InnoForESt

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

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D6.2 Interim Report on Replicability and Upscaling Potentials of Governance Innovations (favoring provisioning and financing of forest ecosystem services)

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Executive summary

One of InnoForESt's main goals is to better understand and support mainstreaming processes related to innovative governance mechanisms that secure the future provision of FES. Mainstreaming can occur when existing niche innovations are upscaled, e.g. expand in scope of volume or area, or replicated in a new setting by new actors, albeit adapted to local conditions.

This report summarizes insights generated by all work packages during the first 18 months of the project that are related to upscaling and replication, as well as the innovations' implications for forest management. It concludes with pointing out specific tasks and areas for future investigation. Following up on these recommendations during the second half of the project by work packages 1-5 will provide important additional insights and lay the groundwork for the development of policy and business recommendations by work package 6 at the final stages of the project.

In brief, these recommendations are:

- Taking a retrospective look at the IRs past upscaling and replication efforts to further the understanding of mainstreaming processes. Hence, upcoming InnoForESt work should reflect and document each IR's past experiences and development through the lens of upscaling and replication.
- Acknowledging, reflecting, and making transparent the variability among the IRs concerning the relationship between the innovative governance mechanisms, forest management, and FES provision. This includes the development of indicators of success for the innovation process, for its implication on forest management, and for sustainable FES provision.
- More equal consideration of the entire spectrum of actors that InnoForESt needs to provide targeted information to, in order to support its goal of understanding and furthering the mainstreaming of innovative governance mechanism for future FES provision. This includes policy makers, but also practitioners working in forest administration, the private sector, or land management, particularly foresters and forest owners.

These nuances and their consideration in future InnoForESt work and related findings are of great relevance to forest owners and managers throughout Europe looking for new ways to manage their land.

A final, more short term suggestion relates to the project's goal of accompanying and facilitating networking among the IRs. During the writing of this report, five topics were identified that are of common interest to practitioners from two or more IRs. These topics are summarized in the Annex of this report.

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Abbreviations

CINA	Constructive Innovation Assessment
EC	European Commission
FES	Forest Ecosystem Services
IR	Innovation Region
lt	long term (5-10 years and longer)
METSO	Forest Biodiversity Program for Southern Finland
mt	medium term (up to 5 years)
st	short term (~ 1year, here until the end of the InnoForESt project)
SYKE	Finnish Environment Institute
t.b.d	to be determined

1. Introduction

a. The InnoForESt Context

European forests provide numerous benefits to society, ranging from purifying air and water to conserving biodiversity, protection from landslides, floods and avalanches, to scenic beauty and recreational settings, tangible forest products like fuel, timber and other useful plants, and many more. Yet their continued provision is challenged e.g. by changing climatic conditions, land-use practices, and demographics.

Local level initiatives throughout Europe are working on new ways to align the provision of forest ecosystem services with the increasing and diversified societal demands. InnoForESt's objective is to draw on these experiences to identify ways to secure the long term sustainable provision of forest ecosystem services (FES) through innovative governance mechanisms.

At the core of this project are six so-called 'Innovation Regions' that pioneer novel governance mechanisms to provide FES. As they develop their niche innovations, they serve as the basis for empirical research and analysis. Building on insights on the role of biophysical and institutional conditions, influencing factors, as well as the motivation and role of stakeholders in fostering the implementation of novel governance mechanisms, InnoForESt aims to shed light on how innovative approaches can be mainstreamed by upscaling and replicating existing innovative ideas. In this context, researchers take the role of facilitating, supporting and analyzing the innovation development process without directing it.

b. Upscaling, Replicability, and Forest Management Implications of FES Governance Innovations

One of InnoForESt's goals is to better understand processes and potentials for mainstreaming governance innovations through upscaling and/or replication. Innovations refer to the application of better solutions that meet new requirements, unarticulated needs, or existing market needs (Maranville 1992). Such innovation takes place through the provision of more-effective products, processes, services, technologies, or business models that are made available to markets, governments and society (Frankelius 2009). In InnoForESt, governance innovation is defined as "new networks and actor alliances as well as payment schemes but can also refer to hybrids, new policy mixes, processes and novel forms of organization" (D3.1 p.3). Innovation is related to, but not the same as, invention, as innovation is more apt to involve the practical implementation of an invention (i.e. new / improved ability) to make a meaningful impact in the market or society, and not all innovations require an invention (Forbes 2019). As such, the governance innovations under investigation may not be entirely novel in the sense of an invention, but rather represent a new constellation of factors in their specific context.

Commercial applications to conserve or restore ecosystem services provision have increased exponentially in recent years (Young et al. 2005) including in the European forest sector. Other

approaches pursue innovations e.g. in forest governance in the private sector, marketable forest products or education to indirectly but explicitly also ensure the economic sustainability of the provision of currently non-marketable FES.

This report's main focus lies on summarizing available information and identifying further requirements to assess the replicability and upscaling potentials of governance innovations favoring the provisioning and financing of forest ecosystem services and their implications for forest management. Each of the six InnoForESt IRs is in the process of developing and or practicing innovative approaches to ensure the provision of forest ecosystem services in the future. Given that the IRs focus on different FES, are progressing at different speeds, and pursuing different governance mechanisms, the InnoForESt team is observing three main phases of innovation processes:

Upgrading refers to optimizing an up-and-running innovation and its design within an innovation region. This may, e.g., encompass

- improving product quality, service or price design, and/or
- realigning marketing strategies to better and continuously attract customers

Upscaling refers to expanding the scope of an existing governance innovation under the aegis of the same original actors, e.g. by

- increasing the amount of and demand for the innovative FES related products, services or payment schemes;
- engaging additional stakeholders with similar interests;
- expanding the governance innovation to a larger geographic scale; and/or
- addressing additional FES with a similar governance approach.

Replicating refers to taking up and implementing an innovative governance mechanism in a new setting by a different set of actors, i.e. 'copying' an innovation, albeit adapted to local conditions, e.g. to

- other regions and countries,
- other legal frameworks and forest-ownership structures
- different Ecosystem Services or
- other economic sectors.

The innovations under observation aim to directly or indirectly enhance the sustainable provision of Forest Ecosystem Services. The report therefore also examines the current role and engagement of forest owners and forest managers in these different phases of the governance innovation processes, as well as the governance innovations' implications for forest management and FES provision. This information is crucial for the assessment of upscaling and replicability potentials, and hence, in the long term, for the development of policy and business recommendations.

c. Objectives and Sources of Information

Identifying the governance innovations' upscaling and replicability potentials is a long-term endeavor. The same is true for the governance innovations' current and expected implications for forest

management practices and forest owners, which is the second focus of this project report. At this point in time, the IRs are in the early phases of developing innovative governance mechanisms and current insights do not yet allow for solid conclusions on these matters. However, this internal, interim report is a first step in that direction: its objective is to reflect on insights gained during the first 18 months of the InnoForESt project to outline specific tasks and areas for investigation during future project activities. The findings generated during these future project activities will support the development of well-informed policy and business recommendations on securing the future provision of FES though innovation mechanisms (Deliverable 6.3).

The original deadline and character of this deliverable were altered to accommodate the timelines and schedules of several project milestones and documentation, which were expected to inform this report. Yet following the official extension and change of character of this deliverable (6.2) by the EC (from public, final to interim, internal report on September 18th, 2018) several deadlines for tasks, reports and milestones were also extended, in part because of developments within the IRs themselves (e.g. WP4 MS 3 from month 18 to 21, Source: Midterm Report). Inquiries in the form of a written questionnaire to the project partners in preparation of this report in the first half of 2019 revealed that insights about upscaling and replicability potentials of the FES governance innovations (or the prospective prototypes), as well as an assessment of the innovation processes' implications for forest managers were rather limited or not yet available. As a result, this report is based on a number of different sources, including draft versions of upcoming internal reports and deliverables, or notes taken by project partners and staff for project internal use. Particularly the documentation related to the various stakeholder workshops, especially of the so called Constructive Innovation Assessments (CINA) (Task 4.2) carried out in each Innovation Region (IR), was a major source of information. In addition, this deliverable draws on deliverables 5.2 (Report on stakeholders' interests, visions, and concerns) and 3.1 (Analysis Framework for the Governance of Policy and Business Innovation Types and Conditions). These written sources were complemented by interviews with the respective InnoForESt scientific and practice leads and other selected persons in each of the 6 IR. A total of 16 individuals were interviewed between June 12th and 24th, 2019.

Several upcoming deliverables will touch upon aspects relevant to questions of upscaling, replication, and forest management implications (e.g. Deliverables 2.2 Mapping of FES and institutional frameworks final report, D2.3 Inventory of innovation types and governance of innovation factors across European socio-economic conditions and institutions, the empirical application of the SETFIS framework (D 3.1) in the IRs, D3.2 Application summary of prototypes for ecosystem service governance modes, D4.2 Set of reports on CINA workshop findings in case study regions [now IRs], compiled for ongoing co- design and knowledge exchange, D5.2 Final report on CINA workshops for ecosystem service governance innovations: Lessons learned.

2. Insights from Six Innovation Regions

This chapter provides a summary of the InnoForESt related activities and findings in each IR during the first 18 months of the project. The portrayal of each IR is structured into the following sub-section:

- WHAT
  brief introduction to the IR and its innovation objectives
- FES
  which FES are important in the IR and which are the focus of the innovation governance mechanism
- ACTIVITIES
  brief summary of the InnoForESt activities that have been reported so far, including different scenarios to be pursued in the future innovation process
- UPSCALING, REPLICATING
  information about past or present developments that relate to upscaling or replication of the governance innovation, and may thus provide useful starting point for future investigation in the course of upcoming InnoForESt work by various work packages
- FOREST MANAGEMENT
  available information about the role of forest management and forestry actors in the innovation so far
- OUTLOOK
  outlines the next steps envisioned in the IR, and points out expected developments of particular relevance to issues of upscaling, replication as well as the innovation's (expected) implications for forest management and FES provision.
- RECOMMENDATIONs TO THE IR TEAM
  summarizes what the authors of this report view as important elements in the IR teams' future work in order to produce further insights for the assessment of upscaling and replicability potential and innovations' forest management implications. Given the diversity within the IRs, the character of this subsection and the recommendations varies.

a. Eisenwurzen, Austria – Value Chains for Forests and Wood

WHAT

Located in a forest-rich, mountainous area in central Austria, the innovation region 'Eisenwurzen' aims to increase the region's socio-economic and ecologic resilience by strengthening stakeholder networks around the production of innovative wood products. Increasing exchange and collaboration between diverse stakeholders along the wood value chain (forestry, public administration, regional planning, tourism, and traditional craftsmanship) is expected to support local employment and attract young professionals to the region. At the same time, using local forest resources is intended to support a type of forest management that ensures resilient forests which continue to be able to protect citizens and infrastructure from rock fall, avalanches, and floods, particularly in times of climate change. This innovation draws on networks and knowledge built during prior initiatives, in particular in the context of

the project “Modular furniture from National park regions“ (2011-13); funded by the European Regional Development Fund.

