on the experience of the six Innovation Regions identifying basic patterns of forest ecosystem services governance innovation in practice “that work”. This is a living Navigator which will be periodically reviewed and updated to repeatedly incorporate advances and new understandings of the heuristic tools as they develop.

A project Navigator, as we understand it in InnoForEst, is **strongly rooted in the socio-political context** of the innovations that are studied and cannot instantly be separated from this context. All methods applied are tailored to the innovations to be analysed and further developed. In turn, this also means that a presentation of methods is not complete without outline of the innovations themselves. Hence, this Navigator also includes preliminary empirical orientations based on the regional socio-political innovation contexts including the respective project’s practice and scientific partners, entities we term Innovation Regions. There are InnoForEst Innovation Regions, in which payment schemes for ecosystem services or variants thereof are introduced or developed further, for example, in Finland and Germany. Others rethink the way they convey knowledge about forest ecosystem services, as it happens in Sweden and Austria. In Italy, the provincial forest management agency undertakes efforts to innovate its management practices of their special land-use type, the mid-elevation forest-pasture landscape. Finally, in the Czech and Slovak Innovation Regions, new practices of collective forest management are explored.

We chose a **reporting structure** which may surprise the scientific reader. It is very much linked to our commitment to the innovation contexts. The empirical orientations do not, as is common in scientific writing, follow the elaboration of theory and method. Rather, we want to express the importance of the empirical material by moving it further up in the reporting structure. After the introduction, in section 2, we present an overview of the theoretical background of the project as well as the analytical methods used to come to the empirical orientations. These empirical orientations, based on a Stakeholder Analysis and a Governance Situation Assessment, follow suit in section 3. Section 4 provides a deeper look at the methods used in InnoForEst, including a technology-assessment-based Constructive Innovation Assessment method, experimental Role Board Games, the systematic development of prototypes, and the provision of methods fact sheets for dissemination in practice contexts. In section 5, the Navigator ends with an outlook on plans how to convey the knowledge and methods acquired in the project in training circumstances, practice interactions, as well as the digital innovation platform which InnoForEst is developing.

Non-technical summary

This deliverable **outlines the approach** the InnoForESt project is currently developing in each regional innovation action. It provides all project members and all others interested orientation about the how InnoForESt works. This is the reason why it is called a Navigator.

The report provides overview, examples, and guidance. It is less of a scientific character than a **manual**:

- In **section 2**, we present an overview of ways we do analysis and come to orientations about the reality in the Innovation Regions.
- These orientations, based on the analysis of the stakeholders involved in the Innovation Regions and a first holistic glimpse on the political situations (“Governance Situation Assessment”), follow suit in **section 3**.
- **Section 4** provides a deeper look at the methods used in InnoForESt, including a method for “Constructive Innovation Assessment”, and experiments called “Role Board Games”, as well as for the development of test instances (“prototypes”) for the innovations. A number of fact sheets about the methods employed are also available within this report.
- In **section 5**, we describe which trainings and interactions with practitioners and the digital innovation platform which InnoForESt is developing.

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List of acronyms

AUT	Austria	MAES	Mapping and Assessment of Ecosystems and their Services
ABM	Agent-Based Modelling	MLP	Multi-Level Perspective
AEM	Agri-Environmental Measures	NGO	Non-Governmental Organization
CINA	Constructive Innovation Assessment	Oppla	Operationalisation of Natural Capital and Ecosystem Services
CICES	The Common International Classification of Ecosystem Services	PAT	Provincia Autonoma di Trentino (Autonomous Province of Trentino)
CLC	CORINE Land Cover	PES	Payments for Ecosystem Services
CORINE	Coordination of Information on the Environment	PR	Private
CTA	Constructive Technology Assessment	PSR	Programma di Sviluppo Rurale (Italian Rural Development Programme)
CZR	Czech Republic	QCA	Qualitative Comparative Analysis
D	Deliverable	RBG	Role Board Game
EU	European Union	SA	Stakeholder Analysis
FES	Forest Ecosystem Services	SETFIS	Socio-ecological Technical Forestry Innovation Systems
FIN	Finland	SK	Slovakia
GER	Germany	SME	Small and Medium-sized Enterprises
GIS	Geo-Information Systems	SNA	Social Network Analysis
GSA	Governance Situation Assessment	SWE	Sweden
ITA	Italy	WP	Work package

Deliverables

D2.1 – Deliverable 2.1: Mapping of forest ecosystem services and institutional frameworks, draft report

D3.1 – Deliverable 3.1: Analysis framework for governance of innovation factors in business and policy processes for forest ecosystem services

D4.2 – Deliverable 4.2: Set of reports on CTA workshop findings in case study regions, compiled for ongoing co-design and knowledge exchange

D5.2 – Deliverable 5.2: Report on stakeholders' interests, visions, and concerns

D5.4 – Deliverable 5.4: Design on training events to develop innovation

Work packages

WP2 – Mapping and assessing forest ecosystem services and institutional frameworks

WP3 – Smart ecosystem services governance innovations

WP4 – Innovation platforms for policy and business

WP5 – Innovation process integration

1 Introduction

This InnoForEST Navigator provides **an integrated view on the core approach** chosen by the project partners to observe existing and stimulate new/further innovations of forest ecosystem services (FES) governance. In this interim version, we take stock of what has so far been developed during the first year of the InnoForEST project. It collects, interprets and explains, as well as translates useful strategies for forest ecosystem services governance innovations into practical terms.

We aim for the Navigator to become a **practical tool** both for project-internal and field-wide, external use during and – looking ahead towards the final version – also after the project. The Navigator can be used as a manual, as we provide suggestions for practical application throughout the sections – if work in an Innovation Action is not already straightforward and practical in itself.

As a project, InnoForEST is constructed to further innovations in **six different practice contexts**. We call these practice contexts ‘Innovation Regions’ to connote the totality of practices, stakeholders, policies, and localities that encompass the targeted innovation. The six Innovation Regions revolve around the following innovations:

- **Austria:** exploration of ways to strengthen existing and constructing novel value chains around forest products, potentially including material products (e.g., furniture, tiny houses) as well as educational programmes
- **Finland:** operationalisation of a ‘payments for ecosystem services’ scheme in the form of a habitat bank acting as intermediary for (corporate) investments in forest biodiversity protection
- **Germany:** expanding an existing payment for ecosystem services scheme involving tree planting by investors
- **Italy:** exploration of new ways to improve existing management practices for a specific landscape type: mid-elevation forest-pastures
- **Sweden:** redevelopment of an educational program with a competitive format which should educate school children in forest knowledge in a playful way and let them experience various aspects of forests
- **Czech Republic/Slovakia:** exploration of new ways to manage forests in a collectively-owned, self-organised legal setting.

The innovations pursued in the Innovation Regions selected by the project involve a variety of forest ecosystem services in order to gain a comprehensive **overview of practices ‘that work’** in terms of making our relation to forests more sustainable. Table 1 shows, which services in the broader sense are targeted in which Innovation Region or currently under consideration.

Defining the Navigator

The Navigator should be seen as a practical tool. You can use it as a manual to apply to your innovation to develop it further.

You will find that the Navigator contains different methods to further understand your innovation and its social context. We hope to clarify the applicability of those methods with the help of introductory explanations.

In this report, we have also carved out more **general dimensions of implementing governance innovations** for the provision of forest ecosystem services in different contexts, for example, regarding the types, interests, and visions of stakeholders, and the governance situation into which the innovations are projected.

The report facilitates the coherence of the individual analytical approaches, tools, and methods employed in the project while appreciating their diversity. It reflects on possibilities and limitations, options and alternatives of the elements currently in use.

Thus, drawing on the experiences of the six Innovation Regions, this report helps to identify and clarify basic patterns of forest ecosystem services innovation practice ‘that work’.

Table 1: Ecosystem services targeted in the Innovation Regions

Ecosystem service	Austria	Finland	Germany	Italy	Sweden	CZR/SK
Timber	✓	✓	✓			
Non-timber products			✓			
Carbon			✓			
CO2 sequestration		✓				✓
Water regulation				✓		
Biodiversity	✓	✓				
Natural hazards protection				✓		
Tourism and recreation	✓			✓	✓	
Spiritual values					✓	

The Navigator is also **based** on the stocktaking and assessment of the biophysical and institutional mapping in Europe more generally, as documented in Deliverable 2.1. It will later be refined with additional findings from the tested and reconfigured innovation prototypes in project Work Package 3 (WP), as well as the digital platform development work in WP4. It will **result** in a set of empirically-grounded typologies that offer practical orientation for forest ecosystem services governance innovation interactions. The first explorative version of these typologies is presented in this interim’s version.

When envisaging this report, we have deviated from the typical structure of scientific reporting. Although focused on the theoretical and methodological frameworks on which the InnoForEST approach draws, we opted for a prominent positioning of initial empirical findings to emphasise their centrality. Figure 1 illustrates the various **aspects covered** in this Navigator across the WPs.

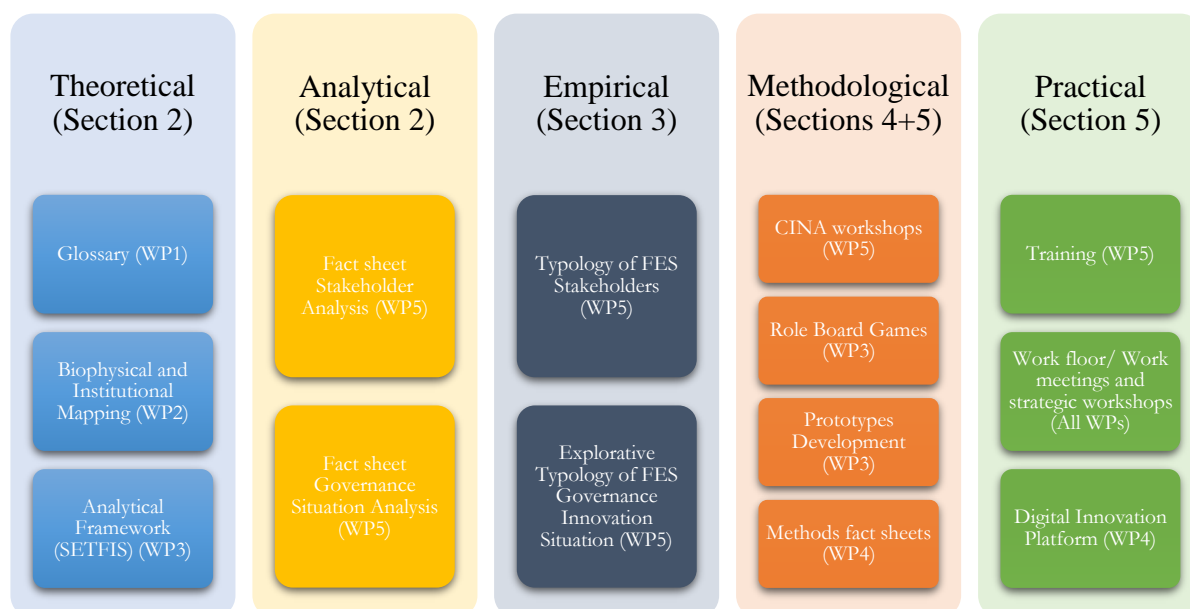


Figure 1: Set of heuristic tools as explained in this Navigator

Section 2 deals with the theoretical frameworks and provides a glossary informing the InnoForESt rationale and language. In addition, two data generation methods are described. When describing methods used within the project, we endeavour to embed these methods in a narrative explaining when and how they can be used as well as what their limitations are. In **section 3**, we present the first results generated in the Innovation Regions. Later, in **sections 4 and 5**, we move on to the methodological background and practical implications of the results produced in InnoForESt so far.

2 Set of heuristic tools

In this section, we present and briefly explain the **heuristics**, by help of which the project has started to explore and assess the six Innovation Regions, the associated political and biophysical circumstances for forest ecosystem services governance innovations in the seven countries where the innovations take place, and the involved actors.

We understand heuristics as a set of **tools to assess and appraise** existing governance situations for forest ecosystem services that serve both the interests of our practice partners and the scientific aspects of the project. Heuristics will thus be presented as a set of 'practical tools' developed by the different WPs which will carve out frame conditions as well as practical activities fostering the sustainable use and provisioning of forest ecosystem services, including their possibilities and limitations, options and alternatives from the major theoretical, methodological, and analytical dimensions.

2.1 Glossary of core terms and heuristics

What is this?

- Large international projects encompassing multi-actor approaches, like InnoForEST, require a **shared terminology** in order to develop a common conceptual understanding.
- This glossary is an alphabetical compendium of **key terms** that are used on a regular basis within the project. It serves as a pivotal element for coherent communication and to be able to link findings within the project.
- The key terms presented in Table 2 were initially given in the InnoForEST proposal, but they have been complemented in the course of the ongoing discussions during the periodic project meetings. The compilation of the glossary is an **ongoing activity** of improving and reviewing shared terminology throughout the course of the project.
- The now common terminology of notions summarized in the glossary will serve as a '*tertium comparationis*', as an **integration** device on project level.

List of heuristic tools

First, we clarify terms which are specific to the InnoForEST project context in a glossary. Then, 4 methods are explained which you can use to analyse your innovation and the context in which you want to introduce or further develop it:

- *Biophysical and institutional mapping*
- *The theoretical framework ('SETFIS')*
- *Stakeholder analysis*
- *Governance situation assessment*

How to use it?

- The concepts presented below offer the chance to get a better idea of what we mean with certain terms **in this project as a whole**, as compared to specific literature or individual use.
- The glossary can be used as a **reference** to enable clarifications during project meetings or workshops with different stakeholders.

Limitations of use

- We are aware that other – in some cases also scientific – meanings of some terms exist, and we do not claim exclusiveness.

- Indeed, the glossary is **neither supposed to replace** the local language, which may have relevance for the actors in the Innovation Regions, nor does it render readers' translation of the notions into the local mindsets and practice contexts unnecessary.

Table 2: Glossary of key terms and concepts used in this Navigator, and their definition characteristic for the InnoForEST project

Key term	Definition
<i>Biophysical and Institutional Mapping</i>	Europe's biophysical forest ecosystem services are well understood on a general level. InnoForEST refines the knowledge base by providing fine-grained maps of the supply of selected, relevant forest ecosystem services in Europe. The institutional mapping component adds knowledge about future societal demand for forest ecosystem services based on public policy. These mapping processes are not a stand-alone effort. They also provide relevant background knowledge for the Innovation Teams to understand and manage their innovation in their specific local context (WP4 and WP5).
<i>Business model</i>	<p>"Representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network" (Shafer, Smith, & Linder 2005: 202)</p> <p>Key components: the sample of strategic choices, the creation of value, the network, and the value preservation</p>
<i>Constructive Innovation Assessment (CINA)</i>	Constructive Innovation Assessment (CINA) is the method for innovation assessment in InnoForEST, inspired by Constructive Technology Assessment (Schot & Rip 1997). It consists of a series of workshop activities, including preparation and evaluation/reflection/learning materials, for multi-stakeholder constructive visioning and assessment of the six governance Innovation Regions in focus.
<i>Digital innovation platform</i>	Digital innovation platforms are virtual spaces for knowledge exchange. As part of the InnoForEST webpage (www.innoforest.eu), each Innovation Region will be provided with a space, which has an open public part presenting the innovation in the respective local language and in English; and a protected space which the innovation teams can use for sharing information with their local network. The digital platform, like a physical one, should serve the stakeholders communication and exchange, and are co-designed with innovation teams.
<i>Ecosystem service governance innovations</i>	The six initial governance innovations in InnoForEST are different Payment schemes for forest Ecosystem Services (PES) and new partnerships/network approaches/ actor alliances. Payment schemes are in focus in Germany, Czech Republic, Finland, and Italy; network/partnership approaches characterise the innovations in Austria, Slovakia, and Sweden.
<i>Ecosystem service governance Navigator</i>	The Ecosystem service governance Navigator has the function for the project to provide an integrated view on the core approach chosen to stimulate and observe innovations of forest ecosystem governance. In this interim's version, we take stock of what has been developed during first year of the project. It collects, interprets and explains, as well as translates useful strategies for forest ecosystem services governance innovations into more practical terms.
<i>Fact sheet</i>	These overviews provide easily accessible information about the diverse set of methods used in InnoForEST. By detailing the processes and suitability of the methods in different phases of an innovation process, the fact sheets present innovators in other innovation contexts with a toolbox to enrich the understanding of their Innovation Region and help them push their innovation.

<i>Factor reconfiguration</i>	Factor reconfiguration means hypothetical or real experimenting with changes in (key) factors when seeking a different design that can potentially work on larger scale or in a different context.
<i>Factors</i>	Factors are “observed conditions or processes that influence the innovation and its development process.” (InnoForEST Deliverable D3.1, p. 3)
<i>FES</i>	Forest Ecosystem Services
<i>Forest Ecosystem Service categories</i>	<ol style="list-style-type: none"> 1. Provisioning: Includes all material outputs from forest ecosystems, such as wood, mushrooms, berries or game. These are tangible things that can be exchanged or traded, as well as consumed or used directly or processed, e.g., for construction, energy or food. 2. Regulating: Includes all the ways in which ecosystems regulate ecosystem characteristics, functions or processes, such as drought resistance, carbon sequestration or water cycles. People benefit from these services directly and indirectly. 3. Cultural: Includes all non-material ecosystem outputs that have symbolic, cultural or intellectual meaning or value (including, e.g., recreation).
<i>Governance Situation Assessment</i>	The governance situation assessment in InnoForEST serves two purposes. Knowing about governance arrangements, histories, structures and processes not only provides an overview of the socio-political context in which an innovation is taking place or is planned, but also lays the groundwork for the development of scenarios that can be used in strategic workshops for the purpose of Constructive Innovation Assessment.
<i>Idealised innovation process</i>	The idealised innovation process depicts what should happen in Innovation Regions in order to best analyse, develop, and foster governance innovations for forest ecosystem service provision. The process consists of three interlinked elements: innovation platforms, networking activities, and workshops.
<i>Innovation Partner (IP)</i>	Refers to the practice partners in Innovation Regions.
<i>Innovation Region (IR)</i>	Refers to the six initial governance Innovation Regions in InnoForEST (formerly ‘Case Study Regions’).
<i>Innovation Team (IT)</i>	Innovation teams (ITs; formerly ‘Case Study Teams’) consist of the science partner and the practice partner who are cooperating in the Innovation Regions.
<i>Matching framework</i>	The matching framework offers methods to assist in innovation/prototype development and assessment, which includes the assessment of their transferability to other places (matching).
<i>Matching tool</i>	<p>The matching tool helps to identify contexts in which certain prototypes have potential to be fed into another context. The methods used for matching could be something very simple like an Excel table or much more complex (e.g., Stakeholder Analysis, Governance Situation Assessment, QCA, SNA, Net-map, etc.).</p> <p>The idea – in this project – is to develop a European matching tool to identify places with potential for innovations, e.g., as web-based devise, potentially to be integrated into the Oppla website¹.</p>
<i>Partners: Practice partners Science partners</i>	Together, as multi-actor teams, practice and science partners facilitate the innovation processes in the six Innovation Regions, starting as regional

¹ www.openness-project.eu/oppla [29 January 2019]

innovation network approaches that become scaled up (and interconnected) to national and to EU-wide networks on good innovation practices for exchange and learning.

Practice partners provide or establish the innovation network and stimulate the forest ecosystem services governance innovation idea. All scientific work and effort is supposed to contribute to the practice partners' objectives. Practice partners include public policy agencies, private forest owners and enterprises, industry partners, environmental NGOs, as well as tourism and hunting associations.

Science partners are research institutes from – or linked to – the six Innovation Regions collaborating with the practice partner to analyse and support the innovations scientifically.

Prototype

A prototype refers to a vision (a scenario, scenario narrative, and model) that describes the future development of the governance innovation in focus. Future development directions are agreed upon by the innovation teams and stakeholders of the governance innovation in terms of its upgrading and upscaling potentials. A prototype is based on the reconfiguration of factors that improve the initial innovation. Prototypes of innovations are different from the initial innovation as they are a future vision, that allows for an abstraction of conditions (i.e., decontextualized from the initial innovation context).

Role Board Games (RBG)

A Role Board Game is used for testing the innovation factors as well as testing and making visible behavioural changes of stakeholders in different settings. It also facilitates the stakeholders (or partners) to learn from each other during the game and to develop a mutual understanding. This is expected to foster innovations and problem solution strategies and sustainability-oriented behaviour, from individual towards collective level which, ideally, enables more sustainable behaviour of all stakeholders involved.

Scenario

A scenario, as InnoForEST understands it, is at the same time a 'useful fiction' and a 'holding device'. A 'useful fiction' is a coherent story or plot of a world, in which the innovation has taken on a specific shape. A 'holding device' is a condensation of what is known about one specific possible development. In other words, a scenario is a thoughtful, systematic, rich mixture of creativity based on prior knowledge of the governance situation. See section 5.1 for more detail.

Socio-ecological technical forestry innovation systems (SETFIS)

This is the analysis framework for the governance of policy and business innovation types and conditions. It serves as an analytical lens to support the exploration of influencing factors on governance innovations to secure a sustainable provision of forest ecosystem services. The creation of the analysis framework builds on the idea of complex processes within linked social-ecological-technical-forestry-innovation systems (SETFIS) of the InnoForEST Innovation Regions.

Stakeholder Analysis

InnoForEST has carried out a stakeholder analysis for each Innovation Region. Such a mapping exercise is meant to find out about a broad range of stakeholder categories. It is necessary to have a broad, exploratory range as characteristics that are (potentially) important when shaping or fostering the governance innovation processes will differ across innovation contexts.

Strategic workshop

Constructive Innovation Assessment (see elsewhere in this glossary) is carried out in strategic workshops. As opposed to regular work floor in-

	teractions, these strategic workshops are characterised by a careful preparation including the (further) development of scenarios representing possible innovation prototypes.
<i>Support products</i>	InnoForEST produces a range of tailor-made support products that assist workshop activities and networks. These products are available at different points in time and relate to different innovation activities. Science partners in Innovation Teams function as translators for scientific support requests. Products are listed in the Appendix presenting “The idealised innovation process” and will be available on the digital innovation platform.
<i>Training</i>	InnoForEST’s approach will be translated into a training manual for practitioners. The training materials are based on internal training sessions as well as other products and deliverables of the project. This contributes to InnoForEST’s sustainability and enables the transfer of the approach to other innovation contexts.
<i>Typology of Forest Ecosystem Services Governance Innovation Situation</i>	The assessment of the governance situations in the Innovation Regions delivered a preliminary typology of governance innovation situations (see elsewhere in this glossary). Eleven categories were distinguished to meaningfully compare governance situations across such different innovation contexts. Based on the innovation analytical approach taken in InnoForEST, these categories cover different levels of the socio-technical system that is the innovation, e.g. regime, niche, and landscape developments. In addition, it maps the core issues in the innovation context and assesses their structuredness (see Fact sheet on Governance Situation Assessment for more details).
<i>Typology of Forest Ecosystem Services stakeholders</i>	Based on a thorough stakeholder analysis in InnoForEST’s Innovation Regions, patterns of stakeholders as well as “odd men out” were distinguished. The typology differentiates between stakeholders’ (a) sphere, (b) business type, (c) scale, and a qualitative assessment of their (d) openness to innovation.
<i>Work floor/ work meetings</i>	As opposed to strategic workshops, work floor or work meetings are all interactions between the Innovation Team and stakeholders that are not linked immediately to the discussion of scenarios. Think of simple phone calls to catch up with certain stakeholders, discussions in preparation of workshops or bringing stakeholders in contact with each other.

2.2 Biophysical and institutional mapping

What is this?

