



NRP 73 Policy Brief Nr. 7 / 2023

Mainstreaming Forest Ecosystem Services

Political Significance of Research

Society's demand for natural resources, such as forests, is increasing. The transition to a sustainable economy is expected to further increase these demands. Additional services enable the forest sector to diversify its sources of income, but also pose trade-offs and challenges due to the following reasons:

- (i) Long time horizons and associated uncertainties in forest management,
- (ii) urgency of management adaptation due to increasing disturbances and climate change,
- (iii) complex interactions between forest ecosystem services (FES),
- (iv) limited capacity of forests to provide compensatory services; and
- (v) lack of acceptance of non-traditional management approaches by the forest sector.

The expected conflicts between objectives can therefore only be adequately solved if FES and their interactions, as well as their influences on forest ecology, are taken into account as comprehensively as possible at all decision-making levels, as well as in the public and private sectors.

This requires the so-called “mainstreaming of FES”, which consists of three steps: raising awareness, defining objectives and further developing instruments.

Mainstreaming FES consists of three steps

- 1 Awareness** should be raised for the FES provided in addition to timber production and for the complex interactions that exist between them, both among the general public and among forest owners, managers and policy-makers. To this end, the conflicts, synergies and values of FES should be made more visible, e.g. through greater cost transparency, clarification of property rights and strengthening of the polluter-pays principle.
- 2** Forest policy should explicitly define ambitious **objectives** for all major FES as far as possible, set priorities, actively address conflicts and use synergies. Policy objectives should be coordinated across sectors to explicitly take into account the impact of other sectors' objectives on the FES.

3 The further development of forest bold **instruments** should be coordinated more closely with other sectors. There is a potential – albeit limited and varying depending on the FES – for instruments that set monetary incentives. However, forests are only partially able to fulfil all requirements at the same time, which is why forest services should not be provided to compensate for policy failures in other sectors.

What is meant by...

Sustainable economy: A sustainable economy takes into account that non-renewable resources become scarce and to what extent renewable resources regenerate. In addition, economic competitiveness and social welfare should be promoted (quote from NRP73 homepage).

Forest Ecosystem Services (FES): benefits to humans provided by forests (such as timber, protection, clean water, recreation).

Decision Support System (DSS): computer-based modeling of synergies and trade-offs between the provision of FES

Biodiversity offsetting in the forest: compensation of forest clearances by nature conservation measures in the forest.

Forest and wood sink: increasing the sequestered carbon amounts either in the forest (standing trees) or in wooden products (after harvest).

Mainstreaming FES: vertical and horizontal integration of FES in policy decisions achieved by raising awareness, defining objectives and designing policy instruments (Figure 1).

Mainstreaming FES for a sustainable economy

Forests provide a wide range of ecosystem services: They produce wood, mitigate climate change, protect against natural hazards, filter water, protect the soil and provide recreational opportunities. In addition, they provide important habitats and contribute to the structure and aesthetic of landscapes. Forests thus provide ecological, economic and social services that are often available for free, even if their provision is associated with costs. However, forests cannot provide all services indefinitely and simultaneously. In addition, current global challenges, such as the climate and biodiversity crisis and the shift towards a sustainable economy, will increase the demand for FES. This requires well-informed and targeted forest management decisions: a fact that the general public is often not aware of and a challenge for which even forest owners and managers are not always optimally equipped.

This development also affects the political sphere. Appropriate policy instruments are needed to ensure that the various FES are provided in the right place, at the right time and to the required extent. While the objec-

tives for traditional FES, such as timber production, have been comprehensively defined by the national forest policy, the objectives for other FES remain rather abstract and are not closely coordinated with the policy objectives of economic sectors that benefit from or influence FES. As a result, stakeholders lack guidance and are reluctant to allow new sustainable economic activities from other sectors in forests or to provide additional FES for these sectors.

