Analysis of Payments for Forest Ecosystem Service in the Pan-European Region
1 Introduction to payments for forest Ecosystem Services

The ecosystem services approach describes ecosystems as natural capital stocks that provide diverse goods and services for human societies (Costanza and Daly 1992; Daily 1997; de Groot et al. 2002; MA 2005; TEEB 2010, MAES 2013, 2014, 2018). Despite the long-term awareness of the importance of ecological functions for livelihoods, the origins of the modern ecosystem service approach are to be found in the late 1960s and the 1970s (Ehrlich and Ehrlich 1981; Helliwell 1969; King 1966; Odum and Odum 1972).

The expansion of pricing mechanisms to ecosystem services has followed two main approaches. The first consists of a “Pigovian solution” where public intervention plays the leading role in the correction of “market failures” through state taxes and subsidies. The second approach, prominent since the 1980 and 1990s, follows a “Coasean solution” whereby correction of market failures is addressed through private transactions, often in markets where ecosystem services can be freely sold and bought. Coase (1960) identified well established property rights and low transaction costs as necessary preconditions for efficiently addressing externalities through direct negotiation. These approaches for correcting market failures have been implemented via two main mechanisms: markets for ecosystem services and payments for ecosystem services (PES). (Comment by UK: the extent to which low transaction costs and the establishment of property rights have been implemented is debateable) Thus, the “polluter pays principle” which underlies the former is complemented by the “steward earns principle” which underlies the latter.

The polluter pays principle is grounded on an alleged ethic of responsibility, according to which the economic agents causing environmental harm should carry the economic costs of the negative externalities they create. Since the 1980s the polluter pays principle has been incorporated in legal texts. In Europe it was included in the Single European Act of 1986 (article 174), in the Maastricht Treaty (article 130.2), and in the Treaty establishing a Constitution for Europe (article III, 233.2), which has stagnated since 2004. At international level, the polluter pays principle was adopted by the Organization for Economic Cooperation and Development (OECD) in 1972, and was contemplated in the Declaration of the Rio Summit on Sustainable Development of 1992 (article 16). Since the 1990s the leading instrument used to operationalize the polluter pays principle are the so-called Markets for Ecosystem Services (MES).

If negative environmental externalities are addressed through the polluter pays principle, positive externalities are dealt with through the steward earns principle, as an underlying logic for making payments for ecosystem services. The underlying rationale is that beneficiaries of ecosystem services should compensate the stewards that maintain or protect the services from which they benefit (Gómez-Baggethun and Ruiz-Pérez 2011). The widespread expansion of PES as integrated development and conservation scheme, however, dates fundamentally from the last two decades (Wunder et al. 2008).

The concept of commodification refers to the expansion of market trade to previously non-marketed areas. It involves the conceptual and operational treatment of goods and services as objects meant for trading. It describes a modification of relationships, formerly unaffected by commerce, into commercial relationships. Commodification of ecosystem services thus refers to the inclusion of new ecosystem functions into pricing systems and market relations (Gómez-Baggethun and Ruiz-Pérez 2011). It takes place though four main stages: economic framing, monetization, appropriation and commercialization.

The first stage consists of the discursive economic framing of ecosystem functions as ecosystem services, which started with the anthropocentric interpretation of ecosystem functions and continued with the application of the ecosystem service concept from the 1960s (Gómez-Baggethun et al. 2010).

The second stage takes place when the use values embedded in ecosystem services are expressed as exchange values through monetization or pricing. The conceptual roots of this
process in economic theory have been traced back to the early 19th century (Gómez-Baggettun et al. 2010), but relate more directly to the origins of the externality concept coined in the 1920s (Pigou, 1920/1932) and even before (e.g. Dupuit 1844, quoted in Maneschi 1996). Although economists have tried to attach monetary values to ecosystems since the late 1950s (e.g. Clawson 1959; Krutilla 1967), environmental scientists did not pay much attention to this work until the 1990s, when they systematized valuation frameworks (Bateman and Turner 1993; Freeman 2003; Heal et al. 2005; Pearce 1993; Pearce and Turner 1990; Turner et al. 2004). Finally, after the publication of the much-discussed paper by Costanza et al. (1997) that estimated the total worth of the Earth’s natural capital, valuation became one of the most frequent target of ecosystem services research.

The third stage consists of the appropriation of ecosystem services and operates through the formalization of property rights on specific ecosystem services, or on the lands producing such services. This stage has often involved privatization, through which ecosystems that were previously in openly accessible regimes, or in communal or public property regimes, have been turned into private property. Although the origins of this process can be traced back several centuries (Ingold 1986) the direct theoretical roots of the recent cycle of the privatization of nature lie in the influential contributions of Coase (1960) and Hardin (1968). The defence of the former for well-defined property rights was complemented with the advocacy by the latter for privatization (or alternatively appropriation by the state) of common pool resources as the way to avoid overexploitation.

The last stage in the commodification process consists of the commercialization of ecosystem services — i.e. the creation of institutional structures for ecosystem services sale and exchange. As with any other monetary market, MES and PES involve the definition of one or more services, which then become commodities subject to trade. The extension of MES and PES towards new ecosystem functions therefore involves, by definition, a process of nature commodification — i.e. an expansion of the commodity frontier into previously non-marketed spheres of the environment (Kosoy and Corbera 2010). The commodification process is finally completed with the implementation of institutional structures allowing for transactions in market exchanges, as occurred with the establishment of MES and PES schemes. [Comment by DE: leave it out or shift to some discussion section. “Polluter” has not been introduced yet at this stage. Reader might feel getting roped into a very differentiated discussion of details before s/he even knows what PES are. Moreover, the literature uses a number of controversial terms “commodification”, “anthropocentric interpretation”, “attach monetary values to ecosystems”, “appropriation”, “privatisation”, “commercialisation”]

Payment mechanisms for many non-market forest services are mainly economic instruments which aim to internalize environmental or depletion cost through financial incentives. It should enable forest service providers, e.g. forest owners, to be able to manage sustainably the forest without incurring costs out of proportion to the personal benefit received but does not necessarily mean that payment to the full value of all forest goods and services is possible or desirable (SFC 2008).