As both ecological and institutional contexts matter for innovations in the forest sector, InnoForEST captures both and provides a **first basis for a more context-relevant analysis** of innovation evolution, which potentially spurs innovations. In general, there is a good spatial understanding of Europe’s biophysical forest ecosystem services (Maes et al. 2013), but ecosystem service supply and demand have been matched only as rough estimates of scarcity (Burkhard et al. 2012). What is missing, so far, is a thorough analysis of the societal demand for forest ecosystem services, as expressed in policy.

InnoForEST D2.1 proposes that **societal demand** can be derived from formal goals and argumentation in public strategies and laws, as these are the results of processes engaging societal actors and experts. In the past years, several European policies have gradually taken up the notion of ecosystem services, and the European Forest Strategy fares well in reference to and integration of the term (Bouwma et al. 2018).

To complement this understanding, InnoForEST analyses the ways in which national forest related policies recognise forest ecosystem services and how this recognition coincides with biophysical ecosystem service supply at the spatial scale.

The biophysical mapping of forest ecosystem services focuses on the supply of ecosystem services, identifies the **relevant services and defines indicators** to map the selected ones. Pan-European maps are produced using the ‘Common International Classification of Ecosystem Services’ (CICES) as well as the ‘Mapping and Assessment of Ecosystems and their Services’ (MAES) indicators using ‘Coordination of Information on the Environment Land Cover’ (CORINE or CLC) and MAES data and published literature, as reported in D2.1. The relevant forest ecosystem **services** are:

Ecosystem services and their measurement

What are ecosystem services?

Ecosystems – forests in the case of InnoForEST – provide a range of goods and services that contribute to the long-term benefit of society. These goods and services are termed ‘ecosystem services’.

How are these measured?

There are different classifications of ecosystem services. For our biophysical and institutional mapping, we have used mainly two classification systems, namely ‘The Common International Classification of Ecosystem Services’ (CICES) and ‘Mapping and Assessment of Ecosystems and their Services’ (MAES).

- Presence of plants, mushrooms and game
- Biomass
- Bioenergy
- Mass stabilization and control of erosion rates
- Water retention potential
- Pollination potential
- Habitat maintenance/protection
- Soil organic matter
- Carbon storage
- Experiential and recreational use
- Symbolic value.

The institutional mapping is designed to **identify future societal demand** for forest ecosystem services, as formalized and expressed in policy, i.e., policy demand. The policy demand is analysed through detailed policy document analysis, for which a protocol and database are developed and reported in D2.1. The mapping focuses on forest strategies in the Innovation Regions and their countries as well as in other forested countries of Europe. Also, biodiversity strategies and bioeconomy strategies are analysed in the Innovation Regions or their countries.

Based on the combination of biophysical and institutional mapping, InnoForEST recognizes the **connection between abundance or scarcity** of forest ecosystem services and their coincidence **with strategic commitment to innovations** and new governance mechanisms. The mapping supports the transfer of innovation as well as upscaling and further co-learning in comparative high potential context regions.

How to use it?

- InnoForEST innovations can be **included in the output map** as pins with pop-up boxes of information.
- Innovation Teams and Innovation Regions in InnoForEST and beyond can **look for similar** forest ecosystem services and/or institutional conditions for transferring their ideas.

- Innovation promoters, such as policy-makers can **look for biophysical and institutionally favourable** innovation and governance settings for the promotion of sustainable use and provision of ecosystem services.

Limitations for use

- The six InnoForEST innovations provide much detailed understanding of innovation processes, but this kind of rich data cannot be mapped.
- The mapping is **coordinated with InnoForEST's sister project SINCERE²**, to include over a hundred innovations as pins onto the map. If this does not eventuate, the map will include relatively little about innovations.

2.3 Social-Ecological-Technical Forestry Innovation Systems (SETFIS)

What is this?

For a better understanding of governance innovations, an **analysis framework** is being developed for explaining the emergence, growth, and spread of successful governance innovations for the sustainable provision of forest ecosystem services. It helps practice partners and scientists alike to gain a good understanding of what has led to the innovation in the region, and the necessary context conditions. Building on the hypothesis that this kind of governance innovations emerge in interconnected social-ecological-technical forestry systems, the analysis framework serves as an **analytical lens to explore** essential direct and indirect positive and negative factors influencing governance innovation types and conditions. Insights from this analysis support project partners and political decision-makers in two ways:

- a) **Retrospectively**, to gain a good understanding of the emergence and development of forest governance innovations (i.e., what factors have influenced the innovation, from early ideas of its emergence and its developments until now); and
- b) **Prospectively**, on conditions enabling their upscaling and upgrading potentials (i.e., what is needed for a similar innovation elsewhere, or an improved version of the innovation in the current context; how to reduce risks for failure).

To date, links between the provision of forest ecosystem services change depending on demand and supply structures, including **socio-economic determinants** (e.g.,

from bioeconomy or diversification of societal interests for forest uses) and **governance strategies** (type of policy instruments, multi-level and multi-sector interactions), which have been defined mostly on a conceptual level (e.g., De Groot et al. 2010; Potschin & Haines-Young 2011; Van Oudenhoven et al. 2012). Governance of ecosystem services has also been conceptualised (Primmer et al. 2015), and institutional constraints on applying the concepts have been recognised; including competing interests,

SETFIS framework

This is the theoretical background on which InnoForEST is built. You can think of it as a pair of glasses through which we look at innovation development in the six regions. With it, we can better understand how certain forest ecosystem services innovations came to be and how to support the implementation of other innovations.

The framework is a combination of two perspectives: social-ecological systems theory and socio-technical systems theory. Both theories have different starting points and come from different scientific disciplines, despite their similarity in name.

constraints on applying the concepts have been recognised; including competing interests,

² “Spurring INnovations for forest eCosystem sERVICES in Europe”

scientific disputes, professional norms and competencies (Saarikoski et al. 2018). Specifically, boreal forest ecosystem services have been organised with the conceptualisations (Saarikoski et al. 2015).

However, systematic connections between social, biophysical, and technological factors have not been analysed with a focus on institutions and governance, let alone innovations. **Socio-technical systems** are crucial for the provision of forest ecosystem services, as information and communication technology is part of ecosystem service infrastructure and exchange processes (cf. Smith & Stirling 2010). Consequently, our SETFIS (Social-Ecological-Technical Forestry Innovation System) framework builds on – and combines – theories and concepts in the realm of **social-ecological systems** (e.g., McGinnis & Ostrom 2014; Ostrom 2011), **institutional economics** (e.g., Hagedorn 2008; North 1990), **environmental and transformation governance** (e.g., Armitage et al. 2009; Gunderson 2002; Jordan 2001; Kemp et al. 2007; Olsson et al. 2004), and **socio-technical and innovation systems** (Asheim et al. 2011; Geels & Schot 2007; Voß & Fischer 2006) to describe the complexity of linked subsystem dimensions, their interactions and impacts on the functioning of governance innovations. Further, concepts with direct relevance to forest ecosystem services, addressing their governance (Primmer et al. 2015), including multiple-levels, multiple actors, and multiple rationalities (Loft et al. 2015) are integrated.

The analysis framework addresses **biophysical, institutional, and technical forestry system dimensions** (see Figure 2). In addition, the framework also includes respective sets of **fostering and hindering factors** that may influence governance innovation dynamics. Thus, the analysis framework serves to collect information on historical developments, and assumptions of future developments of the innovation. In order to so, we translate the dimensions and factors into qualitative questions to identify and explain how innovations emerge, develop, and unfold in a co-created way. As Inno-ForEST builds on the multi-actor approach (cf. Lang et al. 2012; Scholz & Steiner 2015), continuous knowledge exchange between interdisciplinary science, and multi-sector and multi-level practice partners, is managed at all project stages.

This co-creation of knowledge helps explicating the **connection and interrelation** between social-ecological-technical influences on governance innovations in a holistic and stakeholder-oriented way (cf. McGinnis & Ostrom 2014).

The framework, as shown in Figure 2, will be **empirically applied** to the six Innovation Regions. In form of qualitative interviews and/or as part of strategic workshops, stakeholders reveal the development history of ‘their’ governance innovation and are guided through the exploration of the forestry innovation system. In this process, both scientists and practitioners gain a good understanding of past-present innovation dynamics, which enables them to purposefully create innovation-friendly system conditions, such as the adaptation of key influencing factors that are favouring certain intended development paths.

Through the analysis, the dimension/factor interdependencies are revealed, and adjustment possibilities of crucial influencing factors can be elaborated together with stakeholders for road mapping strategies, depending on the vision and ideas of participating actors. As such, the analysis framework **supports collecting information in a comparable way** over six Innovation Regions by analysing, diagnosing, explaining, and predicting system dimensions, influencing factors, outcomes, and requirements for governance innovations to emerge, develop, and work in an intended way.

These insights are the basis for fostering and improving governance innovations and respective policy and business recommendations that create enabling conditions for the sustainable provision of forest ecosystem services. For example, policy makers gain

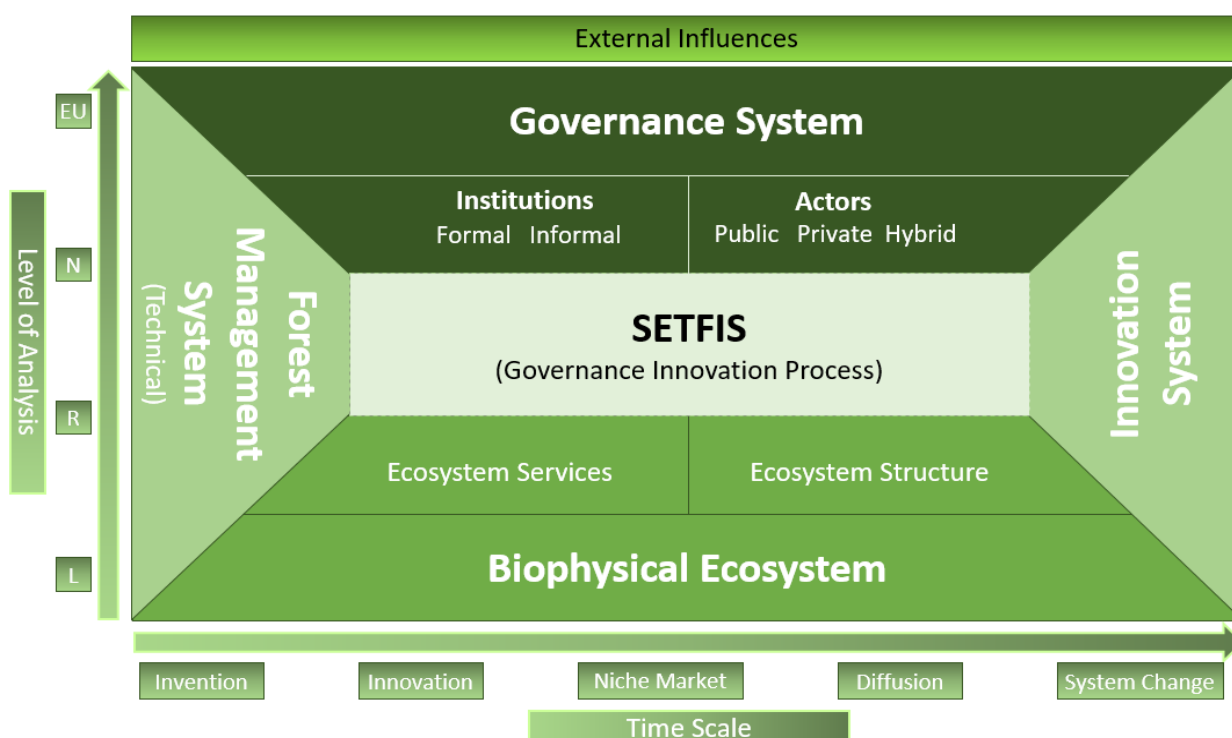


Figure 2: Analysis framework for ecosystem services governance innovations

a better understanding of which governance mechanisms or instruments work best under what conditions and in in which context to encourage and foster innovations and their uptake in the forestry sector. The implications for forest owners, and other local stakeholders, are to diversify their product and service portfolios.

Ideally, service providers in the Innovation Regions benefit from new business opportunities, the creation of new income streams, and job possibilities.

By creating incentives (e.g., through payments for ecosystem services) for better and more sustainable forest management impacts for society are an increased public good and/or common pool forest ecosystem services provisioning, such as carbon storage, maintenance, and improvement of biodiversity habitat, recreational opportunities, etc.

How to use it?

- **Application of the framework:** The analysis framework serves as a checklist for comprehensively analysing the dimension and factors that have influenced governance innovations in a region, i.e., developments from early ideas to its current status. The framework also offers a set of questions (Appendix of framework document D3.1) asking for current information available, insights into historical developments, and assumptions of future developments of the innovation in focus.
- **Data generation and analysis:** Information about innovation developments is generated, for example, with help of individual experiences, semi-structured interviews, focus groups or workshops with key stakeholders in Innovation Regions. The question catalogue helps to categorise and evaluate the influence of dimensions/factors that played out in certain regions and particular contexts.

- **Translating results into future steps & strategies:** Results are translated into future steps for action for concerned stakeholders in Innovation Regions. Based on an overview on crucial influencing factors, the ones that are developed well, the ones with potential to improve, or new opportunities, as well as challenges and threats and for future innovation development, strategies for creating favourable conditions can be jointly developed in a structured and targeted way.

Limitations for use

- **Orientation, not prescriptive:** The set of questions is meant as an orientation to elaborate on factors influencing innovation. The set is designed to detect further influences which are deemed important by stakeholders. We inserted open questions in each set of questions to improve our understanding of governance innovations design and functioning, and to improve the conceptual understanding of innovation development. Also, not every question has to be asked, in particular when information has been already gathered by other project activities.
- **Dimensions, no sequence:** The sequence of analysis questions does not need to follow the sequence of dimensions as presented in this guideline; interviewees are free to reshuffle, combine questions or change them to ‘yes-no’ answers to ease the evaluation. However, for reasons of comparability among the different Innovation Regions, all dimensions should be covered in innovation assessment.

2.4 Fact sheet InnoForEST Stakeholder Analysis

What is this?

- This tool describes the analytical framework and provides practical guidance for **identifying** (potentially) **relevant stakeholders** in an innovation region and
- for assessing their characteristics including their **interests, visions, and concerns** as well as interlinkages between them.
- While the main focus lies on stakeholders at the **local and regional** level, the tool can also be used to identify and assess relevant **national** or **European/global** stakeholders.
- The generic Stakeholder Analysis carried out here will be one **cornerstone** of the subsequent Governance Situation Assessment (cf. section 2.5 below), it allows for **comparative** analyses of relevant characteristics and stakeholder types across Innovation Regions, and
- contributes to the development of a corresponding Stakeholder Analysis **cutting across the entire project**.

How to use it?

- In practice, this tool suggests, first, a broad and rather **comprehensive list** of stakeholders and stakeholder types potentially relevant for fostering or hampering the governance innovation (process) in an Innovation Region. This does not mean that all stakeholder types are likely to be relevant in each and every Innovation Region and thus would need to be analysed in depth. Rather, it can be seen as some kind of ‘check list’ innovation teams can use to decide which stakeholder (groups) might be relevant and thus would need to be considered in the Stakeholder Analysis in their Innovation Region. At the same time, this list can be complemented by stakeholders not yet featured in the list, but with high relevance for the respective governance innovation.

- Second, the tool provides an extensive overview of analytic categories to be covered by the empirical analysis, i.e., the potentially **relevant stakeholder characteristics**. Again, this is meant to be an initial starting point for, for example, designing semi-structured interview guidelines. Again, it can be complemented with questions about additional characteristics considered relevant for the governance innovation under scrutiny.
- Third, a diverse **set of empirical approaches** is suggested, from which innovation teams can choose when planning the Stakeholder Analysis. Which approach to choose certainly depends, among others, on the already existing knowledge of stakeholder constellations and stakeholder interests and characteristics, the resources available to carry out such a Stakeholder Analysis, and the number and types of stakeholders to be covered.

Fact sheet **InnoForEST**

Stakeholder Analysis



Christian Schleyer, Peter Stegmaier, Jutta Kister, Michael Klingler, Ewert Aukes

1. Main purpose of Stakeholder Analysis in InnoForEST

The **project aims** for an integrated approach to knowledge generation, stakeholder interaction, and triggering governance innovation. Thus, it is crucial to identify and map a diversity of stakeholder characteristics, including their interests, visions, and concerns (e.g. civil society perceptions, user demands, facilitators' suggestions etc.) both regarding forest ecosystem services and in general. The stakeholder analysis is not carried out by an external party coming into the Innovation Region, but by the Innovation Team itself, as it already has a feeling for potential conflicts and sensitivities in the Region. Findings from the stakeholder analysis feed into a typology for understanding the bigger picture and comparing the innovations. As a second aim, a deeper understanding of the stakeholder constellations in an Innovation Region enables a confident and cognisant facilitation of the co-production process of the innovation.

In this fact sheet, we focus on the initial analysis of forest ecosystem services' stakeholders constellations in the Innovation Regions at the beginning of the project. The findings are compiled in D5.2 (month 12).

2. Typology and analysis of FES stakeholders (T5.2 / D5.2)

2.1 For InnoForEST's innovation actions to be successful, relevant stakeholders need to concur with and participate in the innovation process. To realize this ambition, we need to know who the respective Innovation Region's stakeholders are, how they are interlinked, and what their interests, visions, and concerns are.

In practice, Innovation Teams are chiefly **responsible** for the empirical work. To allow for the comparison of stakeholder constellations across Innovation Regions, the categories of the stakeholder analysis have to be harmonised somewhat (i.e. targeted stakeholder types, analytical categories for stakeholder characteristics and appropriate empirical methods). While harmonisation for the purpose of comparison is necessary, we have made sure that the special characteristics and peculiarities of the Innovation Regions are still visible and reflected in the findings. This will lead to the development of a cross-cutting stakeholder typology. This typology will also feed into the T5.1 interim *forest ecosystem services governance innovation Navigator* (due in month 15) (see *fact sheet on Governance Situation Assessment – T5.1/T4.2/D4.2/D5.1*).

Note that the results of the individual stakeholder analyses are crucial ingredients for the innovation processes: Innovation Teams need them to plan the innovation co-production activities.

The Innovation Teams probably have some level of knowledge about the relevant stakeholders already. Whatever actual or perceived knowledge gaps exist on part of the Innovation Teams influences the data gathering method as well as the categories used to analyse those data. In addition, which stakeholders to interview or to enquire about as part of the Stakeholder Analysis depends on the required knowledge and expertise.

2.2 In the following, we suggest a list of a) stakeholder types to be considered; b) analytic categories; and c) a range of possible empirical approaches to be covered:

- a) **Stakeholder types** that might be considered in the Stakeholder Analysis include (not restricted to; might be partly overlapping):
- *Forest owners (public, private, collective)*
 - *Land owners (outside forests) (public, private, collective)*
 - *Forest managers/farmers managers (might overlap with owners, but not necessarily so)*
 - *Protected Areas organisations (National Parks, biosphere reserves, etc.)*
 - *Public administration (national, regional, local)*
 - *Civil society actors (NGOs, forestry organisations, environmental, nature conservation, tourism; hunting, leisure, sport, other interest groups)*
 - *Municipalities (local community, villages)*
 - *Forestry industry, including sawmills and other major wood-processing; wood traders*
 - *Small or Medium Enterprises (SME), e.g., (wood) craftsmen, carpenters, (wood)-designers, tree-nurseries*
 - *Networks for forestry or wood processing, federations of forest-/wood-related companies*
 - *Consumers, including various types of tourists (day tourists, over-night tourists; hunters, youth organisations, 'everybody', locals)*
 - *Scientific/Research organisations (universities, research institutes)*
 - *Educational stakeholders (kindergartens, schools, universities)*
 - *Tourism industry/enterprises*
 - *Locals (using forests through collecting wood, fruits, mushrooms; for leisure and recreation; traditional use; religious use)*
 - *Financial enterprises (e.g., banks, funding agencies; business support funds).*

There are many ways to **categorise** and 'sort' **stakeholders**. For example, they may have different actual or potential roles with respect to the governance innovation (process) under scrutiny, e.g. funders, implementers, or mediators/intermediaries. They may come from different societal spheres, such as public/state, private sector, and civil society; or they might be (actual or potential) beneficiaries of, or (negatively) affected by the innovation. Further, they might be situated and active at various spatial and administrative scales, such as local/regional, national, or perhaps even international – and some might even be active at several scales at the same time. Furthermore, they might be enablers of the governance innovation, or slow down and oppose the innovation (process). Finally, the different stakeholder groups might also hold different levels of power to influence the innovation and affect its governance.

Indeed, the first step of the Stakeholder Analysis is to **identify** those actors that are actually or potentially involved in or affected by the governance innovation in the respective Innovation Region and at what levels and different realms they operate.

- b) Some stakeholder characteristics may refer to individual stakeholders, others more to the organisation, administration, or interest group they represent; sometimes both will be relevant, and perhaps distinct. Some of the characteristics might be directly related to the governance innovation, others might be

more or less independent. If possible and appropriate for the individual Innovation Region, the analysis should shed light on the following characteristics for each type of stakeholder identified as relevant:

- *Interests and motivations with respect to forest ecosystem services, forest governance, and the governance innovation*
- *Actual or potential role and influence/role within its organisation, within forest governance and, if applicable, the governance innovation*
- *Knowledge, competencies, educational background*
- *Power and other resources (incl. positional power, coercion, financial); control over resources*
- *How and to what degree affected by forest governance or the governance innovation (positively or negatively; politically, scientifically, financially)*
- *Forms and means of communication employed between relevant stakeholders*
- *Visions with respect to management and use of forest ecosystem services, forest governance, and the governance innovation*
- *Concerns with respect to management and use of forest ecosystem services, forest governance, and the governance innovation*
- *Differentiated rights to access forest and forest resources.*

c) There is a **wide range of empirical tools and methods** that can be used to identify, describe, and assess stakeholder interests, visions, and concerns. Empirical **approaches** for Stakeholder Analysis include identifying and analysing written sources, such as relevant published research, legal documents, planning materials, policy documents, etc. Particularly fruitful are:

- (a) additional interviews: these can be exploratory, open, semi-structured; with all or a selection of relevant stakeholders; face-to-face or by telephone;
- (b) group interactions: focus group discussions, other kinds of workshops, meetings with practice partners, and
- (c) surveys.

These approaches may be employed by themselves or in combination. Which method(s) to choose, **depends** on several factors. These factors include: the time and personnel available for the analysis; the intended degree of detail and comprehensiveness of the results; the availability and quality of relevant previous stakeholder analyses; and the complexity of the stakeholder context.