The development of the forest sector as an integral part of a sustainable economy requires (i) making conflicts explicit, (ii) making a conscious decision to provide alternative FES - if necessary, also at the expense of timber production, (iii) calculating costs transparently, and (iv) enabling direct financial compensation. Mainstreaming FES for a sustainable economy thus means raising awareness of the different FES, defining explicit policy objectives beyond wood production and developing appropriate policy instruments to ensure the sustainable provision of FES (Figure 1).

Mainstreaming Forest Ecosystem Services

The mainstreaming of forest ecosystem services (FES) aims at their wider consideration in strategies, policies, programmes and practices of public and private actors across all those sectors that either benefit from or influence FES. It requires a proactive, integrative approach.

Key steps in mainstreaming ecosystem services

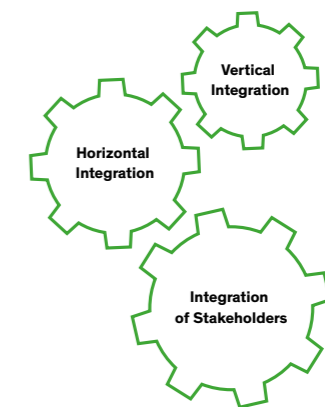


Figure 1: The most important steps in mainstreaming ecosystem services¹

Results

Three NRP 73 projects (ATREE, SessFor, DI-VES) investigated the opportunities and challenges of providing FES to meet new demands on forests. They concluded that there is a potential for marketing new products and services, but that regulatory instruments as well as more comprehensive information systems are also indispensable for new economic activities in the forest.²

Biodiversity offsetting in the forest can only be implemented within limits (ATREE)

The Swiss forest area is strongly protected by law, and any forest clearance must be replaced by reforestation. Under certain conditions, this can be dispensed with in favour of biodiversity-promoting measures, even within the forest. The forest owner is compensated for the implementation and maintenance of such measures by the party causing the clearing. However, developing such compensation transactions as an additional source of income seems to be more attractive for owners of large forests. At present, a large majority of forest owners reject nature conservation measures as a substitute for forest clearance, and forest-related stakeholders also largely agree that these measures should not be subject to a market mechanism.

Including forest sinks in the mandatory carbon market (ATREE)

Forests help mitigate climate change by sequestering carbon. The harvested wood is used to construct buildings, make furniture, or generate energy, replacing more carbon-intensive materials and fossil fuels. The forestry sector prioritises the timber sink because harvesting and selling timber is in line with its preferred management strategy. However, our surveys show that there are forest owners who are willing to store carbon even on productive land. Such forest sink projects could comply with the requirements for participating in the mandatory market. Consequently, a parallel development of certifying wood and forest sinks could be feasible.

Providing insurance services of forest (DIVES)

Forests can protect people and infrastructures from gravitational hazards such as avalanches or rockfall. In Switzerland, this protection is organised through a historically grown, standardised system of strict regulation, monetary incentives and market-based elements. However, the survey participants of our case study regions in the mountain area show a high willingness to pay for improved, additional management of the protection forests. The development of a corresponding insurance product could lead to a stronger market coordination of natural disaster protection beyond the legal requirements. The long-term management perspective and the associated risks make this a challenging undertaking.³

Decision support systems for forest management (SessFor)

Today's decisions on forest management have consequences for the next 50 to 100 years. They determine how the ecosystem services of the forest will develop in the future and which synergies and conflicts of objectives between FES are to be expected. The modelling of these relationships provides recommendations for adapted forest management (Figure 2). Forest managers can thus better cope with the increased complexity and more consciously select those forest management strategies that aim at the sustainable provision of certain FES.⁴

Conflicts and synergies in the provision of specific FES

Diversifying forest management beyond timber production allows forest owners and managers to benefit from new sources of income. Proactive management to provide different FES and foster biodiversity can increase overall performance, but also decrease it. Figure 2 shows as an example five FES that were investigated in the context of the NRP 73 project Ses-

sFor for the three forest enterprises Wagenrain (WAG), Bülach (BUE) and Gottschalkenberg (GOT). Four different management strategies were simulated in each case: No management (NO), reduced management (LOW), business as usual (BAU) or increased management (HIGH) under four different climate scenarios.⁵