ACTIVITIES SO FAR

So far, the InnoForESt team working in and with the IR has met face to face with numerous stakeholders and conducted several interviews with local actors, during which three independent, but not mutually exclusive innovation ideas emerged. These were subsequently discussed further during three focus group discussions with selected stakeholders, and were then shared with a larger audience during two stakeholder workshops.

The innovation scenarios are:

1. **Furniture, design and region** - The development of an "Eisenwurzen design" pursues the goal of establishing a platform for better linking the fields of wood, craftsmanship and design.
2. **Mobile wooden tiny houses & tourism** - A mobile wooden house in modular construction is to be developed and connected with the development in tourism. An ecological building technology using regional wood mediates a connection between contemporary living and traditional handicraft. A local carpentry business has developed a container-shaped modular timber housing construction that can be configured variably. It is already producing tiny houses.
3. **Experiencing forest and wood** (e.g. for hiking, recreation, or education) - Forest and wood should be perceived more consciously in society. This increases the appreciation of the forest, its protection and sustainable use.

Scenarios 2 and 3 have since become central, while the idea ‘design development’ has – for now – moved into the background. In addition, stakeholders expressed a strong desire to initialize a new mode of working in the region which should include all three innovation ideas and should also be open to and for other/new innovation ideas. Hence, a physical as well as digital platform facilitating exchange of ideas and information among stakeholders has become a key innovative element in this IR. Because the IR spans multiple federal states, administrative regions, and institutional responsibilities, such exchanges are especially important. So far, the physical platform in particular has been well-received.

The activities in the IR thus far - both during and before InnoForESt - have laid important groundwork to generate economic benefit for the region through wood value chains by connecting different stakeholders around the idea of using local forest resources and knowhow in innovative ways. As of now, the focus lies on a physical and digital networking platform and one primary innovation product (Mobile Wooden Tiny House). The relationship between these innovations and forests or regional forest management has remained vague. However, a recent development holds potential to strengthen this link: a proposal to establish a sizable timber processing facility specializing in hardwood (beech) lumber and residue-based energy production in the region. Several key actors involved in the initiative have also participated in workshops and discussions facilitated by InnoForESt, or the IR practice partner STUDIA AUSTRIA. Given the focus on hardwood species, such an initiative may provide an incentive to forest owners to convert their forests into more diverse, mixed species forests, which in turn may hold benefits for FES provision. In addition, such a facility could complement efforts to strengthen local wood

processing and construction businesses. Hence, it may offer a link between regional socio-economic and ecological resilience.

FES

A diverse set of forest ecosystem services is considered important and relevant in the innovation context by the different stakeholders, including timber production as well as biodiversity conservation, or climate regulation. Given the mountainous environment, the forest provides important protective functions, such as erosion and flood protection. The innovation currently focuses primarily on the extractive use of timber.

UPSCALING

To this point, upscaling the innovation idea or expanding its reach is not an explicit issue in the IR. The focus is currently on initiating and developing an innovation locally. However, a recent initiative to build a large hardwood lumber facility in the Eisenwurzen region may well benefit from the networks and ideas built around regional wood value chains, can be considered an example of upscaling.

REPLICATION

From a replication perspective, the most interesting aspect is the development of a physical and digital communication platform to build trust and facilitate exchange of knowledge and expertise among local stakeholders and thus ease the development and transfer of innovative ideas. The digital platform is currently in an early stage of development. Stakeholders in the IR Eisenwurzen are expressing a strong desire to increase the exchange of knowledge and ideas among actors within the region, but also with other stakeholders working on similar issues elsewhere.

As the IR Eisenwurzen has been able to draw on prior projects concerned with wood value chains in the region, as well as innovative initiatives in other parts of Austria, and transferred lessons to the Eisenwurzen Region: 'ARGE Hoiz', a consortium of forest owners and wood processing businesses in Upper Austria is working to develop a regional wood-value chain, and offers 'value chain tours', e.g. to students, to inform about forestry, wood use and regional production. The IR Eisenwurzen will organize similar events for interested stakeholders: In the fall, IR stakeholders will have the opportunity to travel to Vorarlberg to visit several regional wood based initiatives. Furthermore, the IR plans to offer a similar tour through the Eisenwurzen region as part of the InnoForESt annual meeting in the fall of 2019. Stakeholders are invited to volunteer and guide InnoForESt members through their forest or business to showcase the regional wood-value chain.

FOREST MANAGEMENT

So far, forest management and the respective actors have not been central to the developments in this IR. The number of actors representing the forest sector (owners, administration, management) has declined from the first to the second workshop, which, according to the IR Team, may be in part due to the second workshop's location. Furthermore, the innovation ideas currently center on the production and marketing of a wood-based product, not on forest management practices or currently non-marketable FES. Nevertheless, the local practice partner (STUDIA AUSTRIA) is in contact with forestry stakeholders. The plans of developing a hardwood lumber facility in the region may offer an opportunity

to strengthen the link between wood-based value chains and forest management and respective stakeholders in the future. A related workshop organized around the initiative to build a hardwood lumber facility, which STUDIA AUSTRIA was engaged in, was well attended by regional forestry actors.

OUTLOOK

The activities in the IR have laid important groundwork for the IR Eisenwurzen by connecting different stakeholders around the idea of using local forest resources in innovative ways to generate economic benefit for the region. As of now, the focus is on a physical and digital networking platform and one primary innovation product (Tiny House). The idea to build a hardwood lumber facility in the region may offer further opportunities to forest owners as well as wood processing businesses in the future. Stakeholder networks strengthened through InnoForESt and prior projects may well help local businesses to take advantage of the opportunity, e.g. by integrating regional lumber into existing and new innovative wood products.

As such, the development of social networks around modular furniture or wooden tiny houses can be seen as small, but important first steps of a bigger and longer process towards sustainable forest ecosystem service provision in the wake of sustainable species diverse timber production in mountainous forest. While the individual product is hardly going to have a significant impact on FES provision directly, the developments made possible by the social networks built and the momentum generated may well become crucial in guiding future developments within the IR towards a vision of social-ecological resilience.

RECOMMENDATIONS TO THE IR TEAM

In light of the forests' protective functions in the IR, whose provision is increasingly threatened (e.g. by a changing climate, (lack of) forest management), a regional wood-value chain can become an important tool to support resilience oriented forest management practices. Resilience in this context refers to both long term forest health, the conservation and restoration of biodiversity, as well as the forest's ability to protect citizens and infrastructure from natural hazards such as rock fall, avalanches, and floods. The current focus on one innovation product (tiny house), and digital and physical exchange platforms may only make up a small portion of value generating activities in the area and has little effect on regional forest management. Yet it serves the important role of building stakeholder networks around the idea of generating innovative wood products and regional resource use. Expanding these networks, widening the discussion to include innovative wood products more generally, and linking the regional wood value chain more strongly to forest management is key in moving from a regional development focus to one of social-ecological resilience and FES provision. In the long term, a solid stakeholder networks covering the entire the wood-value chain may be able to develop additional innovative wood based product ideas. Last but not least, being able to frame wood based products as a tool for socio-ecological resilience in a forested area may aid the mobilization of stakeholders, including representatives of local governments, as well as the marketing of these products. After all, a wood-value chain that helps maintain resilient forests is of great public value and interest.

In this context, upscaling may mean diversification of products, for example, including modular furniture, wood houses, as well as construction lumber. Framing the current pursuit of tiny houses as part of a

larger process towards socio-ecological resilience may help mobilize stakeholders who have an interest in regional wood value chains or forestry, but are not involved in tiny house production.

A future lumber facility may offer significant opportunities for innovative elements in the regional wood value chain. Depending on the amount of timber processed and the kind of forest management required, the impact on regional wood value chains and FES provision may differ. Following the developments regarding this facility closely is important in order to understand its implications and the potentials it might hold for a socio-ecological resilience vision.

As the IR Eisenwurzen has been able to draw on prior projects concerned with wood value chains in the region, as well as innovative initiatives in other parts of Austria, it may be able to contribute to InnoForESt's understanding of replication processes. A closer analysis and documentation of these past and ongoing transfer processes (best format, key issues, etc.) would be valuable to the project as a whole. The further development and use of the physical and digital platforms, as well as the excursions to Vorarlberg and in the Eisenwurzen region may become potential sources of information for a better understanding of processes of replication and transfer of innovative ideas that may provide relevant insights for similar efforts in other regions, as well as academia.

In the context of InnoForESt, connecting directly with the IR in Italy and the IR in Sweden may be particularly valuable; Italy is also dealing with mountain forestry issues and maintaining the forest's protective functions. Organizing opportunities to exchange with the IR Italy may also raise interest among forestry stakeholders from the Eisenwurzen region and provide an incentive to engage with the project. The Swedish IR with its educational focus may also be of interest to upgrade existing approaches of informing interested parties about regional wood value chains and the provision of forest ecosystem services.

b. Czech Republic & Slovakia - Collective Governance of Ecosystem Services

WHAT

Two self-organized, common property forests are at the center of the Innovation Regions in the Czech Republic (CZ) and Slovakia (SK). Both have historically served the purpose of providing fuel and timber to members of the local community. In SK, members of the local community have owned the forests collectively for centuries. In CZ, the community bought the forest 20 year ago from private owners and the state. But with changing demographics and altered society-forest relationships, the expectations towards and uses of these forests has changed. Today, both IRs aim to balance individual and societal interest, including timber production, climate regulation, biodiversity, recreation and education through innovative governance mechanisms. The goal is to develop continuous sources of funding for forest management that supports resilience, biodiversity, and community well-being.