2.3 Time schedule

What	Who	Deadline
Draft heuristic for each innovation team (stakeholder types and categories, analytical framework for stakeholder characteristics, and empirical methods suitable)		
Discussion, revision of heuristic		
Pre-final heuristics for innovation teams; Example: Fact sheet on Austrian case study (Eisenwurzen)		
Case-specific implementation plans, i.e., translation of heuristic in Innovation Region-specific plans for Stakeholder Analysis (iterative process)		
Carrying out Stakeholder Analysis at Innovation Region level <ul style="list-style-type: none"> – Stakeholder descriptions – Sorting 		
Compiling the results of Stakeholder Analysis at Innovation Region level – draft Innovation Region report		

Discussion, and perhaps revision of Stakeholder Analysis Innovation Region level		
Cross-Innovation Region comparison, typology, integration of biophysical and institutional mapping re- sults (Stakeholder Analysis national/EU levels) – draft re- port		

Limitations for use

- Although the tool neither prescribes a concrete number of stakeholders to be analysed, nor the level of detail on which to explore stakeholder characteristics, nor the empirical approach for collecting the stakeholder-relevant information, the sheer **range of potential stakeholders and their characteristics** potentially worthwhile to investigate may be perceived as overwhelming by the innovation teams.
- **Time and other resources** may be critical on part of the Innovation Teams, or the team members tasked to carry out the Stakeholder Analysis. First-hand experiences with some of the empirical methods suggested may be limited. Here, a careful, yet thorough assessment of the knowledge gaps with respect to stakeholders and their characteristics and their relevance for the governance innovation under scrutiny is needed to enable the innovation team to choose the appropriate range and level of their empirical approach.
- **Synergies** with the concrete way of carrying out the Governance Situation Assessment that builds upon the Stakeholder Analysis will need to be explored.
- Even a carefully and properly conducted Stakeholder Analysis will only be able to capture the status quo. With the governance innovation process progressing, stakeholder constellations may **change**, as may the vested, specific interests of stakeholders involved in the process. Thus, procedures would need to be defined for updating and/or expanding the Stakeholder Analysis to account for the changes in context or focus of the respective governance innovation (process).

2.5 Fact sheet on Governance Situation Assessment

What is this?

- **Mapping:** This tool shall give **orientation** for carrying out the analysis of the governance situations, into which forest ecosystem services innovations may be placed.
- **Process, situation, and change in focus:** It combines a situational view on the constellation of stakeholders currently involved and their relations with the dynamic perspective of the prior, current, and future (planned, imagined, expected) developments.
- This heuristic **builds** upon the generic Stakeholder Analysis (cf. section 2.4 above), while now also **emphasising the politics** regarding what innovation shall be pursued and which role might be played by whom.
- It conceptually **anticipates** the SETFIS framework, which is better useable at a later stage in the innovation trajectory when more knowledge has been gathered and the nature of the innovation has become clearer, thus has the role of a ‘SETFIS-light’ or SETFIS starter-kit.

How to use it?

- Analysts should use this “heuristic” as a guideline to include all crucial dimensions of the starting situation. It is a lens for **discovering** the situation, not a ready-made explanation of what the case is.
- It helps to assess the situation in direct view of **preparing** activities and meetings in the Innovation Region with the stakeholders.
- It has a particular value **for the CINA workshops** (cf. sections 4.4 and 5.1) and the scenarios to be elaborated based on the results of the work with the stakeholders.
- It helps to **sketch the conditions** under which any option for pursuing an innovation needs to be seen.
- It anchors the CINA **scenarios** in the (political, business) reality.

Further suggestions about how to use this heuristic are explained in the fact sheet itself.

A. Assessing the governance situation: topics



Ewert Aukes, Peter Stegmaier, Christian Schleyer

This is a set of **guiding questions** that should assist you to get a more comprehensive idea about the situation that characterises the innovation you are trying to tackle and foster in your Innovation Region. Topics 1 and 2 are the link to the Stakeholder Analysis (SA).

We are speaking of the ‘forest ecosystem governance innovation’, in brief: “the innovation”. We are speaking of ‘actors’, because it may be worth looking beyond the stakeholders already identified. The upcoming abbreviation GSA means Governance Situation Assessment.

It might be enough to describe the situation on one page per topic. Use more pages and be more detailed if convenient.

If anything is unclear, please, do not hesitate consulting with Peter, Ewert, or Christian!

Topic 1: Actors

(In the SA, the actors are mapped as such; here, the focus is on their roles and interests in the governance/policy-making; so, what’s the actors’ political (in the broadest sense) agenda, etc.)

- Which actors are currently involved in the innovation? (Just fill in a table, please; in order to avoid redundancy, you can refer to the Stakeholder Analysis for more detail!)
- How do they perceive the innovation?
- How do they perceive other actors and the interactions with them?
- Are there actors who are (purposely or unintentionally) excluded from involvement in the innovation? If so, why?

Topic 2: Actor interactions

(Emphasis here is on how actors play together/against each other; crucial to know regarding the political atmosphere)

- What is the general character of the interactions among actors? Are there long-standing business or policy relations or rather recent ones; are there (a) permanent, (b) temporary, (c) formal, (d) informal occasions (or combinations), on which actors meet and interact? Which are they?
- Are relationships cooperative or competitive, asymmetrical or symmetrical (referring to aspects of power)? Are there relationships or interactions which are rather conflictual among specific actors; are there tensions; if yes, which and among whom?
- Which issues do actors mainly discuss when they interact? What's at the core when they talk to each other?
- Are there actor alliances that pursue or at least support the innovation – or such that work against it? Specify!
- Are there specific actor relationships which are more/less fruitful than others? Specify!
- How do actors deal with disagreements and conflict situations? Please give examples!

Topic 3: History of the innovation

(You could use a timeline here, e.g., in form of a table listing the main features of the process line-by-line.)

- What is the innovation's history: (a) main phases, (b) main events, (c) previous efforts, (d) drawbacks, (e) founding narrative or 'myth'? Could you also characterise the process of change/innovation?
- Who initiated the innovation? How?
- How did the innovation come to be accepted as such by the involved actors?
- How has the actor constellation changed over time?
- How have changes in the social context of the innovation changed its course or made adaptation of the innovation necessary?
- How has non-forest ecosystem services governance changed? Has this made adaptation of the innovation necessary?
- Is the innovation based on any similar governance pattern somewhere else?
- Has it been derived up from a totally different context?
- Which are the main (and the secondary) physical and ecological conditions under which forest ecosystem services governance developed in the past in your case?

Topic 4: Current situation of the innovation

- Which activities currently constitute the innovation process?
- Which policy instruments are currently used (or associated with) the innovation?
- What is currently perceived as key problems now to take care of regarding the innovation in the Innovation Region (by the stakeholders)?
- In terms of some imaginary project life cycle, at what point has the innovation now arrived for the key actors? Same for all?
- Has the innovation so far produced any unintended side effects?
- Are there any parallel developments that are (more or less) competing with this innovation?
- How is the innovation perceived in its direct and indirect social environment: (a) overall public image/perception, (b) support, (c) critique?
- Which are the main (and the secondary) physical and ecological conditions under which forest ecosystem services governance currently functions (more or less well)?

Topic 5: Expected developments for the innovation

(This could be core to the alternative workshop scenarios!)

- Is the journey of the innovation presently seen rather open-ended or closed – according (a) to the main stakeholders' views and (b) to your view as observers?
- Do you expect moments at which large choices have to be made which may (radically) influence the direction the project takes? If so, how would one know?
- Which problems with the innovation are perceived and which solutions are currently discussed (and which ones not?)
- Is the innovation part of or connected to a more general development in the broader landscape (trends, events, external pressures, etc.)?
-
- Which are the trends and directions towards which the main (and the secondary) physical and ecological conditions under which forest ecosystem services governance function?



B. Assessing the governance situation: the key problem structure

This part aims at identifying the **problem structure** of the case: the main struggles and agreements. If you know these, you basically address them strategically.

Look back into part A and collect the current key problem issues in the advancement of the innovation in your case studies. „[P]eople's involvement is mediated by problems that affect them“ (Marres 2007: 759). They mobilise such problem issues and are mobilised through them when dealing with public affairs. **Key problem issues** are those aspects of the innovation or its context that are perceived and eventually communicated in the Innovation Region as to be taken care of.

These problem issues most likely refer to a set of barriers/obstructions that need to be tackled in order to advance the innovation. They may actually characterise the crucial dimensions of the innovation.

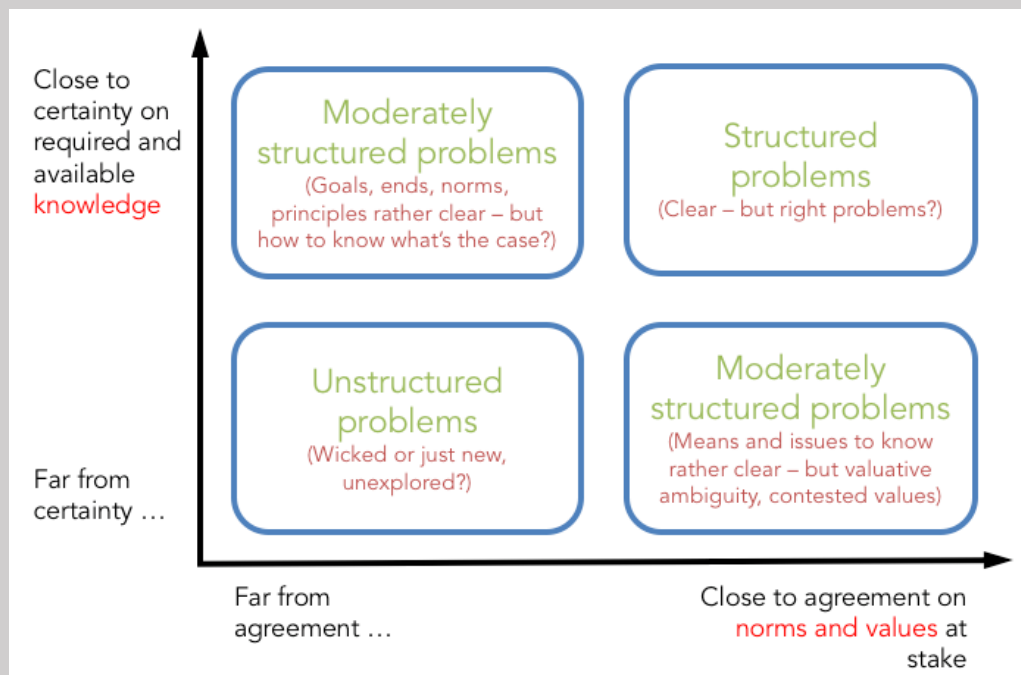
(1) In a first step, identify and summarise these issues:

Make a list of all problem issues associated with the innovation (political, business, physical, cultural, technological, actors, etc., whatever you think characterises the state of affairs for the innovation for those involved), as found in A.

Decide which are the most important ones (a) from practitioners' viewpoints and (b) from your observant's point of view.

(2) In a second step, describe each problem issue in terms of the ease or difficulty with which it can be handled.

We suggest allocating the problem issues into four (one more or less) different categories:
Please describe your categories in terms of their problem structure.



Please, describe in your words how it makes sense to categorise each of the crucial issues in such a way (you can be as brief as you think it sufficient to understand also for case outsiders).

From this, at a later stage a more fine-grained analysis of factors will follow (WP3). This is no factor analysis – just a rough exploration of the key tensions and agreements characterising the overall picture.

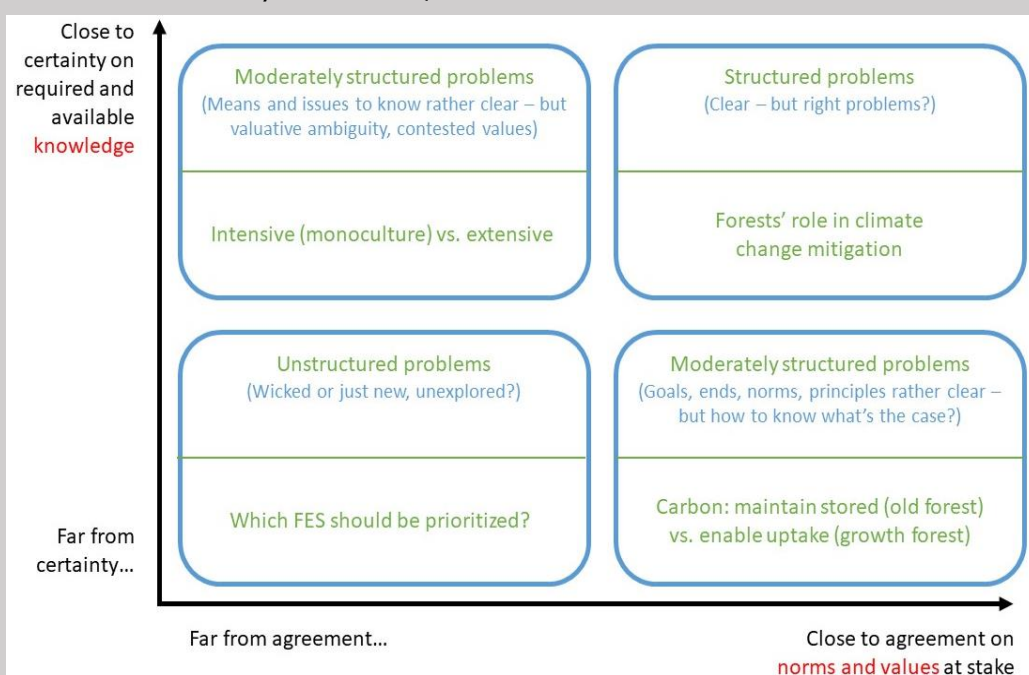
Supplement: Problem categories

This supplement is supposed to elucidate how the figure on key problem issues works (p. 3 of the Governance Situation Assessment sheet).

The figure is based on what has been called the governance of problems and attempts to categorise types of problems depending on two dimensions:

- (a) How much is known about the problem?
- (b) How much do involved actors agree on the norms and values related to the problem?

To make this a little bit more concrete, we provide a similar figure including examples related to forest ecosystem services, see below.



These are just some examples. Based on your deeper knowledge and understanding of forest ecosystem services problematics you may as well categorise the examples differently. However, we hope, the figure can serve as a first hunch for how to describe “all issues associated with the innovation (political, business, physical, cultural, technological, etc., whatever you think characterises the state of affairs for the innovation)” in terms of their problem structure.

If things are still unclear, we are happy to help!

Time schedule

What	Who	Deadline
Heuristic for case study partners		
Discussion, revision of heuristic		
Governance Situation Analysis on Innovation Region level <ul style="list-style-type: none"> – Governance situation descriptions – Sorting of opportunity structures, policy instruments, patterns of legitimation, problem structures Draft reports (in order to be able to link this with the Stakeholder Analysis)		
Governance Situation Analysis on Innovation Region level Final drafts (in order to be able to use this for preparing the strategic workshops)		
Discussion, (if necessary) revision of Governance Situation Assessment		
Final reports		

Limitations for use

- Since the Governance Situation Assessment heuristic implies concepts which are not necessarily common knowledge, it requires the **assistance of experienced facilitators** (in this project through WP5) in a number of intensive meetings with each Innovation Team. It is also useful to hold a short workshop, during which the approach is elucidated.
- The **first version** of the findings may **require extensive commenting** by the facilitators and some collaboration in order to achieve the right density of analysis. Templates will be developed for future use.
- Users may find the approach **time consuming** or too **detailed**. However, the **usefulness** of having this overview at hand may become visible only during the scenario writing, the discussion of the scenarios during the first CINA workshop, or even during the analysis of the workshop results.

3 Preliminary empirical orientation

This chapter offers a first preliminary empirical orientation about the six governance innovations, for which prototypes will be developed. It presents the **core findings** of the Stakeholder Analysis (Deliverable 5.2) and from the Governance Situation Assessment in preparation of the innovation platforms and the CINA workshops. These core findings are meant to build a bridge between the specific cases and the abstract theory used in this project by moderately categorising overall characteristics of the innovations.

In the following, we provide both a brief orientation about the typical forest ecosystem services stakeholders involved in our Innovation Regions, as well as a set of first explorative governance situation ‘**typologies**’. The collection and presentation of these key characteristics are supposed to provide an empirical appreciation of the broader picture of forest ecosystem governance innovation studied in this project. In combination with the more theoretical heuristics and methods constituting the InnoForEst approach, and the findings of the overall European biophysical and institutional mapping in WP2 (Deliverable 2.1), the Navigator allows for a realistic assessment when comparing our own project cases, as well as for further application to new cases outside of or after the project. More detailed deliverables, such as D5.2 ‘Report on stakeholders’ interests, visions, and concerns’ and D3.1 on the ‘Analysis framework for the governance of policy and business innovation types and conditions’ allow for more in-depth reflection of the respective Innovation Regions and the theory.

3.1 Typology of Forest Ecosystem Services stakeholders

In current democratic societies, the **range of stakeholders** involved in the public debate and decision making about a topic is usually broad and diverse, albeit depending on the level of decentralization of a state. In order to keep the InnoForEst innovation action as **compatible** as possible with stakeholder perspectives, we need to know who the stakeholders are, what their interests, visions, and concerns are, and how they are interlinked. Approached in this way, the assessment of the stakeholders’ key orientations regarding forest ecosystem services governance innovation is not an end in itself. It **fosters** the co-production of innovation networks and prototypes by linking up with the needs and issues on the ground.

In order to facilitate the identification and mapping of stakeholder constellations in the Innovation Regions, we suggested an analytical approach that would direct attention to a broad range of stakeholder categories as well as to a multitude of stakeholder characteristics that are (potentially) important to be aware of when shaping or fostering the governance innovation processes. Clearly, regional stakeholders involved in or familiar with the larger field of forest governance are very likely to have a good understanding and knowledge of who additional relevant stakeholders are and what their interests and visions are. However, employing a comprehensive analytical approach allows regional innovation managers to compile stakeholder-related information in a systematic, yet flexible and adaptable way. That is, such an approach can make sure that all potentially relevant stakeholder (types) are actually included in the screening of the stakeholder constellation, and that all potentially relevant stakeholder characteristics are actually explored to the extent possible. At the same time, the approach allows to add other (types of) stakeholders that may be of particular importance for the concrete topical and/or regional context and to complement the set of stakeholder characteristics with new aspects or to ‘zoom in’ or elaborate on selected characteristics that are found to be crucial. Documenting the gained knowledge in a systematic and concise, yet sufficiently detailed written form, is considered to be an important means for facilitating discussions and reflections on perceptions among stakeholders leading – or being involved in – the governance innovation process, and beyond.

A systematic, analytical documentation facilitates the comparison of stakeholder constellations across Innovation Regions. From the findings in other Innovation Regions, a regional innovation manager may learn about the importance of particular types of stakeholders that he/she did not yet consider being relevant and/or important for the governance innovation under scrutiny. Now, he/she may be inclined to explore a potentially facilitating role of this (new) stakeholder type. Of course, it may also go the other way around: making the (potentially) destructive role of a particular stakeholder (type) explicit in one Innovation Region may alert an innovation manager in another region to a potentially similar role or behaviour of this stakeholder type (if relevant in the innovation under scrutiny). That innovation manager could then address the issue pre-emptively in a constructive way.

On a practical level, in order to make the findings of the stakeholder assessments in the different Innovation Regions comparable we developed – together with WP2 but also refined according to the empirical findings in the Innovation Regions – a set of stakeholder categories and corresponding stakeholder attributes including:

- **‘Sphere’** – general distinction between private, public, public-private, and collective, referring to the dominant form of ownership of and within organisational units or stakeholder groups.
- **‘Business type’** – referring to a more detailed or descriptive and more economy-wise classification
- **‘Scale’** – referring to the prior localization of the stakeholder’s scope for action from the local to international scale.
- **‘Openness to innovation’** – referring to the willingness towards the ‘new’, or to readiness to embrace new thinking and change.³

Based on the regional accounts in the D5.2 ‘Report on stakeholders’ interests, visions, and concerns’, a **cross-regional comparison of stakeholder constellations** has been developed. We found that between 11 and 21 stakeholders were identified in each Innovation Region, deemed to be important – or at least relevant – with respect to the forest ecosystem services under scrutiny in general, or with respect to the pursued governance innovation(s) in particular. The stakeholders come from different spheres (private, public, collective, or private/public), play different roles in economy and society, and operate at different scales ranging from local to international. Some of them benefit directly from one or more concrete ecosystem services (“demand”, e.g., sawmills, tourists, local residents) while others do so indirectly. There are stakeholders that are actively managing forests and thus affecting the kind and level of ecosystem services provided (“supply”), often with different objectives (e.g., maximising timber extraction vs. maximising biodiversity benefits or carbon storage) and means (e.g., wood cutting vs. monitoring bark beetle infestations).

There are also stakeholders that **benefit and support** rather indirectly from forest ecosystem services, by shaping the management of forests (e.g., policy makers designing and implementing policies related to forest ecosystem services, or financing organisations organising payment schemes fostering the sustainable use of forests/forest ecosystem services). Further, the level of **interconnectedness** between stakeholder groups and individual stakeholders appears to be quite heterogeneous, depending, among others, on the ‘history’ of the innovation (process), the diversity of interests with respect to forests and forest ecosystem services, and their societal roles (e.g., state authority, civil society actor, SME, etc.).

³ For the list of potentially relevant stakeholder characteristics please refer to D5.2 and the Fact Sheet on Stakeholder Analysis.

3.2 The Forest Ecosystem Services governance innovation situation

Analysing the governance situation in a systematic way has a dual purpose: firstly, it is a useful way of **getting an overview** of the socio-political context of the envisioned governance innovations. Depending on the pre-existing knowledge and needs of the particular innovation region, the assessment can be a detailed study or be carried out in a more superficial fashion. Second, such an overview of the socio-political context of the envisaged innovation lays the **foundation for the Constructive Innovation Assessment**, in which possible innovation options are debated with the help of detailed and context-rich scenarios. This assessment contains dedicated ‘strategic workshops’ as part of the broader stakeholder interaction and network building process. These strategic workshops, based on the appreciation of the stakeholder and governance situation, offer a fair chance not just to discuss innovation options in an abstract way, but rather to enable actual innovation action in an empirically informed way.

For a preliminary analysis, we compare some of the **similarities and differences** between the Innovation Regions regarding innovation-relevant aspects below⁴. These innovation-relevant aspects may range from differences between innovators and incumbents⁵, to describing how similar or different innovations are embedded in their regional context (see Table 3 for more). The following categories have been distinguished for meaningful comparison of innovation dimensions of the InnoForEst forest ecosystem services governance innovations:

1. **Current regime** is the of forest ecosystem services now in place, which the InnoForEst governance innovation seeks to influence, transform, or propose an alternative to. As a result, ‘regime’ may mean different things in different Innovation Re-

gions.
In the Finnish Innovation Region, for example: the innovation targets the current national voluntary environmental protection system (= regime) by implementing a voluntary payment scheme for ecosystem services (= niche). In Sweden on the other hand, the incumbent regime is an educational competition teaching students about forest ecosystem services, which is supposed to be transformed in content and potentially in format (= niche).

Purpose of Governance Situation Assessment

Before you start promoting your innovation, analyse the governance situation.

This has 2 purposes:

1. You get an overview of the socio-political context.
You want to start up and nourish your niche innovation successfully. This depends on your deep knowledge of the socio-political context of your planned innovation.
2. You do the groundwork for a ‘Constructive Innovation Assessment’
You need thorough knowledge of the stakeholders in the socio-technical system for a fruitful Constructive Innovation Assessment. With that knowledge, you can explore new avenues for technological development.

⁴ All information regarding the forest ecosystem services governance innovations was extracted from the Innovation Teams’ governance situation assessments. Wherever possible, we followed the terminology used there.

⁵ The terminology used for many of these categories is strongly imbued with the language and thinking of the Multi-Level Perspective (MLP) as proposed in different versions by Frank Geels, Johan Schot and Arie Rip (cf. Geels 2005; Geels & Schot 2007; Rip 2012). In the InnoForEst context, see also deliverable D3.1, section 3.3 for explanations of terms common in this line of thinking.

