European Commission

JRC TECHNICAL REPORTS

Payments for Forest Ecosystem Services

SWOT Analysis and Possibilities for Implementation

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2016

Joint Research Centre

EUR 28128 EN

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JRC Science Hub
https://ec.europa.eu/jrc

JRC103176

EUR 28128 EN

ISBN 978-92-79-62212-0 (PDF)

ISSN 1831-9424 (online)

doi:10.2788/957929 (online)

Printed in Italy

How to cite: Viszlai, I., Barredo, J.I., San-Miguel-Ayanz, J. (2016) Payments for Forest Ecosystem Services - SWOT Analysis and Possibilities for Implementation. EUR 28128 EN, doi:10.2788/957929.

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Abstract

Forests and other wooded lands cover around 42% of EU's land area and provide a multiplicity of benefits supporting human wellbeing. These benefits are known as ecosystem services. In addition, forests provide economic, social and environmental values. Ensuring those values, as well as maintaining the ecosystem services provided by forests is only possible by implementing a sustainable forest management approach. Ensuring the multifunctional role of forests to supply provisioning services, such as timber, and at the same time provide regulating and cultural services is one of the aims of sustainable forest management. Nevertheless, most of the income in forestry is from timber production, whereas other non-marketed ecosystem services would require incentives for its provision, which would be oriented to satisfy increasing societal demands. Payments for Ecosystem Services (PES) represents one alternative and voluntary way to secure financial sources for multifunctional and protective forest management and sustainable maintenance of ecosystem services.

The aim of this report is to present an overview of PES implementation in forest ecosystems in Europe. A SWOT analysis is presented based in the analysis of first, policy drivers related with PES at the EU level, second literature review, and finally a comparison of best practices in PES. In the policy drivers section, we address the main EU policy documents, such as the Biodiversity Strategy, the EU Forest Strategy and other related with PES. Best practices from European countries are shown in the case studies of established and functional PES schemes.

The SWOT analysis unveils challenges and potentialities for PES schemes development and implementation. The reviewed strategic and policy documents at EU level call for sustainability, development, cooperation and fostering of forest biodiversity. This opens new opportunities for creating and establishing suitable instruments and one of them is represented by PES schemes. The implementation process of PES schemes reveals some weaknesses and threats, for example the issue of sound valuation methods for ecosystem services. The report concludes by considering all aspects from the best practices identified in the case studies. Finally, despite the fact that PES are not a final solution to ensure sustainable forest management, it is possible to successfully implement PES schemes as part of policy instruments promoting the sustainable management or conservation of European forests.

1 Introduction

Forests, together with other wooded land cover more than 42% of EU's land area. The EU currently contains 5% of the world's forests and EU forests have continuously expanded for over 60 years.[1] In the last decades there has been a growing societal demand for forest ecosystem services, although we usually associate forest with wood production. Wood is a natural, renewable, reusable and recyclable raw material used worldwide. But there are many other services provided by forests, which are generally known as environmental or ecosystem services.

The Millennium Ecosystem Assessment (MEA) defines ecosystem services broadly as "the benefits people obtain from ecosystems".[2] It means that it is not only wood, berries and mushrooms that are produced by forests, but also other services such as water protection, carbon sequestration or cultural and human wellbeing services. The provision of such services for coping with the increasing societal demand depends on multifunctional forests, however this represents a challenge for forest managers requiring a comprehensive and economically sustainable approach to forest management.

Timber is the most important tradable material from forests. Forestry companies manage forest stands for timber production. Part of the revenue they get from timber is reinvested to plant new forest stands and for the management operations (thinning, protection etc.). However, as mentioned above, forest provides much more than just wood. All forests also provide other ecosystem services. Forest-based biomass, together with other forest ecosystem services, provide opportunities to maintain or create jobs and diversify income in a low-carbon green economy, fulfilling as well requirements of forest sustainability and multifunctionality. Forests capable of supply provisioning services, such as timber, and at the same time regulating and cultural services are the aim of multi-functional and sustainable forest management. Nevertheless, the provision of non-marketed ecosystem services would require incentives to promote forest management oriented to satisfy increasing societal demands. This is an important aspect in the implementation of Payments for Ecosystem Services (PES) schemes as a tool for maintaining and improving the production of non-marketed ecosystem services and increasing biodiversity levels. PES would thus ensure at the same time the provision of marketed ecosystem services and provide a suitable path for diversifying and scaling-up various sources of funding for forestry activities. Therefore, PES can help maintain sustainable forest management (SFM) and simultaneously protect forest. Sustainable forest management means using forests and forest land in 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.[3]

The aim of this report is to present an overview of the implementation of PES in forest ecosystems in Europe. A SWOT analysis is presented based on the analysis of first, policy drivers related with PES at the EU level, second, literature review, and finally, best practices comparison. The overall scope of the report being the assessment of possibilities and challenges for implementation of PES schemes, by identifying strengths and weaknesses of PES, as well as opportunities for successful implementation and possible threats.

This study is in line with the concepts and framework of the Mapping and Assessment of Ecosystems and their Services (MAES) initiative and its Analytical framework for

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1 MEMO/13/806. Forest resources in the EU.

2 MA (Millennium Ecosystem Assessment), 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington.

3 Ministerial Conference on the Protection of Forests in Europe. Helsinki, 1993

ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020 (Maes, et al., 2013). Action 5 calls Member States to map and assess the state of ecosystems and their services in their national territory with the assistance of the European Commission. MAES will provide spatially referenced information on ecosystem condition and related ecosystem services. This information will facilitate spatial planning and other decision processes. The successful mapping and assessment of ecosystem and ecosystem services will underpin valuation of ecosystem services. And the results of valuation studies together with the knowledge on the providers of such services will facilitate addressing PES as an instrument for diversifying the financial resources needed for sustainable forest management and forest multifunctionality.

The conceptual framework for EU wide ecosystem assessment (Figure 1) clearly shows where the part for mapping and assessment of ecosystem services is (upper green arrow) and where are the possibilities for implementation of PES schemes. PES may be considered as "drivers of change" together with response, because when we know the value of benefits provided by forests and we are able to establish relevant PES scheme, we can influence forest ecosystem state and therefore the provision of services.