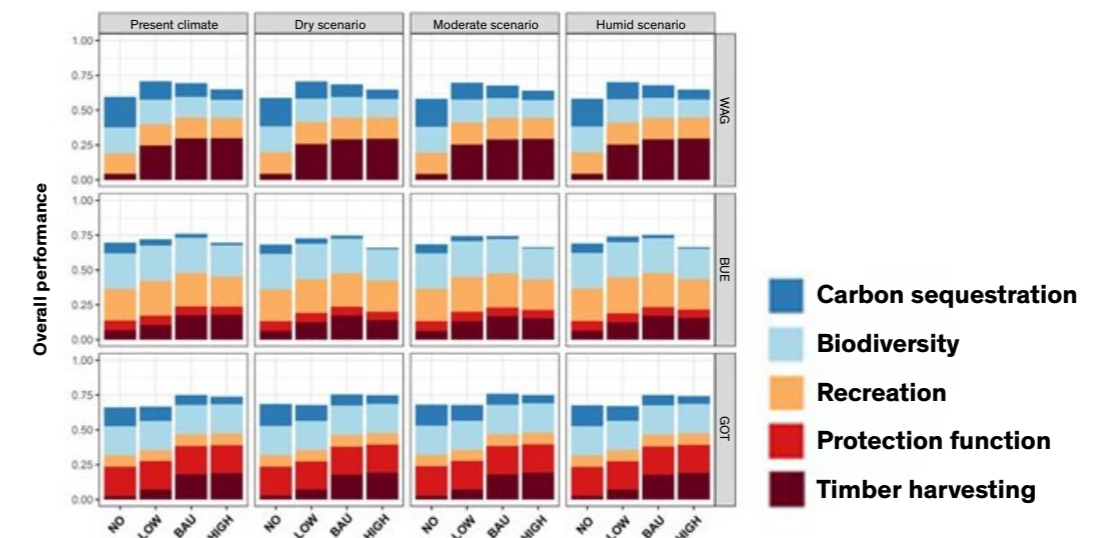


Figure 2: Overall performance of all FES and biodiversity indicators under current and future climate change scenarios.⁵

The figure shows that at two of the sites studied, the greatest overall performance of all the FES considered occurs under the previous management (BAU). Only at the Wagenrain site, which recently experienced major disturbances (storm, drought), did reduced management (LOW) achieve a better result. The lowest overall performance for all farms was achieved by abandoning management (NO). This shows that management increases the overall FES of all three sites.

Such decision support systems can be extended and tailored to specific forest enterprises and their effective management options. The overall performance, as well as the potential conflicts and synergies, depend very much on the specific context and assumptions of the forecasting models. Nevertheless, Figure 2 illustrates the complexity and difficulties associated with proactively securing all FES. Delegating these decisions exclusively to forest enterprises at the local level would certainly exceed their capacities. Forest policy should therefore provide guidance in the form of goals and strategies for the sustainable use of forests.

Mainstreaming FES requires increased awareness, explicit objectives and appropriate instruments to facilitate decision-making

Raising awareness for FES across sectors and actors

Settlement areas are steadily growing closer to forests. This leads to an increased use of forests, especially in densely populated areas. More transparency regarding clearing, its causes and clearing replacement can raise awareness of this increasing pressure and help to protect forest areas from competing land uses⁶.

Various environmental policy objectives that support the transition to a sustainable economy rely on offsets from the forest sector. This is a double-edged sword, because while it creates opportunities for diversification of forestry income, it can also burden forest management by exacerbating conflicting objectives. There is a lack of awareness of the limited capacity of the forest to simultaneously provide diverse FES and meet increasing compensation demands.