According to DEFRA (2013), the term PES is used to describe schemes in which the beneficiaries, or users, of ecosystem services provide payment to the stewards, or providers, of ecosystem services. In practice, PES often involves a series of payments to land or other natural resource managers in return for a guaranteed flow of ecosystem services or, more commonly, for management actions likely to enhance their provision over-and-above what would otherwise be provided in the absence of payment. Payments are made by the beneficiaries of the services in question, for example, individuals, communities, businesses or government acting on behalf of various parties. It is argued that payments for ecosystem services can be more economically efficient and more environmentally effective (i.e. sustainable) than other incentive based approaches because they create a direct relationship between the supplier and the buyer of the service (Engel et al. 2008).

The basic idea behind PES is that those who maintain ecosystems in good condition and provide ecosystem services – like any service – should be paid for doing so. PES therefore
provides an opportunity to put a price on previously un-priced ecosystem services. The novelty of PES arises from its focus on the ‘beneficiary pays principle’, as opposed to the ‘polluter pays principle’ (DEFRA 2013). PES certainly contribute to the understanding of the importance of ecosystems in good condition and their services, bringing ecological awareness, as well as active social participation in governance (FAO NRMED 2010).

Vatn (2010) states that it may be important to differentiate between “the wider concept of PES and the narrower concept of markets for environmental services”. That is also acknowledged by Wunder himself (Wunder et al. 2008). Therefore, recently, there has been an increasing use of a less strict definition that relax some of Wunder’s criteria and put a greater emphasis on PES as an incentive mechanism: “PES are a transfer of resources between social actors, which 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).

Payment for ecosystem services (PES) is an example of a market-based mechanism (DEFRA 2013). PES, originally meant a cash transfers, include all financial and non-financial rewards (or compensation mechanisms) between buyers and sellers for the provision of ecosystem services (Wunder 2007). Clearly, PES is a market tool through which the public sector can directly and actively enter the green market and become a “buyer” of environmental services. (Comment by DE: The public sector would not be the primary actor here. Perhaps the whole paragraph fits better at a later stage.) A deep insight reveals that PES are strictly inter-linked to the conditions that enable a green economy as a whole (FAO NRMED 2010).

PES schemes are most likely to emerge in situations where:

1. specific land or resource management actions have the potential to increase the supply of a particular service (or services);
2. there is a clear demand for the service(s) in question, and its provision is financially valuable to one or more potential buyers;
3. it is clear whose actions have the capacity to increase supply (for example, certain land or resource managers may be in a position to enhance supply).

Especially in the absence of a legislative framework or functioning local governance, PES offer a promising mechanism for increasing the supply and compensating the cost of provision of ecosystem services (Schomers and Matzdorf, 2013) at least if there is some minimum protection of property rights. PES schemes represent a tool for maintaining and improving non-marketed ecosystem services and biodiversity levels and at the same time assuring the provision of marketed ecosystem services; and a possible path for diversifying and scaling-up various sources of funding for forestry activities. Moreover, PES can help to maintain sustainable forest management (SFM) and protect forest (Viszlai et al. 2016). (Comment by UK: explain how this links directly to SFM and forest protection. What ecosystem services are they referencing?) [PES can actuate as incentives for the providers of forest ecosystem 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. (Viszlai et al. 2016). (LUB)]

In the literature, PES schemes are well known according to the Wunder et al. (2008) definition as a voluntary transaction where a well-defined ecosystem service (or a land-use likely to secure that service) is “bought” by a (minimum of one) ecosystem service buyer from a (minimum of one) ecosystem service provider, if and only if the ecosystem service provider secures ecosystem service provision (conditionality).

The definition provided by Wunder is conceptually based on the Coase theorem (Engel et al. 2008, Gómez-Baggethun et al. 2009, Muradian et al. 2010) by seeking to internalize the positive externalities that ES provide through bargaining solutions between those who provide the services and those who gain from it and is theoretically rooted in the field of environmental economics (Gómez-Baggethun et al. 2009).
Drawing on this definition, there are seven key principles, which should ideally underpin any PES scheme.

1. **Voluntariness.** The voluntariness is the degree to which the contracting parties, service provider(s) and the beneficiary(ies), enter into an agreement and participate through a free and informed process of negotiation (Wunder 2005). The voluntariness principle is, therefore, a characteristic that differentiates PES from the more “government based” command and control measures. In fact, PES are negotiation processes where two or more involved parties participate with different degrees of power and participation (de Groot and Hermans 2009). Therefore, we can distinguish different degrees of voluntariness as for the actual degree of participation and level of information between the contracting parties (Fung 2006). Moreover, the role of governments and regulations may influence the voluntariness only from the supply side or the demand side, or both supply and demand side. The degree of voluntariness also relates to the concept of “additionality” (see the point No.4). [The provision of ecosystem services is “additional” to the business-as-usual scenario (Kroeger 2013). The assessment of additionality, therefore, depends on what is already required by law and what is the additional effect of the payment, regarding the ecosystem service provision]. (Comment by DE: fits better to #4).

2. **Beneficiary pays.** Payments are made by the beneficiaries of ecosystem services (individuals, communities and businesses or governments acting on behalf of various parties) (DEFRA 2013).

3. **Direct payments.** Payments are made directly to ecosystem service providers (in practice, often via an intermediary or broker) (DEFRA 2013). The less direct case is when governments play an intermediary role in the transaction between the final user and the service providers (Nisbet et al. 2011). The more direct case is related to where PES contracts are signed directly between beneficiaries and service providers, i.e. “bilateral agreements” (Bluemling and Horstkotte 2007).

4. **Additionality.** Payments are made for actions over-and-above those which land or resource managers would generally be expected to undertake (DEFRA 2013). The additionality principles describe “What would happen without the payment?”. To be additional, the increased provision of ecosystem services must be made in direct response to the payment. [The provision of ecosystem services is “additional” to the business-as-usual scenario (Kroeger 2013). The assessment of additionality, therefore, depends on what is already required by law and what is the additional effect of the payment, regarding the ecosystem service provision] (Comment by LUB: moved from #1) Several design factors influence the additionality of schemes, such as the spatial targeting of the contracts, differentiated payments, which lead to a higher cost efficiency (payments diversified according to the types of adopted management practices, the opportunity costs, etc.); conditionality as the capacity to tie the payment to the provision of the ecosystem service (Ezzine-De-Blas et al. 2016).

5. **Conditionality.** Payments are dependent on the delivery of ecosystem service benefits. In practice, payments are more often based on the implementation of management practices which the contracting parties agree are likely to give rise to these benefits (DEFRA 2013). Conditionality is the degree to which the service provision is conditional to the payment, and vice versa.