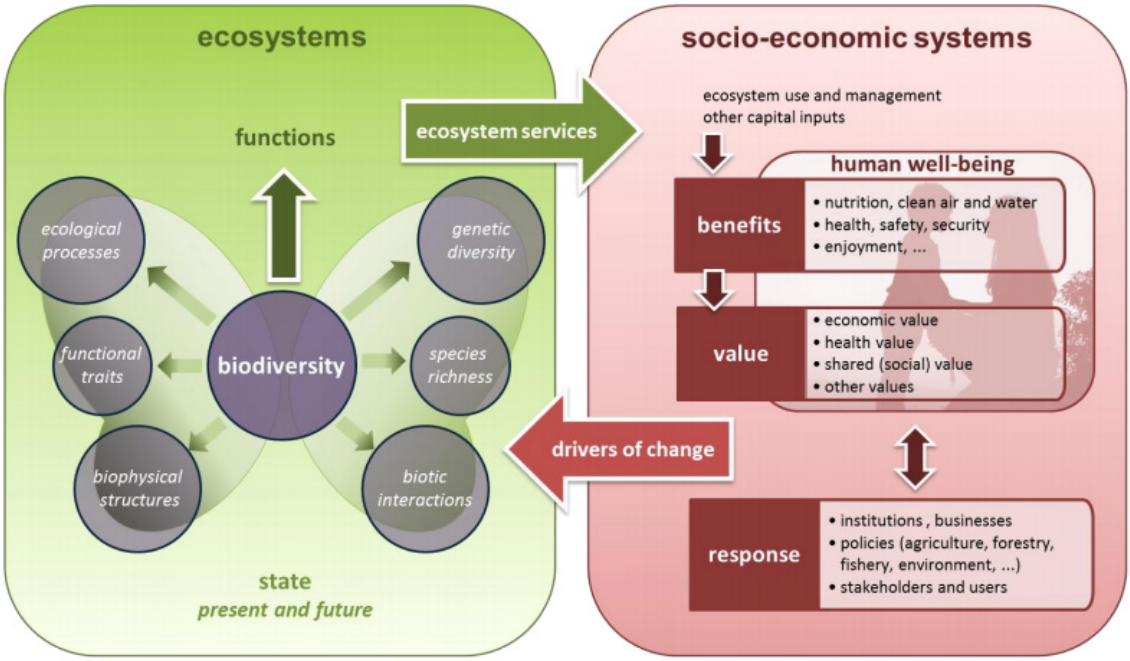

Figure 1: Conceptual framework for EU wide ecosystem assessments (Maes, et al., 2013).

The Green Book on payments for environmental services from Mediterranean forests (Simončič & Matijašić, 2013) set up ten basic questions that should be raised before implementing any PES schemes:

- Which economic, social, or environmental problem do we want to solve with a PES scheme?
- What is the added value the PES scheme will provide to society?
- How do beneficiaries of forest goods and services perceive these benefits?
- To what extent are they aware about the need for introducing a new mechanism?
- How much are they ready to pay?
- Which institutional arrangements can help in gathering money and distributing it among the participating forest manager agents?
- Where are the legal constraints?
- How we can reduce related transaction costs?
- What is likely to happen without any PES?
- What would the role of public sector be in this specific scheme?

In this report we provide some answers to those questions, and other questions related with PES via the SWOT analysis based on the analysis of policy documents related with PES at the EU level, literature review and best practices comparison.

2 Payments for Ecosystem Services

Forest ecosystem functions support the provision of ecosystem services to humans. Ecosystem services constitute the direct and indirect contribution of forest ecosystems to human wellbeing. In this context, ecosystem functions are a subset of the interactions between the ecosystem structure and the processes that underpin the capacity of an ecosystem to provide services. Therefore, information and assessments of forest functions and services is of paramount importance for the design and implementation of effective sustainable forest management options and forest related policies at the European level (Maes, et al., 2013; Maes, et al., 2014). To achieve those targets new tools for the implementation of forest-related policies, such as PES, have to be employed.

In the literature there is no formal definition of PES. Currently, there are five simple criteria used for describing the PES principles that must coexist for the implementation of PES. These are: "a voluntary transaction where (1) a well-defined ecosystem service (or a land-use likely to secure that service) (2) is being 'bought' by a (minimum one) ecosystem service buyer (3) from a (minimum one) ecosystem service provider (4) if and only if the ecosystem service provider secures ecosystem services provision (conditionality) (5)" (Wunder, 2005). There is another definition, which focuses on the public good character of most ecosystem services: "PES ought to be the creation of incentives for the provision of such goods, thereby changing individual or collective behaviour that otherwise would lead to excessive deterioration of ecosystems and natural resources. Therefore, it may be convenient to define PES as a transfer of resources between social actors that aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources" (Muradian, et al., 2010). This second definition was proposed after criticisms of Wunder's PES principle, which was thought to be too narrow and excluded many payments that do not meet the criteria (Schomers & Matzdorf, 2013). Specifically, there was a problem with voluntariness included in definition of PES, as often PES involve governmental intervention and public payment schemes (Vatn, 2010).

In general, there are two basic approaches to PES. The first approach is paying to maintain or enhance the services that an ecosystem provides. The second one is paying to rescue those services at risk, or prevent a change of land-use with potential negative impacts. According to this and the financial arrangements, PES can be divided into three basic schemes (Schomers & Matzdorf, 2013; Matzdorf, et al., 2013):

- Public schemes or government-financed PES: buyers are others (government, NGO or an international agency) acting on the behalf of ecosystem services users (Pigouvian-type)
- Private schemes or User-financed PES: buyers are the actual users of the ecosystem services (Coasean-type)
- Public-private schemes: combination of public and private schemes (hybrids)

In the UNECE region a fourth type of PES scheme was defined: trading schemes and conservation banking/offsets. These usually occur where compensation for the provision of an environmental service comes from funds generated in markets in which permits, quotas or other rights can be exchanged.[4]

For understanding PES principles it is important to distinguish to other principles, i.e. the "User Pays" and "Polluter Pays" principles. PES are based on User Pays principle.

[4] The value of Forests: Payments for Ecosystem Services in a Green Economy. Geneva timber and forest study paper 34, United Nations, Geneva, 2014. ISBN 978-92-1-117071-9

Under this arrangement we understand the beneficiary of an environmental service provides payment, whether this is directly for an environmental service such as water purification, maintaining biodiversity, or storage of carbon. On the other hand, Polluter Pays principle is situation when the parties that are responsible for damaging the environment pay the taxes or are fined for doing so.

3 Policy drivers of payments for forest ecosystem services in Europe

In this section, strategic and policy-related documents were analysed to identify information needed for the SWOT analysis of PES in section 5. The main EU documents addressing forest and the forest sector are considered in this analysis with a focus on the use or proposals to use PES in the forest context.

