

Ecosystem Services in European State Forests



June 2011

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EUSTAFOR and T. Patterson (2011), Ecosystem Services in European State Forests, European State Forest Association, Brussels, 40 p.

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Executive summary

The natural environment provides us with many goods and services; clean air and water, food and fuel, protection from the elements and places to walk, cycle or just to sit, reflect and feel good. In the past few decades the global loss and degradation of natural areas, sometimes with catastrophic results, has highlighted human reliance on the healthy operation of whole ecosystems, not just the parts we can touch, and see, and take away to use.

Forest ecosystems are a major source of highly valued goods and services, and also very important contributors to wider processes around fresh water, the atmosphere and global temperature. There is an abundance of information and research on the subject, and in America particularly, payment for the less tangible services is an increasingly accepted principle. In Europe, the implementation of markets for ecosystem services is still very much in a 'pilot' stage.

We anticipate the UN Environment Programme's study of The Economics of Ecosystems and Biodiversity (TEEB), and the work of NEWFOREX (New Ways to Value Forest Externalities) and other research, to influence in the near future, EU policies and strategies in wildlife, habitats and biodiversity, and key funding mechanisms like the Rural Development fund. Together these will start to shape an operating environment that better recognises the role of forests in delivering ecosystem services and better supports a broader range of the vital services delivered by state forests.

State forests, through their scale, expertise and history of sustainable management are very well placed to implement the ecosystem services concept within the European context, examples of progress in some important service areas (payments, carbon, water, biodiversity and protection) are included in section 4 of this booklet.

The forest sector already has a widespread and highly valued role in recreation and quality of life services. The large areas of managed forest land are becoming central to Europe's ability to mitigate against biodiversity loss, and the afforestation, growth and regeneration of forests is already recognised as a major contributor to mitigating carbon emissions and reducing their effect upon climate change processes. Developing markets in various countries are building on the forests' capacity to catch rainfall, regulate run-off and help improve water quality. The wider application of the Water Framework Directives should assist this. For the protective functions of forests, information about risks and costs are essential elements of the process to ensure that those who rely on the protection understand and value the forest management that is essential to maintain it.

State forest managers must now focus on providing input to EU policies and strategies that best safeguard ecosystem services for future generations, and thus underscore the importance of forests to present and future quality of life. It is also vital that we work to identify the potential 'buyers' of ecosystem services and help them to understand and choose what they wish to pay for, and the mechanisms which best ensure efficient provision. This means collecting information and being good at explaining what we offer, and what the potential options or consequences are. Above all we must then commit to delivery of the chosen services. The biggest change EUSTAFOR members are likely to encounter is that we must learn to deal with a much wider customer base of individuals and businesses, that come from outside the forestry or land based sectors, most of whom we have not had a reason to deal with before and who, as yet, know very little about forests or the value of the services they already provide. It will be an exciting time!

1. Introduction



Georg Erlacher
President of EUSTAFOR

EUSTAFOR represents 27 European State Forest Organizations from 20 countries who together manage 45 million hectares of mainly forest ecosystems, which is approximately 27% of the European Union's forested area.

It is clearly the case that Ecosystem Services can be seen from both an economic and ecological perspective. A significant amount of research on this is already complete and various approaches, assessment methodologies, initiatives and related programmes are now available to better understand the range of ecosystem services that forests provide.

For State Forest Management Organisations, as represented within EUSTAFOR, it is of great value to us all to discuss and work together on this topic, as all organisations and their stakeholders have different values and interests invested in, and expected from, their managed forest areas.

It is important to have a clear definition of ecosystem services to work with but that is not enough in itself. We also need a better understanding of how to define and implement policies; we need a better appreciation of the implications of management actions in order to work within the resilience limits of forest ecosystems; and also a better appreciation of the relationships between natural processes and people so that we can

describe, assess and realise the benefits that forest ecosystems provide.

In finding ways to manage our forest ecosystems for these wider benefits however, we must always ensure we consider the needs of sustainable forest management and keep a healthy balance between the ecological, economic and social dimensions of our management actions.

This booklet from the EUSTAFOR Ecosystems Services Working Group aims to contribute to the understanding and development of this topic in relation to European forests, and inspire new actions for delivery and wider awareness and appreciation of the immense value delivered every day by managing the state forest ecosystems.

EUSTAFOR welcomes your interest, discussion and feedback on this.

2. The relevance of Ecosystem Services

2.1 Historical perspective

For thousands of years, humans have placed fundamental demands on forests and woodlands to meet a whole range of physical, cultural and spiritual needs, grounded in food, shelter, materials and ceremony. However, technological advances and the increasing urbanisation of human societies over the last few centuries have introduced the incorrect perception that we have a reduced reliance on natural landscapes.

In the last half century however, concerns about rising global temperatures, drought, more extreme fire and flood events, habitat degradation, regulation of greenhouse gases and the sustainability of water supplies have highlighted the reliance that all life places on the planet's natural processes and ecosystems. Forests have been recognised as a major component of any strategy for mitigating or reducing our impacts on ecosystems. Forests have a unique capacity to protect the land and soil under them, to provide longevity and consistency as places for other species to live, and to interact on a large scale and in beneficial ways to regulate our atmosphere, carbon cycle and hydrosphere. Through global communications, this knowledge is also more widespread, and with it has come society's growing realisation of our impacts upon ecosystems and our inherent reliance on their healthy functioning¹.

2.2 Public benefits and Sustainable Forest Management

The Brundtland Commission (1987) highlighted the importance of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Subsequently, in 1993, The Ministerial Conference on the Protection of Forests in Europe (MCPFE) defined Sustainable Forest Management as "the stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant

ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems".

Sustainable forest management has therefore a critical and symbiotic relationship with the understanding of ecosystem services in forests because it permits the economic functions of forest use to take place within a framework that requires the environmental or social values to be taken into account. The sustainable harvesting of timber is a common type of 'consumptive use' (WICE)² of a forest ecosystem, in that a part of the resource is removed, but it is done with an understanding of the immediate impacts of the consumption, to ensure that a functional semi-natural ecosystem remains. Non-consumptive uses of ecosystems include the enjoyment of landscapes and nature, watershed and water quality protection, pollination and carbon sequestration.

Public benefits, such as wildlife habitat management, landscape and water quality often contribute to a benefit that is beyond the scale of the particular forest (such as bird populations). They are also frequently experienced from outside the forest boundary (such as landscape) or may be outside the economic market available to the woodland owner (such as local tourism income). Where the costs and values of all or part of these benefits are not included in traditional accounting of economic costs and benefits, they are termed externalities. Because economic tools only work on elements internal to the economic system, numerous strategies have been proposed to bring externalities into account.

2.3 The concept of Ecosystem Services

Aesthetics, recreation, habitats, wildlife, timber and other produce are generally held to be the tangible or popularly recognised intangible outputs of sustainable forest management. The concept of ecosystem services recognises that all such benefits are derived from deeper and larger interconnected natural processes i.e. ecosystems. **'Ecosystem services' is a generic term**

¹ Daily, 1997, McKenzie et al., 2004, Carroll et al., 2008

² World Institute for Conservation and Environment, <http://www.ecosystems.ws/index.htm>

that has arisen to describe the relationship that exists whenever a natural resource or process is expressed in terms of the benefits it provides for humans.

The ecosystem services concept therefore encompasses not only the immediate outputs and contributions to quality of life that most people experience first hand as benefits but also the biotic and abiotic processes that form and maintain the ecosystems that create the resource in the first place. Many definitions of ecosystem services are used, arising mainly because of different methodologies for classifying the services³. Moreover, many of the benefits are difficult to define as true 'goods' or true 'services', and often the economic definitions of goods and services exclude cultural benefits. The most widely used depiction of how ecosystem services support human well-being is that proposed by the Millennium Ecosystem Assessment (MEA, 2005)⁴.

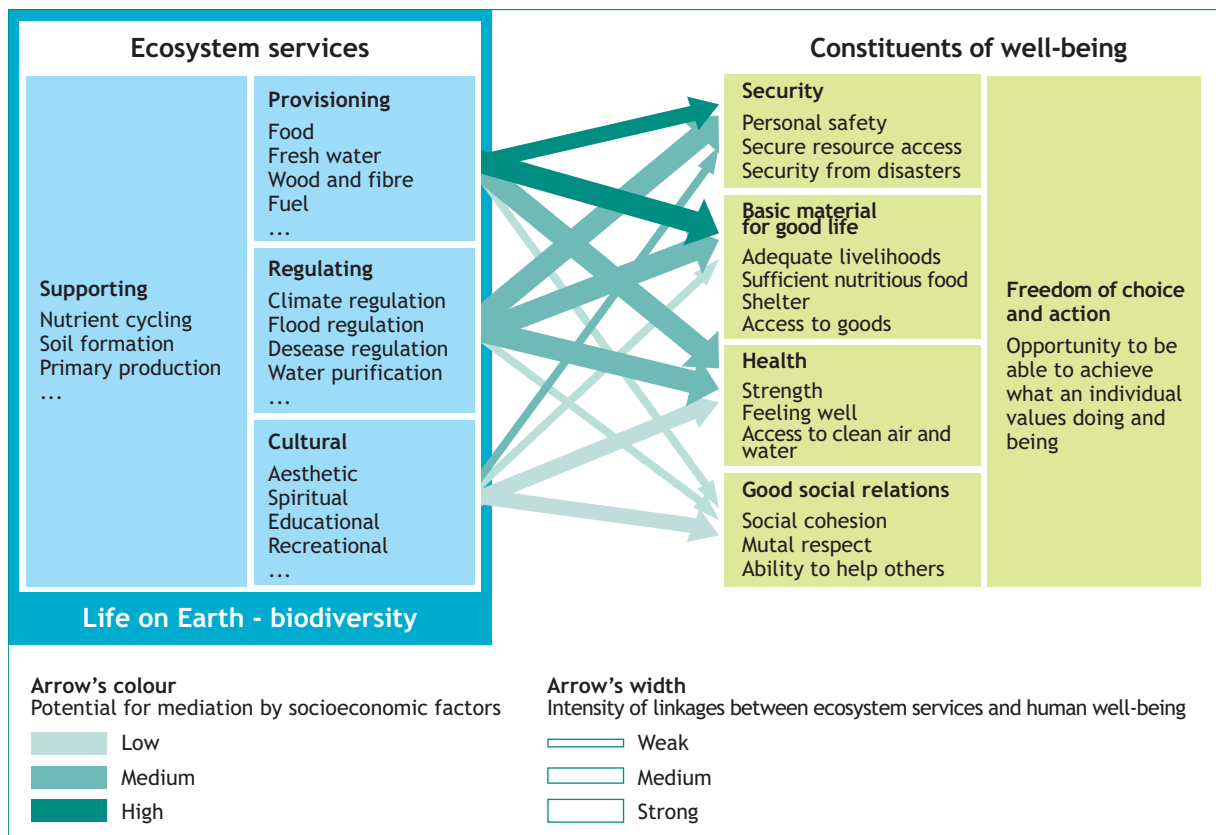
³ Brown and others 2007; Kline 2006; Patterson and Coelho 2009
⁴ <http://www.maweb.org>

2.4 The Millennium Ecosystem Assessment

In 2000, the United Nations called for a study to evaluate the status of the world's ecosystems and the services they provide. The MEA defined an ecosystem "as a dynamic complex of plant, animal, and micro-organism communities and the non-living environment interacting as a functional unit". The MEA model for all ecosystems includes both tangible and intangible services, from both natural and semi-natural ecosystems (see Figure 1) and the model also shows how the constituents of human well-being rely upon the ecosystem services. The inclusive nature of the model and the explicit links to well-being suggest this is a good basis for consideration of European forests in terms of ecosystem service delivery and opportunity.