6. **Ensuring permanence.** [Management interventions paid for by beneficiaries should not be readily reversible, thus providing continued service provision (DEFRA 2013).] / [If the provision of PES involves long-term investments, then some durability of a contract is necessary (from the investor’s point of view), otherwise there is no incentive to investment (DE)]

7. **Avoiding leakage.** PES schemes should be set up to avoid leakage, whereby securing an ecosystem service in one location leads to the loss or degradation of ecosystem services elsewhere (DEFRA 2013).
While these principles should inform about the development of PES, in practice schemes may adhere to them to a greater or lesser degree. The literature on PES suggests that few existing schemes fulfil all these principles in practice and, as such, aiming for a ‘perfect’ PES scheme may create unrealistic expectations (DEFRA 2013).

Definitions of PES mentioned above stress the point of the transaction mechanisms, however Muradian (2010) focuses on type of actors and outcomes of PES mechanisms, giving a broader and more comprehensive definition that better fits existing examples. Most PES are thus best described as “PES-like” or “quasi-PES” schemes implemented by public entities, often acting in a rather complex institutional framework (Leonardi 2015; Bennett et al. 2014; Vatn 2010) (Figure 1). Moreover, some PES policies were initiated before the term “payments for ecosystem services” came into common usage and yet are based on the same theory.

**PES core schemes** – only schemes that strictly follow the 7 main criteria – voluntary transaction between a minimum one buyer and minimum one seller of a well-defined ES and with a strong conditionality attached.

**PES-like schemes** – incentives comply with only some of the five requirements. For example, some programmes may not have buyers paying voluntary for the service or other programmes may only have a low conditionality implemented or have a weak additionally.

**Other economic incentives** – a range of economic incentives as a PES where payments are made to achieve higher levels of ES streams in different contexts.

![Figure 1 PES definitions - between hard core and periphery (Wunder et al. 2008)](image)
2 Policy drivers [for the need of] / [underpinning (EC/JRC)] financing mechanisms and payments for FES in the pan-European region

Ministerial Conferences on the Protection of Forests in Europe (FOREST EUROPE)

At the 7th Ministerial Conference on the Protection of Forests in Europe held in 2015 in Madrid, FOREST EUROPE signatories expressed their commitment to recognise the key role of forest ecosystem services (FES). In the Madrid Ministerial Resolution 1 “Forest sector in the center of a green economy”, signatory countries committed themselves inter alia to:

- Promote the exchange of information on methodologies and practices on the valuation of and payments for forest ecosystem services as well as policy approaches.
- Make further efforts to have the full value of forest ecosystem services better reflected in forest related policies and tools inter alia national forest programmes or equivalents, guidelines, market based instruments and payments for ecosystem services.

To follow-up these commitments a FOREST EUROPE Expert Group was established with the aim to analyse different approaches, methodologies and best practice examples on valuation of and payments for FES in the pan-European region.

As part of the FOREST EUROPE strategy, signatories agreed in the Oslo Ministerial Conference in 2011 on a common vision, strategic goals, and European 2020 Targets on forests, one of them specially focussed on achieving: “the full value of forest ecosystem services across Europe will be estimated with a view to using common valuation approaches, and that values will be increasingly reflected in relevant national policies and market-based instruments such as payments for ecosystem services”.

To fulfil this goal FOREST EUROPE Expert Group was established and worked from 2012 to 2014 with the aim to give recommendations to policy makers on the pan-European approaches to valuation of forest ecosystem services and means to facilitate its implementation, bearing in mind that there can be a range of different possibilities. The report of the Expert Group identifies the challenges for valuing forest ecosystem services and further implementation of PES. In the Expert Group report, PES are identified as a key market-based instrument.

Prior to the Madrid and Oslo commitments, water related services were addressed in Warsaw Declaration (2007) and Warsaw Resolution 2 “Forest and Water” (2007) signed at the fifth Ministerial Conference, held in Warsaw in 2007. In the Warsaw Resolution, signatories committed themselves to implement tools for securing water-related services provided by forests, such as payments for ecosystem services.

Essential benefits provided by forests and the importance of the value of forest goods and services are recognised in Vienna Living Forest Summit Declaration “European Forests – Common Benefits, Shared responsibilities” (2003) signed at the 4th Ministerial Conference on the Protection of Forests in Europe, held in Vienna in 2003. The signatory countries committed to promote incentives that have positive impacts on sustainable forestry, and also to the removal of incentives that have negative impacts.

[The outcomes of Ministerial Conferences quoted here have had a strong influence on the forest policy development within the FOREST EUROPE signatory countries An example is the EU Forest Strategy (DE)]

A new EU Forest Strategy: for forests and the forest-based sector

In 2013, the Commission adopted a new EU Forest Strategy which 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. Its 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. Specifically the Multi-annual Implementation Plan of the new EU Forest Strategy 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**

The EU’s Bioeconomy Strategy and its Action Plan adopted in 2012 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. 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.

**Our life insurance, our natural capital: an EU biodiversity strategy to 2020**

This strategy is aimed at reversing biodiversity loss and speeding up the EU’s transition towards a resource efficient and green economy. It is an integral part of the Europe 2020 Strategy, and in particular the resource efficient Europe flagship initiative. The most important actions under this strategy 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 Action Plan for nature, people and the economy](#)

The Action Plan was adopted by the European Commission in 2017 to reach the EU's Biodiversity targets for 2020. The Action Plan focuses on four priority areas and comprises 15 actions to be carried out between now and 2019, whereas action 1 aims to promote the integration of ecosystem services into decision-making (EC/EUROSTAT).]
3 Actors involved in financial mechanisms and payments for FES

A PES scheme often involves different “stakeholders”, a term used here to cover all those with an economic or socio-cultural interest (whether expressed or not) in the ecosystem services provided by a PES scheme. The term encompasses anyone with a ‘stake’ in an issue, both those actors with influence (i.e. those controlling a resource), and those influenced (i.e. those affected by a change in the resource). Active involvement of stakeholders is here termed “participation”, which may range from “consultation” (effective or not) through to more or less complete control of scheme decision making (Thomson et al. 2014).

Although PES theory mainly refers to two actors (a service provider and a service beneficiary), other actors can influence the design and implementation of the contractual agreement. We can therefore summarize the main groups that are typically involved in a PES scheme as follows:

- **Buyers or beneficiaries** are those who are willing to pay for an improved or safeguarded or restored ecosystem service. In deciding whether to pay, the service buyers have to evaluate if it is worth investing or if some other alternatives could be economically better for them (Smith et al. 2006). These include citizens, water utilities, municipalities, beverage companies, etc.