A new EU Forest Strategy: for forests and the forest-based sector (COM(2013) 659 final):

On 20 September 2013 the Commission adopted a new EU Forest Strategy which responds to the new challenges facing forests and the forest sector. This Strategy was based on the previous 1998 EU Forest Strategy[5], which established a framework for forest-related actions that support sustainable forest management and are based on cooperative, beneficial links between EU and Member State policies and initiatives. The new Strategy gives a new framework in response to the increasing demands put on forests and to significant societal and political changes that have affected forests over the last 15 years. It was developed by the Commission in close cooperation with Member States and stakeholders and has been submitted to the European Parliament and the Council. The main aim is ensuring the sustainable forest management and the multifunctional role of forests, delivering multiple goods and services in a balanced way and ensuring forest protection.[6] The Strategy provides a framework for implementation of national level forest-related policies. Specifically the Multi-annual Implementation Plan of the new EU Forest Strategy[7] indicates PES as an innovative mechanism fostered by Member States and the Commission to finance the maintenance and restoration of ecosystem services provided by multifunctional forests.

Innovating for Sustainable Growth: A Bioeconomy for Europe (COM(2012) 60 final):

Adopted on 13 February 2012 the EU's Bioeconomy Strategy addresses the production of renewable biological resources and their conversion into vital products (ranging from food and feed to bio-based products) and bio-energy. The Bioeconomy Strategy and its Action Plan aim to pave the way to a more innovative, resource efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection.[8] The Bioeconomy Strategy supports the implementation of ecosystem-based management with the scope of look for synergies and complementarities with environmental policies, sustainable use of natural resources, protection of biodiversity and habitats, as well as provision of ecosystem services. Within this approach, PES are seen as valuable instruments for supporting the provision of non-marketed forest services and biodiversity protection. The Bioeconomy Strategy will support a general approach towards more sustainable resource use, including developing new markets.

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5 Council Resolution of 15 December 1998 on a Forestry Strategy for the European Union
6 COM(2013) 659 final. A new EU Forest Strategy: for forests and the forest-based sector
7 SWD(2015) 164 final. Multi-annual Implementation Plan of the new EU Forest Strategy
8 COM(2012) 60 final. Innovating for Sustainable Growth: A Bioeconomy for Europe

Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM(2011) 244 final):

This strategy aims at reversing biodiversity loss and speeding up the EU's transition towards a resource efficient and green economy.[9] It is an integral part of the Europe 2020 Strategy[10], and in particular the resource efficient Europe flagship initiative.[11] The strategy is in line with two commitments made by EU leaders in March 2010. The first one is the 2020 headline target: "Halting 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"; the second one is the 2050 vision: "By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided." From the 20 actions under this strategy, the most important, in connection with ecosystem services and PES, are Action 5: Improve knowledge of ecosystems and their services in the EU, and Action 11: Encourage forest holders to protect and enhance forest biodiversity. Specifically, action 11 suggests fostering innovative mechanisms, including PES, to underpin the maintenance and restoration of ecosystem services provided by multifunctional forests.

EU Assessment of Progress in Implementing the EU Biodiversity Strategy to 2020: The Mid-Term Review of the EU Biodiversity Strategy to 2020:

Following the *EU biodiversity strategy to 2020 (COM(2011) 244)* , its mid-term review provides an overview of its implementation progress. The review states that the new EU financial instrument on Natural Capital Financing Facility (NCFF) will provide financing opportunities in the form of loans or equity investments for revenue-generating or cost-saving pilot projects promoting the preservation of natural capital, including climate change adaptation projects. Projects involving payments for the flows of benefits resulting from forest ecosystems (e.g. PES) are potentially eligible for funding.[12] The review also contains examples of best practices from Member States, where a variety of financing mechanisms to maintain and restore forest ecosystems and their services have been implemented.

Forest Europe: Expert Group and Workshop on Valuation of Forest Ecosystem Services – Final report:

An integral part of the Forest Europe strategy is the valuation of forest ecosystem services with a view to define a common valuation approach and promote its use. The aim is first raising awareness of the contributions to societies of multiple forest functions, second serving informed decision making, and third assessing achievements against the 2020 targets, which are a part of the future Forest Europe strategy, agreed by ministers in Oslo Ministerial Conference 2011 - a common vision, strategic goals, and European 2020 targets on forests.

To fulfil this goal, an expert group was established. It worked from 2012 to 2014 with the aim to give recommendations to policy makers on pan-European approaches to valuate forest ecosystem services and on means to facilitate its implementation, bearing in mind that there can be a range of different possibilities. The report[13] of the expert group identifies the challenges for valuing forest ecosystem services and for the further implementation of PES. The public good character of non-marketed forest ecosystem services explains their insufficient reach or under-provision in commercial markets. Forest managers receive little or no incentive to provide a range of non-market

[9] COM(2011) 244 final. Our life insurance, our natural capital: an EU biodiversity strategy to 2020
[10] COM(2010) 2020 Europe 2020: A strategy for smart, sustainable and inclusive growth
[11] COM(2011) 21 final. A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy
[12] Commission Staff Working Document: The Mid-Term Review of the EU Biodiversity Strategy to 2020, part 2
[13] Forest Europe: Expert Group and Workshop on Valuation of Forest Ecosystem Services – Final report

ecosystem services. This can result in declines in both the quality and quantity of these services. Possible solutions to increase incentives for forest managers include applying regulations to enforce their provision or developing incentive mechanisms (including market-based instruments - MBIs), which encourage forest and land owners to provide them.[13] In the report of the expert group, PES are identified as a key MBIs. In the past few years, MBIs have been recognised as important policy mechanisms for achieving environmental protection goals. Within MBIs, PES present opportunities for their implementation in the forestry sector, with the aim of supporting the provision of both marketed and non-marketed forest ecosystem services and biodiversity protection.

4 Best practices for payments for forest ecosystem services - case studies

This chapter describe a series of PES best practices from a series of study cases from various European countries. Most studies in EU have been conducted in Western Europe and Scandinavian countries, while there have been relatively few studies in the Eastern EU Member States.[14] The reviewed best practices are closely connected with forestry, nature conservation and water protection. The analysis of the case studies follows a common scheme: an environmental problem that should be solved, a legal and policy framework in the selected country (stakeholders), and a design of the PES scheme.

Forest Biodiversity Programme METSO (Finland):

The Forest Biodiversity Programme METSO (2008–2025) aims to halt the ongoing decline in the biodiversity of forest habitats and species, and establish stable favourable trends of biodiversity recovery in Southern Finland's forest ecosystems. The objective of the programme is to ensure that Finnish forests will continue to provide suitable habitats for endangered and declining species.[15] The METSO Programme covers both private and state-owned lands. It is a collaborative effort between the Ministry of the Environment, the Ministry of Agriculture and Forestry, the Finnish Environment Institute and the Forest Development Centre Tapio. It is the following programme to METSO Pilot Programme that aimed to protect forest land in Southern Finland, which was launched in 2002. New voluntary conservation measures for non-industrial small private landowners were introduced in this pilot programme, under which landowners could contract their land for a fixed period, establish a private protected area and sell the land to the state. Nowadays, the criteria for eligible sites are processed in detail and standardised. Conservation agreements are either permanent or temporary (10–20 years). Landowners get financial compensation for conserving areas and tax-free compensation for permanent protection. Compensation is based only on "opportunity cost", which means lost timber income and nature values became simply eligibility criteria, not influencing the payments. The eligibility of the sites for compensation has to be negotiated between the land-owner and the administration. It means that the level of payment is set up according to loss of timber income, but sites are selected according to certain characteristics (habitat type, nature values trading opportunity etc.). The biological criteria for conservation by which the sites would be selected are defined by a separate working group (working group on the conservation biological criteria for forest protection in southern Finland) (Paloniemi & Varho, 2009).