ACTIVITIES SO FAR

Practice partners representing the IRs and InnoForESt scientists have met several times in different constellations and formats. Two focus group discussions with Cmelak (CZ) actors served to develop

scenarios and potential future development paths. Three scenarios were developed and discussed during the first CINA workshop:

1. **Regulation** focusing on environmental protection, **compensating** forest owners for opportunity costs of not practicing more intense forest management. The source of funds not clear yet.
2. **Market** but **with certification of forest management** and products to ensure environmentally friendly management and regional wood use
3. **Hybrid ecosystem service governance using voluntary payment schemes** e.g. for CO2 sequestration based on self-organization and self-regulation by local communities; the community will determine the purpose of the payments, the price for the services and goods provided as well as the decide about carbon forestry practices. Potential buyers: tourists, local business, wider public.

The next workshops will include discussions of the individual innovation ideas and their further pursuit in Czech Republic and Slovakia. Currently, it appears that a form of hybrid ecosystem governance focusing on carbon sequestration certificates is the favored option in both IRs.

FES

Different FES are at the center of the IRs in the Czech Republic and Slovakia. In the Czech Republic, a non-governmental land-trust (Cmelak) focuses primarily on nature conservation and biodiversity. It was established in 1994 in order to restore mixed forest damaged by bark beetles in Jizerske Mountains and to cultivate diverse tree seedlings. Ecosystem restoration has been the main focus so far implemented by buying and transforming monoculture forests into 'new virgin forests'. Funding for these activities comes from donations, public grants, and cooperation with companies, and since 2004, the sale of 'biodiversity patronage certificates'. In addition, the land trust has developed educational programs aimed at school children and tourists to help fund their activities. The actual implementation (planting etc.) has in large parts been based on volunteer work, particularly in the beginning. According to the InnoForESt scientists and partners working in the region, these past efforts to continuously improve the Cmelak initiative and uncover new funding mechanisms have been driven by a few motivated individuals eager to transform the community forest into a more natural state. Biodiversity - the FES pursued - has remained the same throughout the entire time.

For the forest commons Hybe in Slovakia, timber production has been and continues to be a primary objective, and provides funds for various community projects. Yet, income generated from timber is expected to decrease in the coming decades. At the same time, severe storm damages have triggered a change towards more nature-oriented forest management practices, and local residents increasingly demand non-timber forest ecosystem services, particularly recreation. To compensate the expected loss of income, the hybrid ecosystem governance scenario using carbon sequestration certificates are considered as one potential source of forest revenue in the future.

UPSCALING

Cmelak in the Czech Republic has developed a variety of different funding sources for its biodiversity conservation and restoration program (various upgrading processes). Looking into the future, the Cmelak

actors are skeptical about potentials to upscale their innovation to a higher regional level because buying more land is currently not within the organization's financial reach. Also, the close connection between the communities and their forests are a key motivating factor that may not easily be established elsewhere. However, Cmelak is trying to increase the sale of patronage certificates to generate more funding. It is considering moving from their one-time-payment biodiversity patronage certificate to a multi-payment CO2 compensation scheme in order to secure continuous funds necessary to continue their work. In this context, one idea is to sell CO2 certificates to customers from other countries and /or collaborate with the IR in Germany (forest share), who is having trouble accessing new land for their established CO2 compensation scheme.

The Hybe forest commons in Slovakia is interested in upscaling their timber revenue base to include a CO2 compensation scheme, while also continuing to rely on traditional timber production for part of their forest-based income. They are currently not considering expanding the spatial scale as the active management and NGO leadership is closely connected to the community. Thus moving further away where land is more affordable is not a priority.

REPLICATION

Both initiatives see potential for other communities with collectively owned forests to implement similar initiatives – as long as there are motivated and engaged individuals willing to invest time and energy towards this purpose. There are already some community forestry efforts independent of Cmelak or Hybe, where collective forest management is implemented in the context of rural development programs. Commonly owned forests have a long tradition in both countries. The processes associated with collective ownership and adaptation to societal demands over time may offer valuable insights to understand replicability of this innovative governance mechanism.

FOREST MANAGEMENT

In the Cmelak, the establishment of the land trust has significantly altered the direction of forest management in the community forest from monoculture forests to biodiversity driven forest management aiming to generate a greater diversity of structure and composition. Eventually, the 'new virgin forests' are expected to require little active management. Creating 'new virgin forests' has been - and is expected to continue to be – the guiding management objective independent of the evolution of funding mechanisms, including the potential shift from biodiversity patronage to carbon sequestration certificates.

The link between the innovative governance mechanism and its impact on forest management, as well as FES provision is fairly direct – the sale of carbon certificates pays for restoration activities, which enhance the provision of FES, primarily biodiversity, as well as water protection and more.

The Hybe forest commons is currently not expected to undergo a significant change in forest management practices. This is partly due to the fact that a portion of the common shareholders are primarily interested in timber revenue. A possible future CO2 compensation scheme is also not expected to have a notable impact on forest management as the envisioned carbon forest management practices refer to not actively managing hardly accessible sections of the forest which have hardly been managed

in the past. The only potential change in this context is the idea to chip wood residues that accrue during timber harvest and leaving the biomass in the forest for improved soil nutrient content. Thus in effect, the income generated through the innovative mechanism serves to support the same timber oriented sustainable forest management practiced before. The current level of FES provided is therefore expected to be maintained.

OUTLOOK

Both the Cmelak (CZ) and Hybe (SK) initiatives are in the early stages of trying to upgrade or develop new funding mechanisms for their forest ecosystem services oriented management activities. The upcoming second workshop will provide opportunities for further discussions on this issue.

RECOMMENDATIONS TO THE IR TEAM

The unique feature of both Cmelak (CZ) and Hybe (SK) - that they are community owned - on first sight appears to stand counter to the idea of upscaling their efforts. The close spatial and emotional connection between the community and its forest is key to the initiatives' self-perception and limits the spatial expansion of the initiatives. Still, a successful introduction of a locally innovative voluntary payment scheme might increase funds and upscale the amount of habitat restoration activities possible within the existing geographical range. To this aim, community forest organizations like Cmelak and Hybe may benefit from connecting with other community forest initiatives to exchange information and ideas about funding for FES oriented forest management, enhance mutual learning and serve as inspiration for future project development. At the same time these exchanges may inspire other community forests to replicate the FES governance innovation successes already achieved in both IR. The analysis of such learning processes may offer valuable insights to InnoForESt's understanding of upscaling and replicability.

The Cmelak, as well as Hybe may find it helpful to connect with other InnoForESt IRs, particularly Finland, Germany, and Sweden. Like Cmelak, Finland is developing a voluntary biodiversity offsetting scheme, but unlike the Czech 'biodiversity patronage certificate', the 'Habitat Bank' is set-up as a multiple purchase compensation scheme, with private sector actors paying for the offsets. Finding a way to replicate the Finnish model would avoid having to label a biodiversity project as carbon forestry, which may be perceived by buyers as dishonest marketing. In addition, this could be an opportunity for InnoForESt to learn about replication processes. The Swedish IR' educational programs could also be of particular interest to the Cmelak and serve as inspiration for its own educational programs. For Hybe, the IR Germany may offer interesting insights into the design of a carbon offsetting scheme and related forest management practices.

A final recommendation concerns the relationship of innovative governance mechanism, forest management and FES provision. While the IRs in the Czech Republic and Slovakia share several features in common, first and foremost the collective forest ownership, the two initiatives differ greatly from each in terms of their innovations' forest management implications and effect on FES provision (see above). Furthermore, both initiatives are working towards funding (part of) their operations through carbon sequestration certificates. The proposed forest management practices however are not in line with what is generally referred to as 'carbon forestry' (such as practiced e.g. by the IR Germany) (e.g.

Sample et al. 2015). It usually entails the planting on few forests with long lived species and a subsequent harvest and use of timber for purposes that maximize the amount and duration of carbon stored e.g. in construction or long term wood product. Clearly, maintaining restoring forests for biodiversity or maintaining sustainable forest management also contributes to carbon sequestration and prevents a potential reduction of FES provision e.g. though intensified management. These differences in the innovation's impact hold great relevance for and policy and business recommendations that InnoForESt will produce and thus should be reflected in future analyses and reporting.

c. Finland – Habitat Bank

WHAT

The Finnish IR is developing a compensation scheme connecting non-industrial private forest owners with private companies and municipalities to compensate the biodiversity loss that they generate (e.g. through infrastructure development) through ecological restoration of private land. In the past, biodiversity has been conserved mainly through public funding and regulation. The innovation shifts the payment responsibility to the actors whose business activities result in biodiversity loss and creates new business opportunities for forest owners willing and able to restore and protect biodiversity. At the same time, it provides an alternative forest-based source of income that is not based on timber production. Finally it may create new types of jobs in the forestry sector.

FES

The FES at the center of this innovation is biodiversity conservation. Usually, the sites offered by forest owners are in need of some form of restoration activity. While most of the sites are forested land, it can also include peatland areas in need of restoration. Nevertheless, collectively, the parcels set aside are expected to have a positive impact on forest biodiversity. Furthermore, the development of the Habitat Bank has to be seen in the context of broader discussions taking place in Finland about land use and nature conservation, including biodiversity protection in commercially managed forests. Thus, while the Habitat Bank may not cover a large proportion of land in the end, it is nevertheless both a result as well as a tool to raise awareness about the need for forest biodiversity protection.