- **Sellers or service providers** are land and/or forest managers whose change of management practice can potentially secure or improve supply of the ecosystem service. The service sellers provide the effort, change their habits, ways of working or make the concessions. They have to evaluate if it is economically worthwhile for them to make this change, if it will decrease profits. If they behave economically, they will not accept less than the opportunity cost of the scheme. This is the profit they would lose as a consequence of the changes in land use and management or restrictions on land use needed to comply with the scheme. Payment must be at least equal to the foregone net profit of upstream service sellers (Smith et al. 2006).

- **Knowledge providers** these include resource management experts, valuation specialists, land use planners, universities, participation experts, business and legal advisors who can provide knowledge essential to scheme development;

- **Regulators** can impose command and control measures that influence PES or can regulate and/or facilitate the start-up and the effectiveness of PES mechanisms. (Comment by DE: This might be too narrow, as some institutional framework will be necessary in any case)

- **Donors - funding agencies or sponsors** are public or private entities that fund the start-up and/or feasibility studies for a PES scheme.

- **Intermediaries** can serve as agents linking buyers and sellers and can help with scheme design, administration, implementation and operation. The role of intermediaries varies depending on the context, but they may provide information, additional funding, act as brokers, help build trust and facilitate transactions between the PES parties (Schomers and Matzdorf 2013), and reduce the overall costs of a PES initiative (Vatn 2010; Kemkes et al. 2010). They can come from the public, civil, private, or academic sectors (i.e. NGOs, public authorities, river trusts, forest owners’ associations, companies, etc) and can operate at local up to national and international scales.

Effectively linking users and providers through a PES scheme is challenging given the complex environmental, geographic, political, economic and social contexts in which PES operates. This reality motivates the potentially important roles of intermediary actors in PES design and successful operation (Moss et al. 2009). Intermediaries can “possess the ability to work across the often impermeable boundaries between different actor groups,
arenas of actions, or geographical scales which have characterized the governance of these infrastructure systems in the past” (Moss 2009).

As regards buyer(s) and supplier(s) there might be different combinations of these actors. We distinguish four types of market situations (Figure 2) (Lockie 2013).

**Figure 2 Possible configurations of provider(s) / supplier(s) in PES schemes (DEFRA 2013)**

**One to one** [represents a bilateral monopoly or oligopoly (UK)] with only one/few ES sellers and one/few ES buyers.

**One to many** represents a monopsony or oligopsony with many ES sellers but only one or few ES buyers.

**Many to one** represents a monopoly or oligopoly situation with only one/few ES sellers but many ES buyers.

**Many to many**, represents a PES situation with many ES sellers and many ES buyers (polypoly). The combination of different actors and market types originates several PES governance models that are broadly characterised in the next section.
4 Classification of payment mechanisms

The type of actors influences the design and implementation of PES schemes. Following the IAD (Institutional Analysis and Development) approach (Ostrom 2011), a comprehensive analysis has to take into account different aspects such as: i) preference and resource roles, rights and responsibilities; ii) preferences, interests, expectations and values; iii) actions and interactions, use and management of resources; iv) information sharing; v) lobbying; vi) deliberation. These aspects are all useful to better understand the decision-making processes upon resource strategy and management. Actors’ interactions create networks and rules on resource management and conservation. Main PES classifications are based on the type of actors such as public, private, private non-commercial. In this regard, there are three broad types of PES schemes (Greiber 2011; DEFRA 2013):

- **Public payment mechanisms** through which government pays land or resource managers to enhance ecosystem condition and services on behalf of the wider public. These are based on fiscal instruments (such as taxes or subsidies), relies on user fees, a government-driven system is established in which the public entity can play either as a provider or as an intermediary. In these schemes, the buyer is a third party (often in hierarchy) acting on behalf of service users, which “acquire(s) funding to compensate service providers through allocating revenues derived from earmarked tax revenues or general budget” (Porras et al. 2012). These kind of schemes are of a Pigouvian nature (Schomers and Matzdorf 2013). The participation of the end-users may not always be voluntary, as when all citizens are taxed regardless of their individual use of the service(s) provided. Such schemes are generally large in scope, provide legitimacy, and offer scale economies in transactions. On the other hand, government-financed schemes cannot always observe directly whether ESs are provided, they do not have a direct incentive to ensure that the scheme is working efficiently, and they are likely to be subject to side-objectives such as meeting political pressures or alleviating poverty.

- **Private payment mechanisms** are self-organised private deals in which beneficiaries of ecosystem services contract directly with service providers. These schemes represent direct payments by service beneficiaries to service providers, in which both providers and beneficiaries are private entities (individuals, groups of individuals, private companies); the government can participate only as an intermediary. In these schemes, the buyers are the end-users of the services. These schemes can be seen as “private deals” and reflect consumer service demand. They usually operate at a small scale, and target only one or a few services. They tend to have better monitoring, and are less likely to be subject to side-objectives. However, they may struggle to achieve legitimacy, and may involve high transaction costs (Porras et al. 2012). *(Comment by DE: Why is so that?)*

- **Public-private payment mechanisms** that draw on both government and private funds to pay land or other resource managers for the delivery of ecosystem services. These “acquire funding to compensate providers through allocating revenues derived from user fees or tariffs from a public utility or a regulated private utility” (Porras et al 2012). Public-private schemes, a specific subset of private schemes, in principle have the same features as a private scheme, except that the buyer (or one of the principal buyers) is a public utility. The feature which distinguishes public-private schemes from local public schemes is the role of the participating public utilities in public-private schemes. This role is limited to that of providing funds to the PES schemes in the role of a service buyer, just as any other private buyer would do. This means that the utility is not involved in the administration and management of the PES contract, as in local-public schemes, but participates as a contracting party of service buyers. In public-private schemes, the PES contract is thus administered by a third-party PES-management entity in the same manner as in private schemes.
PES schemes can be developed at a range of spatial scales, including international, national and local level (DEFRA 2013). Public schemes may operate at the local or national level, and private self-organized schemes are typically local schemes.