Drinking Water Forest (Germany):

Since 2008, the private company Bionade has been the first German company to act as a partner in the field of sustainable water protection and drinking water proliferation. Bionade requested high quality water for producing their organically manufactured non-alcoholic refreshment drink. In collaboration with the Trinkwasserwald®e.V. association 11 forests for Bionade drinking water were established, covering in total more than 63

[14] Forest Europe: Expert Group and Workshop on Valuation of Forest Ecosystem Services – Final report
[15] http://www.metsonpolku.fi/en/METSO_programme/index.php

hectares. The Bionade Corporation covered most of the costs of converting the forest land from conifers to broadleaves, including the costs of ground preparation, nursery stock, planting and fencing, possible re-plantings, as well as on-going care and maintenance over several years.[16]

KOMET Programme (Sweden):

The Swedish government initiated in 2010 this programme as a joint programme between three government bodies. The aim of the programme is to inspire landowners to protect valuable forests in their properties and inform them of which options are available for habitat protection. [17] Agreements may last for between 1 to 50 years, depending on the site's significance. Owners receive fixed-rate payments to compensate for limitations placed on their management in the interests of nature conservation. For habitat protection sites and nature reserves, owners receive full compensation plus an additional 25%.[14]

Payments for drinking water from forested catchments (Switzerland):

Forest covers 12% of the canton of Basel-Stadt. The broadleaf-dominated stands cover an area of 429 hectares, of which 90 hectares are the property of 330 private forest owners. Approximately half of the drinking water for the canton of Basel-Stadt is supplied from the Langen Erlen catchment area. In this area, water from the Rhine is purified in a natural and sustainable way by forest stands. Among other good practices, this also required changes in species composition, such as replacing hybrid poplars, which have damaged the soil, with willows and *Prunus avium* (wild cherry tree). In addition, water consumers pay for the sustainable management of forests belonging to the city of Basel through an extra charge in their water bill.[18]

Afforestation with Hazelnut Plantations (Georgia):

After the collapse of the USSR in the 1990's, the Samegrelo region (Georgia) on Caucasus' Black Sea Coast – previously a cornerstone of fruit, nuts and wine supply to the USSR – was left with lack of capacity, deteriorating infrastructure and uncertain land tenure issues. Land abandonment, clearing for grazing, deforestation of windbreakers and illegal waste dumping followed, while financing for agricultural activities become difficult to obtain. AgriGeorgia, a subsidiary company fully owned by the Ferrero Group, has developed the project to carbon sequestration in hazelnut trees over the lifetime of the plantation. This includes restoration of previously degraded soils and vegetation cover, protection of watershed with newly established ecosystem buffers, and conservation of 350 ha of natural forests, specially designed ecosystem corridor network. The project takes advantage of additional income from carbon credits to provide significant opportunities for environmental amelioration and better economic opportunities in the Samegrelo region. By creating a permanent forest cover on previously abandoned lands, it stops ongoing degradation, replenishing soil and vegetative stocks.[19, 20]

Good practices comparison and outcomes

General outcomes form the mentioned good practices point out to some common principles of PES schemes. First of all it is its voluntary base. No PES scheme works on mandatory principle. Secondly, most of the PES schemes have a private character,

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[16] The value of Forests: Payments for Ecosystem Services in a Green Economy. Geneva timber and forest study paper 34, United Nations, Geneva, 2014. ISBN 978-92-1-117071-9

[17] http://www.skogsstyrelsen.se/en/AUTHORITY/Projects/Avslutade-projekt/Ovriga-projekt/The-KOMET-programme/

[18] http://www.waldwissen.net/wald/boden/wsl_wald_wasser/index_DE

[19] The value of Forests: Payments for Ecosystem Services in a Green Economy. Geneva timber and forest study paper 34, United Nations, Geneva, 2014. ISBN 978-92-1-117071-9

[20] http://www.climateprojects.info/GE-HAP/

especially agreements between private land owners and private holdings. Nevertheless, there are also public PES schemes, between government organizations and private land owners. Most of the well-working PES schemes are based on water protection and nature conservation.

Before creating any PES scheme, it is important to have suitable background. Every PES scheme should follow the key steps of its development. Key steps for PES development include identifying services and stakeholders, setting the baseline, negotiating the deal and implementing the scheme as well as monitoring and enforcement (Brand, 2002). If payments are entering the market, conditions for trading have to be clear. Also legal conditions in the country have to allow establish the payments. For appropriate address of the payments it is important to identify service buyers, it means those who will pay for services and sellers of PES who will provide such services. Deal details in the agreement between the two stakeholders have to be negotiated. After successful development of these steps it is possible to implement PES. These steps are shown in Figure 2.

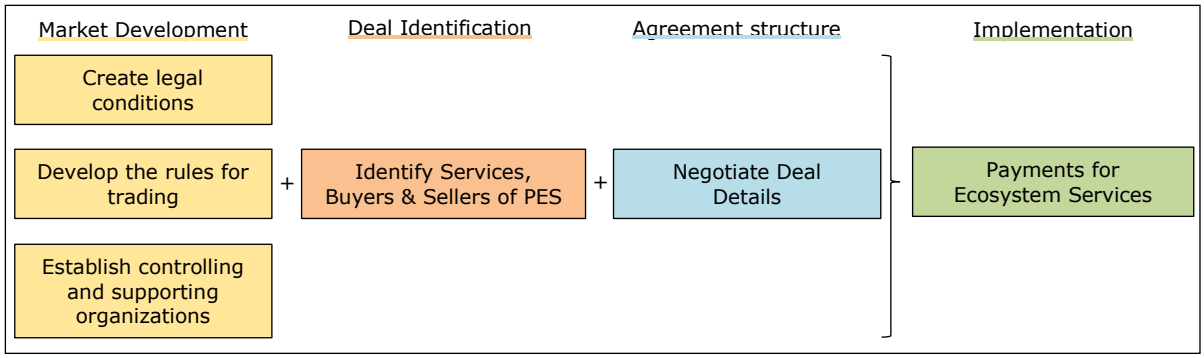

Figure 2: Main stages in PES development (Brand, 2002)-modified.