The MEA model can be re-arranged around the role of forests (Figure 2). From the forest viewpoint we can look upwards on a broader scale to the bigger ecosystems that forests are part of and contribute to, and we

Fig 1: The MEA model of Ecosystem Services (Source: Millennium Ecosystem Assessment)



can also look down at a finer scale and consider the services which are largely the consequences of human interaction with the forest itself, delivered more locally and more directly to forest users.

This dual aspect of a forest's contribution to ecosystem services appears to be an important consideration as both are valid directions for forest policies in Europe. However the approach and means for the delivery, and the mix of ecosystem services delivered can be very different depending on the country context and objectives of forest management. **This ability to integrate and mix different ecosystem services with different emphases on particular services as required, is a key strength of multi-purpose forests to provide a tailored response to human needs, locally, nationally and globally.**

2.5 The TEEB Study

The Economics of Ecosystems and Biodiversity (TEEB) Study came out of the meeting of the environment Ministers of the G8+5 countries in Potsdam in 1997. The Study assembled knowledge on the economic

impact of biodiversity loss, and organised the results for different audiences. The reports can be accessed on the TEEB website⁵. The Study assessed the costs of declining biodiversity and ecosystem services and compared them to the costs of effective conservation and sustainable use. The Study concluded that a "business as usual" scenario would lose ecosystem services valued at trillions of dollars, and effectively squander future generations' heritage. **These report findings supported and articulated the economics-based case for the conservation of ecosystems and biodiversity in quantified terms, and with case studies from around the globe - many of them forest ecosystems.**

The **TEEB Report for Local and Regional Policy Makers** and the **TEEB Report for Business** provide useful reference points for EUSTAFOR members as they outline the value of nature for local well-being and regional development. Maintaining and enhancing functioning natural systems are often the most robust and cost-effective solutions for local economy, food and energy security, and environmental sustainability, but these systems are often the first to degrade because their benefits are often unaccounted in traditional cost-benefit analysis.

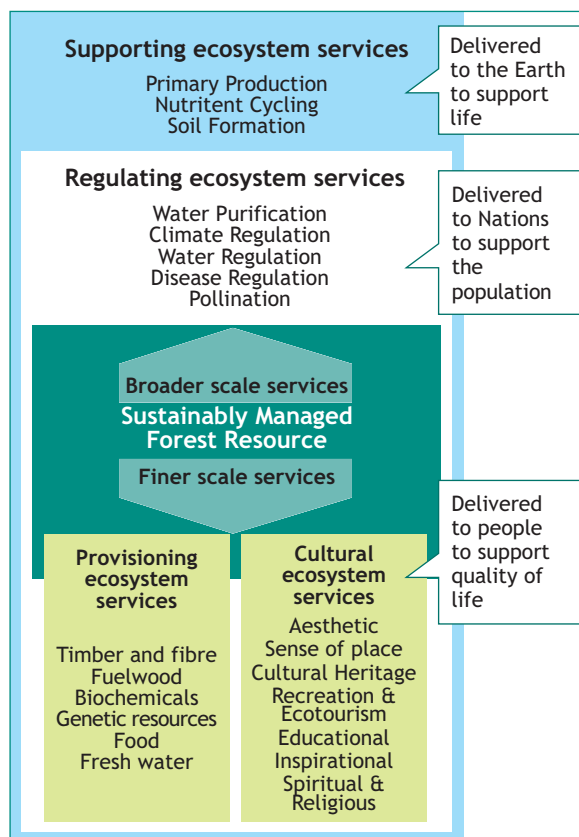
The **TEEB report for business** clarified some of the consequences that rapid loss of biodiversity and ecosystem services might have on companies. It concluded that to maintain economic growth into the future, the impoverishment of biodiversity must be stopped and developers must start to compensate for the negative impact their business have on biodiversity and ecosystem services.

The Study recommended best practices and toolkits for incorporating natural values into political decision making, transparency in accounting and the equitable distribution of benefits. **These are of very high importance to EUSTAFOR members as the European Commission aims to integrate the outputs of the TEEB study into its policies and strategies on agriculture, fisheries and biodiversity.**

2.6 The issue for modern forest management

The MEA and the TEEB Study have highlighted the importance of healthy ecosystems to meet society's growing demands but also the issue of continuing

Fig 2: MEA Model centred on the role of forests



⁵ <http://www.teebweb.org/InformationMaterial/TEEBReports/tabid/1278/Default.aspx>

reductions in the quality and quantity of natural resources to deliver them. This and the potential further demands arising from climate change impacts have increased pressure on the remaining natural land cover types to deliver more and more.

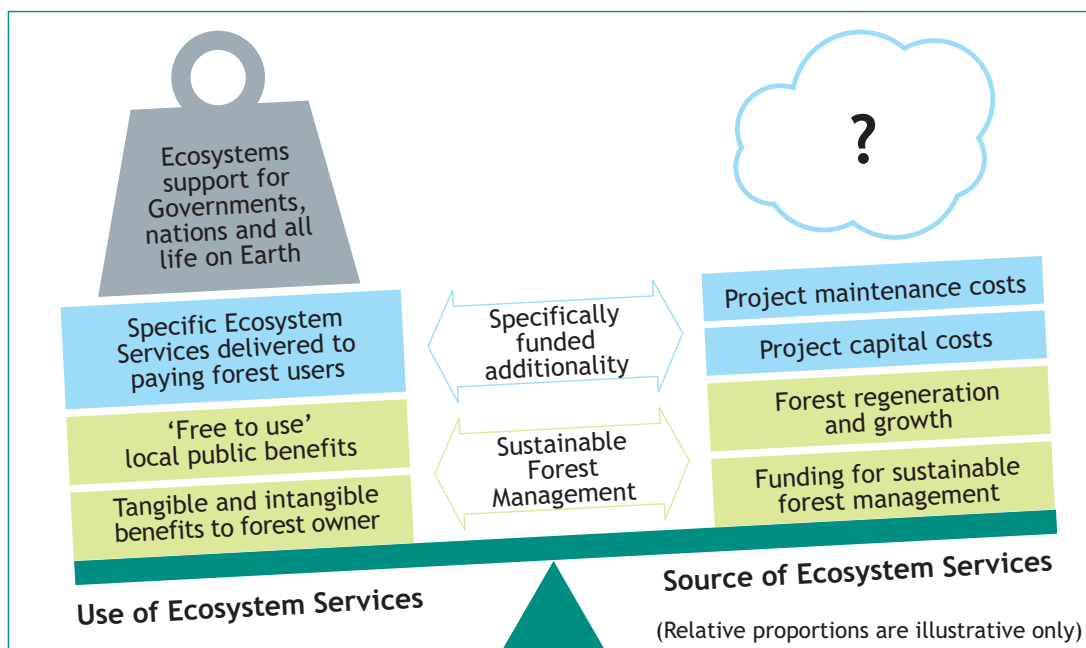
European state forests however are robust, multi-functional assets uniquely positioned to take a major role in increasing public well-being into the future. The sustainable forest management model of balancing economic, social and environmental values aims to prevent a diminution of the natural capital and therefore maintains the potential for ecosystem service delivery from a forest area. However, this is unlikely to increase or expand that potential to meet rising demand, unless additional input (e.g. toolkits, incentive systems, policy) is provided (Figure 3).

While many ecosystem services arise naturally from forests, they can be far better maintained, protected, or enhanced through active management, either through additional specific project work, or by choosing different sustainable forest management practices. Figure 3 illustrates the issue facing managed European forests. The overall demand for services is increasing because they are being lost through changes elsewhere, but as yet the willingness or desire to pay for the work to

secure the additional ecosystem services is not being offered. This is because the less-tangible ecosystem services are often able to be consumed by many people simultaneously, without limit, and without payment. There is little comprehension of the costs of providing those goods and services, nor is there a precedent or a designated responsibility for paying for them. As a result there is no market-based incentive to support the necessary management activity.

Making the case for active management in order to contribute more to these ecosystem services can be very difficult however, because the public benefits associated with many highly valued services are often not formally accounted for in forest management costs or project-level planning and analysis. The TEEB studies repeatedly demonstrate that maintaining or restoring natural systems is often far more cost effective than creating those goods or services via man-made processes. The differences are often only seen when the full life-cycle costs are accounted for. Ultimately the answer to the new balance lies with society, and EUSTAFOR members need to adopt new techniques to describe the accounting, as well as be innovative in offering products and services. Each of these factors will help determine what society wants to pay for.

Fig 3: Balancing ecosystem service delivery from forests



3. Legislative context and funding opportunities

There is an increasing focus on the importance and the economic value of ecosystem services in the world and in the EU and the European Commission is currently working on integrating the important TEEB Study findings into existing EU policies such as the Common Agricultural Policy (CAP), the Common Fisheries Policy, and the Biodiversity Strategy.

Within the EU, structures that support the delivery of ecosystem services seem to be developing.

There are currently few possibilities for payments for ecosystem services within the EU. However, the European Commission considers it essential to introduce new tools, including market-based mechanisms, to halt further decline of ecosystem services. For the forestry sector, which lacks a common policy at EU level, ecosystem approaches will be integrated into a number of EU policies relevant to forests and forestry, such as the Rural Development Regulation and the Birds and Habitat Directives.

Many market based approaches have been applied successfully in the United States, where federal and state laws support such markets to an estimated annual value of several hundred million USD. The most relevant policies and instruments for European state forest owners in regard to ecosystem services are covered below.

The **Rural Development Regulation (RDR)** (EC)1698/2005) under the CAP has most importance to EU forests and forestry. Not all measures are open to State Forests but there is good scope for State Aid (Community guidelines (2006/C 319/01; Chapter VII) for activities which are “directly contributing to maintaining or restoring ecological, protective, and recreational functions of forests, biodiversity, and healthy forest ecosystems”. Changes to this Regulation, and any associated Implementing Regulations, after 2013, may offer more direct support to ecosystem services. The European Parliament is discussing how to make “public bodies” eligible for forestry funding measures in Pillar 2. This may be a significant opportunity for state forest organisations.



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The **EU Forest Action Plan** (COM (2006)302), is a framework for coordinating forest-related policies and actions during 2007-2013 at EU and Member State level. The Action Plan has four main objectives; 1) to improve long-term competitiveness, 2) to improve and protect the environment 3) to contribute to the quality of life, and to 4) foster coordination and communication. Regarding ecosystem services, it promotes actions to “maintain and appropriately enhance biodiversity, carbon sequestration, integrity, health and resilience of forest ecosystems at multiple geographical scales”, and actions that “contribute to the quality of life, in terms of preserving and enhancing the social and cultural dimensions of forests”.

Carbon cycle services

To reach the target of the Kyoto protocol to limit the global warming to 2° C above pre-industrial levels, the EU requires member countries to reduce their emission by 20% by 2020 compared to 1990 levels, or by 30% reductions if other countries outside EU make similar efforts. The 2005 EU Emissions Trading System (ETS) does not include the land use, land use change and forestry sectors (LULUCF). The European Commission is currently assessing the role of LULUCF in EU climate policy, and will issue a Communication in June 2011. There is strong support for including LULUCF within the commitments to reduce greenhouse gas emissions (406/2009/EC) or under a separate structure; but is not likely to be included in the ETS.