ACTIVITIES SO FAR

During several interviews of the IR project partners with stakeholders (businesses, municipalities, towns, and private forest owners) and two workshops, three scenarios have emerged:

1. **Government authority mechanism** – the government strictly regulates the compensation actions (e.g. the calculation of values for biodiversity loss and restoration)
2. **Voluntary contracting** between business and private forest owners to facilitate biodiversity loss compensation
3. **Habitat Bank, a third party intermediary**; a neutral, mutually trusted facilitator matching sites, evaluating their value and brokering between the contract partners

During the first workshop, participants favored the voluntary contracting model, while also showing some interest in Habitat Bank scenarios. In the second workshop, when more specific discussions took

place about contracting details and practical negotiations between companies and forest owners, participants confirmed the need for an intermediary to moderate and facilitate these interactions. Businesses expressed a preference for being able to 'outsource' the management of ecological compensation, while private forest owners were looking for a trusted partner to represent their interests in compensation transactions. Thus, the Habitat Bank model is currently favored. The InnoForESt project partners SYKE, the Finnish Environment Institute, and the Finnish Forest Center have offered to share the facilitator role; SYKE will offer a framework for measuring the biodiversity values while the Finnish Forest Center will hold the register of compensation sites. The innovation is currently heading towards its first pilot project. At this stage, businesses that initially showed great interest have become less active. According to the IR team, government regulation demanding compensation would ease this situation.

UPSCALING

This innovative governance mechanism has already experienced upscaling to some extent, although not necessarily in response to intentional upscaling efforts by the IR: initially, only private companies were targeted as 'clients' interested in compensating ecologically detrimental activities. Recently, however, municipalities have expressed interest as well. This may in part be due to a broader discussion among the general public and policy-makers advocating for compensation measures, which have become common in different aspects of daily life (compensating emissions, food consumption etc.). Future upscaling opportunities are also apparent. The recent Finnish government program for 2019-2023 explicitly addresses the need to experiment with compensation schemes in the context of biodiversity protection. The promotion of biodiversity offsetting by the government would provide a promising setting to upscale the innovation mechanism in the future. Having SYKE and the Finnish Forest Center in the role of facilitators can further support such endeavors: as both organizations have a nation-wide presence, they are able to offer their service as facilitating partner in the compensation scheme on a larger geographic scale quickly.

REPLICATION

Some elements of the Habitat Bank mechanisms have been inspired by other programs that have existed prior to the innovation. This includes e.g. a similar compensation scheme practiced in Australia, as well as the Forest Biodiversity Program for Southern Finland, the so-called METSO program, which compensates forest owners for biodiversity protection measures in their forest. Thus the METSO program created models for the types of contracts needed by the Habitat Bank. It also developed approaches to assess biodiversity values for sites in monetary terms, which is something the Habitat Bank built its own pricing scheme on. The Habitat Bank pricing is based on the costs of restoration activities and the land prices. This also means, that in some cases, a high biodiversity value area that is cost-effective to restore can be more cost efficient than area with low biodiversity values, but high restoration costs. The Habitat Bank aims to also include habitat characteristics and non-forest habitats, and thus amend the original assessment process.

The IR Team identified the following conditions as essential for a replication of their innovation mechanism:

- Land ownership structure: the portion of private landowners has to be large enough in relation to publicly owned land that collectively creates a big enough market for companies and businesses to engage in.
- An independent facilitator, who is respected and trusted by all parties involved
- Transparent mechanisms for assessing biodiversity loss and values of sites
- It is further important to consider that the Habitat Bank in Finland did not emerge out of thin air. The current evolution of the compensation mechanism in this IR has to be viewed in the context of prior developments unrelated to InnoForESt. For one, a successful participation in the university competition 'Helsinki Challenge' in 2016 brought initial funding and publicity around the idea of a Habitat Bank, as well as first contacts among stakeholders. Additionally, ecological compensation has been a subject of discussion the Finnish scientific and policy communities for the past five years.

FOREST MANAGEMENT

The link between the funding generated and the forest management implications and FES provision is very direct as the funding generated is used directly to pay for restoration activities.

The Habitat bank will significantly affect the type of forest management and FES provision of the sites selected for compensation measures. The sites typically offered are not suitable for timber production and are frequently in need of habitat restoration activities. The compensation scheme is not expected to have a significant effect on the management practices of individual forest owners at large. Instead, it will complement traditional forest management for timber production purposes, which will continue to be the focus on large parts of an individual owner's land.

While the intent is to have the restoration activities performed by traditional forestry actors, as they have access to necessary equipment, these actors will have to learn to use their equipment and forestry knowledge for the purpose of biodiversity restoration and protection. The Habitat Bank is expected to result in job opportunities for individuals with a non-forestry background, particularly at the planning level. For traditional forest managers and these new actors in the forest sector to cooperate well, the IR team deems it crucial to achieve a change in attitude toward a broader view of forest management objectives to explicitly include various FES, particularly among the leadership of forest management organizations.

OUTLOOK

The IR in Finland is about to implement its first pilot project - a contract between forest owners and businesses about biodiversity loss offsetting.

RECOMMENDATIONS TO THE IR TEAM

The Habitat Bank can look back at a long but steady path of development that was inspired by other compensation schemes, including one practiced in Australia, and by elements of the METSO program which were integrated into its own system of monetizing biodiversity values. These processes of uptake and adaptation of new and imported ideas to the local context and objectives may - if analysed and

documented in detail - offer valuable insights for InnoForESt's interest in understanding replication processes of innovative governance approaches.

The IR teams sees significant potential for upscaling the Habitat Bank scheme to the entire country, given that key institutions are represented nationwide. Close documentation of any upscaling processes - whether actively pursued or demand driven - would be of interest to InnoForESt. The commitment of businesses to the Habitat Bank idea is also interesting in this context. The positively connotated notion of biodiversity offsetting is about to become very concrete, now that the first transactions are about to take place. Given the pro-environmental political climate, it may not be unrealistic to expect more obligatory compensation requirements in the future, particularly if voluntary instruments like the Habitat Bank are not taken up. Thus, businesses may find it promising to participate in a voluntary program, rather than become subject to regulation. A more detailed compilation and comparison of the existence of commercial biodiversity offsetting schemes in relation to existing or non-existing legislative requirements (e.g. contractual nature conservation, i.e. "*Vertragsnaturschutz*" in Germany) in the different partner countries on national or provincial level are relevant for the Finnish IR. A better understanding of these dynamics between voluntary compensation instruments and the role of government would be a valuable contribution to the InnoForESt project aim of developing recommendation for decision makers in governance innovation.

Within InnoForESt, an exchange of information and experiences with the German IR may prove interesting for the Finnish IR Team.

Finally, to gauge the Habitat Bank's impact on FES provision, a detailed monitoring and documentation by SYKE and Finnish Forest Centre (as leads of the program) of the amount of land actually subjected to restoration in a certain amount of time through the Habitat Bank (e.g. 1, 5, 10 years), and the type of restoration would be beneficial. If possible, these achievements could then be assessed in light of existing restorability estimates.

d. Germany – Forest Shares

WHAT

The German IR is implementing a compensation scheme that strives to compensate CO2 emissions through the planting of so-called 'climate forests'. The idea was established in 2007 by the tourism association of the federal state of Mecklenburg-Vorpommern, the State Ministry for Agriculture and Environment, and the State Forestry Management Agency. These are still the core actors involved in the ongoing development of the compensation scheme. Certificates – 'forest shares' (German: "*Waldaktie*") – are sold on a voluntary basis and used to fund tree plantings on previously non-forest, publicly owned land with a mix of species, most of them deciduous. In addition to sequestering carbon by growing trees, the IR also aims to use 'planting days' to raise awareness about the need to compensate carbon emissions and the role of forests in doing so. Originally, tourists were targeted as the primary buyer of forest shares to compensate their vacation related emissions. Today, about half the certificates are sold to one corporate buyer, the other half is purchased by locals and tourists.

ACTIVITIES SO FAR

The InnoForESt practice partner in the IR (*Akademie für Nachhaltige Entwicklung Mecklenburg-Vorpommern*) has had multiple meetings with individual and groups of stakeholders as well as one CINA workshop.

In these conversations, several key issues regarding the development of the 'Forest Share 2.0' have been identified that require further discussion and consideration. These include:

- to what extent should the goal be encouraging avoidance of emissions rather than only compensating emissions
- the need to increase the price per forest share, as management costs are currently absorbed by the forest administration and marketing by the tourism association. The original price of the share merely covers planting costs. The results of the emission avoidance vs compensation discussion will also affect the price design.
- limited land available for planting. Purchasing or renting private land long term is not feasible as property prices are high and alternative land uses more profitable. One idea is to combine the forest share with two other certificates also initiated by the State Ministry, one for restoring wetlands for CO2 sequestration ('Moor Futures'), and another that supports traditional fruit orchard management and use ("*Streuobst-Genussschein*"), both of which aim to offer biodiversity benefits. Together, they could form 'ecological futures' that offer a mix of ecosystem services and could respond with greater flexibility to sudden compensation demand.
- Finally, the IR is debating whether or not to include additional actors in the development of *Waldaktie* 2.0. e.g. companies that regularly buy a significant number of certificates.

FES

The FES at the center of this IR is carbon sequestration in newly planted and growing trees. However, the stakeholders point out that the resulting 'climate forests' also have beneficial effects on biodiversity and water quality.

UPSCALING

The IR has continuously identified available areas of unforested land and turned it into climate forests; this geographical expansion represents a form of upscaling. Currently, the efforts to further expand the land area are impeded, in part because of the limitation of available land as well as limited personnel resources There are ideas to include private land in the compensation scheme though this has not happened yet due to financial constraints. In this context it is important to consider that the forest share model has until now been effectively subsidized by the state government; the State Forest Management Agency as well as the Tourism Agency cover a substantial portion of the costs for managing and marketing the climate forests. Private property owners have more lucrative options to use their land than climate forests. The desire to establish the climate forests close to tourism destinations - where the emissions that are to be compensated occur - further limits the choice of suitable land. Looking for more affordable land in other regions in Germany or abroad (e.g. collaborating with the IR CZ/SK) is currently not an option for the initiators of the forest share, as it would mean losing the distinct feature of compensating emission within spatial roam of where the emissions they occur.