Table 1 shows a comparison of selected best practices according to countries, environmental problem or issue that is addressed and PES schemes.

Table 1: Best practices comparison.

Country	Stakeholders	Environmental problem/issue	PES Scheme
Finland	- The Ministry of the Environment - The Ministry of Agriculture and Forestry - The Finnish Environment Institute - The Forest Development Centre Tapio - Private forest landowners	To halt the ongoing decline in the biodiversity of forest habitats and species, and establish stable favourable trends in Southern Finland's forest ecosystems.	Landowners receive financial compensation for conserving areas and tax-free compensation for permanent protection. Compensation is based only on "opportunity cost", which means lost timber income.
Germany	- Private company Bionade - Trinkwasserwald®e.V. NGO - Forest landowners	The groundwater sources and the amount of water required, which is particularly high in urban centres, lead to a situation in many parts of Germany where ground-water resources are overexploited in order to ensure the drinking water supply.	The Bionade Corporation has covered most of the costs of converting the forest land from conifers to broadleaves, including the costs of ground preparation, nursery stock, planting and fencing, possible re-plantings, as well as on-going care and maintenance over several years.
Sweden	- The Swedish Environmental Protection Agency - The Country Administrative Board - The Forest Agency - Private forest landowners	To inspire landowners to protect valuable forests on their properties and inform them of which options are available for habitat protection.	Owners receive fixed-rate payments to compensate for limitations placed on their management in the interests of nature conservation. For habitat protection sites and nature reserves, owners receive full compensation plus an additional 25%.
Switzerland	- City of Basel (municipality) - Water consumers	Required changes in species composition and sustainable forest management for ensuring drinking water in canton Basel-Stadt.	Water consumers pay for the sustainable management of forests belonging to the city of Basel through an extra charge in their water bill.
Georgia	- Private company AgriGeorgia - Local landowners and farmers	Lack of capacity, deteriorating infrastructure and uncertain land tenure issues. Land abandonment, clearing for grazing, deforestation of windbreakers and illegal waste dumping.	Afforestation with traditional hazelnut plantations on land of local farmers, funded by AgriGeorgia and trainings on sustainable hazelnut plantation for a total of 2500 farmers.

5 SWOT Analysis

5.1 General characteristics of SWOT analysis

SWOT Analysis is a strategic analysis tool that is used to evaluate the strengths (S), weaknesses (W), opportunities (O) and threats (T) of an organisation or project in order to achieve a certain goal (Wheelen & Hunger, 1998). Strengths are internal characteristics that can help to achieve the goal, while the weaknesses are internal characteristics that make it difficult to achieve the selected goal. Opportunities and threats are external conditions that can help or may undermine the achievement of the goal. When performing a SWOT analysis it is useful to define precisely the subject of its research; from this fact derives the description of all four parts of analysis. The aim is to define a precise definition of the internal and external environment and the ability to distinguish them (Pahl & Richter, 2009).

We can identify five key benefits of SWOT analysis: relatively simple to process and practical to use, clear to understand, focuses on the key internal and external factors affecting the analysed subject, helps to identify future goals, and initiates further analysis.

The main aim of SWOT analysis is to develop a strategy that will benefit from the advantages of the opportunities and overcome the negative impact of threats. All basic possible strategies are described in Figure 3.

	Strengths "S" (internal, positive)	**Weaknesses "W"** (internal, negative)
Opportunities "O" (external, positive)	**SO: Strength-Opportunity strategies** Use the strengths to maximize the opportunities.	**WO: Weakness-Opportunity strategies** Minimize the weaknesses by using the opportunities.
Threats "T" (external, negative)	**ST: Strength-Threats strategies** Use the strengths to minimize the possible threats.	**WT: Weakness-Threats strategies** Minimize the weaknesses to avoid the threats.

Figure 3: SWOT Analysis strategies.

There are four basic outcome strategies of a SWOT analysis. Strength-Opportunity (SO), called also "Maxi-Maxi", are the strategies that use strengths to maximize opportunities. Strength-Threats (ST), called also "Maxi-Mini", are strategies that use strengths to minimize possible threats. Weakness-Opportunity (WO), called "Mini-Maxi", are strategies that minimize weaknesses by taking advantage of opportunities. The last are Weakness-Threats (WT), "Mini-Mini" strategies that minimise weaknesses and avoid threats.

The main tangible output is a matrix presenting the most important strengths, weaknesses, opportunities and threats for the area or sector examined and aiming at giving a reasonable overview of major issues that can be taken into account when subsequently drawing up strategic plans for an organization.[21] That is the reason why the PES SWOT analysis was processed. Input information for analysis were taken from the analysis of policy-relevant documents, best practices and literature review about PES. Next sections show the resulting strengths, weaknesses, opportunities and threats related with PES and assessed best practices of established PES schemes.

[21] http://forlearn.jrc.ec.europa.eu/guide/4_methodology/meth_swot-analysis.htm

5.2 Strengths

The EU Forest Strategy and the forest-based sector identify the key principles needed to strengthen sustainable forest management and improve competitiveness and job creation, in particular rural areas, while ensuring forest protection and delivery of ecosystem services. The Strategy also identifies several options for forest-related policies.[22] In the framework of the Strategy, PES is seen as an instrument for achieving the delivery and maintenance of forest ecosystem services.

The reviewed EU policy documents call for sustainability, development, cooperation and fostering of forest biodiversity. One of the foreseeable advantages of the successful implementation of PES schemes is to maintain a sustainable supply of non-market forest services. PES can actuate as incentives for the providers of forest services for managing forest following a multifunctional approach and keeping constant or increasing the supply of services without any loss. Forests can be managed in sustainable way, conserving the biodiversity and developing the multifunctionality of forest stands. In this point, the strength of PES schemes appears - the buyer of ecosystem services support the ecosystem services provider by payment, which might compensate a shortage in timber production. A different case is when limitations in timber production are not evident, but management should be oriented for providing one or more specific ecosystem services such as clean water supply. This would imply higher management costs (e.g. higher operational costs, close-to-nature forestry/silviculture[23], etc.). Also in close-to-nature (CTN) forestry there is room for incentives supporting protective and recreational functions (Wobst, 2006). Therefore, PES might play a role considering the increasing societal demand of non-marketed forest services.