2. **Incumbents** describe which organisation is currently the main protagonist stabilising the regime. The type of organisation can differ depending on the forest ecosystem services governance innovation.
Such an incumbent may be a regional government's forest management agency as in the Italian Innovation Region or a for-profit knowledge institute, as is the case in Sweden.
3. **Innovators** denote the organisation(s) “driving” the innovation. These may be different types of organisations. We mean those actors who are “enacting” the innovation because they are convinced it is worthwhile, as well as the “selectors”, who are at least ready to consider the innovation, if not yet to decide for it. We don't mean any kind of direct causal or one-sided determination (“driver”), but rather the interplay between enactors and selectors. In some cases, the Innovator is the same organisation as the Incumbent, but this is not at all obligatory.
While in the Italian Innovation Region, the Innovator is the same as the Incumbent, the Forest and Wildlife Service of the Autonomous Province of Trento, a not-for-profit knowledge institute – ‘SYKE’ – is the Innovator in the Finnish Innovation Region. SYKE is not an Incumbent, because it is not in charge of the current regime.
4. **Niche maturation** is the level of development an innovation has reached in a protected space (here called ‘niche’), but not yet as part of the current regime. The assumption is that innovations need a particularly safe and fertile space to grow. Innovations without such a space will hardly survive. Being in such a space is, however, no guarantee for success.
In the Austrian Innovation Region, the niche is still unstable and exploring avenues of further development. On the other hand, the niche in the German Innovation Region is stabilised and readily matured to take a next step of broadening its reach.
5. **Origin of innovation vis-à-vis governance structure.** With the information from the previous categories, we can determine whether the innovation originates within or outside the current governance regime. This position is an indication of the quality and quantity of resistance (institutional, business, culture, social?) the innovation may encounter in its establishment process.
Niches developed by innovators other than the incumbent organisations, i.e., ‘outside’ niches, can be found in, e.g., the Finnish and German Innovation Regions, where a not-for-profit knowledge institute and an NGO respectively enact innovative ideas. Conversely, in the Italian and Swedish Innovation Regions the innovating organisations are the same as the incumbents. In the Italian Innovation Region, the provincial forest management agency is working on innovating its own forest governance practices. Similarly, a for-profit knowledge institute intends to review its own forest ecosystem services educational contest.
6. **Dominant interactions** are described in terms of their degree of permanence and formality. Dominance is, however, also a question of how powerful and relevant they are perceived by the actors involved, but this will require further empirical research during the remaining time of the project.
Standing meetings play a considerable role in the Finnish and Italian Innovation Regions. In Finland, the innovators meet with other stakeholders in other policy-making venues, whereas in Italy, the provincial forest management agency maintains regular interactions with stakeholders that are necessary to work with. In the Swedish, Italian and Finnish Innovation Regions the interactions are mostly formal.
7. **Changes in actor constellations across project development stages.** To understand the development of the innovation stakeholder network, this category contains a brief history in networking terms.

For example, the German and Swedish niches consist of a relatively stable network of stakeholders contributing financially to the innovation. In the Austrian niche, the stakeholder network is still emerging as niche dynamics have been stimulated not too long ago.

8. **Governance process mechanisms** give an indication of the regime and niche dynamics related to the innovation. This may relate to governance or market processes (or combinations thereof) depending on the Innovation Region.

In several Innovation Regions the niche or the regime is coordinated by a competitive coordination mode. As such, the Finnish and German niches revolve around exchanges trading funds for protected areas. In the Austrian niche, the idea is to enact new value chains based on forest ecosystem services. The regime dynamics in the Italian Innovation Region follows the guidelines of the provincial forest management agency.

What can you do with the information from the Governance Situation Assessment?

With the information from the Governance Situation Assessment you have deeper knowledge of the innovation. We termed relevant aspects 'innovation dimensions'. These are:

Current regime, Incumbents, Innovators, Niche maturation, Origin of innovation vis-à-vis governance structure, Dominant interactions, Changes in actor constellations across project development stages, Governance process mechanisms, Character of core issues, Character of external developments, Governance-ecology interactions.

9. **Character of core issues** comprises a description of the core issues perceived in the governance situation assessment with respect to the multi-level perspective outlined in D3.1 and footnote 3.

In some Innovation Regions it is not yet clear what form the niches shall take (Austria, Germany, Italy, Sweden), which means that core issues often relate to the exploration of directions to develop the niche. The regime comes into play when the innovator is looking for ways to define the niche as separate from the regime (Germany, Sweden) and when the innovator wants to find out how envisioned niches would fit, link up to, or supersede the current regime. In the Italian Innovation Region, the innovation landscape is not so much an issue, as the innovator perceives the niche as mainly interacting with the regime.

10. **Character of external developments.** The interactions between external developments and the forest ecosystem services governance innovation. This innovation dimension makes use of the niche-regime-landscape terminology.

Given that the project targets forest ecosystem services, external developments that the innovators often cannot change, but which they have to relate to, include large-scale societal issues such as climate change or migration. In Innovation Regions such as the Finnish the niche also has the potential to influence the innovation landscape, for example, if it manages to change the way Finnish businesses interpret their corporate social responsibility.

11. **Governance-ecology interactions.** Starting from the idea that there is a complex interdependence between forest ecosystem services governance and ecology, which sometimes becomes visible very quickly and sometimes takes considerable response time to show, this category describes these interdependencies.

Some of the niches have direct influence on the forest ecosystem services, but to different degrees. The Finnish and German niche may turn forest areas previously under threat of deterioration into protected areas. The educational trips organised in the Swedish Innovation Region and potentially organised in the Austrian Innovation Region have less drastic influence on the existing forest areas. On the other hand, most governance innovation niches possess the potential to influence the forest ecosystem services in their Innovation Region indirectly.

The educational niches existing in the Swedish Innovation Region and planned in the Austrian Innovation Region, as well as the payment schemes in Finland and Germany have the potential of changing the way their target audiences, i.e., selectors, relate to the forest ecosystem, sometimes even profoundly. In Italy, the niche may introduce new land uses that are even more sustainable than before.

These categories give a **thorough overview** of the governance situation in each respective Innovation Region. They are based in several literatures about the multi-level perspective, networks, or governance of problems. The categories are generally inspired by innovation literature and are closely connected to the SETFIS scheme (cf. 2.3 and Deliverable 3.1).

In the following subsections, we put the separate information on Innovation Regions to use and indicate preliminary cross-Innovation Region findings. The following descriptions of **problems and their level of structure** distinguished in the Innovation Regions are based on the GSAs provided by the innovation teams. See Appendix 1 for a table of all problems, including their classification in Hoppe's (2010) quadrants depicting the governance of problems and on which level of the Multi-Level Perspective the issues fit.

3.2.1 Austria: Finding and developing a new way of utilizing the forest in the Eisenwurzen region (Styria, Austria)

Many of the issues identified in the Austrian Innovation Region should be seen in the light of the **emergent character** of the forest ecosystem services governance innovation. Many explorative issues – some more, some less concrete – were reported. They are a mixture of moderately structured issues in the dimensions of knowledge and norms and values. The following can be distinguished as overarching issues:

1. **Knowledge gaps with respect to legal frameworks, regional planning policies, intellectual property rights, and commercial aspects.** The three innovation scenarios proposed in the Austrian Innovation Region – tiny houses, design furniture, and forest experience and education – are for now in their early stages of development, both regarding to specific content as well as the institutionalisation thereof.
2. **Fair division of labour and financial compensation.** Neither of the innovation scenarios builds on existing production processes or organisational infrastructures. While there are already commercial valorisation processes for forest ecosystem services in the Innovation Region, these are all characterised by fragmented value chains. It will be one of the challenges for the Innovation Team to produce an innovation narrative shaping a common identity for the innovation stakeholder platform and for opening up avenues for structural support with respect to knowledge and funding.
3. **Stakeholder openness to innovation.** It is, as yet, unclear how stakeholders can be inspired to keep an open mind for new ideas and system transformations. While the solution to this issue may perhaps be found in relevant social-scientific literatures ranging from inclusive innovation to nudging or forms of social learning, it is still uncertain, which (combinations) of these fit the situation in the Innovation Region.

The Innovation Team also distinguished a set of unstructured core issues:

4. **Definition of Eisenwurzen Design.** It is uncertain whether there are craft and design traditions in the Innovation Region which could be rightfully characterised as ‘Eisenwurzen Design’. Even if it does exist, the stakeholder network needs to find a consensus on whether it is necessary to define such Design and how to do so.
5. **Bringing together a variety of interests and forming a functioning innovation network and platform.** This is a complex process. On the one hand, it very much depends on the precise contents of those diverging interests. On the other hand, a promising consensus about the objectives of the innovation network and platform still needs to be identified.

The explorative, emergent character of the forest ecosystem services governance innovation in the Austrian Innovation Region means that many of the distinguished issues **cut across** the niche, regime and landscape levels. The process of defining the innovation niche also relates to exploring ‘what is’ in the **surrounding regime and landscape**, not only to find out what kind of forest ecosystem services governance innovation could have potential, but also to gauge the societal, economic, legal and political possibilities and frameworks for the proposed, still-rather-fluid innovation niches ‘in-the-making’. Patterns of **problem-solving strategies** have not yet developed in this young Innovation Region. If they exist at all, they are organised and implemented on an ad-hoc basis.

3.2.2 Finland: Finding an accepted governance mechanism for a “Habitat Bank”

The problem structure in the Finnish Innovation Region relates to both knowledge and norm-value domains and consists of three unstructured issues which are partly outside of the reach of the innovators.

1. The innovation weighs in on the debate about **feasibility of measuring biodiversity and the additionality of offsets**. While through its intention the innovation takes a clear stance in this debate, it is by no means a settled one, neither with regards to the knowledge required, nor the norms and values involved.
2. There is a general **danger of failing to achieve biodiversity and nature conservation targets under international treaties**, which is an unstructured issue, too.
3. One problem currently limited to the niche is how to find a **suitable brokerage mechanism** in the specific Finnish context. Few examples of setting up a compensation scheme are known. It is unknown, however, what structure the brokerage should take and there may be disagreement on which kind of brokerage mechanism to choose.

In addition, two moderately structured problems exist:

4. The innovation team needs to **find more suitable conservation areas for the compensation scheme**, which are not yet used for other schemes or regulatory mechanisms, such as Natura2000. This represents a knowledge issue.
5. There is a **tension between regulatory and voluntary approaches to biodiversity conservation**, which is a norm-value debate waging in the regime sphere.

Given that the way the innovation in question is supposed to take is already quite clear-cut, many of the issues involved are **exclusively related to the niche itself**. Nevertheless, the issues also show how the proposed niche ties into the wider regime and even landscape of biodiversity conservation. Finally, one problem-solving mechanism was distinguished, i.e., actors might use the media for leverage in some cases, while they remain cooperative at the negotiation table.

3.2.3 Germany: Redeveloping the “Forest share” (“Waldaktie”)

Three **core issues** were observed in the German innovation region.

1. **Public discourse opposes quantification of ecosystem services (ES), due to fear of economization, rationalization of nature, and green-washing by companies.** Parts of the German Green party critically scrutinize supporting the ‘Forest Share’ concept, because they assume that monetization of ES will ultimately lead to their over-use. Chances are that potential investors in ‘Forest Share’ also follow the public discourse meticulously, as they want to preserve their environmental image and avoid accusations of green-washing. Since the problem is about different values and perceptions, the information about the situation is clear. This is a moderately structured problem.
2. **Budget cuts at the federal state-level department responsible for the ‘Forest Share’ resulted in staff reductions.** The department’s reduced ability to maintain the efforts invested into and attention directed at the Forest Share created by these cuts also has negative consequences for the Share’s further development. On first sight, this issue seems to be a structured one, as it is a financial problem and information about it is openly available. However, as budget cuts are disproportionately higher in this department than in others, differing norms and values regarding the necessity and utility of the Waldaktie within the governmental institutions responsible for assigning the budget may play a role. It is known that ecological shares are a programmatic issue only for the Green Party, not for others. With a federal state parliamentary election coming up, the importance political parties assign to this kind of policy instrument, especially when government-organised, becomes an important issue for the further development of the Forest Share in the future. This would make it a moderately structured problem.
3. **New goals for forest ecosystem services protection** under the ‘Forest Share’ are still unclear. One option is the merger of the existing shares for forests (“Waldaktie”), peat-lands (“MoorFutures”) and orchard bonds (“Streuobstgenussschein”) into a mixed portfolio from which shares may be bought based on the ES concept. This mixed portfolio faces the challenges that it is unprecedented and that the organization of the ES amounts in the combined shares is unclear. The second option is refining the ‘Forest Share’ as a standalone share that will include more than climate ES alone. A possible third option would be to realize that ‘Forest Share’ as a product is already good enough and the actors involved agree not to change it at all. The situation presents an unstructured problem because aside from the vague vision of a more holistic model there is not much known about the future concept. Furthermore, little is known on how to create the process itself.

The German governance innovation faces challenges in all three spheres of niche, regime and landscape. There are some evident **knowledge gaps**, but some **value disagreements** may slumber below the surface. Within the niche, it seems that everything is possible. The CINA workshops present good opportunities to explore which options are accepted.

In turn, given that the question which way to go is an unstructured issue, agreement on values is not enough to bring the innovation to a higher level. The critical knowledge gaps need to be filled. The landscape issue of a critical public discourse may hold guidance as to how to redesign the ‘Forest Share’ in order to avoid public backlash. In the promotion of the innovation, it needs to become clear, also to the broader public, why the issue of greenwashing does not pertain to the ‘Forest Share’. If it actually is relevant, precautionary measures need to be built into the ‘Forest Share’ that prevent greenwashing from happening. The fact that it is unknown how the envisioned evolutions of the Waldaktie may be realised practically, figures as a central tension. Furthermore, it adds to the necessity of doing at least some exploratory knowledge gathering as to how, e.g., the portfolio combination selling may occur. No specific, established problem-solving strategies were distinguished.

3.2.4 Italy: Forest-pasture management innovation in the Primiero region (Province of Trento)

In the Italian innovation region, four **key issues** are observed:

1. **Incongruence between the purpose of existing forest infrastructure and the potential of the forest ecosystem (productive vs. recreational and other).** Currently, forest roads are exclusively designed for forestry operations. However, the roads seem not to be adequate for that purpose in some places as width and curvature prevent timber trucks from manoeuvring freely. For example, sawmill owners plead for the expansion of roadside spaces to improve access for larger-sized trucks and, in turn, increase the competitiveness of local timber companies. In addition, the little roadside space available leads to unsafe situations as roads are increasingly used by hikers to explore the territory. Although stakeholders such as public land owners (often municipalities), private land owners mostly from the equine and game sector, the Alpinism club, the tourist office, and sawmill owners acknowledge that forests also provide functions other than production, e.g. recreation, they point to the limited functionality – i.e. for production purposes – formally assigned to roads in forest areas. In consequence, most stakeholders acknowledge the necessity of forest roads as access infrastructure for experiencing the forest. Hence, the inadequacy of forest roads to cater to these different functions prevents those forest functions from being fully seized. Nevertheless, the issue is not a forestry-technical one as the know-how required to improve the roads is present. Rather, legislative and management officials have not yet found a way to tackle the issue which presents some more difficulties in these spheres. One aspect of this issue is that funding to improve roads (but not to build new ones) is available from the rural development programme (“PSR”), but this may only be used by public land owners to pursue forestry production goals.
2. **Operators of the forest-wood supply chain (woodsmen, in particular) require field support.** Specialized personnel should provide guidance on which trees to cut for a low-cost, efficient and safe clearing. All stakeholders recognize operator support in the field as an important issue and good practices about how to provide such support are known already.
3. **Bureaucracy continually impairs interactions between multiple stakeholders and private initiatives, such as tourist organisations.** Although private actors perceive it as a big obstacle, the fact that it is ingrained in the public administration’s functioning makes it difficult to tackle. Possible solutions have to be explored.

4. **Wood firms struggle with the idea of opening up to the global market and support protectionist policies** to repel actors from outside the Province due to their small size (2-3 operators). Other actors, e.g., tourist operators and administration, do not perceive the level of opening to the market as a problem. Knowledge about the effects of opening up the market needs to be gathered and communicated to be able to support decisions.

In sum, the major uncertainties in this Innovation Region relate to **institutional issues** mainly on the regime level. To a large part, more knowledge is necessary, e.g., related to the institutional and managerial opportunities for preparing forest infrastructure for multi-functionality, or to the effects of market deregulation on local SME's. However, these knowledge issues also involve questions related to norms and values. For example, optimizing forest infrastructure for timber production could go together well with a stronger competition of local forestry SME's with incoming companies. Is that what the provincial government or the Forest Department wants? If smaller-scale businesses and eco-tourism are much more desirable, decisions need to incorporate this. It could be useful to investigate a streamlining of bureaucratic practices along with options to optimize forest infrastructure (in one way or another) as both would involve knowledge about the functioning of the administration or could lead to new laws and regulations.

As the **vision** of the governance innovation has not yet been developed in the Italian innovation region, and given these institutional knowledge gaps, it seems that filling these blanks is a pre-condition for formulating the next steps in innovation development. No specific established problem-solving strategies except for those standards in a hierarchical governance (principal-agent: PAT vs. Forest Department) mode were distinguished.

3.2.5 Sweden: Redeveloping the “Love the forest” (“Älska skog”) educational initiative

The Swedish governance innovation deals with a **mixture of different kinds of issues** in all spheres (niche-regime-landscape) as well as in the knowledge and norm-value domain:

1. **Finding a suitable topic and set-up for the next edition of the educational initiative.** A major difficulty is to come up with a well-balanced topic due to vested interests, which makes this issue a moderately structured problem in the norms and values domain. Some possible options are shifting the scope, adding a stronger focus on migrants, adding value chain aspects, or adding more actors with different viewpoints. This relates to another issue underlying the set-up of the initiative. In the current organizational structure, it is difficult for the practice partner to **balance the interests** of investing partners with public ones and their own knowledge and educational role. This tension crystalizes most visibly in the innovation objectives of the educational initiative. On the one hand, initiative partners share a common ambition of increasing awareness on forestry and forests in Sweden, making people spend more time in the forests, and attracting future potential employees. On the other hand, the questions with which topics to achieve this ambition and which aspects of forestry, forest ecology and societal aspects to stress, are central to the debate. That means that the issue is structured on the level of the general objectives, while the situation is much fuzzier when diving into more specific objectives.

2. **Broader societal links to be made for the initiative's new competition topic.** Societal links could be the incorporation of aspects such as climate impact and bio-economic potential of Swedish forests, or more socio-political elements such as migration. One practical as well as strategic issue concerns the appropriate embedding of the educational initiative in school curricula. It is a practical issue, because schools need to be able to work with the topic. It is strategic, because the topic needs to link up somehow with what schools are doing anyway. Indirectly, this issue poses a challenge due to inconsistently endowed schools regarding knowledge, time, staff and threats of increased segregation in Swedish society. This issue is by and large moderately structured and relates to the knowledge and norm-value domain at the same time. In the past, the existing regime has developed at least two problem-solving mechanisms to increase success of the initiative. First, topics leading to unsolvable or intractable controversies were excluded. And second, scientists and research findings were seen and used as mediators between initiative partners in cases of disagreement.

The problem context in the Swedish Innovation Region is characterized by a **complex of challenges**. Many of those challenges can be perceived on the landscape level, given the fact that the governance innovation is not a new topic and the ambition is to link this topic to broader societal debates. On the other hand, connected to finding a new topic, the organizational structure of the initiative is also investigated. Changes may be related to roles of established partners, or the addition of new participating partners. The latter problems are more in the niche sphere or sometimes cut across to the regime sphere. Furthermore, the challenges mentioned above are mainly located in the norms and values domain, due to the ambition to bring together actors with many different interests in a broader, constructive dialogue.

3.2.6 Czech Republic/Slovakia: Innovating the management of collectively owned forest areas

The backdrop of the collectively-owned Czech and Slovak Innovation Regions is balancing individual interests and societal interests. This is not only a typical issue in the field of nature development and environmental issues. It may especially represent an issue in the **legal organisation of the two Innovation Regions**. The Slovak Innovation Region is organised as joint ownership of private property, while the Czech Innovation Region is run by a land trust in the form of a non-governmental organisation of which individuals can become a member. Individual interests influence the organisational policy in different ways and individual influence may be stronger in one Innovation Region than in the other making their comparison an interesting case to study ways of organising the governance of balancing individual interests and societal interests. Conversely, it is possible that the self-organising character of the Innovation Regions actually accelerates the evolution of nature-based forest governance and increases the willingness to introduce innovative approaches in forest governance. A **difference between the two Innovation Regions is their funding structure**. The Czech Innovation Region is currently more dependent on external funding, without which it could not function, than the Slovak Innovation Region, where revenues come from forestry activities by-and-large.

The Czech and Slovak Innovation Regions are linked by a set of common issues. First, both Innovation Regions suffer from **declining revenues**, due to decreasing timber prices, lower timber harvests or lower forest protection certificate sales.

Second, the **national legal frameworks are contradictory** in both countries, as legal requirements for nature protection run counter to prescriptions pertaining to commercial use of timber. Third, **stakeholder conflicts of interest** are apparent in both Innovation Regions. On the one hand, the activities of the innovation enactors may spark conflicts with hunting organisations, as is the case in the Czech Innovation Region, where planned fences around young tree seedlings were feared to impede free movement of game and hunters. On the other hand, the Slovak Innovation Region experiences conflicts between stakeholders interested in nature protection and those arguing for a stronger focus on economic use of their forest areas.

Also, within the Innovation Regions, some issues prevail. In the Czech Innovation Region, four issues have been distinguished:

1. **Lacking Public Relations capacity.** In the past, much of the Innovation Regions revenues came from donations elicited by PR activities. As the capacity to carry out these activities has recently declined, this major source of income is in danger of drying out.
2. **Conflicts of interest with other stakeholders.** The forest conservation activities of the Innovation Region have raised irritation among other stakeholders who saw their activities impeded. For example, the Czech Innovation Region has built fences around the areas in which they carried out their activities, which in turn prevented the free movement of game. In turn, hunting organisations protested and started a formal procedure to have the fences removed.
3. **Weak national legislation supporting nature conservation.** An issue resulting from the previous is the perceived favouring of game hunting activities by current nature conservation policies.
4. **Fragile organisational reputation.** The president of the organisation plays an important role in local politics. Political opponents engage in presenting the innovation in a negative light.

As these issues reveal, problems that arise in the Czech Innovation Region are often resolved through formal procedures. Issues arising within the Czech non-governmental organization are dealt with at the annual general assembly or board meetings.

The issues in the Slovak Innovation Region are fivefold:

1. **Conflict with not-for-profit organizations.** It is difficult for the Slovak Innovation Region to align its interests with that of other environmental organisations. One example is the conflict arising after a large storm had damaged part of the forest. While the collective management in the Slovak Innovation Region wanted to proceed with turning the fallen trees into commercial timber, an environmental organisation started a procedure to prohibit this. Some organisations also demand that the Slovak Innovation Region should do more than it is legally obliged to do.
2. **Discrepancy between ecological and socio-political borders.** The traditional forest governance borders, which are still in force nowadays, date back to Austro-Hungarian times. However, these governance borders do not coincide with the borders of the forest ecosystems. This makes effective governance of the ecosystem hard, as activities outside of the area under community governance may have impact on them.
3. **Different attitudes of members towards innovations.** The distribution of shareholders across the country also means that motivations to innovate may be diametrically opposed.

In former times, the organisation was local, and most shareholders were locals, too. Nowadays, people all across the country can become a shareholder and this group already represents just under half of all shareholders. This may also lead to contests over which forest governance strategies should be implemented with people across the country potentially having less connection to the area itself. A reduced connection to the local ecosystem, so it is feared, may increase the call for increasing income out of forestry activities instead of preserving the forest ecosystem.

4. **Problematic cooperation with Ministry of Environment.** In addition, the Slovak Innovation Region is not on good speaking terms with the Slovak Ministry of Environment.
5. **Bark beetle plague.** The Slovak Innovation Region is struggling with threats of bark beetle outbreaks, which have occurred in the past. Although past outbreaks were the reason to turn to more nature-based forest governance and this change of direction paid off to a certain extent, the threat still exists.