Another thought about path to upscale the innovation is to combine the forest shares with two other ecological compensation schemes - one of them also focusing on carbon sequestration, but through wetland restoration.

The overall process of trying to transform the innovation from a top-down to a more participatory initiative (e.g. current thoughts on including more private sector stakeholders in the development of 'forest share 2.0', engaging event managers in raising demand for compensation certificates) is a particularly interesting upscaling development and may provide important insights for other government-initiated innovative initiatives.

Finally, the IR is considering options to increase the demand for the compensation certificates. Rather than investing in more intensive marketing, they are thinking about investing time and resources in cooperating with large event organizers and encourage them to compensate event-related emissions. Past experience proves this to be more effective in acquiring customers and publicity than direct marketing. Also, it may be an opportunity to encourage the avoidance of emissions by promotion and use of low-emission transportation through the event organizing agency.

REPLICATION

Generally speaking, the principles of the compensation schemes, like the forest share, are suitable for replication - compensation tools per se are widespread. What sets the forest share apart from many other more anonymous CO2 compensation programs, is the particular emphasis on compensating emissions locally where emissions are generated. As such, a retrospective look at how the innovation developed and was inspired by other compensation schemes could provide valuable insights for InnoForESt's understanding of replicability processes.

FOREST MANAGEMENT

The climate forests resulting from the forest share compensation scheme are planted on previously unforested land. So far, all climate forests are managed by the State Forest Management Agency. Both the choice of tree species and management activities aim to maximize carbon storage, which includes a commitment to maintain the forest for 200 years, which is when these trees are expected to reach their maximum CO2 storage capacity.

OUTLOOK

The IR Germany is currently still working to upgrade their original innovation and is facing several rather fundamental decisions, including the objective underlying the sale of certificates (compensating vs. reducing emissions), which in consequence affects a number of additional important issues such as pricing and marketing of the certificates.

A related issue that will have to be addressed is the question of the role of the state government in the long term, which has supported the *Waldaktie* financially so far. The low certificate pricing is part of the reason why it is challenging to find private land owners willing to commit their land. Opening up the development process for the forest share 2.0 to new and additional stakeholders may also introduce interesting viewpoints and dynamics which may shape the future trajectory of the compensation scheme.

RECOMMENDATIONS TO THE IR TEAM

A retrospective look at the German IR's development may offer valuable insights for a better understanding of the processes of replicating and upscaling governance innovations, as well as their implications for forest management. Compensations schemes are widespread, yet this IR has developed and been practicing its own particular version of a carbon compensation scheme for a number of years. During this initial period the forest share was continuously developed further, and the IR is already in the early phase of upscaling their innovation. A more detailed documentation and further analysis of the processes involved in first establishing the forest share may provide important insights on innovation replication. Reflecting on how the government leadership has affected the design and its implementation, as well as how the process towards a private market based mechanism might work, would be valuable contributions to the overall project objectives of detecting drivers of relevant governance innovations and deducing recommendations for political decision makers. The ongoing upscaling efforts are closely related to these issues and may thus also contribute to such reflections.

In the process of broadening the range of stakeholders involved and including private landowners, who may offer their land for the purpose, a more detailed description of the compensation scheme's implications for land owners and future forest management may be helpful.

Finally, the German IR may benefit from an exchange with the IR Italy. While this may not be an obvious choice, the provincial administration of Trento is - like actors in the German IR - trying to turn an initially government led, top down approach to FES provision into a more participatory and economically viable effort.

e. Italy – Forest Pasture Management

WHAT

The Primiero Region in the Autonomous Province of Trento has a long tradition of managing mountain forests and pastures for multiple biological production purposes and the provision of ecosystem services. In light of land abandonment, particularly of mid-elevation pastures, due to demographic change, innovative mechanisms are needed to maintain that balance in the future. To continue to meet multiple societal demands while being financially sustainable, the Province of Trento administration aims to engage a broad stakeholder base. With the help of bottom up support and engagement, the aim is to generate a common view on cultural landscape management objectives, develop new financing mechanisms, and mobilize landowners to manage their property, within the larger landscape and ecosystem service context.

FES

As an alpine region, the IR enjoys a particularly rich and diverse supply of ecosystem services. The mosaic of forest and pastures holds great biodiversity, production, and scenic value. In the past, the management in the region has a tradition of balancing multiple forest ecosystem services, focusing in particular on the maintenance of pasture, slope stability, water retention, as well as timber production.

The management of the forest-pasture system is crucial to the tourism industry as the balanced mix of healthy forests and pasture areas creates a landscape that is greatly appreciated by visitors. Tourism in turn is a vital source of income in the region. Yet mid-alpine pastures and farms are increasingly abandoned and the maintenance of ecosystem services associated with them is increasingly threatened. Previously common practices to maintain these areas are now undertaken only in response to ad-hoc funded awareness raising but without long term commitment or planning. Without a landscape perspective - which has to include public and private landowners - the maintenance of these FES services cannot be guaranteed.

ACTIVITIES SO FAR

The InnoForESt Innovation Team working in the Italian Innovation Region has conducted a number of face-to-face conversations with local stakeholders to develop innovative ideas to address current issues in forest ecosystem service provision. These ideas were analyzed extensively by the IR Italy team for their potential implications for various stakeholders and scenarios before sharing them with a broader stakeholder audience during a workshop (not a CINA workshop). The latter aimed to bring all stakeholders together, establish communication between them all and collectively shape the previously identified issues in a way that would help define actual scenarios for the innovation. A severe storm event in late 2018 caused significant damages to the regions' forests and their capacity to provide different forest ecosystem services. It also altered stakeholders' land management concerns and priorities, something the IR team responded to by putting forest-pasture management into a larger context. As a result, the first workshop focused on four issues, each characterized by three levels or options. No pre-defined scenarios were considered given the difficulty of meaningfully designing them. The four issues considered were:

- crowdfunding for enhancing the supply of ecosystem services
- restoration of pastures
- collective management by forest owners
- collective management by forestry firms

Workshop participants were able to choose between three levels of activity for each issue, each level requiring a different level of stakeholder. The selected options, which collectively make up the governance innovation prototype, are listed below. For each issue, workshop participants decided for the option requiring the highest level of stakeholder commitment (see also Table 1).

Table 1 Overview of key innovation issues and levels of activities chosen in the IR Italy (Source: IR Italy Workshop Report 2019, email communication with IR team)

Issue	Option 3
Crowdfunding for restoration and actions aimed at improving the supply of ecosystem services	Products: improvement of infrastructures on trail "x" (5 posters + 20 garbage bins + 20 benches) near settlements in the region's five municipalities. Specific tourist packages and marketing actions are promoted to expand the tourism season over spring and fall, and start educational activities in schools Resources: Trentino Marketing/PAT fund the preparation of information flyers and a web interface for payments, displaying updates on donations. The tourism office patronizes the initiative and promotes it through tourist offices and among its members, who will advertise it with tourists. The tourism office collects a contribution from hotels that is proportional to number of beds and level (i.e. stars)
Restoration of pastures at mid-elevations	About 100 ha of pasture-forests, pastures and grasslands are restored. One cut per year, pasture for 40 days and the spread of x hundreds kg of sludge per hectare are guaranteed.
Develop a shared management of forest owners	Some forest owners adopt a common system for the measurement of lots, the release of contracts and sales
Develop a shared management of forestry firms	Some firms adopt a service of cutting and removal of timber from the forest, and a service of response to intervention calls, and a shared service for selling timber

UPSCALING

As of now, the IR Italy is not considering upscaling their innovation mechanisms as the primary innovation development process is still ongoing. If promising innovation prototypes evolve, the governance innovation has potential for geographical upscaling the prior, exclusively public and cost intensive forest and pasture management practices on public land to increasingly include private land areas. As such, the IR Italy may in the future provide interesting insights for other regions pursuing similar objectives of how to initiate an active dialog with multiple relevant stakeholders and involve and engage them to identify and pursue common objectives, payment schemes and measures for maintaining or restoring selected (forest) ecosystem services.

REPLICATION

While the IR is not currently pursuing a replication of their innovation mechanisms, there is interest in doing so in the future. Some first ideas about necessary preconditions for a successful replication in different settings are evolving already. The neighboring province of Bolzano may be an interesting partner for future collaboration and transfer of the envisioned innovation. Unlike in the project's IR, Bolzano's landscape is dominated by private property ownership. Even though the large portion of public ownership in the Primiero region is considered a key advantage in the implementation of innovative land management, interaction and collaboration with private property owners is a core element of the initiative in Primiero. Consequently, exchanging information, experience and ideas with Bolzano may serve both regions in advancing their land management mission.

In addition, the IR is in touch with Swiss forestry organizations and research centers to showcase the region's forest management in the areas affected by the storm at a meeting in the fall of 2019. Such an exchange may also pave the way for a potential future replication of the IRs forest-pasture management approach.

The current development and future implementation of the innovative land management approach in the IR is facilitated by a number of factors relating amongst others to the political and natural setting, the forest administration's past relationship with stakeholders. All these are important aspects to consider when thinking about replicating the innovative approach in other regions in Italy, or European countries.

First of all, alpine settings like that of the IR tend to have a particularly high level of a diversity of forest ecosystem services provided (see also WP2 mapping results). This is in part a result of the fact that the mountain environment limits the opportunities for alternative, large-scale uses of natural resources, e.g. steep terrain prohibits large scale development (see also InnoForESt Deliverable 2.1). Frequently, the focus in these regions is thus on maintaining the already relatively high level of FES provision, rather than improving the level of FES provision. Replication of the ideas and mechanisms developing in the Primiero region may thus be most promising if the they are transferred to another alpine setting.

The IR furthermore enjoys a supportive political climate. Over the past two years, a new regional government has encouraged public participation in discussions about landscape services. Thus, the efforts within InnoForESt do not take place in a vacuum but rather happen in a context in which stakeholders may already be sensitized with land management issues as well as their potential roles as active stakeholders in land management decision processes.

Finally, the main actor pursuing an innovative land management approach is the provincial administration in charge of public forest and pasture management. Not only does it own a lot of property rich in important forest ecosystem services (timber, scenic value, protective functions), but it is also a trusted actor in land management.