In the past few years, Market-Based Instruments (MBI) have been increasingly recognised as important policy mechanisms for achieving environmental protection goals. PES play an important role in the MBI toolbox, this importance is derived from the fact that PES are recognized as a key MBI for achieving environmental protection goals (Snowdon, 2015). MBIs can be defined as mechanisms that encourage behaviour (management oriented to provide a range of ecosystem services) through market signals (i.e. prices) rather than through explicit directives. MBIs are also mechanisms that create a market for ecosystem services in order to improve the efficiency in the way the service is used.[24]

An important aspect of PES development is the proper identification of service buyers and sellers. A fundamental aspect for the implementation of PES schemes is the ability to clearly define who is the ecosystem service provider – seller – and who is the consumer – buyer. To identify service providers is usually not hard. They are often forest owners (private or public bodies) managing forest stands and ensuring the multifunctionality of forests and the provision of ecosystem services. The service buyers may be private or public bodies, representing the demand side of the services. The demand can be represented by nature conservation, water protection, or many others organisations. Under specific circumstances they could be willing to pay forest owners for a specific management approach ensuring the provision of selected ecosystem services. The positive outcome from the best practices analysis is the fact that the agreements are negotiated between all stakeholders – private companies as well as public bodies (see Table 1).

The voluntary character of PES can be considered as a weakness in some cases and still, in some other cases as a strength. PES instruments, because of their voluntary nature,

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[22] COM(2013) 659 final. A new EU Forest Strategy: for forests and the forest-based sector

[23] In the initial stages of close-to-nature forestry establishment, the operational costs are higher. Later on, there are increases of revenues (because of harvesting large size timber of good quality) and reduces of costs (due to natural regeneration and smaller harvesting costs) (Höfle, 2003).

[24] MA (Millennium Ecosystem Assessment), 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington.

offer a less prescriptive and coercive approach and therefore may be a more feasible instrument in practice in some situations (Dunn, 2011), especially it seems to be most effective in private PES schemes. Voluntariness provides flexibility in decision making. The voluntary nature of PES gives the opportunity to negotiate deal details between stakeholders without any restrictions and limitations (within the boundaries of legislation).

5.3 Weaknesses

The review of best practices from the previous chapter suggested some weaknesses of PES schemes. A good example is the METSO program in Finland and the programs in Norway and Sweden. Under these schemes, landowners get financial compensation for conserving areas and tax-free compensation for permanent protection. However, compensation is based only on "opportunity cost", which means lost timber income. The nature values are in this case simply eligibility criteria and they are not influencing the payments. Practically, it means that on the one hand, the level of payment is set up according to lost timber income but on the other hand, the site selection is done according to nature values and other biological site characteristics; however these characteristics have no influence on the level of payments. Additionally, the ad hoc working group on non-wood forest goods and services under the EU Standing Forestry Committee found that, "it may be possible to increase the number and value of such schemes through innovative approaches, ideally based on revealed preferences to more convincingly demonstrate the public value of forest goods and services."[25] According to this, nature values and values of ecosystem services should also be included in compensation mechanisms and not be used as simple eligibility criteria.

The weakness connected with the exclusion of nature values from compensation mechanisms originates from the challenge of how to measure nature values and ecosystem services. It is relatively easy to value water and other marketed provisioning services, however putting a value to most regulating and cultural services represents a limitation. Because of this fact, most of the PES schemes studied tend to be linked to water supply due to that it has a market value that is relatively easy to calculate. The valuation of non-marked forest services such as soil protection and formation or habitat provision for wildlife is not straightforward because these services do not easily translate into a tangible value in conventional markets.

A recent report by the expert group on Valuation of Forest Ecosystem Services [26] classified ecosystem services valuation approaches in two broad categories. First, preference based valuation methods that determine the value by means of willingness to pay for quality preservation or improvement of environment or to accept compensation for deterioration in quality. And second, cost based methods that estimate values of ecosystem services based on either the costs of avoiding damages due to lost services, the cost of replacing ecosystem services, or the cost of providing substitute services.

One limitation of these methods is that there is not a generally accepted methodology able to evaluate all forest services using a common approach. It is often needed to implement specific approaches for valuation of each group of ecosystem services. This is due to that certain groups of ecosystem services requires specific methods and specific approaches suitable for valuation of such services (recreational and cultural services of forests requires different valuation methods as for example biodiversity conservation). For instance, cost based methods, which value concept are price surrogates, are not well suited for non-market forest services and non-use values of forests. Other approaches

[25] http://ec.europa.eu/agriculture/fore/publi/sfc_wgi_final_report_112008_en.pdf
[26] Forest Europe: Expert Group and Workshop on Valuation of Forest Ecosystem Services – Final report

such as Contingent Valuation Method (CVM) and Choice experiments seem most suitable for valuing a range of forest ecosystem services (Ventrubova, 2015).

By using valuation methods, it is possible to provide a measure of total economic value of forest ecosystem services (e.g. Merlo & Croitoru, 2005) as well as valuate future goods and services in scenario analysis. However, these methods present several limitations, they have high data requirements, their implementation is mathematically complicated, and results are sensitive to numerous sources of bias in survey design and implementation.

Another potential weakness for the implementation of PES is the form of ownership and tenure rights of forest land. Forest tenure must be clearly defined and recognized and the ecosystem service provider must hold the rights of the service as a pre-condition for PES. This is because, if property or use rights are unclear, the buyer of the service cannot define the conditions of payment. This condition is strongly connected with forest and other wooded land ownership. Ownership forms vary from country to country in Europe. At pan-European level almost half of the forested area is privately owned. Countries with predominance of private ownership of forest and other wooded land are for instance Austria, Finland, France, Iceland and Norway. On the other side, countries with predominance of public ownership of forest are Bulgaria, Czech Republic, Lithuania, or Poland. Balanced private and public ownership of forest is present in Belgium, Latvia, Serbia or Slovakia (Schmithüsen & Hirsch, 2010). In general, it is easier to apply the PES schemes in private forests. That is the reason why most of the best practices of the previous chapter were soured from countries with predominantly private ownership. The problem of forests tenure rights in some, mostly post-soviet, Central and East European countries (CEE) is that those rights are still not clear and one of the most important factors influencing the current state of the forestry sector and ownership structure in CEE countries was restitution of land rights which were lost during the Communist regime (Sarvašová, et al., 2015). Restitution of forest land is a process of returning property rights to the original (pre-Communist regime) owners. Nevertheless, in some wooded lands the forest owners are still not clearly identified, tenure rights are not exactly defined and properties returned to private individuals are often too small for viable independent management and highly fragmented. New forest owners also lacked financial capital, technological know-how and the necessary equipment and tools (Weiss, et al., 2011). This situation originates difficulties in PES implementation in such countries.