In general, a greater awareness of the forest and forest ownership and the associated rights and duties should be created among the general population. In order to meet the increasing and diverse demands on their property, forest owners may have to engage in more complex and costly forest management oriented towards performance mandates.

The awareness of policy-makers and forest managers of the potential of targeted forest management should be raised. This could lead to an optimised FES supply for specific private or societal demands financed through market-based or public policy instruments.

Defining objectives to preserve the forest and tackle trade-offs

The number of explicitly formulated forest policy and objectives has increased in recent decades. However, forest policy remains vague in prioritising objectives and does not explicitly address conflicting objectives. The resolution of conflicting objectives and the identification of synergies is delegated to regional planning and local forest management. Forest planning faces the challenge of spatially disentangling the provision of FES at a local and regional level without abandoning the national guiding principle of multifunctionality.

If objectives of other sectors require the use of FES, they should not be enforced at the expense of sustainable forest management in the economic, ecological and social sense. This requires cross-sectoral coordination of goals and strategies with a focus on maintaining healthy and biodiverse forests as a goal in its own right.

Developing instruments to manage FES provision

In order for the forest sector to become an integral part of a sustainable economy, the ownership and use rights must be made explicit, as well as the costs for the targeted provision of FES. In addition to awareness-raising campaigns, this can be achieved by charging the beneficiaries of FES.

However, there are limits to the market-based coordination of FES provision, especially in a sensitive ecosystem such as the forest. These are particularly evident in the case of nature conservation measures as a substitute for forest clearances, which raise concerns about equivalence and permanence in implementation and thus reduce acceptance.

Forest and timber carbon sinks stand out as an example where market coordination seems promising in terms of stakeholder acceptance. However, such in-

struments are highly dependent on successful capacity building by forest owner associations, effective coordination and appropriate incentives for forest management.

The success of financial compensation for more targeted forest management also depends on the payment instrument chosen. An insurance product could be successful if a minimum number of beneficiaries are willing to pay for better-tailored protection against natural hazards. This raises the question of how public and private provision of FES can be coordinated to increase efficiency.

The development of decision support systems can enable forest companies to weigh and prioritise the provision of FES. In this way, the forest sector can both contribute to and benefit from a sustainable economy.

Conclusion

Swiss forests are protected by law, and multifunctionality is the guiding principle according to the Swiss Forest Act. Therefore, regulatory instruments form the backbone of policies to protect biodiversity and ecosystem services of the forest. In addition, financial, market and information-based instruments are used to create additional incentives for the provision of FES. Well-designed, context-specific policy instruments embedded in a coherent, cross-sectoral policy framework are important preconditions for FES to contribute to the transition to a sustainable economy. However, our project results suggest that the possibilities of market coordination for sustainable oil provision are limited by (i) the long time horizon and uncertainties of forest

management, (ii) the urgency of increasing disturbances and climate change, (iii) the complex interactions between FES, (iv) the limited capacity of forests to provide compensatory services, and (v) the lack of acceptance of non-traditional management ideas by the forest sector. Policy makers should avoid degrading the forest as a “dumping ground” for all kinds of ecological compensation for flawed or insufficient environmental policies in other sectors. This is especially true against the backdrop of the global climate and biodiversity crisis: only healthy, biodiversity-rich, and thus resilient forests are able to provide FES in the long term. This requires a proactive and precautionary policy and management approach.

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About NRP 73



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The National Research Programme “Sustainable Economy” (NRP 73) was launched by the federal council with a global budget of CHF 20 million for five years of research starting mid-2017. It funded 29 research projects in different thematic areas such as Circular Economy, Finance, Building & Construction, Cities & Mobility, Forestry, Agriculture & Food, Supply chain, Sustainable Behaviour and Governance. NRP 73 aims at generating scientific knowledge about a sustainable economy that uses natural resources sparingly, creates welfare and increases the competitiveness of the Swiss economy.

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