FOREST MANAGEMENT

Two elements have characterized forest management in this region in the recent past. On the one hand, the systematic adoption of close-to-nature silviculture (instead of clear-cutting) and forest consolidation moved forest management beyond mere biomass production. These forest policy decisions became tools that guarantee the provision of various fundamental forest ecosystem services, such as scenic and recreational value, or those related to slope stability and erosion control. On the other hand, structural, provisional and compositional improvements have helped maintain the forest's productivity (i.e. timber and fuel production), which in turn is expected to ensure a level of management intensity that is providing sufficient revenue to limit the expansion of marginal areas (a growing phenomenon in many alpine regions). This approach to forest planning and management has become a widely accepted tradition in Trento Province.

Overall, forest management practices in the IR are not expected to change significantly because of the involvement of additional stakeholders. While there is room for some adaptation – e.g. to consider the

use of certain forest roads for recreational purposes in forest management – stakeholders have confirmed their satisfaction with forest management practices and focused discussions on developing innovative funding mechanisms for management on public and private land. The innovation process thus serves primarily to develop innovative funding mechanisms that support the maintenance of forest management practices on public land, and also support private land-owners in actively managing their interspersed parcels. Combined, this landscape approach to forest and pasture management is expected to halt the further loss of FES and secure a future sustainable provision or restoration of a diversity of forest ecosystem services on a landscape scale.

OUTLOOK

The IR Italy has just finished the scenario selection and prototype development and is moving towards the governance innovation implementation phase.

RECOMMENDATION TO THE IR TEAM

The expansion the spatial scope of forest-pasture management by including private landowners and taking a landscape perspective holds great upscaling potential. As such the IR in the Premiero region of Italy may in the future offer valuable insights relevant for understanding upscaling processes. In order to take advantage of these experiences, a detailed documentation regarding the outreach and stakeholder involvement processes may prove useful.

The exchange between the IR and its neighboring province of Bolzano may offer valuable insights into issues concerning the potential replication of the envisioned local innovation. Insights could be particularly relevant because of the differences in ownership structure between the two provinces, which spans the spectrum of primarily private vs. primarily public property. Hence, documentation of any transfer processes could be of great interest to InnoForESt.

f. Sweden – Love the Forest

WHAT

The Swedish IR focuses on educating schoolchildren about forests and the use of forest resources. The aim is to disseminate facts and fascination about the Swedish forests and encourage students to visit the forest more often. Young people are thereby offered the opportunity to reflect on how the Swedish forests are currently used and can be used differently in the future to achieve a more sustainable world (CINA workshop report). The initiative is implemented by UNIVERSEUM science center in cooperation with partners from the forestry sector, including large forest owners, forest owners associations, and state forest agency.

The program ‘Love the Forest’ is based on an established educational model called “Young people speculate”, which has been applied by UNIVERSEUM in the past to teach children about a variety of natural resources and related topics, including one application focused on FES (Love the Forest 1.0). During the program, elementary school students meet the cooperating partners from the forest sector and are invited to express their visions and ideas about the Swedish Forests and showcase how they see forest resource use in the future. The main activity is a competition in which the classes develop a

project idea around innovative and new uses of forest resources and the forest itself, which they then present to the different representatives from industry, academia and the public.

FES

There is not one particular FES at the center of this innovation. Rather, this IR focuses on school children learning about the diversity of forest ecosystem services, forest management and forest products.

ACTIVITIES SO FAR

So far, two CINA workshops have been carried out in the IR. Because UNIVERSEUM has been in regular contact with key stakeholders through prior runs of the 'Love the Forest' program, the preparations for the InnoForESt workshops were well-informed about their views on FES and the educational program. In addition, the IR team conducted surveys and focus group discussions with teachers and students who had participated in the program before. The findings of this research are in the process of being published.

During the first workshop, a set of scenarios for 'Love the Forest 2.0' were developed based on reflections on the original version (1.0). The stakeholders aimed to use the further development process to integrate additional issues important to them. This includes climate change, raising interest in the forest sector in future potential employees, and reaching societal groups they would not usually reach. The further discussions about Love the forest 2.0 were thus guided by two main themes:

- Forests and climate change
- Forest as a platform to learn about Swedish forests for newly arrived Swedes

These themes were conceptualized further into three scenarios during the second workshop:

1. **Wild Kids** - A school project for students in grade 4-6. Students' mission is to design a day trip in the woods - for a specific audience. The target groups are defined by our partners and are real "cases", that is, audiences who can't or don't want to spend time in the forest or do not have the same capacities to go into the forest, e.g.: young people with disabilities)
2. **Certified Outdoor Guide** – A school project where students in grades 7 and 8 develop into outdoor guides in their various nearby forest areas. The mission is to plan and implement an outdoor activity for students who are new arrivals to Sweden and learning Swedish.
3. **Climate Challenge** – Classical school projects for students in grade 7 to 8 to enhance students' inspiration, continuing education for teachers. The mission is to identify, investigate and propose a solution for a climate problem with the help of the forest in your neighborhood.

UPSCALING

The IR team sees great potential to upscale the 'Love the Forest' program in the sense of reaching more students. The limiting factor however is having the staff and financial resources necessary to do so. Additional factors limiting upscaling of such programs is the difficulty of fitting the UNIVERSEUM program into the children's' regular curriculum, both in terms of the time required and the content covered during that time.

REPLICATION

Given that 'Love the Forest' represents a particular version of the educational format 'young people speculate' developed at the UNIVERSEUM in 2002, the envisioned innovation 'Love the Forest 2.0' can be regarded as an upscale of the forerunner innovation, addressing additional but related issues and reaching out to more students. In theory, the program is well-suited for replication elsewhere, however, the UNIVERSEUM in many ways enjoys a unique position that may be hard to copy and thus hinder replication: apart from having the building facilities necessary to accommodate larger groups of children, they have several professional pedagogues on staff, funding from multiple stakeholders representing different perspectives (forest products, conservation, recreation etc.) as well as a steering committee consisting of knowledgeable experts (the founders of UNIVERSEUM) who also inform the program's content from an academic perspective. Nevertheless, a retrospective look at the design of the 'love the forest' program including the particular adaptation from the original 'Young people speculate' curriculum to a FES focused program may hold potential to transfer some of the lessons learned to other educational programs.

FOREST MANAGEMENT

There is no direct or indirect link between the innovation mechanism, forest management and FES provision. Forest management is not affected by this innovation, neither is the provision of FES.

OUTLOOK

The IR Sweden has developed their scenarios in the form of three different educational programs and will be moving towards the implementation phase soon.

RECOMMENDATION TO THE IR TEAM

There is a strong interest in the Swedish education program, and forest related education activities among the other InnoForESt IRs. Replicating a 'Love the forest'-like project is considered difficult, given that a similar level of support and resources are probably hard to find. Nevertheless, there may be lessons learned regarding forest related paedagogic aims, strategies and experiences, that UNIVERSEUM could share with other IRs in order to help them improve their educational activities. Still the educational goals, target groups and concepts as well as the funding and governance scheme of this innovation are well worth to be considered for replication in other countries, acknowledging the fact that major adaptations to different forest ecosystems, stakeholder interests and languages would be necessary.

3. Conclusions and Recommendations to the Project Team

Among InnoForESt goals is to better understand mainstreaming processes related to innovative governance mechanisms that secure the future provision of FES. Mainstreaming can occur when existing niche innovations are upscaled - expand in scope of volume, e.g. cover a greater area, or replicated - implemented in a new setting by different actors, albeit adapted to local conditions. This report outlines specific first insights, tasks and areas for future investigation related to upscaling and replication, as well as the innovations' implications for forest management, which will form the basis for the development of policy and business recommendations (Del. 6.3).

Insights gained during the first half of the project reveal that the IRs are currently in early phases of development, only few are actively engaged in upscaling, and none in replication efforts. Most are still in, or have just completed the process of developing their innovation ideas into more concrete scenarios. The innovations pursued by the IRs are new and innovative in their local or even national context. Nevertheless, the establishment of their innovations, in most cases, included a transfer, uptake and adaptation of ideas and knowledge from somewhere else. Most have drawn on experiences of others implementing similar governance mechanisms developed elsewhere (IR Finland, IR Germany) or have had prior experience and programs which also targeted FES or forest products (IR Sweden, IR Austria). Likewise, several have already gone through upscaling processes with their pre-InnoForESt project innovations (e.g. IR Germany, IR Czech Republic). These findings have been summarized in Table 3 at the end of this document. Taking a retrospective look at the IRs past upscaling and replication efforts thus appears a very promising approach to further our understanding of mainstreaming processes. Hence, a **first recommendation is to reflect, and document each IR's past experiences and development through the lens of upscaling and replication**. Upcoming work such as applying the SETFIS framework in the IRs offers an opportunity to do so.

A second observation is that the IRs' diversity goes beyond just the particular FES in focus, the innovation mechanisms chosen, or the current phase of development. There is a much more fundamental variability among the IR that demands acknowledgment and recognition in future project activities. It concerns the relationship between the innovative governance mechanisms, forest management, and FES provision. Three points to consider are:

1) the link between the innovation governance mechanism, forest management implications and FES provision ranges in different IRs from very indirect (e.g. IRs Sweden, Austria) to very direct (e.g. IRs Czech Republic, Germany, Finland);

2) as a result of the above, a successful innovation process does not automatically imply successful securing of FES provision, particularly in the long term. The innovations' actual effect on FES provision will only be measurable in the long-term, beyond this project's time span. That makes it all the more important to consider the links between the innovation process and is implications for forest management and FES provision now.

3) the innovations' expected impact on forest management practices as well as sustaining future FES provision varies considerably between the IRs and are not in a linear relationship – i.e. strong impact on forest management does not automatically imply sustaining or enhancing FES provision. In Italy, the innovation is expected to maintain a well established type of forest management to halt the further loss of FES provision; in Slovakia, the current aim is to maintain the type of forest management practiced and thus secure current levels of FES provision in its wake; both thus do not expect a major change in forest management practices. The IRs in Germany, Finland and Czech Republic, on the other hand, expect their innovation to establish and pay for FES oriented forest management. Whether or not a no-change in forest management should be a concern depends on the whether the existing forest management practices ensure the provision of the desired FES. Similarly, an innovation's impact on FES

provision depends on the initial level of FES provision in a particular place, and may vary in the short, medium or long term.