The Kyoto protocol for 2007-2012, permits state forests to sell credits from afforestation and reforestation projects, and from improved forest management under the 'Joint Implementation' mechanism. These credits are excluded from the ETS and as yet it is unknown if Joint Implementation projects will be possible after 2012. National governments may well be potential buyers of carbon credits from forestry projects but there is no developed mechanism to link national carbon targets with the accomplishments of forest owners. Supporting the development of such schemes could be a priority for EUSTAFOR members.

The **Biomass Action Plan**(COM (2005)628) secures supplies for sustainable energy production to reduce oil dependency in Europe. It aims to use market-based incentives and to remove barriers to market development. It supports activities like the development of renewable, alternative energy sources and energy crops from forestry and agriculture.

Funding measures are mainly under the RDR for developing new technologies and products, and for cooperation between forest landowners, the industry, and other parties. The European Regional Development Fund has also funded similar activities; Forestry Commission Scotland received nearly EUR 350,000 for biomass development, to empower rural enterprises and help them meet the demands of the energy industry.

Biodiversity & habitat

In March 2010 the European Council agreed a 2050 biodiversity vision, and a 2020 target to "halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as

feasible, while stepping up the EU contribution to averting global biodiversity loss".

A **post-2010 Biodiversity Strategy** is now in preparation to include the decisions of the COP 10 meeting in Nagoya. The Nagoya agreement states that ecosystem services shall be protected and restored, that their resilience shall be improved, and that the economic value of ecosystem services shall be visualised in each country's gross domestic product (GDP). When the new Biodiversity Strategy is finalised, the European Commission will work on adjusting the funding programmes for the post 2013 period. New market-based instruments for biodiversity are under discussion.

The **Birds Directive** (2009/147/EC) and **Habitats Directive** (1992/43/EEC) are the most important tools for protecting biodiversity and habitats in the EU, and together protect more than a thousand species and 200 habitat types mostly in Natura 2000 sites, which cover 18% of EU land area. The Birds and Habitats Directives require compensation for damage or destruction to valuable habitats, so they have the potential to support future markets for biodiversity and habitat offsetting, and are to some degree already doing this.

Through the **Environment Liability Directive** (2004/35/EC) those responsible for contaminating land, harming protected species or habitats, or breaching water management legislation, are liable for the costs of restoration under the "polluter pays principle". The Habitats Directive requires those responsible for 'permitted' damage to NATURA 2000 sites to take compensatory measures to ensure that the overall coherence of network is protected.

This enables necessary development by offsetting environmental damage to protected areas but it is not enough in itself to halt biodiversity loss or sustain ecosystem services so pro-active, market-based action like habitat or biodiversity banking is needed. The 'banking' process creates a fund to pay for environmental projects, by selling 'credits' to projects that damage the environment, such as new roads or housing.

The Directives provide a starting point for setting up future habitat and species banking as it is possible to use EU legislation to require the compensation, even though that requirement can only be applied to strictly protected sites within the NATURA network. The implementation of Habitat and biodiversity banking therefore, and the market potential in EU member states is currently low. Habitat banking, and the subsequent trade

in credits, could however be expanded to other habitats and species with additional legislation, and open up a much larger market potential.

For EUSTAFOR members, the main EU funding opportunities for biodiversity and habitat projects are found in the LIFE+ programme. Mälaren Inner Archipelago (Sweden) is a good example of a LIFE+ nature project to restore old grazing land and deciduous forest, to promote recreation.

A developing policy area is **Green Infrastructure**, which aims to reduce landscape fragmentation, increase ecosystem resilience, protect biodiversity and help it adapt to climate change. As an example, Life+ could be used to fund biodiversity offset actions that create corridors between NATURA 2000 sites.

Water services

The **Water Framework Directive** (2000/60/EC) requires Member States to achieve a good level of management of water quality and quantity by 2015. Implementation is still in its early stages and Member States are now identifying and analysing the status of the water bodies and adopting management plans. The European Commission is currently looking at payment mechanisms and market-based tools as one way of achieving the targets. Article 9.1 includes the “polluter pays principle” and implies that the costs of dealing with reduced water quality should be borne by those using (or polluting) the water. This raises the possibility for commercial water suppliers to pay landowners for the quantity and quality of water they use to reduce the costs of clean water supply to customers and also help dilute the used or polluted water to reduce further cleaning costs. There is a good example of this working in Lower Saxony, and commercial water abstraction examples in France and Poland.

Protective Services

The Rural Development Regulation includes funding for the restoration of forests damaged by natural disasters, for preventative action including climate change mitigation, and for the use of advisory services to promote action and assist forest owners to manage sustainably.

The European Commission consulted, via a Green Paper, on forest protection and climate change (COM (2010)66) in 2010. The paper assesses how climate change influences the terms of forest management and protection, and suggests how the contribution of forests could be enhanced.

Quality of Life Services

The RDR provides for the multifunctional use of forest, such as infrastructure for visitors like roads, signposts and information, on condition that the forests and facilities are free to recreational visitors. Initiatives to strengthen and develop tourism, culture and leisure activities are supported by the European Regional Development Fund.

Future prospects

Without new EU payment mechanisms for ecosystem services, real opportunities for EUSTAFOR members to get remuneration from EU funds for ecosystem services are limited and probably restricted to tourism and recreation activities and commercial activity in timber and non-timber markets. In the near future there may be some opportunities in habitat banking.

Funding opportunities for State Forest owners for ecosystem service activities in the current programming period (2007-2013) include:

- The Rural Development Fund currently has a low uptake, which means that applications made before 2013 have a good chance of being successful.
- LIFE+ funds for biodiversity projects include pilot projects for habitat banking, green infrastructure, and carbon storage. The next application deadline is 18 July 2011, for projects starting after May 2012.

Regional funds also offer some funding opportunities, especially for projects that benefit businesses in the local region, including forestry and tourism activities, but the opportunities for State Forests varies between regions and have to be sought out in each individual region.

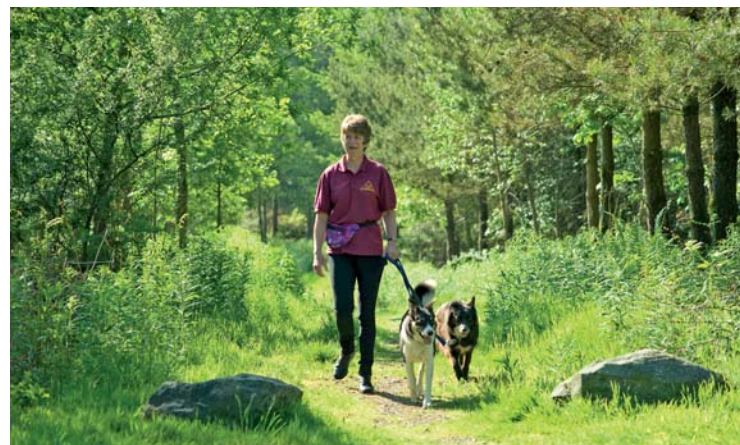


Photo: Forestry Commission

EU Funding instruments for Ecosystem Service Projects available for European State Forests in the period of 2007-2013

Funding measures	Purpose/objectives	Scope of use (relevant to ecosystem services)
Council Regulation 1698/2005. Support for rural development by the European Agricultural Fund for Rural Development¹		
Art 20a (iv)	Use of advisory services	Use of advisory services to improve the overall performance of the forest land or for implementing ecosystem services in overall forest management
Art 20a (v)	Establishment of advisory services	Setting up advisory services for ecosystem services
Art 20b (iv)	Co-operation for development of new products, processes and technologies	Co-operation between forest land owners, the processing industry and/or third parties for developing new technology or equipment
Art 20b (v)	Infrastructure	Development or improvement of infrastructure related to access to forest land, land consolidation, energy supply and water management. E.g erosion or bark beetle control, and bioenergy distribution.
Art 36b (i)	First afforestation of agricultural land	Establishment of afforestation projects, including afforestation for erosion control or climate mitigation
Art 36b (iii)	First afforestation of non-agricultural land	Establishment of afforestation projects, including afforestation for erosion control or climate mitigation
Art 36b (vi)	Restoring forestry potential and introducing prevention actions	Restoring forestry potential in forests damaged by natural disturbance, or for introducing appropriate prevention actions, e.g. against fires
Art 36b (vii)	Non-productive investments	Investments that 1) link to 36b (vi), or 2) enhance the public recreational value of forest and wooded land
Art 52a (iii)	Encouragement of tourism activities	Infrastructure like information centres, sign posts and access to natural areas, and also marketing of tourism services
LIFE+		
	Fund for supporting environmental and nature conservation projects (pilot studies & demonstration projects)	Restoration and prevention projects for habitats or species under "LIFE+ Nature and Biodiversity", including e.g. prevention of natural hazards and prevention/control measures for alien species. Information and awareness raising campaigns for nature protection and biodiversity issues under "LIFE+ Information and Communication".
Regional policy funds²		
European Regional Development Fund	Sustainable rural development. Strengthen economic and social cohesion in the European Union by correcting imbalances between its regions	Improving the environment, the competitiveness of forestry and agriculture, the quality of life and the management of economic activity in rural areas.
Cohesion Fund ³	Convergence of the least developed Member States	Reforestation, erosion control and nature conservation measures, protection and management of natural and cultural resources, supporting efforts to adapt to climate change, and development of tourism in rural areas.

Support	Ecosystem service	Forest Biomass/ Products	Water Quality	Bio-diversity & habitat	Climate Mitigation	Protective Services	Quality of Life Services
80% of costs, maximum 1500 EUR		●	●	●	●	●	●
Costs arising from setting up the service, and decreases over a maximum of five years		●	●	●	●	●	●
Covers the costs of the cooperation		●	●	●	●	●	
Covers cost of operations related to infrastructure		●		●	●	●	●
No fixed budget - decided by Member States, up to 80% of establishment costs		●	●	●	●	●	●
No fixed budget - decided by Member States, up to 80% of establishment costs		●	●	●	●	●	●
No fixed budget - decided by Member States		●	●	●	●	●	
No fixed budget - decided by Member States			●	●	●	●	●
No fixed budget - decided by Member States							●
Maximum 50 % of the total costs, or maximum 75 % for LIFE+ Nature proposals on actions regarding priority species or habitat types of the Birds and Habitats Directives		●	●	●	●	●	
No fixed budget - decided by Member States		●	●	●	●	●	●
Up to 85 % of eligible expenditure		●	●	●	●	●	●

¹ The following funding instruments, which are available only for private forest owners or municipalities, are not included in the table: 20b (ii) Improving the economic value of forest, 20b (iii) Adding value to agroforestry products, 36b (ii) first establishment of agroforestry systems on agricultural land, 36b (iv) Natura 2000 payments, 36b (v) forest-environment payments

² Includes regions within countries, and cross-border and transnational cooperations. The extent of support to State forests and forestry measures are decided by individual regions.

³ Eligible countries: Spain, Greece, Portugal, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia

4. The Ecosystem Services Approach



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4.1 Advantages

Experiences from State and National Forest researchers around the world offer many opportunities to collaborate and learn about the ecosystem service approach, and help identify emerging European market opportunities across the broad range of ecosystem services and policy contexts relevant to EUSTAFOR members. For state forest management organisations (SFMOs) the more specific accounting and valuation of a broader suite of ecosystem services can lead to more diverse funding sources to support their provision. An ecosystem service approach can include:

- describing the range of services provided by the forest;
- examining the potential tradeoffs between services associated with management activities;
- using the ecosystem services concept to facilitate partnerships with stakeholders who might benefit from, and help pay for, particular services that the forest provides.