5.4 Opportunities

The targets of the EU biodiversity strategy to 2020 represent an opportunity for possible PES implementation. In this strategy the EU calls for a policy framework that coordinates and ensures forest related policies and allows synergies with other sectors that influence forest management. Also one of the main targets, closely connected with PES, is mobilising resources to support biodiversity and ecosystem services. Within the current programming period, the Commission and Member States will work (among other) to diversify and scale up various sources of funding. Here, PES schemes should support the provision of non-marketed services from agricultural, forest and marine ecosystems.[27]

Incentives will be provided to attract private sector investment in green infrastructure and the potential of biodiversity offsets will be looked into as a way of achieving a 'no net loss' approach. The Commission and the European Investment Bank are exploring the scope for using innovative financing instruments to support biodiversity challenges, including through Public Private Partnerships and the possible establishment of a biodiversity financing facility.[27] Also under Target 3, Action 11 of the EU Biodiversity Strategy, Member States and the Commission will encourage forest holders to protect

[27] COM(2011) 244 final. Our life insurance, our natural capital: an EU biodiversity strategy to 2020

and enhance forest biodiversity by fostering innovative mechanisms to finance the maintenance and restoration of ecosystem services provided by multifunctional forests. One of those innovative mechanisms are PES.

As stated in the previous sections (see page 8), the Mid-Term Review of the EU Biodiversity Strategy to 2020 indicated in the section on horizontal measures that the EU will mobilise resources to support biodiversity conservation. The new EU financial instrument on Natural Capital Financing Facility (NCFF) will provide financing opportunities in the form of loans or equity investments for revenue-generating or cost-saving pilot projects promoting the preservation of natural capital, including climate change adaptation projects. Projects involving payments for the flows of benefits resulting from forest ecosystems (PES) are potentially eligible for funding.[28]. In addition to the NCFF, the European Investment Bank also provides support for forestry through priority lending streams-smaller enterprises, climate action and innovation/skills. Projects such as afforestation, renewable energy can be supported under this mechanism.

One challenge for PES implementation is represented by the emergence of markets for ecosystem services. Nowadays, there is growing evidence about the significant potential for long-term growth in emerging markets for biodiversity and ecosystem services (Dunn, 2011). Biodiversity and ecosystem services markets are emerging, alongside markets for carbon. These are new markets for biodiversity 'credits' and non-marketed services such as watershed protection. It is estimated that market size for PES (including payments for water related ecosystem services, payments for watershed management and Other PES) will reach up to $15 billion in 2020 and $45 billion in 2050 from $8.2 billion in 2008. [29] This high estimated increase provides an opportunity for PES development and the implementation process. Among other, PES schemes may also attract those stakeholders that are interested in voluntary nature protection activities (e.g. NGOs), and hence payments may also play a significant role in reinforcing (socially acknowledging) good environmental stewardship (Kosoy, et al., 2007).

Best practices analysis of successfully implemented PES schemes points out that there are many options to establish PES. Stakeholders – private and public bodies, are willing to create conditions for a successful implementation of PES schemes for some ecosystem services, mainly connected with watershed management and nature protection (Wunder, et al., 2008; United Nations, 2014). The case studies of chapter 4 are good examples showing opportunities for further development of new PES implementations. Finally, the local character of PES schemes represents an opportunity to precise deal identification (including services buyer and sellers), negotiate deal details and develop markets.

5.5 Threats

The successful implementation of PES requires knowing when, where and in which conditions is possible to effectively use the PES schemes. PES efficiency depends on many factors. In first instance it is necessary to approach each payment for some environmental service individually. Secondly, identify the framework which should be followed. Subsequently it is important to develop the market by creating legal conditions and rules for trading. It is also necessary to have clear deal identification and negotiate deal details and agreement structure. Then the PES schemes should be implemented and can work efficiently and effectively. But there are many challenges in effectiveness and efficiency of PES because of some inefficiencies and deficiencies which can be considered as threats.

[28] Commission Staff Working Document: The Mid-Term Review of the EU Biodiversity Strategy to 2020, part 2
[29] TEEB – The Economics of Ecosystems and Biodiversity Report for Business - Executive Summary 2010

The efficiency of PES and possible threats are well described in the studies of Pagiola (2005, 2008). Firstly, there is the issue of social inefficiency. There are two situations that lead to social inefficiency of PES. Failure to adopt practices whose social benefits exceed their costs, and adoption of practises whose benefits are smaller than their costs. Secondly, lack of additionality produces a situation of give "money for nothing". This is a common issue in PES programs with low, undifferentiated and untargeted payments. Targeting has a fundamental role for the practical implementation of PES. Therefore, selection among applicant sites can maximize the program's financial efficiency. Targeting also has to be based on variation in benefits, costs or benefit/cost among sites. In this framework the goal of PES programs is to make privately unprofitable but socially-desirable practices become profitable to individual land owners (Pagiola, 2005; Engel, et al., 2008).

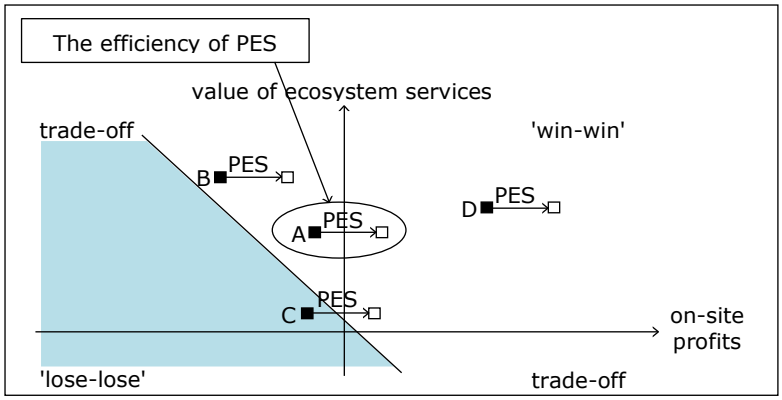

Figure 4: A framework to analyze the efficiency of PES (Pagiola, 2005)-modified.

Figure 4 represents a framework to analyse the efficiency of PES. On the horizontal axis, there are land uses according to their net private profitability from the perspective of land users and on the vertical axes there is the net value of ecosystem services, generated to others. The diagonal line separates practices whose total value to society is positive (above) and negative (below). There are four possible designs of PES, which came out from the above mentioned threats. *Case B* represents offering payments that are insufficient to induce adoption of socially-desirable land uses, thus causing socially-undesirable land uses to remain in use (payments too low). *Case C* inducing the adoption of socially-undesirable land uses, that supply environmental services, but at a cost higher than the value of the services, it means adoption of practices whose benefits are smaller than their costs (payments too high). *Case D shows* PES where payment is done for adopting practices that would have been adopted anyway (money for nothing). *Case A* represents the optimal design of PES schemes, where privately unprofitable but socially-desirable practices become profitable to individual land users. In this case PES are efficient.

Generating negative externalities is considered a possible threat. Thus, any practice in the top-right quadrant is 'win–win' in the sense of generating profits to land users while generating positive externalities. Likewise, any practice in the bottom-left quadrant is "lose–lose". From the perspective of profitability, the top-left and bottom-right quadrat practices are the most interesting ones. At bottom-right, land-use practices are privately profitable but generate negative externalities; at top-left, practices are unprofitable to land owners but generate positive externalities. It is land-use practice in this last quadrant that PES programs particularly seek to encourage (Engel, et al., 2008).