Similar to the Czech Innovation Region, problems in the Slovak Innovation Region are usually solved through official, formal channels, such as complaint procedures with the Ministry of Environment.

Table 3: Innovation characteristics per innovation region

Category	Austria	Finland	Germany	Italy	Sweden	Czech Republic/ Slovakia
<i>Current regime</i>	Fragmented stakeholder landscape/FES value chain	National, voluntary environmental protection system	Forest share including carbon storage ecosystem services	Close-to-nature Forest-pasture management in mid-elevation mountainous area	Educational competition about FES	Self-organised management of collectively owned forest
<i>Incumbent</i>	Decentralized, no incumbent exists	National government	State government	Provincial government	For-profit Knowledge Institute	Local communities
<i>Innovator</i>	Private civil society actor	Not-for-profit Knowledge Institute	NGO	Provincial government	For-profit Knowledge Institute	Local communities
<i>Niche maturation</i>	Orientation & exploration phase	Operationalization stage	Maturity and development → assessment and redevelopment	Orientation & exploration phase	End of 1st life-cycle → assessment and redevelopment	Orientation & exploration phase
<i>Origin of innovation vis-à-vis governance structure</i>	Outside	Outside	Outside	Inside	Inside	Inside
<i>Dominant interactions</i>	Newly established and partly pre-existent	Permanent, formal	Constructive, cooperative	Permanent, formal	Temporary, formal	CZR: many connections to diversity of actors, low intensity interactions; SVK: many connections to diversity of actors, active community has many irregular and informal meetings
<i>Changes in actor constellations across project lifecycle stages</i>	Broadening of range of (potentially) cooperating stakeholders; emerging network	Small stable network with large spectrum of satellites	Small stable network of administration and forest area provider; one large, relatively permanent purchaser and many other satellite purchasers	Regime has had a relatively constant network of actors; if anything, some private forest managers have dropped out of regime-type forest management activities.	Stable network of paying partners; some debate about participation at start, but not so much later on	CZR: stable local network SVK: strong local network, growing across the country in recent years

<i>Governance process mechanisms^a</i>	Regime: Business as usual, decentralized market dynamics; Niche: stimuli to construct new FES value chains	Regime: voluntary; Niche: uncertain	Payment scheme	Governance follows executive agency lines: there are forest management planners and operational employees, interwoven by regular meetings and information exchange	Frequent meetings of steering group; investing partners advocate their interest	Regime: conflicts between interests; Niche: exploration of new revenue alternatives, e.g. value chains
<i>Character of core issues^b</i>	Niche: what will the niche be precisely? Niche-regime: how do niche ideas fit into current practices, laws and regulations? Niche-landscape: can the niche link up with usually FES unrelated sectors?	Niche: brokerage and area designation, but value issues underlying; influence on landscape level	Niche-Regime issues; one other core issue holds for all similar payments for ecosystem services	Landscape not an issue, core issues revolve around niche and regime level	Niche-regime: how to differentiate niche from regime; Niche-landscape: how to speak to important societal topics while maintaining a good investment base	Niche: value conflicts of what should be done; Regime: settled ways of doing things, deterioration of business conditions, legal ambivalence
<i>Character of external developments</i>	Climate and demographic change impacts viability of FES sector, might open up new opportunities; rural development funding is an opportunity	Niche seems to have influence on landscape level	Niche fits with forests' positive connotation, creates meaning and regional embeddedness	Climate change begins to have a stronger grip on the innovation region. The niche turns into a response to a feeling of urgency.	Immigration and sustainability have been in the landscape and reflected in the regime; no similar niches in the landscape	Looming bark beetle infestation
<i>Governance-ecology interactions</i>	Direct: educational trips into forest Indirect: new ways of processing existing forest products being developed	Direct: Protection and 'renaturalisation' of existing forest areas Indirect: changes in rights and responsibilities pertaining to forest areas	Direct: New areas being protected; individuals coming into forest for planting trees Indirect: addition of FES to portfolio changes perception of forest	Direct: new ways of managing the existing forest-pasture areas Indirect: subsequent new uses of forest-pasture area	Direct: visits of school classes into forest (production) areas Indirect: transformation of youth's attitude towards the forest and potential behavioural change	Direct: new ways of sustainable forest governance Indirect: improving economic situation of participants

^a I.e., regime and niche dynamics. ^b See InnoForESt deliverable D3.1, section 3.3 for terminology.

3.3 Preliminary transversal analysis

Several pairs of Innovation Regions are identified based on the **type of governance innovation** they are pursuing:

1. ***Innovation within payments-for-ecosystem-services framework:*** The Finnish and German Innovation Regions are both organizing a ***payments-for-ecosystem-services system***, albeit in different phases of maturity and scope – operationalization respectively redevelopment phase. Notwithstanding the differences in socio-political context and specifics of the payments-for-ecosystem-services system – relating to biodiversity in Finland, and, for now, relating to carbon offsetting in Germany –, there may be learning potential regarding the administrative organization of the schemes and ways to integrate more ecosystem services.
2. ***Innovation beyond payments-for-ecosystem-services framework:*** The current **openness to pursue different future innovations, possibly in combination**, visible in the Austrian innovation may reveal novel ways of governing ecosystem services sustainably, which go beyond the settled idea of payments for ecosystem services. Similar to the Swedish and Czech/Slovak Innovation Region, the options of an educational program and other productive uses of local timber in new value chains are on the table in Austria. InnoForESt may deliver new sustainable forest value chain alternatives that can be placed alongside payments for ecosystem services in the ecosystem service perspective toolkit.

For understanding the structure of an innovation, it is useful to know, whether the governance innovation comes from within the current governance system (Incumbent innovators) or network of players, or whether it is being brought in by organisations not immediately involved with it (External innovators). Whether or not the **innovation comes from within the current regime or from the outside** makes a difference for the routines, commonalities, and legitimacy of the actors driving it. Outsiders will likely have more difficulty making their innovation count, than insiders will.

3. ***Incumbent innovators:*** In the Innovation Regions of Czech Republic/Slovakia, Italy and Sweden, **the innovator is at the same time incumbent**. In these cases, the ambition to innovate current practices is the result of a critical self-review.
4. ***External innovator:*** In Austria, Finland and Germany, **organisations other than those currently involved in the governance regime** feel there is a need to act to compensate for the inertia of the incumbents, and to suggest new ways of organizing the particular forms of forest ecosystem services governance.

The formality and permanence of interactions among stakeholders in the Innovation Regions influence the **stability of the innovation network**.

Comparing innovations

Why would you? *You may see patterns when you look at more than one innovation at the same time. Furthermore, you can learn from other ways of doing things.*

How do you compare? *You can take characteristics of the innovations and see how they are similar or different (see Fehler! Verweisquelle konnte nicht gefunden werden.).*

What else? *You cannot assume that things that work in other innovations will immediately work in your situation, too. If you want to use lessons from other innovations, you have to see how they fit your specific governance situation.*

In general, frequent formal interactions enable stakeholders to become acquainted with each other's positions and perspectives, which may in turn improve trust relations among them. The same can be said about low **fluctuations in the constellation of the stakeholder network**. The fewer the changes in the network the easier trust relations will evolve. A potential downside of stable informal stakeholder networks can be the insensitivity to or ignorance of other perspectives or new incentives from unexpected parties from the outside. To prevent getting stuck in such stabilised patterns of thinking and perceiving, precautions need to be taken. Looking at Table 3, informal interactions are uncommon in all of the Innovation Regions. In addition, there are **different combinations of dominant interactions which cannot be traced back to a specific governance innovation aspect**. Instead, they depend at least on the niche maturation of the innovation as well as the current regime. For example, the fact that no clear interactional pattern has developed yet in the Austrian Innovation Region can be ascribed to the fact that it is still in an unstable, exploratory phase. On the other hand, in the Italian Innovation Region, where forest governance interactions have developed over a long time, actors knew each other and had their usual interaction patterns, at least until the recent provincial elections. Similar to many other elections, these provincial elections can stir up these previously stabilised conditions and transform the innovation climate in the Innovation Region. With new parties in the provincial parliament and potentially the provincial government, powers and capabilities of existing actors may shift or new ones may be introduced. This situation may mean that once again interaction patterns need to get underway and trust needs to be built. Previously obvious connections need to be re-established or new ones made. Well-known actors in the innovation network may have new tasks, interests and capabilities, which need to be mapped, before meaningful innovation action can be undertaken. The consequences of the fact that the Innovation Team is in the orientation phase as to what innovation road to take still need to be seen. Although the potential destabilisation of previously trusted interaction networks may seem daunting, the introduction of new stakeholders into the Innovation Region may just as well spur new and previously unimagined ideas for the innovation niche.

There are numerous issues currently at stake for the innovators:

1. **Niche focus:** Most core issues in the Innovation Regions tend to **revolve around the niche itself** (Table 3), i.e. what its content will be, how it should function and who will participate. This is, e.g., the case in the Italian and Austrian Innovation Region, where the Innovation Teams are exploring how the forest ecosystem services governance can be innovated, including new management techniques, new sets of actors or business models.
2. **Niche embedding:** Although the niche is the main focus, in several of the Innovation Regions, issues pertaining to the regime also have to be solved. For example, in the Austrian Innovation Region, a number of questions pertaining to the regime-level legal framework need to be answered in order for the directionalities explored in the niche to be clarified further. On the other hand, in the German and Swedish Innovation Regions, the differentiation of the niche from the regime is furthered. A few Innovation Regions also consider the landscape. For example, debates on the societal level potentially influence the outcome of the innovation process in the Swedish Innovation Region.

Due to the similar geopolitical region in which the Innovation Regions are situated, the **character of external developments among regions is aligned**. Situated in Europe and the EU, i.e. rather closely together on a global scale, all Innovation Regions are subject to similar large-scale, societal, transboundary issues, of course with each EU member state having its own manifestation of those issues. All Innovation Regions are dealing with the following issues:

3. ***Climate change urgency.*** Climate change and adequate responses to it are mentioned in relation to forest ecosystem services.
4. ***Societal urgency.*** Other pressing societal matters, such as immigration or sustainability in general, are also linked up to forest issues.

There are also some topics that could have been expected to influence the governance situation in the various Innovation Regions, but did not appear in the accounts:

5. ***Economic recovery.*** Improvements of the economic situation of the Innovation Region, especially with reference to the 2008 economic crisis, are *not* mentioned by any assessment.
6. ***Political trends across Europe.*** Contestation of scientific knowledge and the strengthening of populist political parties have not been mentioned as issues by governance situation assessments.
7. ***Popularity of austerity policies.*** The popularity of austerity policies in the wake of the economic crisis seems not to have impacted the forest sectors in the Innovation Regions. Perhaps, the German Innovation Region with its budget cuts comes closest, but it would be speculation to claim that these cuts were part of austerity considerations.

The **potential effects of the governance innovations on the forest ecosystem services** on the ground are diverse, depending on the ecosystem services targeted (Table 3).

8. ***Limited governance impact on forests:*** Innovation Regions working on cultural ecosystem services seem to have less of a lasting direct impact on the forests, as students or tourists visit the forests without dramatically changing the management of forests or forest ecosystem processes. For these Innovation Regions, there is potentially a strong indirect and long-term effect, relating to changed attitudes, values and associated behaviour towards forests in general.
9. ***Heightened governance impact on forests:*** In other Innovation Regions, the governance innovation has direct impact and may transform forest management and ecosystem service processes considerably in the short term, e.g., when production forests are turned into protected areas, or when a new way of cutting trees is tested. In such cases, land use, rights and responsibilities are primarily subject to change as an indirect consequence of the governance innovation.

It is also important to mention **at what level policies about forests are made** – e.g., in Germany it is the federal state level, in Italy the regions, while Sweden and Finland are very centralized. Only very recently, Sweden is undergoing a decentralization process in the forest sector – although it is still quite unclear what the outcome will be and to what extent this will change the current management approaches.

A final remark on the political climate is necessary. Democratic elections can lead to changes in the political system and climate, which in turn may affect the environment and forest ecosystems. Although the governance innovations themselves target different forest ecosystem services, the Swedish and Italian Innovation Region, according to the Governance Situation Assessments, face similar **uncertainties due to recent national and provincial elections**. In both Innovation Regions, the election outcomes may impact the course of the governance innovation in the future.

However, given the organizational structure of the innovations – with the Italian practice partner directly subordinated to the provincial government and the Swedish practice partner independent of any governmental level – the impact may take different shapes. Whereas the Italian innovation may be directly shaped by the new government, it is merely the topic of the next educational initiative's edition that may differ due to election results in the Swedish Innovation Region and thereby changing interest by participating partners and stakeholders. The Finnish governance innovation also faces potential changes due to upcoming elections and it is for now uncertain whether the mood surrounding the innovation will change as a result. All Innovation Regions in this project will see elections on one level or another within the time-frame of this project (or could be under the impression of recent elections shortly before the project started). It would be an additional empirical question how far the elections and political changes affect the **innovation climates**⁶. Elections resulting in changing and new players and shifting political majorities can go hand-in-hand with new or altered discourses that potentially affect forest ecosystems, forest ecosystem services and forest management (such as what is seen as politically desirable and economically or ecologically viable). Our impression is that some core political convictions so far often taken for granted are challenged these days. Although this project cannot investigate them, it nevertheless should be aware of them and their potential or already visible influence on forest ecosystem services and the innovation of their governance.

⁶ The term 'innovation climate' refers to the readiness with which an Innovation Region is willing and capable to take up and support new innovation niches.

Stakeholders interaction approach

In this section, we describe the **overall stakeholder interaction strategy** for this project, as well as the key platform interaction strategies, such as:

- General engagement strategy with and among stakeholders;
- The empirical foundation of all interaction efforts;
- The CINA strategy articulation workshops;
- The prototype development and dissemination;
- The Responsibility Navigator⁷ is introduced as a meta-governance framework for coordinating and collaborating in this project and its innovation platforms.

The principal objective of InnoForEst is to **foster innovations on the ground**. This objective is mirrored in the strong cooperation with the practice partners from the Innovation Regions. Such an approach presupposes close engagement with existing groups of actors but may also entail the active support of existing or new networks and platforms in later stages of the innovation process. Given the **strong actor orientation of the project**, ways of finding and mobilising stakeholders are emphasised. Finding and contacting them is relevant throughout the innovation process, in order to scope opportunities, but it is most important, when the innovation is rather new. Mobilising stakeholders can be an issue throughout the innovation process, too, as the innovation teams may need additional support to spark the interest of those stakeholders relevant for the innovation. On an operational level, this process entails a **continual dialogue** between science and practice partners, including bilateral talks about methodological issues, assistance with analyses, training, etc.

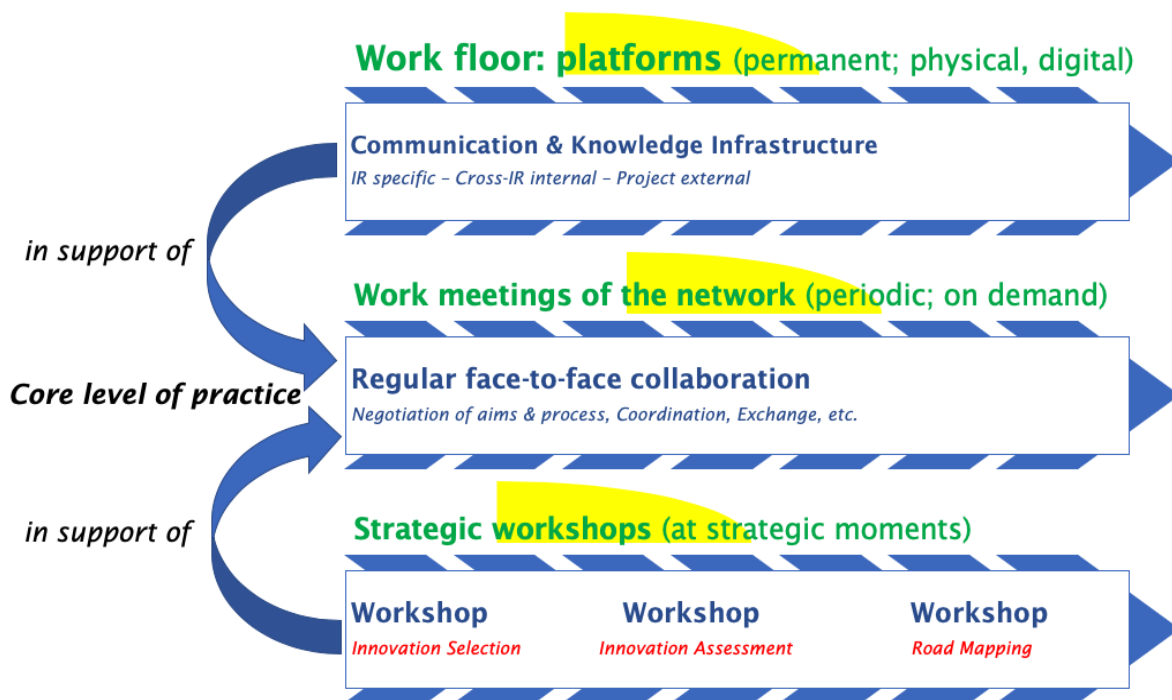


Figure 3: The three types of processes in support of stakeholder interaction

⁷ This is not the Navigator on InnoForEst Ecosystem Service Governance Innovation, but another one, more specifically addressing stakeholder/multi-actor involvement. It is also the eponym for the InnoForEst Navigator.

Stakeholder interaction happens according to **three types of processes** (see Figure 3). First, stakeholders meet under the label of the innovation platforms to communicate, exchange knowledge, and carry out common activities.

Second, networking activities are used to involve potential additional partners in the region. In this way, the aims, processes, collaborations, and exchanges can be fostered. Third, the innovation teams organize a series of workshops with very specific targets of strategy articulation and innovation assessment. All three types of processes are closely linked and help the innovation teams to analyse, develop and foster their forest ecosystem services governance innovation. Figure 3 shows how all three types of processes build upon each other and how they are intended to support the core level of the innovation – a lively stakeholder network working towards more sustainable provision of forest ecosystem services.

3.4 Provision of a physical & digital platform

The InnoForESt approach provides a **meeting platform** in the real and the virtual world that represents the work floor of the innovation (Figure 4). In both cases, the platforms offer spaces to meet, exchange, and work together in meetings, seminars, and workshops. First, the infrastructure at the Innovation Region constitutes the physical parts of the InnoForESt platform. This does not only include a stakeholder interaction facilitator with an office space to work and meet with stakeholders, but also all formal and informal meetings. The local stakeholder interaction officer organizes and manages the network and workshop activities taking place in the respective Innovation Region. Second, the InnoForESt website (www.innoforest.eu) essentially represents the digital platform. The website's protected section is exclusively accessible for project partners and allows for different types of knowledge exchange, for example, through fact sheets, blogs, etc. Further connections to other platforms are currently explored.

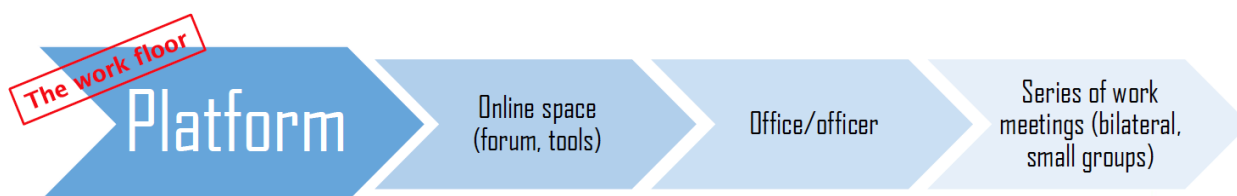


Figure 4: Digital and physical meeting platforms

Additionally, within the **digital platform**, each Innovation Region will have a protected online space to communicate, to exchange information, and to provide updated details on workshops outcomes, as well as latest news in the local languages.

3.5 Innovation network

In order to successfully realize an innovation in practice, there has to be a **network of stakeholders** that carries the innovation forward. From the InnoForESt perspective, the innovation network consists of all local and regional stakeholders familiar with, or interested in becoming involved in, the innovation action. Being member of this network enables stakeholders to participate in activities dealing with the innovation.



Figure 5: Elements of co-creation networks in the InnoForESt context

They learn about it, debate its potentials and risks, and, in turn, gradually but surely co-develop it. In an ideal situation, the innovation network includes decision makers from forest practice and administration as well as otherwise interested actors from public administration, civil society, nature conservation, agriculture, tourism, or business.

In addition, the establishment of stakeholder networks across the Innovation Regions is supported. These extended networks would include actors from other regions, the national level, and different sectors that may become involved in networking activities over time. These co-creation network activities for forest ecosystem services innovations can be summarised in three parts, which can, but do not have to, occur sequentially (see Figure 5). First, through interaction in the stakeholder network the socio-political and biophysical situation becomes analysed and clarified. Second, the stakeholders in the network maintain an open outlook on who should also be involved and, thus, contribute to mobilising other potential stakeholders and building the network further. Third, the stakeholder network co-develops and co-revises the forest ecosystem services innovation.

3.6 Strategic workshops

Once innovation networks are initiated, the network members can be brought together in a series of strategic workshop activities. The platforms provide the organizational structure in which the workshops can take place. For a successful development of the forest ecosystem services governance innovation, **three kinds of strategic workshops** are implemented in each Innovation Region over the course of the project. These strategic workshops constitute the core of what the InnoForESt project calls ‘Constructive Innovation Assessment’. Strategic workshops come to life and thrive when they are based on well-defined, innovation-specific scenario narratives as a main input. Scenario narratives can be seen as visions of possible futures of the innovation, which become more specific after every workshop and whose focus gradually shifts from innovation definition to road mapping.

The three kinds of strategic workshops constituting the workshop series are: (a) innovation analysis and visioning, (b) prototype assessment, and (c) preparing future conditions (see Figure 6).

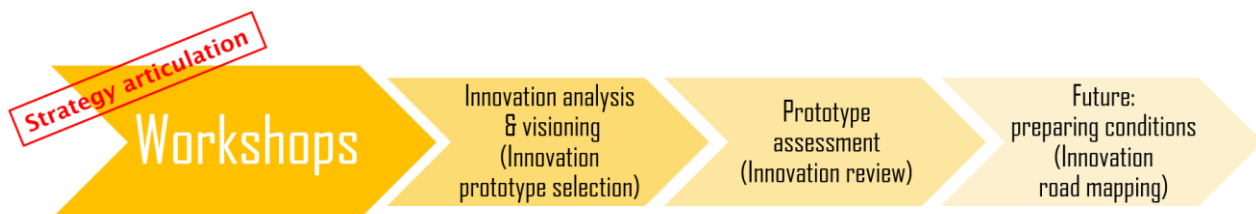


Figure 6: Three elements of the strategy articulation workshops

These three types of workshops follow a logical **sequence of innovation development**, which can be entered at different levels depending on the stage of one’s innovation:

- In the workshop dealing with ‘**innovation analysis and visioning**’ an understanding is gained of what makes the innovation work, and what its actual and/or potential impacts and limits are. Furthermore, the activities develop a vision how the innovation coordination can happen or improve. These discussions should all be based on insights of the development of the innovation and its key influencing factors (related to governance, institutions, economic, environmental, or practical issues). This workshop type leads to a set of concrete ideas on how the innovation should be improved and developed further, resulting in what InnoForESt calls innovation ‘prototypes’

(see Sections 2.1 and 4.5), i.e., the version of the innovation that the innovation network wants to proceed with.

- During the second type of strategic workshops, the **innovation prototype** chosen during the first analysis and visioning workshop is **assessed**.