Public and private PES schemes may adopt different financial arrangements regarding the compensation to sellers and the collection of buyers’ contributions. The six most common financial arrangements include (for sellers) direct compensation, investment or development funds, and land purchasing and (for buyers) customer-charged payments, lump-sum contributions and tax-based contributions.
5 Other market-based mechanisms used in forestry

There are several types of market-based instruments that can be differentiated by the degree of government intervention, the nature of the transaction and the characteristics of the buyers and sellers.

Support measures of various forms such as transfers, payments, assistance or protections are generally referred to as subsidies (eftec and IEEP et.al 2010). Subsidies or subventions are government payments to individuals or legal entities without being directly conditional on any defined output. The payments are connected to certain requirements and aim to reward desirable behaviour. Subsidies are paid to all subjects who fulfil the set requirements. The forms of subsidies are manifold, including direct payments, low interest rate credits, state guarantees or tax exemptions (indirect subsidies) (DG AGRI 2008). They may be justified to correct market failure e.g. to encourage socially beneficial behaviour. Subsidies can be environmentally friendly or environmentally harmful depending on what activity they are designed to support and the environmental impacts of that activity (eftec and IEEP et.al 2010). In forestry, they are used to support forest holdings economically (e.g. subsidising the construction of forest roads or other investments for rationalisation of forest production or innovation) or to guarantee the provision of ecosystem services of forests. In Europe, subsidies are often given for measures of “multi-functional” or “close-to-nature” forest management. Specific purposes also include the protection of biodiversity, soil, air, water and recreational uses of the forest, as well as climate regulation, protection against natural hazards, landscape amenities, and historical and cultural sites. Subsidies may be granted by local, provincial, national governments or supranational/international levels (DG AGRI 2008).

Public duties or taxes are financial charges imposed on individuals or legal entities by the state. Besides of the financing function for the state, taxes also have the function to control certain behaviours by putting a price on resource use. A special case is the use of environmental taxes (eco-taxes, ecological taxation) which promote ecologically sustainable activities. Eco-taxes aim to correct negative market externalities by discouraging people from overusing resources. There are two main aims for environmental taxes. The primary goal is to use taxes to increase the price of products which are considered to be undesired products, in favour of more environmentally friendly alternatives that become more competitive in comparison, as a result of the tax increase on other products. The second goal is to finance the costs of collection and treatment systems or other compensation measures. This is a relevant measure in forestry because the collected funds may be invested back into forests in order to manage them for multiple / social benefits; thus, such charges, known as earmarked charges would finance specific purposes. Special forms represent tax exemptions. They differentiate according to environmental impacts and honour environmentally friendly behaviour. Exemptions from tax duties can also be regarded a subsidy as some entities or behaviours are favoured. They are often used in forestry to compensate for legal restrictions on the use of forests, e.g. in protected areas (eftec and IEEP et.al 2010; DG AGRI 2008).

Credit programmes may be implemented as “bubble” scheme (a number of stationary emission sources are assigned a certain limit together), an “offset” scheme (firms buy pollution allowances from other firms that abate their emissions), or a “banking” scheme (where firms may store earned emission credits for future uses) (DG AGRI 2008).

Under a cap-and-trade scheme a cap is established for the use of a certain resource or the release of certain pollutants. The cap is the aggregate maximum amount of subtracted material or of pollution that can be released by participating entities. Tradable permits or credits are then allocated by dividing up the allowable overall total among those who participate in the established market. Industries or companies can sell permits that they do not need to other participants who need more than their allocation. This rewards companies which cut their pollutant discharge while it penalises those who pollute more heavily, and thus, creating an incentive for them to invest in pollution control. Trading increases the economic efficiency of
resource management, by enabling companies or landholders to buy permits from those able to comply in a cheaper way (Smith et al. 2006; SFC 2008).

A typical forest-relevant application is the trade with greenhouse gases/carbon trade. Emissions may be reduced by cleaner technologies or other abatement measures. In the case of carbon emissions compensation is possible through carbon sinks or carbon sequestration. Forests act as carbon sinks as the carbon is stored in the woody biomass and other compartments of the ecosystem (as long it is not burnt or rotten). The Kyoto Protocol (UNFCCC 2006) has sanctioned offsets as a way for governments and private companies to earn carbon credits which can be traded on a marketplace (carbon offsets) (DG AGRI 2008).

Markets can also be created for other forest-related services such as water and mineral extraction or biodiversity. An example that works on the basis of legal obligations for compensation of adversarial impacts of development projects are conservation banks, in which projects with negative effects on the landscape or biodiversity pay into a bank for compensation. The bank holds/purchases land on which projects are realised to balance the adverse effects to the environment. Sites are chosen and managed for their natural resource values and special-status species or sensitive habitats. Sites may be natural (preservation) and/or include restoration, and/or creation of habitat (White 2008; Carroll et al. 2007).

The simplest pure market mechanism for the financing of forest benefits is the direct acquisition of goods (such as timber, fuel wood, forest fruits, mushrooms, greenery, etc) or services (such as catering, accommodation, education services or adventure, the right of access to the land or sport facilities, hunting and fishing rights, etc). The list of goods or services that can be traded on markets is long; however, the trade is not always well developed and the goods and services are partly defined as public goods by law or according to their nature. Purchase of goods and services is an important category that depends strongly on the innovation and marketing activities of land owners. (Mantau et al. 2001; Rametsteiner et al. 2005). In the field of forest goods, marketing could be further developed with better organisation of the whole value chains. With regard to the marketing of services many possibilities exist but these opportunities are rarely utilised by land owners. Territorial marketing is an innovative approach of marketing bundles of goods and services of a particular region (DG AGRI 2008).