Another threat is connected with market failure. An important part of market failure is related to the "public good" aspect of some ecosystem services. It is necessary to recognise distinctions in the exact nature of the public good for different ecosystem

services. This could have implications for how PES schemes can be implemented. In some contexts, government financed PES may be the only option (Dunn, 2011). A good example is the case of biodiversity. It is often difficult to clearly identify all the users. Most of the users are not willing to pay for general human well-being ecosystem services and have a strong incentive to free use of these services.

A threatening aspect of financing PES schemes is the fact that the economic value of biodiversity is not reflected in pricing of ecosystem services and decision making. Biodiversity and the services it underpins have significant economic value that is seldom captured and represented in markets. Due to that biodiversity escapes pricing and is not reflected in society's accounts, biodiversity often falls victim of competing claims on nature and its use.[30]

A possible threat for PES implementation is also represented by some financing models in place in a few EU countries financing forest management from various sources (stakeholders). In these cases one entity is not the only financer of a specific type of forest management, but the funds are provided from more stakeholders, for example state, private sector and EU funds. This situation is typical in Austria and Switzerland, where private corporations (e.g. ski resort owners) give support to forestry activities for the construction of forest roads, forest ameliorations, etc. (Viszlai & Hajdúchová, 2013). In this case, limitations in forest production in protected areas are supported form other sources, but ecosystem services are not directly supported. Forest managers are satisfied, but the private companies pursue objectives that only in a few cases are connected with nature protection and enhancing biodiversity. Because of that, these models cannot be considered PES schemes; on the contrary they are a type of forest management financing mechanism.

5.6 SWOT Analysis outcomes

The SWOT analysis of PES identified some important aspects of the PES implementation process. Table 2 shows a synthesis of the SWOT analysis results. The table contains four quadrants, each representing one part of the SWOT analysis: strengths, weaknesses, opportunities and threats. The table highlights key findings from each part of the SWOT analysis.

[30] COM(2011) 244 final. Our life insurance, our natural capital: an EU biodiversity strategy to 2020

Table 2: SWOT analysis of Payments for Ecosystem Services.

Strengths:	Opportunities:
- PES can be considered as supporting instruments of forest-related policies. - EU policies call for multifunctional forest under sustainable forest management. In this framework PES could play an important role. - PES are recognised as a key Marked-Based Instrument for achieving environmental protection goals. - In most cases it is feasible the clear identification of the ecosystem service provider/seller and consumer/buyer. - Voluntary approach for some PES schemes.	- EU biodiversity strategy to 2020 and other EU policies call for a framework that coordinates and ensures mobilisation of resources to support biodiversity and forest ecosystem services. - PES are potentially eligible for funding from the new EU financial instrument on Natural Capital Financing Facility (NCFF). - Many good practices examples of well-functioning PES schemes – basis for development of new ones. - Setting of new markets for biodiversity "credits" and non-marketed ecosystem services such as watershed protection, etc. - The local character of PES schemes facilitates deal (transactions and players) identification.
Weaknesses:	**Threats:**
- Most of the compensation mechanisms in the PES schemes are based only on "opportunity cost", which means lost timber income. - It is hard to measure nature values and ecosystem services. Each group of ecosystem service require specific valuation methods. - Valuation methods could introduce bias depending on assumptions and available (local) data. - Ownership and tenure rights for forests are not always clear and well identified (e.g. because of restitutions of forest land).	- Issues related with efficiency of PES schemes - social inefficiency, lack of additionality, role of targeting. - Generation of negative externalities. - Market failure related to the "public good" character of some ecosystem services. - Providing ecosystem services without pricing. - Other financing models (e.g. direct private payments).

6 Conclusions – possibilities for PES implementation

Results of the SWOT, analysis of policy documents, case studies and literature review on PES in the forest environment produced a series of relevant aspects for PES schemes implementation. The four parts of the SWOT analysis are balanced regarding positive and negative aspects. It is promising that we found more strengths and opportunities than threats and weaknesses, which lead to the conclusion that a Strength-Opportunity strategy for PES implementation can be followed. In other words, it means using strengths to maximize opportunities. Nevertheless, PES supporting actions should take into consideration the weaknesses and possible threats.

There are some key findings derived from the analysis presented related with PES implementation:

- The reviewed EU policy documents call for sustainability, development, cooperation and fostering forest biodiversity. Therefore, there is a demand for instruments able to support environmental protection and maintaining forest ecosystem services goals, specifically non-marketed ecosystem services. Indeed, one of the foreseeable advantages of the implementation of PES schemes is to maintain a sustainable supply of non-market forest services and maintain and improve biodiversity levels.

- PES schemes are considered economic instruments for policy implementation (Dunn, 2011). However, for a successful implementation of PES schemes it is necessary to approach each payment for specific services individually and identify the framework which should be followed. It is also important to develop the market by creating legal conditions and rules for trading, as well as defining controlling and supporting organisations. It is also necessary to have clear deal identification

(identify services, service buyers and sellers) and negotiate deal details and agreement structure.

- An equally important point of PES implementation is valuation of ecosystem services. Valuation methods show methodological limitations, hence it is necessary to have validated and accepted approaches for valuing different groups of ecosystem services. This is because some ecosystem services require specific suitable methods, and one size doesn't fit all in this case.

- There are examples of well-functioning PES schemes in the forest sector in Europe. These examples represent a basis for development of new PES. Nevertheless, the local character of PES schemes requires precise deal identification and assessment of local socio-ecological conditions.

Acknowledgments

This study was implemented in the framework of the Unpaid Visiting Scientist Agreement No. 11/IES/2015 awarded to Igor Viszlai and supervised by José I. Barredo and Jesús San Miguel. The views expressed in this report are purely those of the writers and may not in any circumstances be regarded as stating an official position of the European Commission.

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List of abbreviations

CEECs	Central and Eastern European Countries
CTN	Close-to-nature (forestry)
CVM	Contingent Valuation Method
EC	European Commission
ES	Ecosystem Services
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
JRC	Joint Research Centre
MAES	Mapping and Assessment of Ecosystems and Their Services
MBI	Market Based Instruments
MEA	Millennium Ecosystem Assessment
MS	Member States
NCFF	Natural Capital Financing Facility
NGO	Non-governmental Organization
PES	Payment for Ecosystem Services
SFM	Sustainable Forest Management
SWOT	Strengths Weaknesses Opportunities and Threats (analysis)
TEEB	The Economics of Ecosystems and Biodiversity
UNECE	The United Nations Economic Commission for Europe
VAT	Value-added Tax

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doi:10.2788/957929

ISBN 978-92-79-62212-0