Considering ecosystem services in the planning of forest management activities ensures that the immediate public benefits from the site, and their relevance and contributions to the larger picture can be described. Similarly, it offers the potential for a more extensive accounting of the costs and benefits of different management strategies. An ecosystem services approach would therefore rely on a mix of traditional performance measures, and new ones for services that are important to society, based on the management targets from the activity site itself, in conjunction with other measurable outcomes and influences experienced in the wider forest area.

The ecosystem services concept, as a framework for forest management, is potentially useful to EUSTAFOR members in five main ways. The first four points on the following list are largely adapted from the US Forest Service's PNW Station Working Group on Ecosystem Services.⁶

⁶ Smith et al, 2011

1. Describing the value of European state forests.

This is particularly important as costs rise and timber production priorities and revenues decline. Defining ecosystem service values meets EUSTAFOR's need to 'market' the products of state forest management, as a rationale for continued public funding of a state forest system. Values need not always be expressed financially. Evaluating and describing the broader set of benefits quantitatively and qualitatively within a clear ecosystem services structure will help to improve wider understanding of what well-funded state forests provide.

2. Characterising and evaluating trade-offs between different values, functions, goods and services.

Different forest management activities (e.g. timber, biomass, roading, recreation, riparian enhancement) affect ecosystem services in different ways and new tools are needed to describe and evaluate the benefits that result. An ecosystem services approach can help in this by;

- Offering a more complete account of the range of values that the forest provides;
- Providing a better analysis of the relationships between multiple values;
- Identifying the benefits of management activities that are relevant to particular stakeholders.

3. Identifying ecosystem service decline and providing a wide range of potential mitigating or restorative options.

Informed changes to forest policy, actions and techniques can redress declines. Planning and education can address potential over-consumption when demand for ecosystem services becomes concentrated or increases.

4. Providing a basis for consultation and collaboration with stakeholders by defining common objectives for forest stewardship.

By clearly describing benefits, the ecosystem services approach offers a common language for forest owners and interest groups to share management objectives.

5. Supporting the emergence of markets, productisation⁷, and payments for ecosystem services.

Many forest benefits such as freshwater production, protection of topsoil, carbon sequestration, and preservation of biological and genetic diversity, as well as traditional commodities and services, such as timber, grazing, recreation and aesthetic beauty, cultural and educational benefits, can be supported through various mechanisms, which transfer payments to the lands producing those services.

⁷ 'Productisation' is the process of defining and marketing the desirable tangible features of an intangible service, for example selling pictures of the best local forest landscapes.

4.2 Payments for Ecosystem Services

State forests in Europe have a rich and robust history of providing ecosystem services but for most, the approach (in concept, terminology, and toolkit) is relatively new. EUSTAFOR can broaden the options available for funding ecosystem services provision, by examining successes and challenges in contexts (such as the United States) where management mechanisms may be more market reliant. The study on the Development and Marketing of Non-Market Forest Products and Services (EC DG Agri, 2008) gives an excellent overview of this subject.

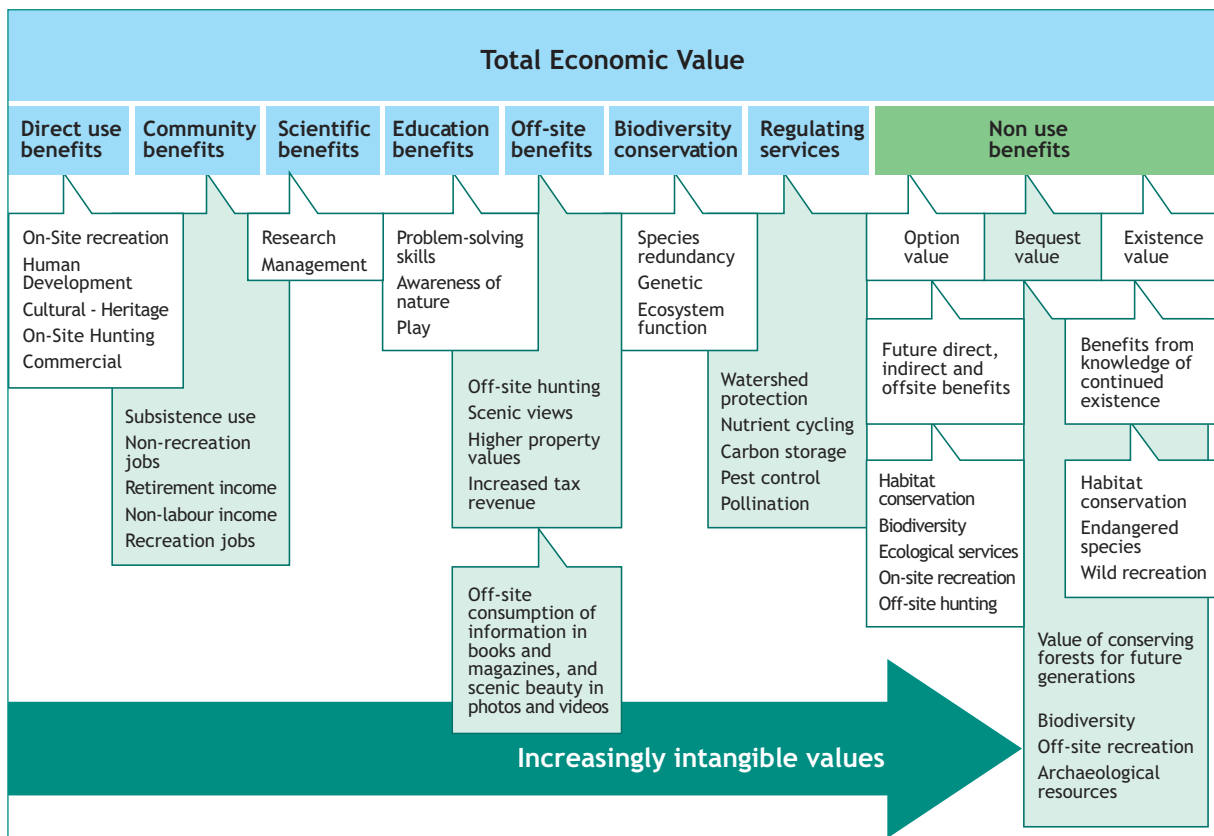
Valuing the Services

European state forests provide valuable ecosystem services with a range of characteristics - in terms of access, private and collective use, as illustrated in Table 1 (next page). Markets deal most efficiently with private goods where access can be limited to those who pay for them, and productising the features of a service can achieve this (bottom right, Table 1). However, public institutions remain very important deliverers of those services that are provided as public goods. State forests can therefore seek to present the 'product' characteristics of these, in innovative ways, so that markets and other institutions can take them up too and contribute effectively to their overall provision. Accounting for the high value of services produced can also provide the incentive for reinvestment (upper left, Table 1).

Table 1: The Public/Private nature of goods⁸

	Low Rivalry (Collective consumption)	High Rivalry (Private consumption)
Difficult to Exclude (Unlimited Access)	Public Goods Scenic views, Biodiversity Clean air, Carbon sequestration	Common Goods Fresh water, Fish stocks
Easier to Exclude (Limited Access)	Club Goods Private parks, car parks Recreation areas, Ski areas	Private Goods Timber, Food, Non-wood products

Fig 4: The components of the total economic value of a forest.
(Adapted from Morton, 1999)



Many methods are used to assign a monetary value to the benefits of forests ecosystems. One has been used more than most for forest ecosystem services – the Total Economic Value (see figure 4). This method

is inclusive, like the MEA model and is suited to the many ecosystem services provided by forests. **It clearly shows that the particularly important areas for forests, like biodiversity, carbon, and water are towards the less tangible end of the suite of direct-use benefits.**

⁸ Adapted from Study on the Development and Marketing of Non-Market Forest Products and Services (DG Agri, 2008 and Randall, A. 1993.)

Within the EU, the range of economically valued non-market forest goods and services is very limited. Transfer of results from studies elsewhere is feasible but a similar context and compatibility is very important, and value is rarely reflected in price which may explain why non-market forest goods and services have generally been low priorities for forest owners⁹.

Forms of payment for ecosystem services

A key concept in successful mechanisms for Payments for Ecosystem Services (PES), and one which is often overlooked, is *additionality*. Additionality is the extent to which the action, market, and payment increase the provision of the ecosystem services above and beyond that which would have been provided under the 'business as usual' scenario. Therefore, a successful PES program relies on reliable and quantified information about the baseline situation; information that SFMOs are in a good position to provide. Baseline information may include estimates of current areas receiving specific land management treatment, quantified land cover and species assessments, landscape assessments (qualitative or quantitative), water quality assessments, or other indicators of biological diversity, and the ecosystem service flows expected over time.

PES systems are becoming more widespread, and have been championed in many Latin American countries facing deforestation, such as Costa Rica where many payment systems were pioneered. The approach is particularly politically palatable in the US. Most recently, The TEEB Study cited PES, at a global scale, to be an important mechanism to drive private sector investment.

One definition of PES is a **voluntary transaction** where a **well-defined ecosystem service** (or a land-use likely to secure that service) is being bought by at least one **ecosystem service buyer**, from at least one **ecosystem service provider**, on the **condition** that the services are actually provided.¹⁰

This suggests that SFMOs should not look for simple broad payments for unspecific service provision but must focus on identifying potential 'buyers' from all sectors then explaining specific services and the potential options or consequences of not having them so people

can choose what they want. SFMOs must then commit to delivery of the chosen services for an agreed price, paid on results. This generally suits a contracted partnership approach.

A number of tools can be used to shift the balance sheet of how ecosystem service values are perceived, and accounted for in payments and decision making. When a payment for ecosystem service scheme includes the creation of the market, numerous forms might apply, for example:

Direct Public

Public funds pay the provider of a public good (e.g. local government pays a private forest owner for nature conservation objectives).

Direct Private

A private business or person pays for a specific good or service (e.g. a hunter pays a forest owner for the right to hunt in the forest).

Tax Incentives

Tax credits, or rebates (e.g. a tax credit is awarded to the provider of agreed soil stabilisation measures on a landscape prone to erosion).

Cap and Trade

Policy or legislation sets limits on the total use of an ecosystem service and quotas or credits are traded (e.g. the tradable permits and credits for businesses that affect the water temperature of the Willamette River in Oregon).

Voluntary Markets

A product has a price premium because it is marketed and trusted to have positive impacts on the targeted outcome (e.g. a chocolate bar donates a portion of its revenue to subsidise rainforest friendly chocolate). The arrangement is not necessarily certified and is not mandatory.

Certification Programme

A product has a price premium because it has been certified to have positive impacts on the targeted outcome (e.g. FSC or PEFC certified timber).

⁹ Study on the Development and Marketing of Non-Market Forest Products and Services (DG Agri, 2008)

¹⁰ Adapted from Wunder, 2005

4.3 NEWFOREX – New ways to value and market forest externalities¹¹



Irina Prokofieva
Head of Forest Economics Area, Forest Sciences Centre of Catalonia

NEWFOREX is a four-year research project (2009-2013), funded by the European Commission under the 7th Framework Programme for Research and Technological Development. The project is coordinated by Prof. Bo Jellesmark Thorsen from the University of Copenhagen, other partner institutions are Center for International Forest Research (CIFOR), Forest Sciences Center of Catalonia (CTFC), European Forest Institute (EFI), French National Institute for Agricultural Research (INRA), Finnish Forest Research Institute (METLA), University of Hamburg, University of Padova, University of Warsaw, European State Forests Association (EUSTAFOR) and Confederation of European Forest Owners (CEPF).