The purchase of land is an expensive way to secure the provision of desired products, but it is also very simple. It is an appropriate organisational solution if the production requires a specific way of management of the land and if the management know-how is on the side of the user. The characteristic of this mechanism is that the property rights lie in the hand of one person or legal entity. As the owner can freely and flexibly decide on the management of the land he/she may choose the management strategy, may change this strategy in future, may manage for multiple benefits, and may change the management goals at any point in time. Furthermore, the future provision of the goods and services from the land is not dependent on markets or the will of providers. In many cases a certain piece of land is required for the provision of the desired service (e.g. recreation forest or water reserve) and only one party is interested (e.g. nearby municipality); in this case there is a double monopoly and no competitive market exists. The parties have then to agree on the basis of negotiations which strongly depend on the urge of need on both sides (wish to sell on the side of the land owner or political mandate to buy on the side of the interested user). Another possibility represents land lease. In a lease one person pays a rent for the right to possess a property that belongs to another person for a certain time period. The rent may be paid in one off but is typically given in yearly payments. Lease of forests is not as common as lease of agricultural land. Examples from forestry refer to specific uses of the land such as, for instance, for recreational purposes, sports facilities, use of drinking water sources, nature conservation or burial sites. Similar to land purchase, leasing is particularly suited for complex services or when the know-how of the production/land management is on the side of the interested party. These mechanisms are of importance in cases when the users have a high interest in a specific type of land management,
Sponsorship is a business relationship between a sponsor who provides financing, resources or services and a party which offers certain benefits in return. It is a contractual agreement with mutual benefit and the value of the provided financing can usually be deducted from the company's tax dues. Usually the commercial advantage is to establish an association between the sponsor's image, brands or products and the sponsorship investment. Typically, the sponsor receives the right for advertisements or may also receive benefits for their staff. Sponsors may successfully be found for the support of events or projects that offer a high public visibility (e.g. large audience of an event or visitors of a site). Further, the audience should be the target group of the company in order to receive the intended advertising effect. The sponsoring of cultural or ethical projects – such as in the case of eco-sponsoring – usually works in the way that the money is used for charity and for projects in the public interest – such as biodiversity conservation or the preservation of beautiful landscapes. Eco-sponsoring is usually done by enterprises in order to illustrate their care for the environment and for sustainable development. Typical projects are afforestation, maintenance of natural monuments, nature conservation or restoration projects, nature-related sports or cultural events, environmental education, etc. There should be a connection to public benefits and an appropriate audience (DG AGRI 2008).

Donations are gifts given voluntarily and without return consideration. They are typically given for charitable purposes. Donations take various forms, including cash or other funds, goods and services including voluntary work. They may be given by organisations or private persons, including commercial organisations. In contrast to sponsoring, the firms donate without expecting direct benefits in return. In the case of donations, the charity purpose would be in focus. Forest-related donations are often given for the preservation of rare or beautiful trees or sites, recreational facilities, environmental organisations, or projects in development cooperation. Similar to sponsoring, it is not easy for forest holdings to attract donations. Projects that gain high importance on local level or are connected with specific purposes are still promising. A possible strategy may be to find partnership with influential local institutions or a well-established organisation that is interested in the project. Examples for donations for forestry projects are often found on local level (e.g. sponsorship of extraordinary trees or stands by private persons, or funding of educational activities by local companies) or in cooperation with environmental NGOs that raise funds for the purchase or lease of areas of specific interest for nature conservation (e.g. purchase of natural forests that are at risk to be developed for commercial purposes). The most commonly used is the symbolic sponsorship of one tree, one hectare, one species, etc. (DG AGRI 2008).

An innovative financing tool for nature conservation and landscape preservation is also auctioning. Elements of a certain landscape are offered by the land-owners and their maintenance can be secured by organisations or citizens for a certain time (Wensing and van Santen 2008).

Certification is the process of indicating through labelling that a commodity complies with a set of regulations governing the production process. As a market tool it creates niches, increases product recognition and/or secures market access. It can also be used to achieve social or environmental efficiency by defining minimum performance requirements (Taylor 2005). It is defined as the confirmation of a certain property or quality of a person, organisation, product or process by an authority or an independent party. The basic idea of ecolabels or sustainability labels is that consumers support through their responsible choices environmentally friendly and sustainably produced products. It means that consumers buy certified sustainable supplies and pay a premium for promised ecosystem benefits. The most important certification schemes in forestry refer to timber from sustainable forest management. The certification is an instrument for integrated nature conservation because ecological and social standards are requested by the certification systems. The certification should provide market benefits to the producer/trader in terms of higher prices or increased
market shares. In Europe, two main certification schemes are particularly relevant: the FSC (Forest Stewardship Council, with around 100,000 ha certified forests worldwide) and the PEFC (Pan-European Forest Certification, since 2003: Programme for the Endorsement of Forest Certification Schemes (around 200,000 ha) standards. For other forest goods, especially food, the certification of organic production may be considered. Organic standards do also exist for food production in the agricultural sector. Certificates of origin guarantee that a product has been produced in a defined region. In regional certification, often also certain quality standards are included, e.g. the sustainable management of the regional resources or the use of particularly ecologically valuable tree species (DG AGRI 2008).

(Comment by LUB: Examples of financing mechanisms will be available at the FOREST EUROPE Web-based portal on FES)
6 Development and implementation of PES schemes

Before development of any PES scheme, it is important to have a suitable institutional background. Every PES scheme should follow the key steps of its development (Figure 3). For successful implementation of PES schemes it is necessary to approach each payment for specific service individually and identify the framework which should be followed. In some cases, it might be a necessary precondition to develop market by creating legal conditions and rules for trading, as well as defining controlling and supporting organisations (Viszlai et al. 2016).

An important aspect of PES development and implementation is the clear deal identification i.e. to clearly define who is the ecosystem service provider (seller) and who is the consumer (buyer), as well as the details of the good and its provision. To identify service providers is not usually difficult. 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. Besides that, 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 (Brand 2002).

A PES scheme can focus on more than one ecosystem service. Those services being sold are then described as having been „packed“. Ecosystem services can be packaged in three distinct ways (Figure 4) (Smith et al. 2013; DEFRA 2013):

- **Bundling**: a single buyer, or consortium of buyers, pays for the full package of ecosystem services that arise from the same parcel of land or body of water. For example, an agri-environment scheme funded by government on behalf of the wider public.

- **Layering**: multiple buyers pay separately for the ecosystem services that arise from the same parcel of land or body of water; layering is also sometimes referred to as ‘stacking’. For example, an area of peatland is restored and yields a range of saleable ecosystem service benefits. The carbon sequestration benefits are purchased by a business, the water quality benefits by a water utility, the flood risk management benefits by the government on behalf of downstream communities, and the biodiversity benefits by a wildlife charity on behalf of its membership.
• **Piggy-backing**: in this case, not all of the ecosystem services generated from a single parcel of land or body of water are sold to buyers. Instead, a single service (or possibly several services), is sold as an umbrella service, whilst the benefits provided by other services accrue to users free of charge (i.e. the beneficiaries ‘free ride’). For example, a business pays an upstream land manager for riparian restoration work to reduce the downstream flood risk to its bankside facilities. These improvements simultaneously improve water quality, enhance recreational values and provide habitat for wildlife. However, no buyers are found for these additional services and the benefits they provide are received at no cost to end users.