Acknowledgement and reflection of these nuances in upcoming InnoForESt work is essential. Not the least to generate insights that provide a solid base of information for the development of specific, policy and business oriented recommendations about innovative means to secure FES provision in the future. A **second recommendation is therefore to clarify, and make transparent the relationship between the innovative governance mechanism, forest management, and FES provision**. Figure 1 provides an illustration of the issues to be considered.

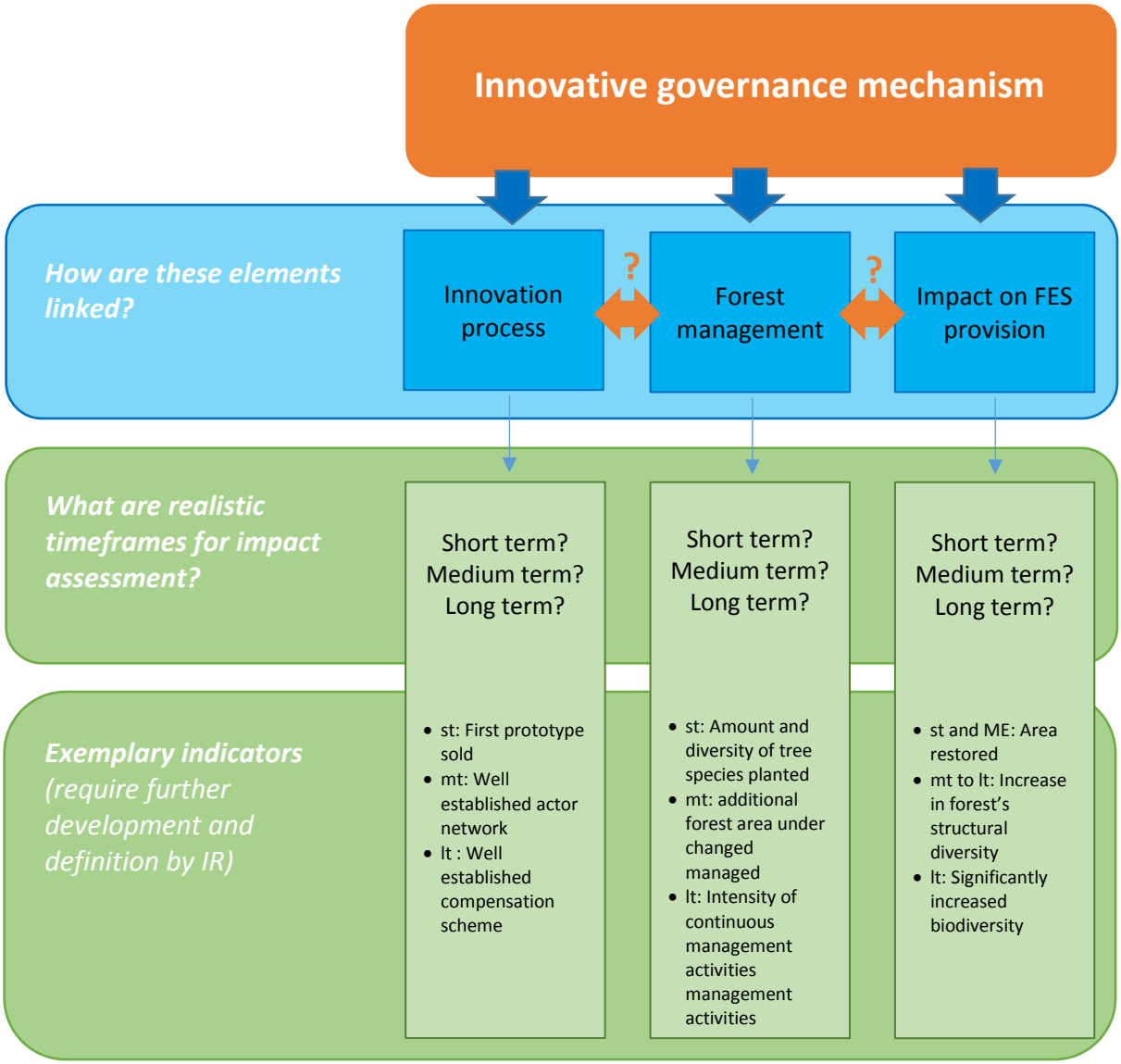

Figure 2 Recommended considerations regarding the relationship between the innovative governance mechanisms, forest management, and FES provision

During the projects lifetime criteria and indicators for the assessment of the impact of the innovative governance mechanisms on forest management and FES provision should be further developed and

short term effects monitored. The medium and long term impact of the researched governance innovations may only materialize after the time that InnoForESt is actively engaged in the IRs. However, the development of suitable indicators for future assessment of the innovative approaches could prove very useful to the practice partners involved. Most likely, many of them will be engaged in their effort to secure the future FES provision much longer than InnoForESt researchers. As such, working with the IRs to develop suitable indicators for the short, medium, and long term impact of the respective governance innovations on forest management and FES provision can also be seen as an important part of InnoForESt's efforts to support the IRs in their pursuits. Table 4 provides a preliminary overview of the current respective relationships in the individual IRs, as well as exemplary indicators for impact assessment.

A related, **third recommendation** is to **consider the entire spectrum of actors that InnoForESt needs to provide targeted information to** in order to support its goal of understanding and furthering the mainstreaming of innovative governance mechanism for future FES provision. This includes policy makers, but also practitioners working in administration, the private sector, or land management, particularly foresters and forest owners. The above described nuances and their consideration in InnoForESt findings are of great relevance to forest owners and managers throughout Europe looking for new ways to manage their land.

A final, more short term suggestion relates to InnoForESt's goal of accompanying and facilitate networking among the IRs. During the writing of this report, five topics were identified that are of interest to practitioners from two or more IRs (see also Table 2).

1. compensation schemes around biodiversity loss offsetting
2. compensation scheme around carbon sequestration
3. mountain forestry
4. transformation of top-down towards more participatory initiatives
5. education

The annual meeting 2019 could provide a venue to facilitate direct exchange of information and knowledge, especially between the different IR. An opportunity to again exchange information and ideas may not only be a valuable contribution of the overall project to the practice partners but also serve as an opportunity for InnoForESt scientists to observe and study transfer processes.

4. List of Information Sources

Literature

Forbes, 10 September 2015. "What's the Difference Between Invention and Innovation?" available at https://www.forbes.com/sites/jacobmorgan/2015/09/10/whats-the-difference-between-invention-and-innovation/#314f771770f4 last accessed July 24th, 2019

Frankelius, Per (2009). "Questioning two myths in innovation literature". The Journal of High Technology Management Research. 20: 40–51.doi:10.1016/j.hitech.2009.02.002.

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Sample, A. V., Birdsey, R., Houghton A. C., Swanston, C., Hollinger, D., Dockry, M., Bettinger, P. 2015. Forest Carbon Conservation and Management: Integration with Sustainable Forest Management for Multiple Resource Values and Ecosystem Services available at http://www.pinchot.org/PDFs/IntegratingForestCarbonManagement_web.pdf last accessed July 25th, 2019

Young, T. P.; Petersen, D. A.; Clary, J. J. (2005-04-28). "The ecology of restoration: historical links, emerging issues and unexplored realms".EcologyLetters.8 (6): 662–673.

InnoForESt Deliverables

Stefan Sorge, Carsten Mann. September 2018. InnoForESt Deliverable 3.1 Analysis Framework for the Governance of Policy and Business Innovation Types and Conditions.

Christian Schleyer, Jutta Kister, Michael Klinger, Peter Stegmaier, Ewert Aukes. September 2018. InnoForESt Deliverable 5.2 Report on Stakeholders Visions, Interest and Concerns.

Project documentation related to Innovation Regions (IR)

IR Austria

Analyse und Feedback CINA 2 (project internal reflection on the 2nd CINA workshop)T4.2 - First CINA workshop report IR Austria_final (project internal document)

Klimaanpassungskonzept für die KLAR! Klimaanpassungsregion Ennstal - available at: https://klar-anpassungsregionen.at/fileadmin/user_upload/regionen/12_Ennstal/Anpassungskonzept_KLAR_Ennstal.pdf (last accessed on June 24th, 2019)

Notes from CINA Kirchdorf 7 Feb 2019 190222 (notes taken by InnoForESt member on first CINA workshop, project internal document)

Memo - CINA WS1 - Austria (notes taken by InnoForESt member on fist CINA workshop, project internal document)

Participant observation of 2nd CINA workshop held on May 16th, 2019 in Reichraming, Austria.

Interview with scientific and practice leads of the IR (Wolfgang Baaske, STUDIA Austria; Jutta Kister, University of Innsbruck; Christian Schleyer, University of Innsbruck) on June 18th, 2019

IR Czech Republic and Slovakia

Martin Špaček, Jiří Louda, Lenka Dubová, Tatiana Kluvánková, Veronika Gežik: Governance Situation Assessment in the Czech and Slovak Innovation Regions; draft version January 28, 2019

Martin Špaček, Tatiana Kluvánková, Jiří Louda, Lenka Dubová: T4.2 - CINA workshop report case CZ-SK_190521 (project internal document)

Interview with scientific and practice leads of the IR (Martin Špaček, CETIP; Jiří Louda IREAS; Veronika Gežik, CETIP) on June 12th, 2019

IR Finland

Stakeholder Analysis Finland August 2018 provided by the IR (project internal document)

Interview with scientific and practice leads of the IR (Saija Kruusela, SYKE; Markku Granander, Finnish Forest Centre; Minna Pekkonen, SYKE) on June 19th, 2019

IR Germany

Notes on 1st CINA workshop provided by the IR (project internal document)

Interview with scientific and practice leads of the IR (Peter Adolphi, Agentur für nachhaltige Entwicklung (ANE); Claas Meyer, ZALF) on June 19th, 2019

Participant observation at a meeting with key actors from the IR on July 3rd in Güstrow, Germany.