Forests provide multiple goods and services of tremendous value to society. In recent decades the research community has put a lot of effort into quantifying the monetary value of the benefits that humans derive from forest goods and services, yet the existing methods for assessing their value do not take into account the simultaneous production of several benefits or the trans-boundary issues. Also there is still no detailed understanding of who actually benefits.

There is a significant potential for increasing the welfare of society, if market-based methods to enhance the provision of forest goods and services can be developed.

These must also be adaptable to the varying characteristics of forests, their capacity to provide the goods and services, the forest owners' objectives, and the socio-economic contexts of the area.

The NEWFOREX project seeks to accomplish the following objectives:

1. To provide new methods for valuing forest externalities that enable to handle joint produced externalities in an integrated way. Specific attention will be given to the question: Who benefits from the provision of externalities?
2. To develop a methodology for assessing the cost of providing externalities. This approach will account for the costs of the trans-boundary effects of forest management, as well as the transaction and opportunity costs of selling/buying these externalities.
3. To assess several market-based methods for enhancing the provision of forest externalities, like payment schemes, certification, or (re-)definition of property rights. The project will also develop a methodology to help select and design the most appropriate market-based mechanism, by taking into account the type of externality, the values, the cost of provision, and the relevant stakeholders.

These efforts are undertaken across a set of regional case studies in Europe targeting four key externalities: carbon sequestration, biodiversity protection, watershed services, and recreation. The project aims to extend the state-of-the-art theory and methods with new empirical insights. The gains in knowledge are communicated using seminars, popular articles, guidelines, and best practice examples from across Europe. An easy-access guiding tool for analysts, policy-makers, and decision-makers will be compiled and widely distributed.

Financing the provision of goods and services from state forests

Considering that nearly half of European forests (excluding Russian Federation) are public¹², their role in the provision of valuable forest goods and services cannot be ignored. For the managers of public forests, the issue is to capture part of this value through various mechanisms to direct financial flows to the lands producing these goods and services. Identifying the beneficiaries is key as it is among these people that

¹¹ Many forest goods and services have values to people other than the forest owners. Where that value is received outside of the forest economy, it is termed an 'externality'.

¹² MCPFE, 2007. State of Europe's forests 2007: The MCPFE report on sustainable forest management in Europe. Ministerial Conference on the Protection of Forests in Europe, Warsaw.

“buyers” of the goods and service are likely to be found. Exploiting the strong demand for certain goods and services (such as recreation) can bring significant revenues for the management of public forests.

The revenue-generation potential of a particular forest good or service essentially depends on its type, the potential demand for it, its value, and the ease of implementing a financing mechanism. For example, an important part of the biodiversity value can be generated through recreational services (e.g. camp sites) or extractive activities (e.g. hunting, fishing, gathering permits for non-wood forest products or even bio-prospecting rights). Revenue in this case is generated from user-fees for access to the forests, hunting or fishing licenses, or forest mushroom picking permits. Innovative marketing solutions can be applied to increase the value of these goods to the buyers and thus increase the revenue for the forest owners or managers (e.g. adventure parks). Experience shows that revenue can be further increased by bundling different forest goods and services, or linking them to recreational services in order to market a complete recreational experience (e.g. nature tourism, guided tours).

In Italy, for example, community-owned forests in the Northern Apennines have introduced a system of mushroom picking permits (“Fungo di Borgotaro” system)¹³, which allows them to re-invest part of the revenue from permits into forest improvement plans, control actions and public information. Similar schemes exist on municipal forest lands in some regions of Spain. It is important to note that this type of mechanism relies on existing legal regulations restricting the access to forests and/or limiting the scope of extractive activities. Therefore this is not transferable to countries where public access to forests and/or non-wood forest products is free or is at least culturally acceptable within reasonable limits.

There are also other types of payments relying on a private-sector demand for biodiversity or forest conservation. Such demand can stem from the altruistic motives of environmentally conscious individuals or companies, or can be created based on legal requirements for biodiversity protection. Biodiversity offsets are a good

example of that (see section 4.4). In addition, forest biodiversity conservation can be sponsored by businesses or charities to attract valuable ‘green credentials’. Land stewardship, land sponsorship and ‘adoption’ initiatives of this sort can be found both on public and on private forests lands¹⁴. Moreover, in certain cases businesses can benefit from additional commercial revenues by influencing consumer choice through product marketing and eco-labeling schemes. FSC and PEFC certification of timber are examples of this. Novel approaches, such as auctioning the sponsorship rights for parcels of protected forest land can also be trialed on public forests lands.

In the case of water, demand from drinking water companies or from hydroelectric generators (both public and private) could be exploited to obtain extra funds for forest management activities (see section 4.5).



Photo: Forestry Commission

¹³ <http://www.fungodiborgotaro.com> and Prokofieva I., Gorriz E., Vedel S. et al., 2011. Report on the currently applied market-based methods in the case studies. Deliverable D4.1 of the NEWFOREX Project (FP7-243950), European Commission, 131 p. with annexes (137 p.).

¹⁴ Study on the Development and Marketing of Non-Market Forest Products and Services -FORVALUE (DG Agri, 2008) available at http://ec.europa.eu/agriculture/analysis/external/forest_products/index_en.htm and Prokofieva I., Gorriz E., Vedel S. et al., 2011. Report on the currently applied market-based methods in the case studies. Deliverable D4.1 of the NEWFOREX Project (FP7-243950), European Commission, 131 p. with annexes (137 p.).

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4.4 Biodiversity – the basis for all ecosystem services



Olof Johansson
Senior Vice President and Director of Environment & Sustainable Development, Sveaskog

Biodiversity is the basis of all ecosystem services, and although humans depend on them, many are taken for granted. Forestry, agriculture and fishing industries directly depend on healthy productive ecosystems but each component of an ecosystem is also necessary. Micro-organisms that can mobilise nutrients or help neutralise pollutants in soil and water, insect abundance and climate conditions for pollination, and the capacity of particular vegetation to regulate water levels and water quality are just some examples of services we depend on. Biodiversity and nature, as a source of enjoyment and recreation, are invaluable to many but there is also the ethical responsibility to preserve biodiversity for coming generations to experience, explore and utilise.

Markets for biodiversity offsets

There is a global trend to explore how markets for biodiversity could work to compensate for the negative impacts of development. Powerful incentives for such markets are corporate social responsibility, legislation, political goals and international agreements. Shortened approval processes for development projects would likely be another powerful driving force for developers to volunteer mitigation measures and there is also the generally increase of awareness among leading companies that sustainable use of ecosystem services and biodiversity could be vital to business and continued economic growth.

Markets for biodiversity offsets are not new phenomena. In the United States, biodiversity offset and compensation programs were initiated in the early 1970s, in

particular offset programs addressing wetlands, rivers and endangered species in connection to the Clean Water Act and the Endangered Species Act. Due to a longer history of programs for offsets, the US has the most advanced system for compensating for biodiversity losses. Although there are initiatives in some countries like the UK, France, and Sweden, few European countries have a strong national legislation for biodiversity compensation, and only Germany has a developed system in place. Biodiversity offsets can be individually designed but compensation funds and mitigation banking (such as the Natural Capital bank in France) are examples of collective efforts to reduce biodiversity losses through a market-based system.

Some voluntary initiatives have evolved during recent years. Of these, the Business and Biodiversity Offset Program (BBOP) is the most advanced, with developed principles, guidelines and handbooks for designing and implementing biodiversity offsets. BBOP is a programme of Forest Trends and is built around a partnership of companies, governments, conservation experts and financial institutions from around the world. The vision is that biodiversity offsets will become a standard part of business practice for companies that have a significant impact on biodiversity, and that no net loss will occur relative to development impacts. Some pilot projects have been conducted, mainly in the mining industry.

General principles for biodiversity offsets

Biodiversity is not easy to measure and unlike climate impact for example, there is no single currency to evaluate losses and gains of biodiversity. It is complicated to calculate any losses of biodiversity and ecological functions, and it is equally complicated to estimate the gains of biodiversity offsets, particularly as there is a time lag before the offset delivers its full ecological potential. A survey of existing initiatives on biodiversity offsets indicates agreement on at least some general principles:

Prevention and mitigation measures must be used first

Offsets are not an acceptable reason for allowing unnecessary harm to biodiversity. All reasonable measures to avoid and minimise negative impacts should be undertaken before considering offsets.

No net loss

A biodiversity offset should be designed and

implemented in a way that results in no net loss of biodiversity and preferably a net gain of biodiversity.

Like-for-like

Offsets should be located in areas that have the same or similar ecological characteristics and functions as the area affected by the development.

Thresholds of unavoidable loss

Compensation for some negative impacts on unique or very vulnerability biodiversity will not be possible. The limits (which may be zero loss) should be set out.

Additional conservation outcomes

Design will vary but compensation measures should result in an additional value, e.g. protection or restoration of habitats that would not have otherwise have taken place.



Photo: Forestry Commission

4.5 Clean drinking water – a valuable commodity



Christian Boele-Keimer
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In general, European forests represent large natural areas where rainfall is intercepted and absorbed into the ground to deliver long term clean ground water. In forests only a relatively small amount of water drains from the surface and this generally benefits the ground water and surface water levels, especially in times of heavy rainfall. It should be said that in drier areas on porous geology, some studies have shown that tree growth can reduce the ground water available for agricultural irrigation but in general, forest cover is beneficial to ground and surface water.

Forestry is a flexible and multi-purpose land use and has the ability to deliver water ecosystem services in a sustainable way. For instance, changing conifer stands to mixed or broadleaved trees improves the rainfall absorption of the area. Although sustainable forest management practices support benefits like clear water in streams and rivers, the silvicultural and forest composition changes needed to increase water outflow and further improve water quality will happen only if the objectives and economics of the silvicultural management also require it.

The case for forests

In areas with a low cover of forests, ground water protection is an essential target for this and future generations. The EU water framework directive shows that the problem is clearly recognised and forestry is an important factor in achieving its aims. Article 9(1) of the Directive requires that all the costs of water ecosystem services, including the environmental and resource

costs, are covered by those who use it, but currently Article 9 is not implemented fully. Commercial and domestic water users must pay for it to be treated, and supplied, and in some cases cleaned again after use. But water suppliers are not being required to pay forests for their role in collecting, regulating, filtering and cleaning rainfall in the first place.

SFMOs are businesses managing the state forests to deliver a range of other more tangible benefits, including long term profits to reduce costs as much as possible. If Article 9 was applied more widely to require water suppliers to pay towards cost of managing the land that provides their raw product, the potential movement of funds back to the forestry sector would be highly important (Merker, 2010).

The value of water is rising and the importance of water supply is rising too. In Lower Saxony in Northern Germany more than half of the water supply is done by private companies within a commercial environment. In this commercial context with paying end-users, the silvicultural practices in forests are effectively the advance treatment within the value chain of the production of drinking water. This is especially true if the silviculture is done at a cost to the forest owner as a necessary part of other forestry management, such as conversion from conifer to broadleaves for other policy reasons. For forestry, the main issue is not to pursue the financing of a public good by society, as happens with agriculture under the Common Agricultural Policy, but to seek to get an adequate reward for the provision of water that currently is not costed at all and is therefore free to the suppliers who then sell it to end users.