This comprises the critical debating of idealized models of the improved innovation by a large range of stakeholders from the innovation network, asking questions such as: (a) what are the chances of the innovation to succeed, (b) what are the risks of an improved innovation that is for example, augmented to a larger region, (c) what are current and potential economic, social, and ecological impacts and benefits? A special element in the prototype assessment workshop can be an experimental role board game, which will explore these questions from a different perspective.

- The last strategic workshop in the sequence discusses which **future conditions** need to be prepared. This presupposes a good idea of how the innovation should ideally look like and how it should work in future applications. Based on the discussion about the conditions that need to be prepared to make the innovation work, the stakeholders develop an innovation **roadmap** that highlights what needs to be changed, who needs to be included, and how all this may be achieved; and thereby match the developed vision of the innovation with reality to actually put it to work.

While in the ideal situation, one workshop is organized for each kind of strategic workshop as well as for the role board game, InnoForESt acknowledges that this is not always realistic or practical or sometimes even unnecessary, depending on the situation the innovation is in. For a complete picture and a **comprehensive process**, though, it is useful to devote attention to all three aspects in those workshops that are organized. This means that the particular strategic workshop series for a specific innovation may take different shapes. The variants are displayed in Figure 7.

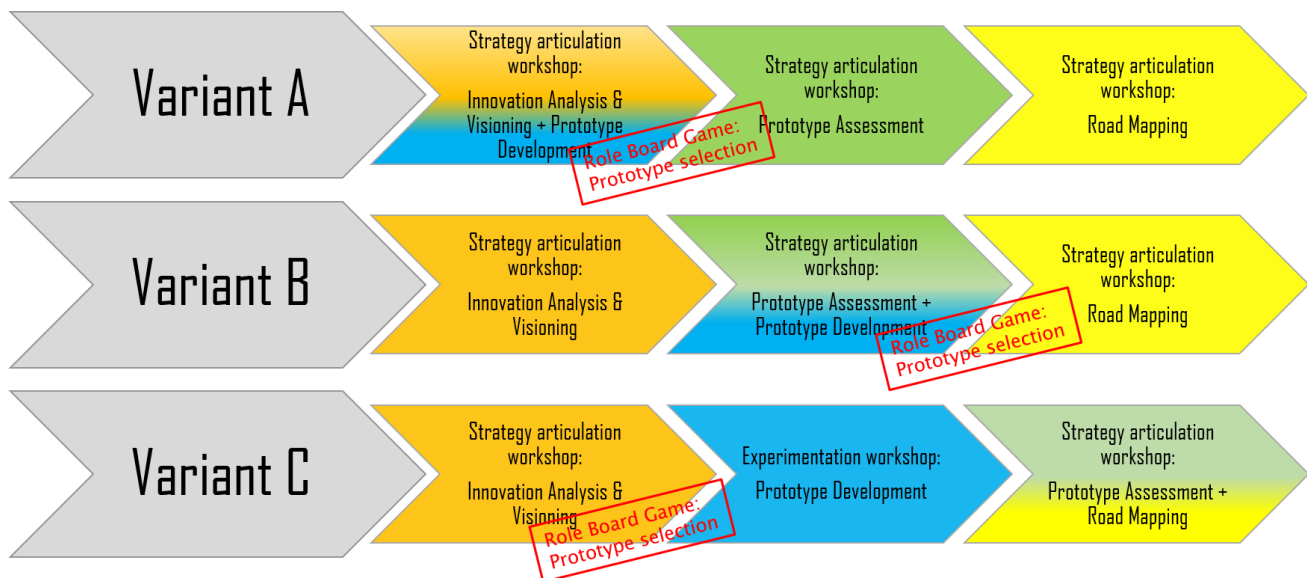


Figure 7: Variant combinations of the strategic workshop series and the role board game depending on the specific context to which the method is applied

3.7 Constructive Innovation Assessment for strategy articulation

The core idea of assessing a technology or innovation ‘constructively’ is to contribute to the shaping of an innovation. In the context of InnoForESt, this means to develop a novel or revised forest ecosystem service governance approach.

The question how such a contribution can be made is not trivial. At early stages of the development of an innovation, there is plenty of scope for designing, but comparatively little indication about which direction the innovation can take or what the criteria might be to assess the design alternatives, whereas at later stages this assessment is easier, but the design scope will have decreased as routines and consolidation have been established (cf. Collingridge 1980). Before an innovation has stabilised, Constructive Innovation Assessment⁸ inserts opportunities for **structured reflection on alternative innovation options, aspects, and dimensions**, as well as on the **conditions** under which an option could be realised.

CINA assumes that actors, which take different roles and positions with respect to an innovation, would also be taking **different perspectives** that ultimately may lead them to different valuations of the chances and limitations of a development. In this context, we speak of **‘enactors’** and **‘selectors’** – those actors who actively push an innovation forward and place it at the centre of their thinking, and those for whom this very innovation is only one option among several. In order to bridge and facilitate between these actors and their viewpoints, CINA offers specific occasions for shared reasoning.

Against all the variability of innovation and the limitedness of the chance to anticipate it, from an innovation studies point of view, the development of innovations follows **regularities and patterns**. Dynamics and patterns in different dimensions seem to play a role: from local micro processes over dynamics in specific areas to broader landscape developments, as well as typical governance, business, natural/biophysical, and techno-scientific dynamics. Knowing about and anticipating these patterns for a given innovation is expected to help the actors in the innovation network to carefully preview at least some principle aspects of what is typical for a particular kind of development and innovation format, as far as it can be described in a scenario and be done in a reflexive and controlled speculation. This collective speculation can, if done well, become part of the innovation process, as the negotiation of what enactors and selectors actually want to pursue.

The CINA approach **combines sound research** on innovation situations with a series of **stakeholder workshops**. The results of the research go into the preparation of the workshops, and the workshop results can be used by interested stakeholders as strategic intelligence for their innovation projects, and by the researchers for scholarly reflection and publication. The CINA approach aims at establishing a fertile environment, in which those interested can probe each other’s worlds, provided that:

- (1) **Prior research** on the current situation of the targeted innovation is done.
- (2) The facilitators are very **familiar** with key stakeholders’ perspectives, interests, visions, interactions, histories.
- (3) Stakeholders are equipped with a stimulating, realistic synthesis of what can be known (in form of **scenarios narratives**).
- (4) Stakeholders are **taken seriously** as equally well-informed experts of their own situation.
- (5) The innovation platforms are understood as **policy-making arenas**, not more, and not less. It is about **real innovation**, not just a mere game or speculation; real actors with real ideas and constraints engage in real interaction, and their commitment, ambitions, struggles, consensus, and dissent are also real.

⁸ CINA has been developed from the Constructive Technology Assessment (CTA) approach (Schot and Rip 1997; Rip 2018).

The **research** can use all kinds of methods appropriate for the subject matter at hand. Since the CINA approach requires practical understanding about the innovation efforts (be it a new governance approach or a new technology, a new business model or service, a prototype or product) as well as a broader overview over the circumstances under which the innovation takes place (the alternatives to the innovation, the history, the expectations for the future of the innovation and its use, the policy and market environment, etc.), it is wise to study the innovation to a larger extent in its context and with direct communication with the practitioners involved.

Those **preparing** for a CINA workshop need to be quite familiar with the field and possess enough context knowledge in order to be able to moderate deliberations in such a way that they can stimulate discussion through specific hints and by including relevant issues and stakeholders, anticipating what kind of contributions they typically make. This is the case both for the composition of the workshop (invitation, setting the frame) as well as for carrying out the workshop. Well-informed, realistic, and thought-provoking scenarios (narratives, with conceptual graphs, symbolic pictures, etc.) are a core tool for CINA workshops. The preparation of a CINA workshop therefore crystallises in the development of scenarios the participants find compelling to discuss, because they mirror the situation they are in or aiming at, while also projecting realistic expectations about how specific conditions may influence the feasibility or further development of an innovation.

The **workshops** are to be moderated as safe spaces, in which those committed to collective reflection on an innovation can think out of the box. They serve as carefully and minimally structured occasions for strategy articulation:

- **Mutual learning** about the opportunities and limitations of an innovation, the perspectives of other actors, how far one can converse or even start to collaborate with others, etc.
- **Encountering** actors, who are either like-minded or nevertheless can offer constructive inspiration even through pursuing own agendas or seeing things differently.
- **Interconnecting** while making explicit the actors' strategic aims and considerations, thereby literally probing options of working together with one another.

The **workshops** need to be specific about the cases at hand, the actors participating, the options discussed through the scenarios – but they also need to be open-minded, unrestricted, inviting for critical remarks, counter-arguments, alternatives:

- **Being explicit about options:** supported by (socio-ecological, governance-related, physical) scenarios, which urge to express possible constellation fruitful for an innovation in clear terms, including what is ambivalent, unknown, or out of reach or of control.
- **Being explicit about constitutive elements:** options only start making sense when aspects upon which the scenario options are based are explicated.
- **Being specific about futures:** scenarios reflecting the near-term (or also mid-term) futures, by extrapolating existing trends, while elaborating on the conditions of changes as precisely as possible.
- **Conditions of the possibility that an option actually works:** in order to be also specific about what could lead to a future of the innovation.
- **Help stakeholders to anticipate and decide** through better understanding of ongoing dynamics, complexities, desired effects and less desired repercussions of possible actions.

- **Occasions to building visions together**, networks, priorities, instead of only solitary or mono-dimensional speculation without any contrasting views, alternative sources of knowledge and experience, or an idea about the broader spectrum of importance the innovation can have for other actors.

The **scenarios** derived will:

- feed into an estimation of potential effects of activities and into the development of strategies, taking into account desired outcomes and unintended impacts.
- provide the **collective reasoning space** for identifying crucial issues for the options and pathways, both in terms of potential problems and benefits together with key actors.
- should ideally include those who **enact** the innovation (because they find it worthwhile) and those who would possibly **select** it (as soon as they find the innovative results interesting enough, useful, desirable, or would choose for any other reason). This can mean to involve even third parties not yet directly engaged but promising as potential partners elucidating how certain policy or market conditions, business models, and technological or scientific **aspects** or **conditions** of an innovation may become viable.
- show the stakeholders how other actors, who normally might not be involved, could indeed be crucial for the advancement of the innovation.
- can be used as **decision aides** for selecting participants that actually need to be invited to have the full spectrum of relevant perspectives sitting at the table and being heard.

The scenarios in InnoForEST are based on a series of **research efforts** the project has placed in its first year: the mapping of biophysical and institutional conditions for forest ecosystem services across Europe and in the Innovation Regions, the Stakeholder Analysis and the Governance Situation Assessment. In the further pursuit of the project, particularly through the innovation platforms and the workshops, the research focuses on integrating the new findings from the interactions with the stakeholders in the Innovation Regions into the further development of the prototypes. The **learning curve** also connects one workshop to the subsequent one, as the results of one workshop will feed into the next innovation action, and the findings about the innovation actions will again feed into the next-stage workshop and the revised scenarios used there.

3.8 Prototyping

Prototyping in InnoForEST stands for all activities involved in the **development of innovation prototypes**. In technical terms, this development is based on the ‘reconfiguration’ of factors that make up the socio-political and biophysical conditions in the Innovation Region. Reconfiguration of factors means the optimization of key positive and mitigating negative influences of the socio-political and biophysical context on the innovation process. It also includes experimental testing of innovation visions. The process of reconfiguration and, in turn, the prototyping should lead to a policy and business innovation prototype. If there are more than one innovation involved in a project, as is the case in InnoForEST, those innovations may find collaborative potential based on the shape of the prototypes.

3.8.1 Prototype assessment

The innovation prototypes (scenario of the preferred vision) are **assessed** by stakeholders by critically debating:

- What are **chances** of the envisioned innovation?
- What are **risks** of the envisioned innovation – for instance when applied to a different context or larger region?
- What are economic, social, and ecological **impacts** and **benefits**?

Role Board Games (experiments) can be applied to determine those questions along with understanding the **players' underlying motivations** to innovate or not to innovate. A large range of stakeholders are invited to discuss and work on improvements.

The development of prototypes for innovations in each Innovation Region is based on the reconfiguration of factors. A three-part, factor-based process leads to the definition of the innovation prototype in the respective Innovation Region. First, a set of key positive and negative **influences** of the specific innovation processes needs to be compiled. Second, this set is **tested** experimentally by means of a standardised Role Board Game. Third, the **factors** are reconfigured optimally to construct the policy and business innovation prototype. Once the optimal form of the prototype is known, it is possible to identify potential fruitful collaborations among Innovation Teams based on similarities in the prototypes and the relevant factors.

3.8.2 Role Board Games for prototype assessment and reconfiguration

The main aim of the Role Board Games is to **identify and test innovation factors** that may lead to a successful embedding of the innovation into its socio-political and biophysical context. It also aims at **deep mutual learning** among stakeholders who, by playing the game, discuss diverging uses or conflicts over forest ecosystem service provision that may arise between them.

In order to get a better understanding of the role and the impact of key innovation factors for each Innovation Region, we have designed a behavioural (lab) experiment in the form of a role board game. The main question to be addressed by the Role Board Game is: how to create conditions to enable innovations for sustainable use of forest ecosystem services and well-being in Innovation Regions under the diverging interest of forest ecosystem services users?

The Role Board Game tests **combinations of key innovation factors** as part of the innovation prototype development in a real-world setting. They are based on the preferred future scenario for sustainable forest ecosystem services provision in a regions' fundamental policy intervention (e.g., strict regulation vs. payments for ecosystem services scheme, business incentives and external risk factors, such as climate event, depopulation, migration, market, etc.). The Role Board Games will allow **testing stakeholders' specific behaviour** for resource use, **and innovation activities**, by exchanging incentives (certificates, compensation schemes, offset-banking, payments) and control mechanisms (state, bottom-up, monitoring mechanisms), collaboration strategies (networks, voluntary, regulatory), and elements of risk management. We argue that this will help to set conditions for successful development of policy and business innovations in InnoForESt Innovations Regions and to foster collaboration on sustainable provision of forest ecosystem services by stakeholders in the long term.⁹

⁹ For more information on the rules and game play of the Role Board Games, see section 5.2.

3.9 Responsibility Navigator¹⁰

High quality stakeholder interaction is a key to the success of this project.

The project needs to be **sensitive to societal challenges and concerns** and respond adequately, especially to those stakeholders and other actors engaged in this project. The Responsibility Navigator can **facilitate debate, negotiation, and learning** in a constructive and productive manner.¹¹ It entails a set of 10 requirements (see Figure 8¹²) practitioners (‘change agents’) might want to consider when pursuing the innovation of forest ecosystem services governance, such as

- (1) Ensuring Quality of Interaction: **Inclusion – Moderation – Deliberation**;
- (2) Positioning and Orchestration: **Modularity & Flexibility – Subsidiarity – Adaptability**;
- (3) Developing Supportive Environments: **Capabilities – Capacities – Institutional Entrepreneurship – Culture of transparency, tolerance, and rule of law**.¹³

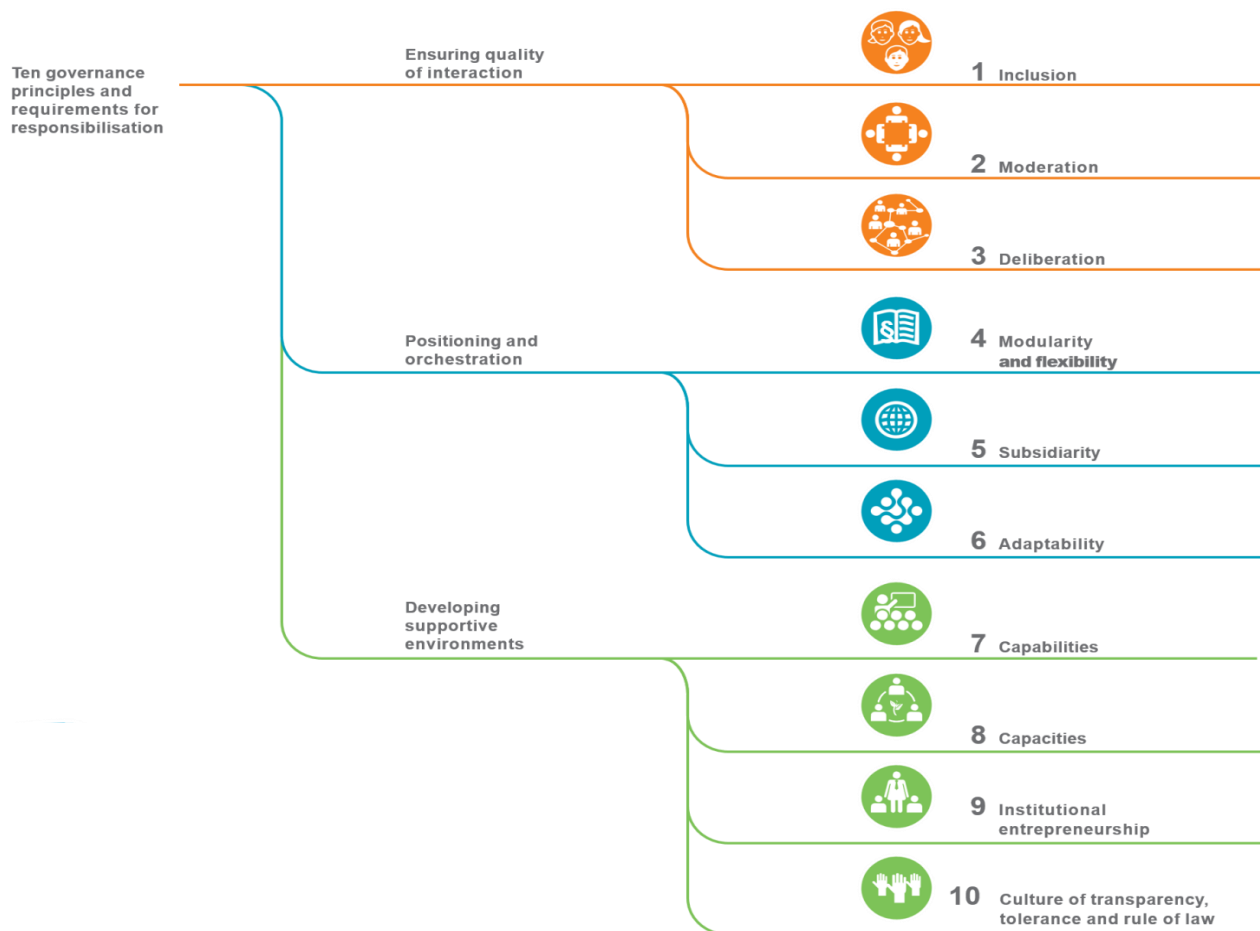


Figure 8: Responsibility Navigator as developed in the Res-AgorA project.

¹⁰ This is not the Navigator on InnoForESt Ecosystem Service Governance Innovation itself. The Responsibility Navigator is the product of the FP7 project Res-AgorA. Cf. <http://responsibility-navigator.eu/> [29 January 2019].

¹¹ <http://responsibility-navigator.eu/navigator/>; <http://responsibility-navigator.eu/navigator/why-what-how> (12 December 2018)

¹² Lindner et al. 2016: 138-139

¹³ Cf. http://responsibility-navigator.eu/wp-content/uploads/2016/01/Res-AGorA_Responsibility_Navigator.pdf (12 December 2018).

The basic idea of these requirements is the *process* of stakeholder interaction for innovation which is organized **just, legitimate and as a broadly accepted course of action**. It does not predefine what outcomes of such a process would be.

Focusing on a responsible process instead of steering towards one actor's desired outcome requires an open mind, tolerance of other perspectives, and an acknowledgement of 'being in this together' by all participating actors.

3.9.1 Ensuring Quality of Interaction

For a high quality of the interactions in innovation projects, the Responsibility Navigator provides three processes: first, inclusion of a diverse set of actors which are relevant for the innovation as well as those impacted by the innovation. In the interactions, not only their interests should be considered, but also the values these actors might hold. The innovation process should be organized as such that all involved may **influence the decision making**. Second, innovators should ensure that their process is characterized by an **environment of trust and organized dialogue**, with the aim of increasing actors' potential goal alignment. Third, engaging such a **diversity** of actors with heterogeneous positions, interests and values requires systematic deliberation, which leads to "confronting, synthesizing and eventually compromising" (Lindner et al. 2016: 144). Spelling out the trade-offs that arise among the different actors who are involved in the innovation will decrease the long-term risks of the innovation failing and can, instead, strengthen the foundations of the innovation.

3.9.2 Positioning and Orchestration

Three principles – all describing the character of regulation necessary for responsible innovation – constitute the interaction governance. First, a **mixed set** of hard and soft regulatory **mechanisms** is advised, allowing innovation participants the freedom to organize their process themselves within certain limits. A **balance** should be struck between self-regulation and external control and accountability. This external control returns in the next principle of **subsidiarity**, which states that external control mechanisms should only take on "those tasks which cannot be performed effectively at a more immediate level" (Lindner et al. 2016: 148). Finally, any regulatory mechanism devised for innovation should feature the possibility of being reviewed, i.e., **adaptability**, in the face of external changes.

3.9.3 Developing Supportive Environments

The third domain of preparing the context of the innovation contains four principles. First, innovations will increasingly rely on the capabilities of participants. In a fast-changing world, adapting skills and capabilities to the needs of the innovation is paramount. This includes a set of **collective reflexive processes**, such as "recognising, anticipating, deliberating, communicating, and collectively pursuing societally desired processes and outcomes [...], and evaluating them" (Lindner et al. 2016: 152). For innovations and the people involved in them to thrive, not only need the individual capabilities be in focus; a **supportive organizational environment** is equally important. This may entail "access to information and resources, spaces for reflection, interaction and negotiation, appropriate incentive structures, and an open knowledge base" (Lindner et al. 2016: 152). The former two practices can easily survive independently without producing meaningful responsible innovation. Hence, they must be enforced by **visionary and supporting leadership**, which constitutes the third principle. Finally, and most abstractly, responsible innovation can only take place in contexts **valuing and living basic democratic principles**.

For example, only innovation contexts abiding by the rule of law can install the confidence of “making claims and invoking legal or political means” if required (Lindner et al. 2016: 158).

3.9.4 Practical issues for InnoForESt

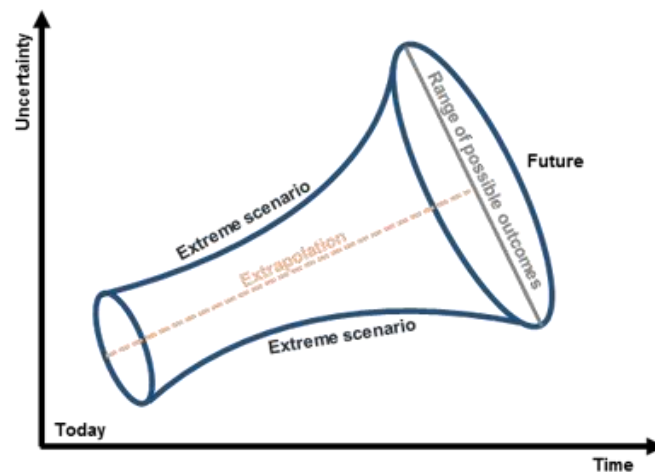
The Innovation Actions this project undertakes in the Innovation Regions concerns the Innovation Partners and their stakeholders within their real live contexts and needs to maintain or strive for a viable business. As in every interaction, productive cooperation depends on **flourishing togetherness**. Since compulsion is excluded, **voluntary collaboration** is the essence. The criteria listed above are intended to support the creation of a **constructive atmosphere** filling the innovation activities with life. However, members of this project need to be equipped and able to moderate the collaboration, while being perceived as **honest brokers and facilitators**. The challenge is to balance the interests and viewpoints, to provide help needed to canalise the stream of information, and to handle situations that are potentially conflictive or competitive. The procedural principles may help **legitimise the innovation** work in the regions by providing a set of rules all parties can agree to.