![Figure 4 Approaches to “packaging ecosystem services” (Smith et al. 2013)](image)

**How PES works in practice**

Understanding how PES mechanisms work in theory and in practice, and knowing their limitations, is crucial for exploiting their full potential as a policy tool for solving complex environmental problems we are confronted with (Prokofieva 2016).

For a PES scheme to work it must represent a win for both buyers and sellers. PES may be positive from a buyer’s perspective if the payments are less than those associated with any alternative means of securing the desired service. PES schemes may be positive from a seller’s perspective if the level of payment received at least covers the value of any returns foregone as a result of implementing the agreed interventions (DEFRA 2013) (Figure 5).

![Figure 5 How payments for forest ecosystem services work (adopted from Smith et al. 2013)](image)
It is important that the financing structure of any PES should be sustainable and sufficient. This ensures that the incentive to provide the ecosystem service remains even in the face of continued competing land uses. In order for PFES schemes to be successful, it is important to achieve a win-win situation for both sellers and buyers. The payment offered to forest owners or forest managers must exceed the additional benefit they would receive from the alternative forest use (or they would not change their behaviour) and must be less than the value of the benefit to FES users (or user would not be willing to pay for it) (Engel et al. 2008). (Comment by UK: It is confusing) The minimum PES payment would be generally expected to at least cover any (private) return forgone by the forest manager as a result of reduced timber production. The theoretical maximum payment would represent the cumulative value of additional ecosystem service benefits that would accrue to the buyers. Many of these benefits are still hard to quantify (Smith et al. 2013).
7 Preconditions for implementation of PES

At first sight, the obstacles to PES implementation might seem formidable, but in many cases, PES just make transparent the contradictions that implicitly apply to other conservation tools. A number of preconditions for the implementation of PES emerge through the literature and practical experiences. (UNECE/FAO 2014):

- **Legislative and institutional framework**

  As Primmer and Karppinen (2010) stated, for PES to succeed, a number of legal and institutional frameworks, as well as a particular administrative culture, need to be in place. A regulatory framework is needed to allow deployment, legal recognition of services, enabling of contracts and payments, and avoid counterproductive or unintended distributional effects.

  Rules and institutions must have mechanisms to enforce contracts based on reliable contract law with good governance, and credible enforcement (IUCN 2006). Institutions define the roles of different actors in PES schemes, and are also important to facilitate transaction and reduce transaction costs, coordinate with other policies and mechanisms, set up insurance or other mechanisms to manage risks and provide related business services should the need arise. Furthermore, institutions provide vital direction for the valuation, utilization and conservation of ecosystem services, helping to avoid conflict between the conservation and use of natural resources (Vatn 2010). Effective governance is needed to support the establishment of PES schemes via legislation, for example laws to implement a new public payment scheme (UNECE/FAO 2014).

- **Ownership and tenure rights**

  For PES to work, ownership and tenure rights have to be clearly defined and recognized. Tenure is a generic term referring to a variety of arrangements that allocate rights to, and often set conditions on, those who hold land. Tenure regulates access to and use of resources (UNECE/FAO 2014).

  Ownership refers to a particular type of tenure in which strong rights are allocated to the landholder. Tenure arrangements may involve exclusive access (when only one person or group has access), or different types of access for different groups of people at different times. The ecosystem service provider must hold the rights to the service as a condition for PES because if property or use rights are unclear, the buyer of the service cannot define the conditions of payment. In situations where the land is open access with no clear private, public or communal owner, PES is not the solution (Ostrom 1990; Vatn 2010). Where resource access and ownership are disputed, “buyers” have little incentive to participate in a PES scheme as there is no guarantee that they will get what they are paying for.

  PES schemes are applicable to all situations where ownership is clear, however they are generally easier to apply to private forests and so are currently used on a larger scale in countries with predominantly private ownership. User-rights will also need to be respected, such as the right enshrined in the laws and traditional practice for the public to use the non-woody products and services of the forest (UNECE/FAO 2014).

- **Stakeholders and negotiations**

  The identification and participation of a number of key stakeholders is also necessary when making a PES agreement in forestry. As noted in the TEEB report, wide participation in decisions relating to PES design and implementation can help ensure transparency and acceptance and to avoid the covert privatization of common resources (TEEB 2010). Forest stakeholder analysis could help guide negotiations towards an agreement which is socially and politically acceptable as well as institutionally feasible (IUCN 2006).

  As forest stakeholders may include the general public, or specific groups within it, capacity building and appropriate support are needed to ensure that these potentially weaker-voiced
stakeholders are able to participate in negotiations, as successful PES schemes need a strong commitment by all parties (TEEB 2010). Advocates or representatives will be needed to ensure that the changes to forest use are acceptable to them, and bad publicity repercussions thereby minimized (IUCN 2006).

The variety of forest PES stakeholders and their interactions are present in Figure 6.

![Figure 6 PES stakeholders and their interaction (Pagiola 2003)](image)

Forest PES schemes are easier to implement where there is equal bargaining power between stakeholders, especially the service providers and the beneficiaries. (Comment by DE: Bargaining power influences the distribution of benefits, but not necessarily the probability of reaching an agreement) This can affect who is included in the scheme, the way the money is shared, the rate of payment and the conditions set for service provisions and access (TEEB 2010).

As a result of this, completing a forestry PES deal may take a long time. Throughout the negotiations, the aim should be to form an agreement that specifies the design and rules for operating a payment scheme, which is effective, efficient, enforceable, transparent, equitable and sustainable (IUCN 2006).

- **Monitoring, enforcement and compliance**

An effective monitoring and enforcement is necessary to ensure the continued functioning of the PES scheme, the delivery of the intended service and its measurement. Payments need to be clearly linked to good ecosystem condition and service provision and should be withdrawn if users of the forest resource abandon management practices associated with the service. Monitoring data of the services and ecosystem condition at the site can help improve the targeting of payments (TEEB 2010).

How compliance will be determined and monitored needs to be decided in advance. Self-monitoring and monitoring by service sellers and buyers using agreed procedures is also an option but, whatever the approach, it is crucial to clearly delineate responsibilities for providing compliance and agree on sanctions in the event of noncompliance (IUCN 2006). As many of forestry PES schemes involve vast areas of land, agreements on sampling and degree of non-compliance or delivery failure will also have to be agreed.