Payments for water ecosystem services in Lower Saxony

In Lower Saxony the discussion between forest companies and the private and municipal water suppliers about the role of forestry within the water supply chain has just started. The process is that the forest owner first determines the costs of the silvicultural changes or actions they will take. For example the cost of managing beech in areas close to the drinking water wells is 270 to 345 €/year/ha more than managing Douglas fir (German Forest Owner Association, 2001). The water supplier must also value the reduction in their costs for the reduced treatment of water coming from the forest catchments. This is around 0.08 €/m³ treated (Olsceweski, 1999). The valuations serve as a range for

subsequent negotiations and although at the moment payment contracts between forest owners and water suppliers are few, their numbers are rising.

The general problem encountered in this process is the very long period of forest growth and ground water movements. This makes it difficult for forest owners to demonstrate the beneficial impacts of different silvicultural practices on water quality and volume. This same issue makes it easier for water suppliers to deal only with agricultural land owners, where costs and benefits can be verified annually.

Priorities

One of the priorities for the forest sector therefore is to increase the perception of forestry as a partner for water suppliers, and additional research is required to support forestry's case in this.

Another priority is to promote the wider implementation of Article 9 of the Water Framework Directive and use this to facilitate partnership working between forest owners and water suppliers based on a contract of payment for water services.

Other examples

One example, that seems to be more and more popular, is the sponsoring of forest projects by beverage manufacturers capitalising on the water quality and the green credentials of forest ecosystems. In France and Poland there are now arrangements in place where businesses bottling drinking water are paying land managers (farmers and foresters) within the water catchment areas to maintain the water quality. In France the arrangement is for water quality and the beverage manufacturer pays farmers to reduce agricultural chemical inputs on the land above the aquifer. In Poland, beverage manufacturers can buy licences to extract clean freshwater from wells on State forest lands, which is then treated, bottled and sold.

A further example in Germany is the afforestation of farm land to reduce water treatment costs. In 1989 the NLF and Oldenburg-Ostfrisischer-water-association (OOWV), one of the largest drinking water suppliers in Lower Saxony, signed an agreement to secure higher water quality in the sparsely wooded Weser-Ems region. In this region, intensive agricultural use has led to an increasing input of nitrates creating higher drinking water treatment costs. Over 20 years OOWV has bought

1800 ha of agricultural land near the water abstraction wells and has assigned the land, free of charge, to NLF to manage. NLF has afforested more than 1500 ha of the land, mainly with oak and beech and the new forests have not only improved the character of the landscape, local biodiversity and recreation opportunities but have also had a significant positive effect on the water quality. Purchasing the land has been the biggest barrier to the initiative, and some purchases received part public funding. Much of the afforestation was funded by private development seeking nature compensation for construction projects.

European State forests and public forests already protect large areas of water catchments so in this respect they have a major role to play and a huge value to our societies' future.



Photo: Forestry Commission

4.6 The climate role of forests and forestry



Olof Johansson
Chairman of Forest Trends, Washington DC

According to the Intergovernmental Panel on Climate Change, the greatest contribution to mitigating the carbon impacts on climate would be achieved through a sustainable forest management strategy for the world's forests. A recent EUSTAFOR publication, 'European forestry in the face of climate change' outlines how forestry can best contribute. This includes increasing the forest area, improving carbon balance in existing forests and producing as much wood material as possible to store more carbon in forests and forest products and substitute wood products for fossil-based materials and fuels.

In the EU, forest areas have increased in recent decades and since growth has generally exceeded extraction of timber, European forests have increased their function as carbon sinks. Focusing solely on increasing stored carbon would be one obvious way to further increase this ecosystem service but this would be a one-off and one-sided solution since the rate of carbon sequestration declines with age and the sustainable harvesting of timber and woody biomass would cease.

Fortunately, continued management, harvesting and regeneration creates a wider range of ages ensuring there are always significant areas of young or middle-aged forests in their most active growth phase. Thus, the carbon sequestration capacity is sustained and forests can continue to provide society with renewable biomass. For managed European forests therefore, a strategy of sustainable forest management and increased growth seems to be the most efficient way to maximise long-term contributions to the overall carbon balance and long-term climate change mitigation actions. A recent Swedish-Swiss research study estimated

that for Sweden, forest sequestration and product substitution stores or saves approximately 60 million tonnes of carbon dioxide annually. This equals the total annual emissions at country level.

Climate mitigation measures within a forest management strategy could involve developed silvicultural techniques to increase growth, improved fire management techniques and more efficient protection against pests and diseases to reduce losses.

Forest Carbon Markets

There is no current system within the EU to stimulate additional efforts to sequester forest carbon. Forest carbon trade is not yet a component of the EU ETS, which only deals with trading of emission rights. The Kyoto protocol does recognise the role of forests and is open to possibilities for member states to develop forest carbon credits from 'land use, land-use change and forestry' (LULUCF) activities and the Clean Development Mechanism. However, following this route is complicated and only one LULUCF project seems to have been registered so far in Europe. The "Romania Afforestation of Degraded Agricultural Land Project" implemented by the Romanian National Forest Administration aims to afforest 6,000 hectares of state-owned, degraded agricultural lowlands in seven counties.

In the absence of regulated markets for forestry offsets, most markets transactions in the world have been voluntary. Up to 2009 there were 226 documented projects in the global forest carbon market with a total volume of 20.8 Million tonnes of CO₂. Nearly three quarters of that was in voluntary markets and most of the volume was generated after 2007, which indicates a market on the rise. North America and Latin America topped the list of places where credits originated while Europe was the source for less than 5% of the market volume. There are strong indications that the voluntary forest carbon market will continue to grow and the political signals from Copenhagen and Cancun were more explicit than ever on the need for mechanisms to reward sustainable land-use practices to capture carbon.

The forest carbon credits originate from three major project types.

- Afforestation / Reforestation projects are the most common.
- Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) projects, including the avoidance of deforestation. This

is expected to grow in importance significantly after recent climate negotiations and the Copenhagen Accord.

- Improved Forest Management projects (IFM). Amounting to less than 10% of documented projects but growing. Most IFM projects have been developed in temperate forests.

In the European forest context this should mean incentives for improved forest management that can sequester more carbon and increasingly provide substitution for fossil based products. It will be in the interest of European State forest organisations to take part in the future development of this ecosystem service.

An example of developing forest carbon credits in Sweden

The Swedish state-owned forest company Sveaskog is studying methods to verify the level of carbon sequestration in forests and soils. Improved forest management is used to increase growth and sequester additional carbon, which can be traded on the voluntary carbon market. The trial area is 40,000 hectares of Sveaskog's boreal forest in northern Sweden. Here different silvicultural measures are used, like improving nutrient status, denser stands and use of improved plant material. Forest management is directed towards maximising carbon uptake on the basis that improving the forest's capacity to grow enhances photosynthesis to develop extra biomass and so store additional atmospheric carbon.

Participants in the project include the Swedish University of Agricultural Science (establishment of baseline, measurements), Price Waterhouse Cooper (verification and development of a trading system) and the mining company LKAB (also the buyer of the forest credits created).

In conclusion, the forest sector is key to the mitigation of carbon emissions and reducing their effect upon climate change processes. In Europe however, where forests have been managed sustainably for decades, few forestry carbon offset schemes exist but there are strong indications that the voluntary forest carbon market will continue to grow. In the European forest context this should mean incentives for improved forest management that can sequester more carbon and increasingly provide substitution for fossil based products.

4.7 Protection – a key forest ecosystem service



Roland Kautz
International Affairs, Österreichische Bundesforste (ÖBf) AG

Forest ecosystems in alpine areas are of paramount importance to the protection of settlements, streets, houses, and infrastructure. This includes protection from events such as avalanches, rock fall, landslides and mudflows as well as general erosion. It is only when catastrophes happen that people realise the stability and protection afforded by forests, and that there are consequential costs for society; either for technical measures to avoid catastrophes, or to pay compensation and reconstruction expenses after such events.

The protection of human settlements and structures by forests does not follow a normal economics since there is no price set in accordance with a supply and demand model. Many forest laws within the European Union in some way oblige forest land owners, to accept these costs and guarantee the protective function of forests as part of a social contract with householders and property owners. Nevertheless, those services are provided and paid for by forest owners and in many cases by SFMOs. The essential point is that the value of the protective function is not, at the moment, reflected in the financial balance sheet, only the costs for sustainable forest management.

Often, discussions on ecosystem services will focus mainly on the biodiversity context only and in scientific literature, policy programmes, and media it is usual for the terms 'biodiversity' and 'ecosystem services' to be used interchangeably. This raises a real barrier if the idea of human intervention in forests, to sustainably secure ecosystem services, conflicts with popular notions of biodiversity, naturalness, and non-intervention. The

concern is that in some forest areas, too little management, although well intentioned, may lead to the loss of critical protective forest.

Studies show however that the benefits people receive are, by far, more important to them that whether the management intervention is the "right" thing or the "wrong" thing and it is particularly the centuries of human management in rural alpine forest regions that has created the balance between utilisation and protection of the habitat that people now value. This position is supported by climate change concerns and the need for adaptation within forest ecosystems. Sustainable management to implement the adaptation will be required if the forests are to remain as useful protection in the future.

In this context, it is clear that forest ecosystem services cannot be considered in an isolated way, but rather connected with the other social and political subjects pertaining to productive forest ecosystems such as CO₂ emissions, climate change, rural development programs, the UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) or 'land use, land-use change and forestry' (LULUCF) issues.

In respect of steep terrain, the most useful protective functions provided by forests are:

Protection forests against avalanches

To reduce avalanche risk, susceptible areas benefit from an irregular, permanent stocking of trees to better 'absorb' the snow and create a complicated snow structure, which disrupts the accumulation of even layers of snow that can slip off each other. The stocking should be at least 50 to 70% evergreen pine (*Picea abies*, *Pinus cembra*). Tree stands also decelerate avalanches and *Larix decidua* is especially useful for its high recovery potential from stem injury. Felling operations retain very high stumps and a sufficient number of stems felled along the contour to help hold snow back. Broadleaves are generally better protection against dry land slips.

Protection forests against rock-fall

Protection forest against rock-fall should be as dense as possible and use trees like *Larix* spp., *Acer pseudoplatanus* or *Pinus nigra*, which have a high recovery potential. Young stands are denser and more resilient so regeneration is done early and achieved through a progressive shelterwood system. The shelterwood

openings are always oriented across the slope and the trees are cut high to create obstacles.

Protection forests against Land Slips

Protection forest against land slips should preferably use firs (*Abies* spp.), which can help break up heavier clay-based soils. Areas should be densely stocked to increase the removal of water from the upper soil layers and very old stands are avoided to remove the weight of the trees on the slope. The drainage of forest paths and roads is also carefully planned.

Protection forests against erosion

Besides maintaining a permanent forest cover in these areas, it is important to choose tree species that will

improve the soil organic condition. Broadleaf trees such *Fagus sylvatica*, *Acer pseudoplatanus*, *Fraxinus excelsior*, *Sorbus* spp. etc. are crucial for this and on dry, pine sites, dwarf-shrub layers are permanently maintained where they occur.

In conclusion, to maintain their protective functions, forests in mountainous areas must be healthy, robust, and properly structured. Work is required to show how the value of the protection might be considered as part of the organisation's overall economic worth but there is also a need for governments and the people that rely on the protection to understand that it is not a free resource that is always available without cost.



5. Implications for state forests

5.1 Most relevant ecosystem services

Other than the sustainable production of timber and other non-wood goods, the ecosystem services relevant to SFMOs are those that are essentially natural functions of forests as a land cover type, and which also reflect the larger societal issues of today and provide the intangible public goods.