Nevertheless, our project members in the regions will need to **carefully observe, interpret, and adjust to the dynamics** in the innovation network among the participants – be it in a workshop meeting or in the overall process. The trick is to use the momentum of those very active while at the same time prevent them from out-trading interested others who are still examining cooperation.

This chapter presents the **key methods** so far used in the project as well as those still to be adjusted and used during the remaining project time frame.

3.10 Constructive Innovation Assessment

The CINA method relies on the formulation of **scenarios** which are weighed against each other by stakeholders during intensive workshops. A scenario, as InnoForEST understands it, is at the same time a **‘useful fiction’** and a **‘holding device’**. In turn, we understand a ‘useful fiction’ as a coherent story or plot of a world, in which the innovation has taken on a specific shape. A ‘holding device’ is a condensation of what is known about one possible development. In other words, a scenario is a thoughtful, systematic, rich mixture of creativity and prior knowledge of the governance situation. It tells a thought-provoking story about how an innovation *may* take shape. Figure 9 visualises how scenarios can be understood as a telescope looking into the future. Based on the world today, the future holds a range of possible outcomes limited only by extreme scenarios, which border on impossibility. Opening up possible futures of the innovation for discussion, the **scenarios trigger speculation about and reflection on possible outcomes and their opinion and feelings about these**. This way of discussing potential governance innovations is an alternative for plain guessing, naively carrying on with known/outdated routines or for relying on prediction in the strictest sense. For the CINA method, some of these scenarios are used to take a closer look at and engage with.



Alternative 1		Alternative 2	
Extreme 1	Ceteris paribus	Extreme 2	
Extreme 1	Extreme 2	Extreme 3	
Alternative 1	Alternative 2	Alternative 3	Alternative 4
Alternative 1A	Alternative 1B	Alternative 2A	Alternative 2B

Figure 9: Top: Representation of scenarios as telescopes directed at the future. Bottom: Scenario combinations (colour groups) and their general thrust

During stakeholder workshops a small set – say 3 – scenarios with different plotlines and potential future contexts are discussed. Combinations of scenarios and how they relate to each other are depicted in Figure 9 (every colour represents one possible set of scenarios and their general thrust). Such discussion intends to tease stakeholders out of their shell and stimulate out-of-the-box talk about what is important, what may be missing in the scenarios or which links and incompatibilities exist between scenario elements. Mind that the scenarios are **thought experiments** and are not the only way the different scenario elements can be storified. In scenarios for following workshops, resonating elements from different scenarios may be recombined.

Figure 10 shows the idealised intertwining of research, network collaboration, and CINA workshops. In principle, the trajectory entails research to derive a set of raw scenarios which will subsequently be refined by close consultation with the stakeholders of the innovation network and in a first CINA workshop. At this first workshop, the most viable scenarios are selected and developed into the actual prototypes. Once the prototypes are clear and work with them has started, the second CINA workshop is dedicated to assessing and reconfiguring the prototypes – again as scenarios, this time of the prototypes. After the most viable prototype configuration has been advanced, roadmap scenarios for continuation of the prototype beyond the project time frame are probed in the third CINA workshop. The input for this workshop is again a set of explicit forward-looking scenarios.

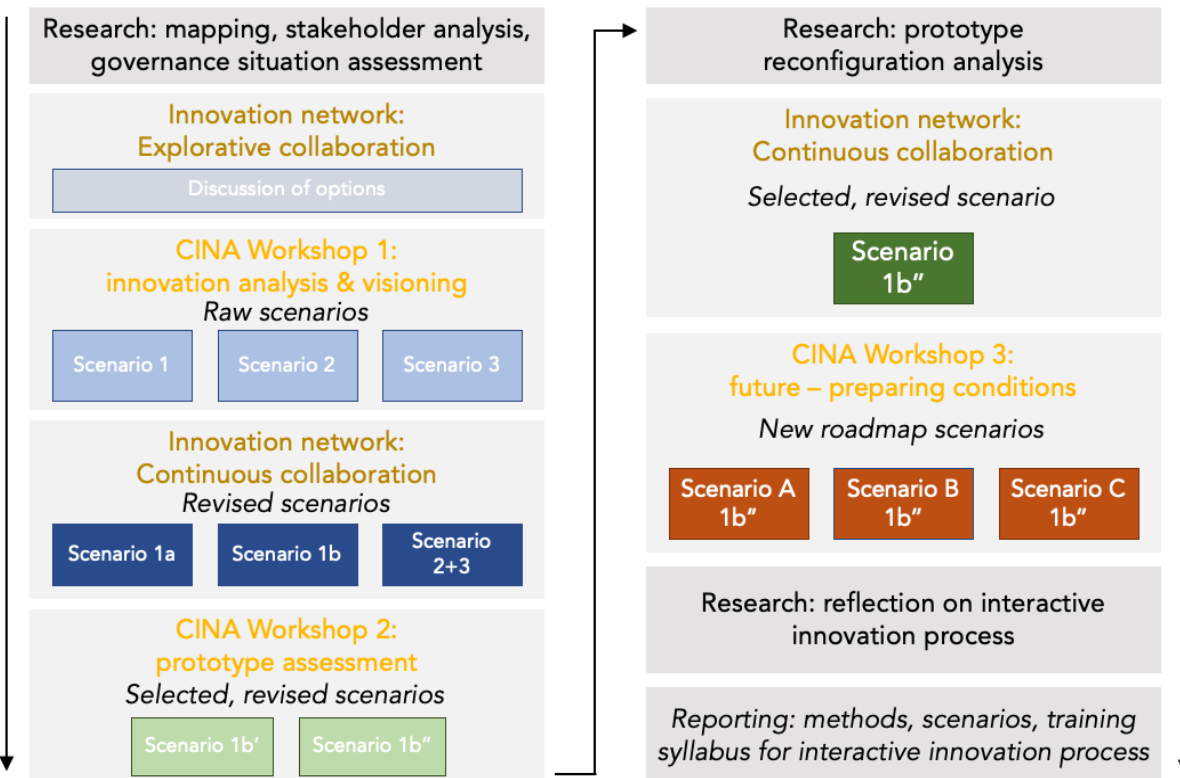


Figure 10: Principle coupling of CINA and innovation network processes

3.10.1 Scenario building basics

Scenario building rests on a **thorough analysis of the innovation context** prior to taking action. The types of analyses you can think of are not only Stakeholder Analysis and Governance Situation Assessment, but also a mapping of the biophysical and institutional setting of the innovation. As a general aid of thinking about which information would be useful, relevant or important, generic conceptualizations of a governance situation are helpful (Figure 11¹⁴). In a simpler way (Figure 11, left image), one can think of the potential innovation being

- (a) **constituted** by actors, things, issues, activities, and events,
- (b) **located** in some place, space, and time, and
- (c) surrounded by a certain **context**.

¹⁴ Cf. Spradley (1980) left; Clarke (2005) right.

The question where context begins and ends, has to be solved empirically.

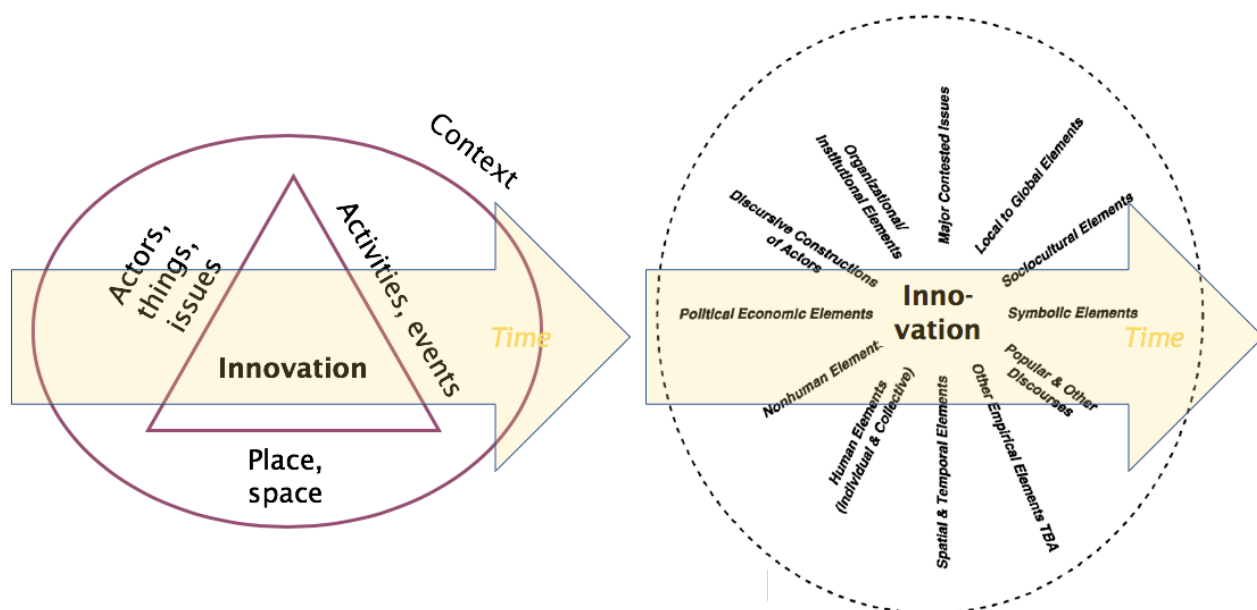


Figure 11: Generic conceptualisations of a governance innovation situation

These very **generic categories** will have to be specified for the actual cases (Figure 11, right image). One should identify:

- (a) the socio-technical & socio-ecological processes impacting the governance innovation in the innovation context;
- (b) the impact of the governance innovation on its socio-technical and socio-ecological environment;
- (c) societal developments, which are not under the project's control;
- (d) current & expected uncertainties.

Once these aspects of the innovation context have been charted, scenarios are developed by discussing **imaginable variants** of the innovation. For a start, think of 3 variants. Following the identification of the variants, discuss how they may be embedded into socio-technical and socio-ecological futures. As a final step, formulate a narrative encompassing all of these aspects.

3.10.2 Preparing for a stakeholder workshop

Besides developing the scenarios, there is another crucial element to a good CINA **method use**:

- For a lively discussion based on different perspectives and generating new insights, several aspects should be considered when preparing a stakeholder workshop. First, all relevant actors in a given field should be invited.¹⁵ However, keep an open mind about stakeholders who may not be involved or acknowledged in the innovation context yet.

¹⁵ Knowing who the usual suspects are, who is always involved, who could be an interesting addition to the network and what their particular views and interests are, presupposes prior knowledge. This may already be present, but it may also be acquired by the methods described under section 5.1.1.1. This might also mean that the CINA workshop in which the scenarios are discussed may not be the first interaction moment in the innovation effort.

Who may actually be connected to the envisioned innovation in a way not yet thought of. Such stakeholders could provide interesting new contributions to the discussion or even give decisive impulses.

- Motivating stakeholders for such a workshop and involving them can be tricky, as the workshop's utility may not always be clear for them. Thus, try to make the workshop appealing by offering participants to gain additional insights and networking opportunities with people they do not normally interact with. This makes the workshop useful and reduces the possible feeling of just being research subjects who are answering scientists' questions. Utility can also be increased by developing scenarios that resonate with the participants and which they may make use of also after the workshop, for example, at their respective home bases.

3.10.3 Documenting the stakeholder workshops

Given that the aim of a stakeholder workshop in the CINA methodology is not extracting some kind of 'facts' from participants for research purposes, but that it rather intends to **elicit reflection and constructive discussion**, it is not enough to note down what was said in an abstract, technical manner. If the results of the workshop are to be used for follow-up workshops, for example, type 2 or 3 (see above), a different way of documentation needs to be pursued:

- First and foremost, the **responses to the scenarios** need to be noted. This not only includes spontaneous or primary responses to the scenarios as presented, but also combinations of elements from different scenarios, deviations, pros and cons, modifications, and aspects beyond the original scope need to be reported, preferably including whose suggestions these were.
- To construct a rich documentation honouring all **participants' positions**, it is also necessary to document strategies that were uttered on various levels (implicit/explicit, interpersonal/interorganisational/intergovernmental/international) as well as the interaction dynamics that evolve, including conflicts, convergences or collaboration. In other words, do not just describe single aspects, but put them into context, i.e., (a) those conditions under which they were mentioned in the discussions as well as (b) those conditions under which they could become real. These **deviations or suggestions beyond what you proposed as scenarios can be understood as alternative scenarios**, which are equally important as they tell you more about the position and opinion of the participant expressing them.
- At the end of the workshop, note all **next steps that were agreed** upon with the stakeholders. In addition, discuss participants' **expectations** of what will be achieved until the next strategic workshop. In turn, you can reflect back on these expectations at the start of the next workshop. Doing so allows for first or even second order learning processes as participants anticipate the future.
- Finally, do not forget to describe how you **prepared** for the workshop, i.e., the interaction strategy you had in mind. Describe which **new impulses**, such as unusual actors, materials, or additional examples, you brought into the discussion during the workshop.

Detailed notes on the workshop should be first taken in the local **language**. This guarantees maximum clarity, detail, and nuances. For the Demonstrator Report D4.2, detailed summaries will have to be translated into English.

3.11 Role Board Games¹⁶

InnoForESt Innovation Regions (conceptualised as social-ecological systems) are characterised by **manifold, sometimes diverging uses of forest ecosystem services**, such as extraction, recreation, preservation or education. These uses are driven by, for instance, depopulation, market pressures, and ecosystem dynamics (e.g., climate events). Depending on the legislative context, forest ecosystem services are often public or common goods facing diverging individual and societal interests that in turn affect the quality of ecosystems and well-being of the communities living nearby. This may result in overuse, degradation, or unsustainable behaviour, creating also barriers for cooperation, economic profit, and innovative business initiatives.

The proposed experimental session builds on Cardenas et al. (2013) and Castillo et al. (2011) as an **interactive agent-based model** arranging for repeated interaction and learning in real-world situations. It contributes to testing the effectiveness of incentives provision for the sustainable production of forest ecosystem services and the acceptance of such an intervention by forest ecosystem services communities (Kluvankova et al. 2019).

The game intends to **create a situation** in which a group of five forest ecosystem services **users make decisions** about the use and management of a forest for forest ecosystem services provision as a governance innovation and are confronted with fostering or hindering context conditions (local climate, economy, governance, innovation potential, etc.) and stakeholders' interests. Stakeholders will face change in conditions/factors (individual/collective action, diversity of rules, innovation factors, external events and disturbances etc.) and will be able to observe/test what conditions lead to successful collaboration for sustainable forest ecosystem services provision in their specific contextual conditions for well-being of their communities/region (will need to be discussed specifically for Innovation Regions). One stakeholder of the game will be representing an authority (e.g., national park, regional office, government, bank etc.) external to forest use but with regulatory and monitoring power. This approach will create a space to test innovation activities for prototype development (reflecting scenarios as preferred development options for the Innovation Regions).

On the other hand, the experimental design of the Role Board Game allows to study and discuss **only a limited set of factors** and necessarily has to be based on **simplified** real-life situations from Innovation Regions. It has also lower explanatory power, so it is necessary to combine it with other research methods that enable to answer 'why' something is particular happening in Innovation Regions.

The game consists of **two optional treatments**. Each treatment has two stages (two parts with 10 rounds to play with changing conditions). One group plays only one treatment. Both treatments have an identical first stage, with certain forest ecosystem services without any innovation in place. In the second stage, treatments are different in factors that may affect decisions and innovations and thus leads to behavioural change of stakeholders.

¹⁶ The proposed behavioural experiment (Role Board Game) undertaken under Tasks 3.2 and 3.3 of WP3 follows a transdisciplinary approach and aims for a co-production of empirical and theoretical knowledge among participating scientists and stakeholders. It contributes to InnoForESt objective 2: understanding success factors of novel policy and business models. The method allows testing innovation factors and stimulates learning process on the functioning and impacts of governance innovations also across scales (objective 3), addressing policy recommendation (objective 4). The set of governance and business innovation factors (following InnoForESt Deliverable 3.1) to be further complemented by and for specific Innovation Regions' needs).

- **Treatment 1:** concerns the **variety of motivations** that make innovations attractive for stakeholders to participate and support forest ecosystem services provision in the long term (**state regulations, payments for ecosystem services or a business innovation incentive**). It is here where the preferred vision for innovation development may be implemented.
- **Treatment 2:** focus on the **governance innovation, when the forest is affected by an external disturbance** (climate event, market pressure, etc.). Stakeholders can decide about the introduction of new regulatory rules, such as monitoring and sanctions, and they can collaborate on development of innovative social rules.

After playing, stakeholders will be asked to take part in a short survey to clarify the reasoning of their decisions during the game, their motivations, and their reflections on the game design. At the same time, calculations and graphical interpretation of the game are prepared to show the stakeholders their decisions during the game. Then, stakeholders are invited to a focus group discussion to discuss main findings and game implications for their innovations in the regions. Last minutes of the session are allocated for the stakeholders' payoffs that are based on their individual results from the game (in form of financial/material rewards to the stakeholder part is fixed and part is based on their individual decisions during the game).

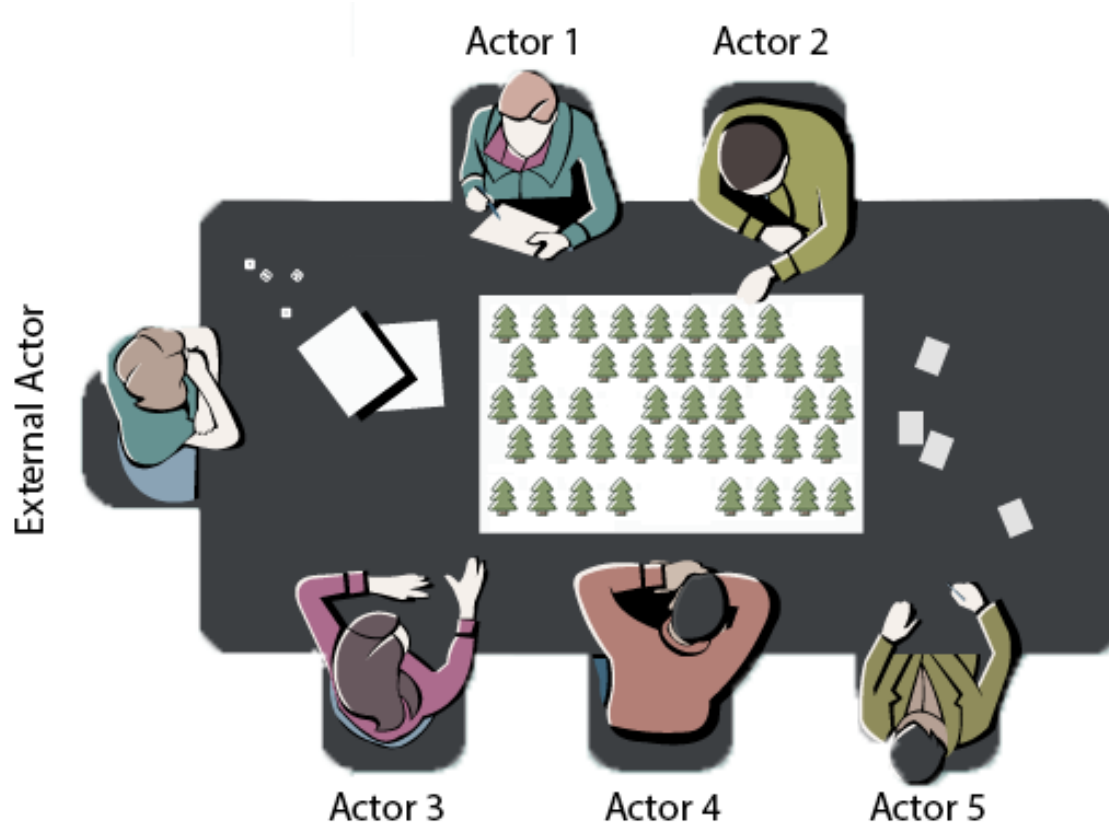


Figure 12: Role Board Game situation with players

Steps of the experimental role board game:

The **total time** needed for the experimental role board game is about 2 hours, consisting of:

- Explanation of the rules (15-20 minutes).
- Game playing (60 minutes).

- Short survey on decision reasoning and calculation of the group results (5 minutes).
- Focus group discussion: game results and comparison (25 minutes).
- Payment of earnings to stakeholders (5 minutes).

The role board game **session** is based on a common algorithm but allows for flexible arrangement and adaptation for each innovation region. Adapted can be:

- **The role of 6 stakeholders** can be specified in each case (e.g., networks, extraction and conservation users, students, visitors, bank, etc., depending on Innovation Regions and networks);
- **The use of the resource** can be specified in each case (harvesting, reduction of forest quality, decrease of biodiversity/habitats, etc.);
- **Treatment 1** – offers options for modifying business innovations/prototypes towards sustainable forest ecosystem services provisioning specific to the case (based on scenarios: wood chipping, local wood furniture, recreation, education, etc.);
- **Treatment 2** – offers space for design of authentic resource regime (e.g., self-organisation, network, centralized conservation, public - private partnership, etc.) dealing with external disturbance.

3.12 Methods fact sheets

The method fact sheets relate to the WP4 matching framework (see also section 2.1). They are meant to introduce a collection of different qualitative, quantitative, and mixed methods that are potentially helpful to **assist** the Innovation Teams in the different Innovation Regions in innovation and prototype development and assessment, which includes the assessment of their applicability to other places (called ‘matching’).

The methods available can be **useful in different phases** of the innovation process, for example, in the beginning to assess the original innovations or later on to develop the initial innovations further by prototyping.

At present, four method fact sheets have already been elaborated. Additional method fact sheets will become available during the further course of the project. Thereby, suitable methods can be suggested by both, science and practice partners in the project. While some of the methods will be applied in all InnoForESt Innovations Regions, some methods will only be applied in some of them. It also might be the case that a specific method is not applied at all, as the **choice** which method to use is made by the individual innovation teams.

The method fact sheets are all **structured** in a similar way: They contain information on the name of the method and the authors of the fact sheet, give a short description of the method, describe which steps are involved when applying the method, and the type of outcomes produced. If applicable, an example how the method was applied in the InnoForESt Innovation Regions and how the outcomes could inform prototype development and assessment is provided. Also, the particular strengths and weaknesses of the method, materials and/or software needed, and if available some key references are specified. Finally, the contact info of a team member in InnoForESt who has worked with the method before and, thus, can offer advice for the other team members is provided. For the layout process of the fact sheets also graphs, tables, and photos can be provided. The authors of the method fact sheets also categorize each method in regard to its time needs, data demands, required expertise, and participation options for stakeholders.

Limitations for their use:

- Only those methods which InnoForEst **team members** are already know about or are familiar with/ are suggested. New or unknown methods would require expertise from outside the project.
- **Time** constraints apply, especially for very time-extensive methods.
- Other resources are limited, too, for methods which **require a lot of data**, which might have to be bought (e.g., spatial GIS data).

A **more detailed description** of the individual suggested methods will be provided in Deliverable 4.1. This deliverable will have a modular concept, which means that the method fact sheets can either be downloaded from the InnoForEst website individually or as a whole package. If deemed necessary by the authors, single method fact sheets can be complemented and updated during the runtime of the project, for example, by adding experiences made through the application of the methods in the different Innovation Regions.

Below, in sections 5.3.1 and 5.3.2, two of the method fact sheets that are already available are presented as **examples**. In order to avoid redundancy, we include here only the fact sheets which do not refer to CINA and Role Board Game already explained above.