IR Italy

T4.2_CINAworkshop report. Version May 2019 (project internal document)

Interview with scientific and practice leads of the IR (Caterina Gagliano, Province of Trento; Francesco Orsi, University of Trento) on June 13th, 2019

IR Sweden

Christa Törn-Lindhe, Sara Brogaard, Torsten Krause and Sean Goodwin. Stakeholder Analysis in the Swedish case study (Älska skog). Contribution to 5.2 (project internal document)

CINA workshop report case Love the forest workshop 1 and 2. Draft version of May 2019 (project internal document)

Interview with scientific and practice leads of the IR (Sara Brogaard, Lund University; Torsten Kraus, Lund University; Christa Torn-Lindhe, UNIVERSEUM) on June 19th, 2019

Annex

Table 2 Suggested topics for inter-IR exchange

IR	Sweden	Italy	Germany	Finland	Czech Republic/ Slovakia	Austria
Austria	Education program	Mountain forestry			regional wood value chain development	
Czech Republic/ Slovakia	Education program		compensation scheme - carbon	compensation scheme - biodiversity		
Finland			compensation scheme			
Germany	Education program	transformation of a top-down to a more participatory initiative				
Italy						
Sweden						

Table 3 Current phases of the innovation processes, and assumed upscaling & replication potential in the six Innovation Regions

Innovation Regions	Origin of current innovation			Current innovation process phase						Current implication for FES oriented forest management	Upscaling (provided prototype proves successful)		Replication (provided prototype proves successful)		Further information to be gained in 2nd project phase regarding … (see also Table 4)
	Development of an original innovation idea	Mix of both	Replication & adapta-tion of an innovation originating elsewhere	1	2	3	4	5	6		Currently	Potential	Currently	Potential	Analysis of upcoming , data and reports from WP1-5 and additional interviews by WP6
Austria			x	√	√	x	√	x	x	indirect	(x)	x	--	x	- sources of inspiration & information - supportive tools and frame conditions - offers to newcomers (upscaling) and outsiders (replication)
CZ/ SK	X	x		√	√	x				direct	(x)	x	--	x	
Finland			x	√	√	√	√	x		direct	(x)	x	--	x	
Germany		x		√	√	x				direct	--	x	--	x	
Italy	X	x		√	√	x				direct	--	x	--	x	
Sweden	x	x		√	√	√	x			indirect	--	x	--	x	

1 orientation, 2 scenarios development, 3 scenario selection, 4 prototype development, 5 upgrading, 6 implementation of prototype

x = phase of innovation as assessed at time of reporting

√ = phase of innovation development achieved at time of reporting

(x) = first steps at this phase

Table 4 Relationship of innovative governance mechanisms, forest management, and FES provision

IRs	Innovation mechanism	Innovation output or product	Innovation's expected impact on forest management	Innovation's expected impact on FES provision	Relationship of governance innovation and FES provision	Exemplary indicators for… • short term (st) = within the project's time frame, • medium term (mt) = within 5 years after the project • long term (lt) = 5-10 years after the project or more (all would need further specification by the IR partners!)		
						… a successful innovation process	… the impact on forest management	… the impact on FES provision
Austria	Network approach connecting actors along the wood value chain	Wooden Tiny House Intermediate step: potential establishment of a regional (hardwood) lumber processing facility	Tiny House-> none; (hardwood) lumber processing facility -> possibly a significant impact in the future	Tiny House-> none; (hardwood) lumber processing facility -> possibly a significant impact in the future	Very vague, could become more direct in the future	• st: first sales of first wood product; established stakeholder networks (Needs def. e.g. of core stake-holders, means & frequency of institutionalized communication) • mt: development of xy further wood products within actor network • lt: well-established portfolio of regional wood products (e.g. at least 3 with aligned PR strategy)	• st & mt: no impact expected • lt: If regional hardwood lumber facility is installed: Increased area of regional forest management with focus on hardwood species	• st & mt: no impact expected. • lt: the forest area (x ha) actively managed for maintaining important protective FES functions and supports climate change adaptation. (quality assessment beyond project realm)

IRs	Innovation mechanism	Innovation output or product	Innovation's expected impact on forest management	Innovation's expected impact on FES provision	Relationship of governance innovation and FES provision	Exemplary indicators for… • short term (st) = within the project's time frame, • medium term (mt) = within 5 years after the project • long term (lt) = 5-10 years after the project or more (all would need further specification by the IR partners!)		
						… a successful innovation process	… the impact on forest management	… the impact on FES provision
CZ	Voluntary compensation scheme that funds forest restoration, establishment of 'new virgin forests'	Carbon sequestration certificates; restored more natural forests	Biodiversity oriented forest restoration and management becoming extensive	Increase of biodiversity and other FES provided by near natural forests	Direct: income from sale of certificates funds forest restoration activities	• st: functioning compensation mechanism (e.g. price, contractual issues, PR strategy a.o. in place) • st & mt: successful sale of certificates (e.g. amount or value per year) • lt: well-established funding mechanism (e.g. continuous sales in 'sufficient' amounts, t.b.d.!	• st: amount and diversity of tree species planted • st & mt: additional area of forest restored • lt: additional area of low intensity forest management;	• st & mt: additional forest area restored • lt (beyond project realm): biodiversity increase (using indicators such as species richness of various genera, t.b.d.!), water retention and quality (indic. t.b.d.)
Germany	Voluntary CO2 compensation scheme for individuals and businesses that funds afforestation	Well priced Carbon sequestration certificates; New marketing strategy Newly established 'climate forests'	Increase of the forested area; forest management aimed at maximizing CO2 storage	Carbon sequestration and storage by newly planted trees and forests	Direct: income from sale of certificates will fund tree planting	• st: functioning compensation mechanism (e.g. price, contract issues, PR strategy in place) • st & mt: successful sale of certificates (e.g. value/year)	• st: amount and selection of tree species planted • mt & lt: forest management maximizing CO2 sequestration	• st: area afforested with selected suitable and diverse tree species • mt & lt: amount of carbon stored in climate forests per year or in total (beyond project realm)

IRs	Innovation mechanism	Innovation output or product	Innovation's expected impact on forest management	Innovation's expected impact on FES provision	Relationship of governance innovation and FES provision	Exemplary indicators for… • short term (st) = within the project's time frame, • medium term (mt) = within 5 years after the project • long term (lt) = 5-10 years after the project or more (all would need further specification by the IR partners!)		
						… a successful innovation process	… the impact on forest management	… the impact on FES provision
Finland	Voluntary compensation scheme that funds forest restoration activities and increase biodiversity	Contract development and brokerage between potential buyers and forest owners; Biodiversity restoration on private forest land	Biodiversity oriented forest restoration activities and management on private land	Increased biodiversity	Direct	• st: first contract concluded between company and private forest land owner • st & mt: successful matching of sites by the Habitat Bank, e.g. x contracts, or contracts for y ha forests • lt: nationwide implementation of the forest biodiversity management compensation scheme though the Habitat Bank (e.g. x contracts for y ha forests in z pol. regions)	• st & mt: restoration activities implemented by private forest sector actors on x ha; non-forestry actors entering the forest sector, engaging in restoration activities (y companies or for z value) • lt: possible impact on forest management practices at large (ind. t.b.d.)	• st & mt: using biodiversity indicators such as species richness etc. to reflect the development on restored sites (beyond project realm) • Long term: comparison of area restored to overall restoration potential (beyond project realm)

IRs	Innovation mechanism	Innovation output or product	Innovation's expected impact on forest management	Innovation's expected impact on FES provision	Relationship of governance innovation and FES provision	Exemplary indicators for… • short term (st) = within the project's time frame, • medium term (mt) = within 5 years after the project • long term (lt) = 5-10 years after the project or more (all would need further specification by the IR partners!)		
						… a successful innovation process	… the impact on forest management	… the impact on FES provision
Italy	Networking and payment scheme to support forest and pastures landscape management	Landscape perspective on forest and pasture management; engagement of private stake-holders; funding mechanism to support forest management activities	Maintenance of forest management and expanding active forest management to private land	Halt the further loss of FES provision; maintenance of FES provision	Indirect	Generating sufficient funding for forest pasture management (xy €/year); engaging new stakeholders (e.g. types? number? responsible for x ha?) to enable landscape scale management	Area actively managed; Types, degree, frequency, goals of forest management activities implemented on private land (ind. t.b.d.)	Indicators needed to assess the types and level of FES provided, e.g. scenic value, flood protection, avalanche protection etc. (beyond project realm)
Slovakia	Compensation payment for Carbon sequestration	Carbon sequestration certificate	Maintenance and economic viability of current forest management	Neither directly nor indirectly. Maybe very indirect and far in the future	Indirect	• st: functioning compensation mechanism (e.g. price, contractual issues, PR strategy a.o. in place) • st & mt: successful sale of certificates (e.g. amount or value per year) • lt: well-established funding mechanism (e.g. continuous sales in 'sufficient' amounts, t.b.d.!	st, mt & lt: Maintenance of forest management as currently practiced (e.g. 0 change in ha and intensity)	lt: Maintenance of current types and levels of FES provision (def. and ind t.b.d.)

IRs	Innovation mechanism	Innovation output or product	Innovation's expected impact on forest management	Innovation's expected impact on FES provision	Relationship of governance innovation and FES provision	Exemplary indicators for… • short term (st) = within the project's time frame, • medium term (mt) = within 5 years after the project • long term (lt) = 5-10 years after the project or more (all would need further specification by the IR partners!)		
						… a successful innovation process	… the impact on forest management	… the impact on FES provision
Sweden	Educational program for school children	Student competition about knowledge on forest management and FES	Neither directly nor indirectly. Maybe very indirect and far in the future	Neither directly nor indirectly. Maybe very indirect and far in the future	Very vague	st & mt: sufficient funding (e.g. x Euro per year) to continue the education program	Not measurable	Not measurable