- Carbon and climate mitigation (credit trading)
- Climate adaptation and green infrastructure (rural and urban design)
- Water regulation (quality, quantity, temperature)
- Protection (soil / erosion, property)
- Biodiversity (offsetting development)
- Quality of life (including recreation and tourism)

EU funding is available for SFMOs in only a few circumstances, however business to business partnerships are growing. Many of these projects target specific multi-purpose uses of forest lands, and relate an identified consumer to a specific arrangement to fund the capital investment and maintenance on a cost basis. It is vitally important that EUSTAFOR and its members provide critical input to EU developments, particularly in the revision of the Rural Development Regulations, and wherever the role of forests is key to ecosystem services.

SFMOs can work now to collate information about the services provided, such as actual costs or replacement or recovery costs. They can try to identify specific users, beneficiaries and the numbers of each and so on, and they can co-operate with stakeholders to describe the benefits in their terms and support policies that may increase 'willingness to pay' for these services.

'Willingness to pay' is increased by data that helps people understand their reliance on ecosystems and the risks of their loss or decline. The challenge for SFMOs is to explain the tangible and intangible contributions of their forests and express values for the benefits (especially those which have not been accounted for before) in terms that are real to other people.



Photo: Forestry Commission

5.2 SFMOs as deliverers of ecosystem services

Certain characteristics of SFMOs support their capability to deliver ecosystem services. Many characteristics of state forest organisations are common to all, but the unique circumstances of their political context, operating environment and commercial status will change what is possible and practical for each organisation to do. Here we have listed what we believe to be the most important strengths and weaknesses of SFMOs.

Strengths

Links with Government

SFMOs generally exist to manage the state asset of forests and land and to create public benefits at minimal public cost through commercial forestry activity. Revenue is used to reduce the public cost, therefore the expenditure of public funds is not servicing a commercial profit, which gives the nation a significant financial efficiency for the benefits created. This makes SFMOs particularly good candidates for developing non-financial indicators of success, reflecting the full value of ecosystem services provided, rather than just the subset which result in commodity sales or key species conservation.

SFMOs act in many cases as leading developers of new policy, provide land for field research, undertake

scientific research and plant health functions attract expertise to the industry and provide sector training. This makes SFMOs well placed to establish reliable baselines, and to experiment with different mechanisms and strategies which can then be rolled out to broader audiences.

SFMOs generally enjoy a close and direct contact with the public and local stakeholders in an environment they all appreciate. Public and local partnerships have been critical to many emerging marketing schemes so SFMOs are well positioned to engage in emerging policy discussions.

Multi-functional and sustainable forest management objectives

Forest ecosystem goods and services provided by SFMOs, and the maintenance of the natural capital underpinning them already make significant contributions to government commitments. This includes contributions to national economies, carbon targets, social and welfare policies, Natura 2000 sites, development offsetting and human welfare.

State forests are managed on sustainable and multi-functional policies which makes them very flexible public assets that are in tune with the rising awareness of sustainability within people's everyday lives. Public expenditure for the benefits of sustainable forest management already has high levels of social acceptance, leaving SFMOs in a strong position to broaden public awareness for ecosystem services that previously have not been accounted.

Large scale advantages

SFMOs generally have a single management decision framework to prioritise objectives and co-ordinate action. The large scale state forest holdings are able to span a diversity of woodlands, land types and management objectives. The sustainable balance of environmental, social and economic benefits can therefore be applied across a wider range of sites regionally or nationally, so that each site in each forest can be managed for its greatest ability to contribute to a full range ecosystem services.

The national level overview of the public funds and revenue available to SFMOs means that project funding for ecosystem services can be transferred within the organisation with minimal bureaucracy. The more productive areas of the forest holding can be effectively used to fund public benefit projects elsewhere. This increases

the ability of SFMOs to fund more projects over time, and increases their buying power to ensure projects are efficiently funded.

Speed, precision and additionality in policy delivery

National and European land management policy is often slow to change on the ground because private forest owners require incentives to change what they do, and that in turn requires processes to develop and administer them. The 'incentive' also has to compete in the market for alternative land management options, so take-up is dependent on many other factors. SFMOs on the other hand are well placed to put new policy into action quickly and can effectively target delivery at the parts of the state holding that will create the best results. This means that SFMOs can also conduct pilots of new practice, and provide reliable information on baselines, trajectories and improvements, using state land and state resources to improve the cost effectiveness of realising and scaling-up effective policies.

Partnership working

The ability to act at a national scale increases the consistency of policies and supports the confidence of the private sector and other stakeholders to engage with SFMOs. In the chain of service delivery in the forestry sector, there are four broad groups of stakeholders: policy makers, organizational providers, frontline professionals and clients. SFMOs have strong credibility and a recognised degree of neutrality within groups of stakeholders which helps build a balance of respect, equity, and empowerment between the diverse groups that become involved in decision making processes. This will be essential to an ecosystems services approach.

SFMOs are held to be valued partners in projects as they can potentially offer a wide range of assistance (land, funding, advice, expertise, administration, promotion etc.) to the partnership objectives and often already have strong network communications with all stakeholders.

EUSTAFOR

SFMOs already have a pan-Europe association in place to co-ordinate and share information, to help shape the future political environment. Ecosystems services like biodiversity offsetting and issues of carbon management and climate change adaptation and mitigation are hugely important developments for European forests

and EUSTAFOR is well placed to co-ordinate initiatives and promote the interests of SFMOs.

Weaknesses

Constitution and remit

The diverse histories of SFMOs and the variety of constitutional and legal freedoms that each organisation has within its remit, funding and domestic legislation mean that one solution may not suit another organisation so international scale mechanisms may be difficult to apply in a uniform manner.

Existing high level of provision of public benefits

The adoption of sustainable management practices and securing certified status for very large areas of forest are truly immense achievements for SFMOs and this has provided societies across Europe with considerable benefits, many of which are now being recognised as components of ecosystem services. Because of that success however, many people would now consider that everything they currently enjoy from forests free of charge, is also free of additional cost. The distinction between the benefits deliberately created by spending public money in a forest (like a picnic area) and the benefits that are a consequence of spending money to manage forests to sustainability principles (like landscape) is now blurred and SFMOs face a significant challenge to re-educate many people, including policy makers and legislators.

Links to Government

In some countries State forests are subject to political aims. These often have medium term outcomes that reflect political timescales, which are generally far shorter than those needed to consider the needs of forests and broader-scale ecosystems. This tends to put political focus on immediate budgets and can cause discontinuity in policy, and restrict action by SFMOs to short-term fixes, neither of which help if trying to implement projects and secure long term delivery of ecosystem services.

Many organisations close to governments tend to have a risk-averse nature that is intended to protect public funds and organisational and political reputations. Market-based initiatives involve elements of risk and trust which may not appear to be acceptable to some SFMOs. Although trading in wood, goods and services is not new, business ventures involving new services and new customers involving greater risk with public

funds may be difficult to agree and manage initially. However, SFMOs are in a good position to describe the risks if forest ecosystem services are lost, and how the costs of loss or damage can be avoided. Clear and transparent full-cost accounting supports forest funding as part of an overall risk management strategy. Natural capital can therefore be seen as a cost saving measure.

Limited experience with valuation of ecosystem services

Qualitative assessments of the value of ecosystem services are relatively easy to describe and understand but the quantitative, and in particular the financial, evaluation of ecosystem services is highly complex and difficult to describe. Most people will have experience of financial values and tend to defer to economists who take it for granted that finance offers the most universal reference for assessing benefits. This makes it difficult for SFMOs to make a case for considering the financial value of an intangible benefit.

Where studies have been undertaken, the value of social benefits provided by forests is generally seen to many times higher than commercial and recreational income so the provision of the greatest benefit is largely independent of the traditional forest economy. However, as most SFMOs use public assets or public funds, their performance measures can be focussed on outputs and costs. In addition, connections with non-wood markets are not always mainstream. This reduces the motivation and resources available for development and marketing of ecosystem services.

5.3 Main engagement areas for SFMOs

SFMOs have a key role in taking forward and developing ecosystem services thinking and approaches that reflect the TEEB study findings, so that they can effectively influence the development of supportive instruments in EU. In the policy area, the main opportunities for EUSTAFOR appear to be:

- Influencing the Rural Development Regulations and associated Implementing Regulations to broaden the potential funding for forest services
- Influencing any White paper that may result from the Green paper on Protective forests
- Supporting implementation of the Water Directive more fully

In planning for the future, SFMOs need to engage in, conduct and share research. Each forest service context is different and each requires a mix of traditional and new markets, a mix of market and non-market mechanisms and new partners and knowledge to work well. Robust, pragmatic, simple, credible and reasonable valuation and payment mechanisms will be key selling points of any service offered from forest ecosystems. Opportunities include:

- Developing systems with researchers that account for values and support trade-offs between different ecosystem values in the national context.
- Developing case studies, information and ways to describe and market the services to different groups of stakeholders.
- Educating policy makers, fund holders, stakeholders and forestry businesses.
- Developing how natural values and services are reported and accounted for in balance sheets.
- Evaluating and testing payment systems and working to remove barriers.

In the delivery of ecosystem services SFMOs need to engage particularly with forest users to inform large sections of society about the meaning and relevance of forest ecosystem services, and in particular the costs of losing them. SFMOs also need to look at the range of public and private businesses that currently use or could potentially use forest ecosystem services and classify and describe the services (and their loss) in terms relevant to the particular business. The main delivery opportunities appear to be:

- Commercial recreation and eco-tourism facilities
- Habitat and biodiversity banking for development offsetting
- Inviting and facilitating corporate social responsibility actions on state forest land
- Water extraction and/or sale from forest catchments
- Trading systems for carbon sequestration

5.4 Impacts of ecosystem services on SFMOs

Ecosystem services will feature increasingly in EU policies and strategies, and forests will have a greater role. The impacts of this depend on which ecosystem services are recognised and adopted by governments and societies. The biggest change would probably be the need for SFMOs to interact with a much expanded

customer base comprising some potentially diverse non-forestry industries, servicing far wider sectors of society than SFMOs are currently familiar with.

Changes that could be positive for SFMOs might include the following.

- Society understands the benefits of forests and people are able to say which values are important to them.
- Policy developments work to bring the larger and more intangible public benefits into focus rather than concentrating on the more tangible and more politically expedient benefits.
- Funding flows from centres of population to rural forest areas increases, bringing better forest management and more support jobs in recreation, conservation and other environmental activities.
- Free-to-use public services are improved further as new funds for other services are deployed within the forests.
- State forests become the champions and local focus for the delivery of ecosystem services, perhaps facilitating, managing or underwriting public / private arrangements as part of the state forest business.
- Business sectors such as rural tourism benefit from the revitalised interest in nature, earning significant amounts of foreign exchange.

Changes that could be less positive for SFMOs might include the following.

- Particular ecosystem services become a requirement under European or domestic legislation so reducing opportunities for funding through effective partnership approaches.
- Other sectors like mining or agriculture may receive most support as this might create the quickest and greatest difference for some services like water quality.
- The complexities of linking management inputs and costs to small margins of increased benefits over long forestry timescales may cause generalised or trivialised responses and forest services become undervalued.
- For the same reasons, and to reduce the costs of payments, the payment mechanisms become broad and shallow and largely disconnected from performance making them seem less important.
- Competition is created between different services as functional ecosystems become rarer (such as more water release or more carbon sequestration). SFMOs may find themselves having to balance out new arguments.