3.12.1 Qualitative Comparative Analysis

How to use this?

- *What is it?*
 - Qualitative Comparative Analysis is an approach that aims to find **causal relationships** between cases' properties and outcome(s).
 - **Example:** Property A, a cooperative body, together with property B, a strong leading person, make associations economically successful.
- *When to use?*
 - The method could be especially used if Innovation Regions with **different outcomes** shall be compared to find certain property constellations leading to one preferred outcome.
 - **Example:** Forest is differently managed (properties) in the counties A, B, C, and D. County A and D have high nature value forest (outcome), counties B and C not. Which combinations of management rules make for a high nature value outcome?
- *How to use and limitations?*
 - There is a requirement for **conceptualization** of the properties (e.g., management rules) and outcome(s) (e.g., high nature value) and a requirement for empirical data.
 - Various **instructive** literature and software is available.
 - The method's application is considerably **time consuming** in terms of learning, data gathering, cleaning, and processing.

InnoForESt Method Fact Sheet



Method name:

Qualitative Comparative Analysis

Author(s) of fact sheet:

Claas Meyer

Short description of method:

Qualitative Comparative Analysis (QCA) is seen as middle way that combines certain features of qualitative research with features of quantitative research. QCA aims to find causal relationships between cases' properties (so-called conditions) and an observed phenomenon (called outcome), like success/non-success or similar. Thereby, QCA is not following a statistical logic but employs set theory, the logic of prepositions based on Boolean (Yes/No, True/Untrue) or Fuzzy algebra (degrees of membership to Yes/No or True/Untrue within a range between 0 and 1). The method focusses on the understanding of the relations between different causes and how they are interconnected in a certain context. Basic QCA ideas are the application to intermediate sample sizes of cases between 5 to 100 that are too small for statistical analysis and a systematic cross-comparison while still being case sensitive. The central principle is 'multiple conjunctural causation', which means that not only one single variable, but combinations of variables can (and most often will) lead to an outcome, that different combinations of variables can produce the same outcome, and, that one condition can have different impacts on the outcome, depending on the combination with other factors. QCA allows for a determination of necessary and sufficient conditions for the outcome. It reveals that condition can be interpreted as necessary if in the case that the outcome is present, the condition is always also present. On the other hand, a condition can be interpreted as sufficient in the case that if the condition is present, the outcome is always also present. The necessary condition is a super-set of the outcome, while the sufficient condition is sub-set of the outcome (see in particular Sehring et al. 2013; Schneider and Wagemann 2012; Rihoux 2003).

Application example:

The Kindergarten case (adapted from Berg-Schlosser and Cronqvist 2012: 138):

In a hypothetical case, the parents of a four-year-old boy are surprised about the desired guests for their son's birthday party. Thus, the example's outcome is a party invitation or non-invitation. The parents assume that reasons for invitation could be the membership in the son's Kindergarten-group (K-group), the age of the children (older kids preferred), and the gender. They look at data of five invited and three non-invited children:

An example for a proposition from the table: Betty is a girl who is older than four and is not in the son's Kindergarten-group. Now, which individual conditions are sufficient for the outcome 'Invited' are checked – meaning that wherever the condition occurs, the outcome should also occur. Neither all kids from the K-group nor all older kids (Age 1) are invited. Thus, the K-group and Age alone are not sufficient conditions. However, all girls (Gender 1) are invited to the party. Thus, gender is sufficient for the outcome. However, this does not fully answer the parents' question as in addition to the girls, the boy Adam is also invited.

Therefore, combinations of conditions are applied: all kids older than 4 (Age 1) who are in the same Kindergarten-group (K-group 1) are also invited. The parents now can explain the invitation list of their son: Kids are invited when being a girl or an older kid from the son's Kindergarten-group.

Names (cases)	Conditions			Outcome
	K-group (yes: 1, no: 0)	Age (>4 years: 1, ≤4 years: 0)	Gender (girl: 1, boy: 0)	Invited (yes: 1, no: 0)
Peter	0	0	0	0
Cindy	0	0	1	1
Ian	0	1	0	0
Betty	0	1	1	1
Michael	1	0	0	0
Paula	1	0	1	1
Adam	1	1	0	1
Jane	1	1	1	1

Steps involved:

- Hypothesis relating certain properties (conditions) to an observed phenomenon (outcome) (problem definition)
- Case selection and gaining case knowledge (data collection)
- Selection of conditions and specification of the outcome
- Transformation of data into crisp Boolean or Fuzzy sets
- Determination of similarities of cases with the same value of the outcome variable
- Complexity reduction: many variables will be reduced to a few patterns
- Determination of necessary and sufficient condition
- Examination of the inconsistencies (different combinations of conditions lead to the same outcome) and non-coverage (not all possible combinations of conditions are represented in the sample)
- Result interpretation and discussion

Outcomes produced (examples):

QCA can show sufficient and/or necessary conditions (often combinations of different variables) for a certain outcome – for example combinations of certain design rules for agri-environmental measures (AEM) which are sufficient for the measure's success in terms of environmental effectiveness (see Meyer et al. 2015). Within the exemplary study it has been determined that (i) the targeting of one environmental goal; (ii) application to a certain area/ habitat; and (iii) an accessible advice system, combined with (iv) either the possibility for flexible application or the obligatory participation of the nature protection agency in implementation may lead to AEM (payments for ecosystem services) environmental effectiveness.

How outcomes can inform prototype development and assessment in Inno-ForEST:

- Identification of sufficient and necessary (framework) conditions for the implementation of governance innovations.
- Identification of sufficient and necessary conditions for certain forest governance systems.

Strength & weaknesses of the method:

Weaknesses/challenges

- Selection of cases and conditions: QCA faces challenges of studies with small case numbers – only a limited number of factors and conditions can be considered for valid findings.
- Limited empirical diversity: 2^n possible conditions need to be checked but it will be hardly possible to find cases with all combinations.
- Binary coding (csQCA): Crisp-set QCA makes it necessary to dichotomize all factors – the conditions have to be assessed as fully absent or present. Social and political phenomena may be too complex for such simplification.

Strengths/benefits

- Multiple and conjunctural causation: Necessary and sufficient conditions and their combination may better reflect social reality than statistical methods.
- Better understanding of complex causal relationships among a larger number of cases.
- Data summary: Putting all data into a truth table can make it easier to explore similarities, clusters, patterns, and differences among cases.
- Testing existing theories and assumptions: QCA can be designed to falsify existing theories.
- Testing new ideas, assumptions, and conjectures: QCA can be used in an exploratory way.

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- COMPASSS (COMPARative Methods for Systematic cross-case analySis). A worldwide network for scholars and practitioners with interest in theoretical, methodological, practical advancements in systematic comparative case research <http://www.compass.org/>

Photos/Graphs:

→ Please send as separate files as *.jpg, *.png, or *.tif

Please also categorize method in regard to following criteria (→ will be used to develop method finder):

	low	medium	high
Time need to apply method to one case study?	<input type="checkbox"/>	<input type="checkbox"/>	x
Data demand?	<input type="checkbox"/>	<input type="checkbox"/>	x
Expertise required?	<input type="checkbox"/>	<input type="checkbox"/>	x
Participation options for non-experts?	<input type="checkbox"/>	<input type="checkbox"/>	x
	qualitative	quantitative	remark
Type of data needed?	x	x	All data possible
Type of data produced?	-	-	Middle way
	open source	proprietary	software
Software needs?	x	<input type="checkbox"/>	x
	Fine-grained	Coarse-grained	remark
Applicable spatial scales?	x	x	
Applicable temporal scales?	<input type="checkbox"/>	<input type="checkbox"/>	Difficult to include temporal scales

3.12.2 Agent-based Modelling

How to use this?

- ABMs are computational models to **simulate the interactions** of multiple agents (e.g., people, businesses, animals, etc.) and see how these affect the system as a whole.
- ABMs are particularly suited to describing systems characterized by **heterogeneity** (i.e., each agent is unique), **randomness** (i.e., some or all of the phenomena area characterized by a degree of randomness), and **interactions** (i.e., agents interact with the environment and each other).
- **Agents** can move, learn, and adapt to the external environment.
- Basic **rules** are assigned to each agent that reflect its behaviour, and the agents are allowed to act according to those rules.

InnoForEst Method Fact Sheet

Method name:

Agent-based Modelling

Authors of fact sheet:

Francesco Orsi

Short description of method:

Agent-based Modelling (ABM) is a class of computational models that simulate a complex system as a collection of agents interacting with each other and the environment according to some user-defined rules. With respect to other modelling or simulation techniques (e.g., system dynamics), which look at the system from above trying to describe its general features and eventually extrapolating the effects of the system on its components, ABM moves from the bottom up, trying to define the behaviour of a system's constituent units (i.e., the agents) and letting broad patterns emerge from interactions of such units. While there is no formal definition of agents, they have some specific properties. They are autonomous, in that they can act independently; heterogeneous, in that they differ from each other in one or more characteristics; they can learn from the external world; they can interact with the outside world and other agents; and can move. Depending on the field of application, agents can be anything from people to animals, from plants to vehicles, from firms to political parties.

A key element of ABM is the concept of emergence, namely the system dynamics arising from the interactions of multiple agents. For example, the residential patterns we observe in cities (e.g., distribution of social and ethnic groups) do not simply depend on pure household preferences, but rather on the complex dynamic interactions that are induced by those preferences (Schelling 1971). This is what is often labelled as the idea that the overall system is more than the sum of its parts.

ABM is not a mathematical modelling technique, though mathematical equations can be used to simulate agents' decision-making (e.g., probability of choosing one path or another, one transport mode or another, etc.). Most actions in ABM are driven by conditional statements (i.e., if statements). Models aimed at simulating



real-world contexts may be informed by behavioural information acquired through various kinds of survey (e.g., stated preference) and can rely on data describing the spatial characteristics of the study area (e.g., GIS data). ABM supports a special kind of inductive scientific approach where the observation of individual behaviours allows the detection of pattern formation and eventually the formulation of theories, therefore aiding intuition (Axelrod 1997).

Steps involved:

The modelling cycle is a recursive process involving the following steps:

- Formulate the question
- Assemble the hypothesis about the processes and structures that are essential to the problem
- Choose model structure: definition of scale, entities, and state variables
- Implement the model: translation of a verbal model into an ‘animated’ object
- Analyse the model: learning from model outputs
- Start over...

Outcomes produced (examples):

ABM can show the effects of individual decisions on the overall system and describe the consequences of a policy over time and across space, also highlighting which elements of a policy are likely to generate stronger or weaker outcomes. In a study conducted in 2012-2014 to assess the effects of transportation management on visitation flows in a protected area of the Dolomites (Orsi and Geneletti 2016), the use of ABM enabled the estimation of the effects of a transport mode’s characteristics (e.g., frequency of travel) on the flows of hikers, the consideration of the impact of contingent traffic conditions (e.g., road congestion) on visitors’ transport mode choice and the identification of ‘carrot and stick’ policies that safeguard the environment without overly limiting visitor inflows.

How outcomes can inform prototype development and assessment in Inno-ForEST:

- Identification of factors that may have a stronger impact on the success of an innovation (e.g., impact of harvest rate on sustainable forest management).
- Identification of actors that may have a stronger impact on the success of an innovation (e.g., impact of farmers on the extent of the forest over time).

Strength & weaknesses of the method:

Strengths

- Ability to account for heterogeneity and interactions
- Ability to detect emergent phenomena
- Possibility to simulate systems that are too complex for mathematical modelling
- No mathematical literacy required

Weaknesses:

- Specificity of a model (scale, area, etc.)
- Difficult validation
- Computationally expensive: several simulation runs needed to account for stochasticity
- Difficulty of isolating the characteristics of agents

Software/Materials needed:

NetLogo (<https://ccl.northwestern.edu/netlogo/>) is a free open source software that requires relatively easy coding and can import GIS data. Other free packages are available, but they often imply a steeper learning curve. Commercial packages also exist.

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Photos/Graphs:

→ Please send as separate files as *.jpg, *.png, or *.tif

Please also categorize method in regard to following criteria (→ will be used to develop method finder):

	low	medium	High
Time need to apply method to one case study?	<input type="checkbox"/>	<input type="checkbox"/>	X
Data demand?	<input type="checkbox"/>	<input type="checkbox"/>	X
Expertise required?	<input type="checkbox"/>	<input type="checkbox"/>	X
Participation options for non-experts?	X	<input type="checkbox"/>	<input type="checkbox"/>
	qualitative	quantitative	Remark
Type of data needed?	X	X	
Type of data produced?	X	X	
	open source	proprietary	Software
Software needs?	X	<input type="checkbox"/>	NetLogo
	Fine-grained	Coarse-grained	Remark
Applicable spatial scales?	X	X	Depending on the scale, data and potential

			outputs change significantly.
Applicable temporal scales?	X	X	There is obviously a link between temporal and spatial scales.

Limitations for use

- The development of an ABM requires a **deep knowledge** of the system to simulate and modelling skills to write the code.
- **Validation** of an ABM is very difficult, especially if the model aims to simulate future scenarios.
- **Several** simulations may be needed to get some robust results.

3.13 Training

The project explores an approach, describes it, and will offer a **manual for training practitioners** at the end of the project (to be realised through Deliverable 5.4). In the course of the project, there is a need for internal training. Since March 2018, several **bilateral talks** with all partners in the Innovation Regions took place that step-by-step introduced the Stakeholder Analysis, the Governance Situation Assessment, and the CINA approach. The CINA approach was introduced in more detail in September 2018 during a **four-hour webinar** for all partners in the Innovation Regions. At the project consortium meeting in Trento in October 2018 a **clinic for the scenarios** to be used in the CINA workshops has been carried out. In Trento, also a **demonstration and a reflection meeting** on the Role Board Games was offered.

In addition, **trainings** for the methods presented in the single method fact sheets (see section 5.3 above) **can be arranged** by the InnoForESt team members who have worked with these methods before and thus can share their experience with other interested team members. Trainings can be either organized as face-to-face events via the physical component of the innovation platforms in the different Innovation Regions, or as online events via the digital component of the innovation platforms.

The experiences gained through providing internal training in its various forms during the InnoForESt project will inform the **design of the manual** for training practitioners. This refers to formats (e.g., webinars, physical workshops, training material made available online) as well as components introduced during these events (e.g., introduction to the CINA-approach, to empirical and analytical tools like Stakeholder Analysis, network analysis, Role Board Games).

The **manual will contain** formats and components that worked, elaborate on the necessary practical, technical, and other preconditions that are important for the formats and components to work, and reflect on the (experienced and/or anticipated) factors that made a particular format or method ineffective and provide suggestions on how to overcome or mitigate obstacles and/or provide alternatives.

Depending on the targeted audience/participants of the training events, the stage of the innovation process (if already known or identified), and the format (e.g., webinar, three-day training course) **lecturing elements** will be **combined with various forms of interaction** (e.g., group work developing brief narratives for possible innovation-related scenarios; carrying out short Role Board Games; etc.).

The manual will also contain **fact sheets** on the various tool or methods developed and used by various WPs in the context of InnoForEST. Further, links will be provided to other documented governance innovation training manuals and events [this refers to other examples/projects where CTAs or similar were applied].

Finally, **a list of ‘experts’** (from InnoForEST and perhaps beyond) will be added which would be available for either consultation on specific methods or approaches or joining future training events (webinars, training courses, etc.).

The manual will be made **available online** via the InnoForEST web portal.

4 Conclusion

In this InnoForESt interim Navigator, we have collected a **comprehensive compendium** of approaches applied in the project context. It ranges from the theoretical and conceptual backdrop to methods of innovation exploration and prototype testing. It also includes the project's intentions of sharing the gained knowledge with a broader audience in the future. Not least, we have elaborated a first empirical impression of the Innovation Regions with regard to the characteristics of their innovations.

Given the project is framed as an Innovation Action, the primary use of the empirical findings is **for the benefit of the Practice Partners** leading the forest ecosystem services governance innovations. Each Practice Partner is supported by a scientific team and together they develop 'their' innovation further, using the set of heuristics tools explained in this Deliverable 5.1. When zooming out, it should be possible to learn from the Innovation Regions on a more abstract level, as well as to identify the success and hindering factors affecting the innovations which form the prototypes that could be upgraded or scaled up somewhere else with similar conditions.

A critical aspect in the InnoForESt project is to **coherently manage** the different tools so that they can be applied timely and the generated outcomes could be integrated coherently. The six Innovation Regions serve as starting points for the formation of regional, national, and European network initiatives and the upgrading and upscaling of innovations.

In principle, the methods explained in this Navigator should be translatable into other Innovations Regions and innovations as well. An **extra adaptation effort** is necessary when the methods are intended to be used outside the InnoForESt context.

The outcomes provided by the set of heuristic tools, and the stakeholders interaction approaches, will contribute to the achievement of the **InnoForESt objectives**, synthesising information on forest ecosystem services provision, which will help to understand the success factors of novel policy and business. With these tools, InnoForESt will not only provide practical insights into strategic partnership formation, but also be able to provide sound policy and business recommendations to really spark the transformation of the European forest sector.

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Annex 1: List of problems compiled by Innovation Teams and characterised according to type of problem and levels involved

<i>Problem description</i>	<i>Type of problem</i>	<i>MLP level(s)</i>
ITALY		
Incongruence between purpose of existing forest infrastructure and ecosystem service potential (productive vs. recreational and other)	Knowledge problem of incorporating multifunctionality in legal and management frameworks, but technical knowledge for adapting the infrastructure to new requirements is available	Niche and regime
Provision of ongoing technical support to operators on the ground for implementing the management plans	Tamed problem: agreement on necessity and knowledge is available	Niche
Bureaucracy experienced as cumbersome	Unclear	Regime
Opening of the market problematic	many uncertainties with regards to knowledge and values	Regime-Landscape
GERMANY		
Public discourse opposes quantification of ecosystem services, fear of economization, rationalization of nature and green-washing by companies	Primarily differing values, but knowledge about quantification mechanisms is also debated	Landscape
Job cuts at department implementing Waldaktie	Might be the result of a value conflict, as the department was hit harder by job cuts than others	Niche-Regime
Unclear goals for ES protection	Value and knowledge issue, no agreement on where to go with the indulgence	Niche-Regime
SWEDEN		
Value of forests for recreation, mental, physical wellbeing	Structured	Landscape
Benefits in using forests for integration of migrants *possible employment *aligning with Swedish environmental norms and values (such as rights of public access) *health	Structured	Niche-Landscape
The need to use forest biomass strategically considering the high demand for the bio-economy	Structured	Landscape
Demand for broad range of employees in the forest sector	Structured	Landscape
Young people important for conveying messages on multiple values of forests	Structured	Niche-Regime
Universeum is a strong platform for collaboration	Structured	Niche-Regime
It is important to work across multi-actors constellations	Structured	Niche-Regime
Capacity at Universeum for development and implementation of new Älska Skog project	Structured	Niche-Regime

<i>Problem description</i>	<i>Type of problem</i>	<i>MLP level(s)</i>
Partners resources (time/ personnel)	Structured	Niche-Regime
Forest role for carbon regulation and climate mitigation (bioenergy vs old forests)	Unstructured	Landscape
Which FESs need to be prioritized in Swedish forestry? Maximum yield or other ES?	Unstructured	Landscape
Which FESs need to be prioritized in Älska Skog and Universeum exhibitions?	Unstructured	Niche-Regime
Cultural view that forest management is primarily expert driven – is there space for broader participation?	Unstructured	Niche-Landscape
Geographical location and area of influence, i.e., related to the issues of scale and innovation	Unstructured	Landscape
Benefits of clear-cutting versus selective logging practices; monoculture vs. diverse species stands	Moderately structured (disagreement on norms and values)	Landscape
Need to adapt forest management to a changing climate (fires, pests, droughts)	Moderately structured (disagreement on norms and values)	Landscape
Value chain perspectives of forestry and biomass are important in Älska Skog (scale/consumption)	Moderately structured (disagreement on norms and values)	Niche-Regime-Landscape
Is the forest dangerous?	Moderately structured (disagreement on norms and values)	Landscape
Planted monoculture forests are appealing and good for health	Moderately structured (disagreement on knowledge)	Landscape
Planting trees is a universal “good”	Moderately structured (disagreement on knowledge)	Landscape
Abilities for schools to participate (time constraints and tight schedule)	Moderately structured (disagreement on knowledge)	Niche-Regime
AUSTRIA		
Business: Knowledge deficits about intellectual property rights (might hinder stakeholders to provide substantial inputs and share ideas)	Moderately structured (disagreement on knowledge)	Niche-Regime
Business: Knowledge deficit about the legal situation and regional planning policies	Moderately structured (disagreement on knowledge)	Regime
Business: Eisenwurzen Design – does it already exist? If not, how can it be developed and who can develop it?	Unstructured	Niche-Regime-Landscape
Business: Lack of knowledge about tourism market (demand/expectations) and future development trends: for example, will there be an increase in number of summer tourists?	Moderately structured (disagreement on knowledge)	Niche-Landscape
Business: Overcoming limited production capacities of small craftsman enterprises. Is collaboration between enterprises a solution? Who can and should take entrepreneurial risks, for example, financial risk of developing new production sites for construction of innovation prototype?	Moderately structured (disagreement on norms and values)	Niche
Political: Management issues: Marketing solutions, organisational solutions ((legal) form of collaboration)	Moderately structured (disagreement on norms and values)	Niche
Political: Financial support for prototype development is unclear.	Moderately structured (disagreement on norms and values)	Niche-Regime-Landscape

<i>Problem description</i>	<i>Type of problem</i>	<i>MLP level(s)</i>
Cultural: How to account for – or converge – different stakeholders’ aims and thus establish a functioning innovation platform/network?	Unstructured	Niche
Cultural: How to open up stakeholders’ minds for new ideas and changes	Moderately structured (disagreement on knowledge)	Niche-Landscape
Cultural: Re-evaluate forest and wood related topics in society and related professions (forest management, joinery and carpentry, forest education, construction with wood, “forest wellness”/ forest experience for health)	Unstructured	Niche-Regime-Landscape
CZECH REPUBLIC & SLOVAKIA		
Reduction in incomes – decrease in wood prices, reduction of harvesting or decrease of revenues from certificates	Structured	Niche-Regime
Lack of PR capacity (Czech Innovation Region)	Structured	Niche
Problematic cooperation with Ministry of Environment (Slovak Innovation Region)	Structured	Niche-Regime
Discrepancy between ecosystem borders and the traditional governance borders dating back to Austro-Hungarian times (Slovak Innovation Region)	Structured	Niche-Regime
Conflict of stakeholders’ interests - natural protection by fences vs. game hunters; nature protection vs. economic usage of forest	Moderately structured (disagreement on norms and values)	Niche-Regime
Conflicts with not-for-profit organizations: processing calamity wood and doing more for nature protection than legally necessary (Slovak Innovation Region)	Moderately structured (disagreement on norms and values)	Niche-Regime
Distribution of shareholders across the country with conflicting interests as a result (Slovak Innovation Region)	Moderately structured (disagreement on norms and values)	Niche
Different attitudes of members to innovations/new approaches (income vs. sustainability) (only SVK)	Moderately structured (disagreement on norms and values)	Niche
Bark beetle – Spread of bark beetle to healthy forests (Slovak Innovation Region)	Moderately structured (disagreement on norms and values)	Niche-Regime
Imbalance of legislation favouring game hunting (Czech Innovation Region)	Unstructured	Niche-Regime
Contradiction of laws - nature protection vs. harvesting	Unstructured	Niche-Regime
Political engagement - Negative perception of activities due to political engagement of president (Czech Innovation Region)	Unstructured	Niche