6. Conclusions

The term 'Ecosystem Services' is most useful to EUSTAFOR members as a fully inclusive concept, because sustainably managed European forests have the multifunctional capacity to be fully inclusive. The non-market goods and services provided by forest ecosystems are widely considered to be very important for people but the importance of a particular good or service varies according to the perceptions and needs of the beneficiary, the scale and the national context. The ability to integrate and mix different ecosystem services with different emphases on particular services, at a variety of scales is a key strength of European forests in providing a tailored response to human needs, locally, nationally and globally.

Activities to deliver forest ecosystem services add value to State Forests and make important contributions to the global aims of preserving biodiversity and ecosystem services, and to 'Europe 2020' aspirations. Making the case for active management to contribute more to ecosystem services however can be very difficult. Ultimately the answer to this lies with society and EUSTAFOR members are well placed to develop innovative products and services and to determine and deliver what society wants to pay for. A creative mix of traditional and non-traditional markets for forest goods and services is important.

The Economics of Ecosystems and Biodiversity (TEEB) Study is of very high importance to EUSTAFOR members as the European Commission aims to integrate the outputs of this study into its policies and strategies on agriculture, fisheries and biodiversity. With the provisions of the Habitats, Birds and Water Framework Directives this could significantly raise the potential for forests to attract funding for securing and improving ecosystem services, using mechanisms that rely on land availability like habitat banking and offsetting. There is likely to be a continued development of biodiversity markets in Europe, largely linked to regulations and legislation at EU, national and regional levels but transparent systems for designing, evaluating and managing an offset are required.

The costs of many protective activities (which have no real markets) that EUSTAFOR members perform today

without specific compensation could be recovered through EU funds e.g. prevention against fire, soil erosion and floods and climate change adaptations. Tax incentives and subsidies are the most common payment mechanisms at present but without new EU payment mechanisms supported by regulations and other instruments, opportunities for EUSTAFOR members to access EU funds are limited.

An ecosystem services approach offers a system of accounting for forest benefits with a more comprehensive rationale for management actions. It also becomes possible to assign values on an organisation's balance sheet to record the equivalent value of the natural capital managed and the services delivered. An estimation of value however can never be used as a price and just valuing a service does not mean that there is an obvious customer, or that there is a willingness, or ability to pay.

Understanding how a 'buyer' may view the services, and which combinations of goods and services are relevant and important to them helps determine how a valuation could be defined and presented as a basis for negotiation, and ultimately how a payment mechanism might be designed. Many leading companies and entrepreneurial businesses are now aware that the sustainable use of ecosystem services could be vital to their business resources, processes, sales, and continued economic prosperity.



Photo: Forestry Commission

Appendix

Ecosystem services - case studies in brief

These are case studies that have been brought together by the working group. The full case studies, including contact details, are compiled in a separate document associated with this booklet, which is available from the EUSTAFOR website www.eustafor.eu/publications

Austria Protection services - a forest management approach

An article on the strategy and approach to managing forests in mountainous regions in order to secure protection for property and infrastructure from avalanches, rock falls and landslips.

Czech Republic Biodiversity - Conservation of rare and endangered forest species

Contracted partnership with non-governmental organisation to establish a programme of measures using state funds to identify important species and habitats in state forests and restore and improve them. Also included is the conservation of wild genotypes and reproduction of important species.

Water quantity, soil formation - Forest watershed management

Use of funds and resources from sustainable forest management to secure 30,000 km of watershed for public interest aims.

England Biodiversity - Relocation of reptiles

The maintenance of forest areas as suitable habitat for protected species displaced by urban development. Developers pay to relocate animals to the forest areas in order to allow their building projects to proceed.

Carbon capture - Northamptonshire carbon sink

Partnership with municipal planners, national park and developers to bid into the Community Infrastructure Fund for carbon capture, to create new Green Infrastructure for urban developments and transport corridors Woodlands to be publicly accessible and linked into existing rural infrastructure. Funding issues still to be resolved.

Educational, recreational, quality of life - Waterside Community Ranger service

Sponsorship by large employer (ExxonMobil) to pay for forest ranger services in waterside areas of the New Forest. Offers 'Corporate Social Responsibility', reduces anti-social behaviour in locality and allows employees to volunteer for conservation work.

Finland Aesthetic, spiritual, educational, recreational - Scouting facilities

A public / private partnership to establish a permanent camping and outdoor facility on state forest land in the heavily used Evo hiking area. Previously temporary facilities were built each summer. This consolidates the facilities for greater health opportunities and enjoyment.

France Biodiversity, habitat compensation - Wetland restoration to support rare species

Extensive habitat re-creation to compensate for losses due to rail network development, and to protect the Royal fern habitat. Uses state forest expertise to manage the project to convert coniferous forest to wet, open, broadleaf forest. Funded by the rail network.

France

Carbon capture - Experimental carbon sink

Article on a project started in 2006 to identify additional silvicultural activities that have a potential to add 'carbon value' in different contexts. It looked at how practices by the forest and wood-based sector could optimise carbon storage and result in reductions of greenhouse gas emission. The project includes activities concerning biodiversity and sustainable management of natural resources. Some conclusions are included.

Protective Services - Evaluation of the protective function of forests

Two interreg projects between France and Italy and France and Switzerland to look at accounting for the forests role in protection strategies in mountainous areas. Example of one pilot site, looking at the hazards, risks, costs of silvicultural options and costs of engineering options. Compares different methods of valuing the ecosystem services.

Germany, Lower Saxony

Biodiversity, soil formation - Krickmeere nature compensation area

Creation of a service to compensate for habitat lost through harbour and rail developments. Broadleaved wet forest land was re-created from a drained, commercial forest area. Includes engineering works to remove forest roads and restore natural ground water hydrology. Funded by a 30 year annual payment per hectare.

Fresh water quality, nutrient cycling - Afforestation to improve water quality

For the last 20 years, agricultural land around wells has been purchased by a water company with some public help, and given to the state forest organisation to afforest with broadleaved trees. Afforestation has partly been funded by private development as an offsetting arrangement. Reduces nitrates in water, adds to public recreation facilities and improves biodiversity and landscape in a sparsely forested area.

Ireland

Aesthetic, Educational, Recreational - Dublin Mountains Partnership

Partnership approach to resolving conflicts between commercial forest needs and local recreational needs. Involves the provision of better recreational facilities to secure better public understanding of, and higher tolerance for, sustainable forest management practice.

Recreational - Provision of recreational services for Government

Service-level Agreement operating between the state forest organisation and their Department for Communities. Funded as an annual budget, based on data from users and non-users, and the costs of alternatives.

Norway

Aesthetic, Educational, Recreational - Forest roads and hiking

Partnership with a municipality to restore a state forest road to make it usable and improve the local recreational facilities. A new car park and refurbished buildings in the forest are included to improve the accessibility and enjoyment of the new facilities.

Aesthetic, Educational, Recreational, Health - Storjord recreation

Development of recreational facilities around a historic building in the state forest over a period of time, responding to changes and new initiatives. Built on a government desire to use forest land for social benefits. Now moving into health and accessibility services.

Recreational services

Use of central websites to deliver productised services and information. <http://www.godtur.no/> run by Statskog aims to inspire and help people to use the unique hiking opportunities. <http://www.inatur.no/> allows the immediate purchase of licences and other goods and services related to fishing, hunting and recreation across Norway.

Poland

Recreation, tourism - Angler services

The use of small water bodies (created under a national scheme to retain rainfall and help with fire protection) as a commercial resource by selling fishing licences to local enthusiasts.

Recreation, Tourism, Aesthetic, Education - Nature Reserves

Use of nature reserves as visitor attractions. The right to sell entry permits was auctioned to the best bidder, who undertook to maintain the nature reserve from the proceeds. The scheme did not progress due to the high costs of reserve management.

Recreation, tourism - Tourism services

Refurbishment and conversion of unused buildings in the forests (originally used as training facilities) into accommodation for tourists. Now offering 4,500 overnight stays per year on commercial rates.

Water quality - Freshwater distribution

The sale of rights to abstract clean water from springs within the forest catchments. The forest management is tailored to support fresh water production and the purity of the extracted water is high enough to permit cost-effective treatment and bottling.

Scotland

Biodiversity, climate, cultural services - Scottish Forest Alliance

Partnership of State forest, large business interests (BP) and woodland and wildlife charity organisations. Aims to create 10,000 ha of new forests to reduce the fragmentation of native woodland, engage local communities and help research into carbon capture.

Recreation, Tourism - 7Stanes cycling centres

Project to create 7 world class cycling centres and trails to attract visitors and improve the rural economy using EU Rural Development Fund and domestic public funds. Evaluation shows it has created new jobs, and attracts 400,000 visitors to forests and rural areas annually. It continues to attract new investment.

Sweden

Climate regulation by carbon sequestration - Carbon Credit Trials

Large scale trial to manipulate tree crops and increase the forest biomass growth enough to be able to market the additional carbon sequestration. Verified carbon credits are then available to sell, and the buyers can set these against the carbon emitted by their activity. In the trial a mining company is the buyer of the credits.



Photo: Forestry Commission

The EUSTAFOR working-group on ecosystem services and acknowledgements

This working group was established in response to a request from the 2008 General Assembly to examine the potential contribution that the delivery of Ecosystem Services might make to meet the financial, social and environmental objectives of state forest management organisations.

The group aims to collate and share information about ecosystem services, bringing knowledge together from the scientific research in this area and from the wide range of experience already gained by EUSTAFOR members. The strategic purpose of the working group is to help to develop an understanding of the ecosystems approach and the associated valuation methods and financial mechanisms, and to identify the potential impacts and opportunities for SFMOs and recommend where EUSTAFOR and individual SFMOs should target their resources in response.

This booklet has been edited by **Paul Johnston** from the work of all the many individuals in the working group. The Group members have all contributed to this project through their time, ideas, case studies, texts and reviews. This support by EUSTAFOR members is gratefully acknowledged.

EUSTAFOR also gratefully acknowledges the research support of Pacific Northwest Research Station, USDA Forest Service via **Dr. Trista Patterson**. Prior to co-authoring this document, she provided ecosystem services training presentations, case research, and subject matter expertise that supported group advancement and collaboration. Content herein was initially based on the research document she compiled for our working group, with assistance from **Thomas Bouix**.

A key outcome of the collaboration of the working group has been the compilation of a significant resource of case studies, describing projects and initiatives that EUSTAFOR members have been involved in, highlighting the opportunities and issues in delivering

a wide range of ecosystem services. Although they are listed in this booklet they cannot all be reproduced in full here but they will be compiled into a separate document and made available from the EUSTAFOR website at www.eustafor.eu/publications.



Photo: ÖBf/archive

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EUSTAFOR

in short

EUSTAFOR represents commercially oriented state forest companies, enterprises and agencies that have sustainable wood production as a major concern. It currently has 27 members.

The members represent 27% of the EU forest area, including 12.6 million hectares of protected areas and most member organisations are certified to FSC or PEFC standards (or both). The annual production is about 115 million m³ of round timber and together the organisations employ more than 100,000 people.

The goal of EUSTAFOR is to promote the common interests and sustainable development of state forests in the EU. The Association supports and strengthens state forest organisations in Europe to maintain and enhance economically viable, socially beneficial, culturally valuable and ecologically responsible sustainable forest management.

Our main objectives are:

- To analyse and investigate the existing framework conditions within EU, in order to create the preconditions for sustainable management of state forests;
- To facilitate and expand an exchange of ideas and contacts between the state forest organisations of Europe;
- To keep its members regularly informed on topics and issues that concern the whole of Europe.