Control systems are an essential part of any PES scheme. Where these are already in place, for example to promote sustainable forest management or agro-environmental schemes, establishing a PES can be easy. However, this is rarely the case and the establishment of new control systems is often required, usually adapted from already existing institutions and structures (Vatn 2010) and shaped to the PES scheme (Corbera et al. 2009; Primmer and Karppinen 2010).
• **Ensuring permanence and avoiding negative impacts**

Permanence refers to the provision of an ecosystem service over the long term. This may be undermined by unforeseen events such as fires, hurricanes and the invasion of alien species, or illegal logging. Also, maximizing the provision of one ecosystem service may have negative impacts on the provision of others, in which case trade-offs will be involved (TEEB 2010). These factors should be taken into account in the PES conservation contract (OECD 2010).
8 Opportunities and risks associated with PES

Today, non-market goods and services of forests are often provided as positive external effects of sustainable timber production and through regulatory provisions. It is generally assumed that the societal demand would often be higher than the actual supply (DG AGRI 2008).

Nevertheless, there is a wide range of mechanisms for financing provision of forest goods and services that are in use, conventional regulatory and financing instruments are often not seen as effective and efficient in all cases (Cubbage et al. 2007). Some mechanisms could be modified to cover goods and services other than those originally targeted.

In the past few years, a clear trend towards market mechanisms already can be observed. Market-based instruments (MBI) have been increasingly recognised as important policy mechanisms for achieving environmental protection goals. 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 (Viszlai et al. 2016). Therefore, the creation of markets and especially local contractual systems should receive increased attention and support. Situations where the market can play a role in the provision of goods and services should thus be stimulated, while maintaining public payment schemes (SFC 2008).

Researchers and policymakers have tried to develop new ways of compensating landowners for forest goods and services – PES (DG AGRI, 2008). PES play an important role in the MBI toolbox and are recognized as a key MBI for achieving environmental protection goals (Snowdon 2015). Since many such market mechanisms are often still in the project/starting phase, monitoring of their performance, exchange of results and awareness raising is required for broader implementation (SFC 2008).

PES should not be seen as an end in itself, but it is a policy tool with several advantages and opportunities:

- **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. And in this point appears the strength of PES schemes - the buyer of ecosystem services support the ecosystem services provider by payment, which might compensate a shortage in timber production. PES might play a role considering the increasing societal demand of non-marketed forest services (UNECE/FAO 2014).

- **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, 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) (Viszlai et al. 2016). It represents an opportunity to engage previously uninvolved actors (especially in the private sector) in conservation activities. Their behavioural changes are promoted with positive incentives rather than coercion, more likely leading to transformational change (UNDP).

- **Gómez-Baggethun et al. (2010) point out that the focus on payment schemes has contributed to attract political support for conservation, but also to commodify a growing number of ecosystem services and to impose the market logic to tackle environmental**
problem. The easily understood PES arrangements have already been shown to be useful tools in raising awareness about environmental issues with the general public (UNECE/FAO 2014).

- PES brings opportunities for actions on political-institutional systems and enterprise development for innovation and enhancement of the marketability, as well as the development of direct sales of previously non-marketed non-wood forest goods and services.

- Funding for environmental protection in most countries is done by complex systems of tax, subsidy, penalty and budget. Compared to other resource management approaches, PES schemes are often recommended as being more flexible, more easily applied and more cost-effective, allowing high customization to local circumstances (Ferraro and Simpson 2002). PES makes a simple link between the use of an environmental service and the payment, which goes directly to providing it. Any system like this which can be easily grasped by the public, the media and opinion formers can be immediately seen to be ‘doing good’ in environmental matters - forests are saved (UNECE/FAO 2014).

- Although PES programs are not designed for poverty reduction / wealth redistribution (DE), there can be important synergies with social aims when program design is well thought out and local conditions are favourable. [This might specifically support the European policies for rural areas (DE)] According to Pagiola et al. (2005), PES may reduce poverty by making payments to poor natural resource managers and may offer distributional benefits, if poor communities can improve their livelihoods by offering and selling their ES and through access to new markets (Wunder 2005). (Comment by DE: the poverty issue might not be fully connectible to the European policy environment, therefore I tried to focus on the rural areas issue instead)

- Besides providing cash to land users, PES schemes may also provide non-monetary benefits such as training, specialist advisors, infrastructure improvements or technical support. Furthermore, PES schemes bridge the interests of landowners, resource users and nature itself, and can therefore be seen as an efficient tool to address a set of problems. Rural communities can benefit from increased knowledge of sustainable resource use practices that are usually connected to PES through the provision of training and technical assistance. However, it is not well understood whether or not these potential benefits are realised in practice, or how they depend on scheme design (Thomson et al. 2014).

- PES provides a potential platform to integrate conservation and climate efforts into a common policy framework, and facilitates the transition from an economy of production to an economy of stewardship (UNECE/FAO 2014).

- Implications for public relations. Being involved in a PES offers a publicity boost for the companies involved. This is a benefit for the company involved, although it may mean that the reputation of PES may rise or fall with the reputation of these high-profile companies (UNECE/FAO 2014).

On the other hand, various difficulties and challenges can be recognized in the implementation of these new financing mechanisms, that can partly be explained for being in early stages of the innovation process and for the weak support provided by the institutional system. The coverage of the initial costs of such initiatives also often forms a bottleneck (SFC 2008). However, we should not forget that we still operate in a field where the marketability is and will stay restricted, at least to a certain extent. The most common risks are associated with following:

- The definition, understanding, measuring and economic assessment of ecosystem services at appropriate scale and precision remains a basic challenge for the implementation of payment mechanisms. While this requires appropriate scientific knowledge and technical competences and skills, it also builds on stakeholder consultation. Besides the site-specificity of services, the sharing of knowledge and experiences can help reducing costs
and promoting a more efficient approach to the study of ecosystem services and the implementation of payment mechanisms. Information can also allow the development of an accounting system focusing not just on ecosystem service flows, but also on the natural capital (stock) (Leonardi et al. 2016).

- A pre-requisite for establishing a payment scheme is the existence of institutional and political support. The application of a specific payment scheme depends on the interest and willingness of involved actors, laws and regulations in place and sufficient financial resources. In general, society may be willing to pay for non-wood forest goods and services, but operational mechanisms supporting valuation and financing remain comparatively rare due to low interest or limited information and are not fully reflected in forest policy. These shortcomings should be made more explicit to policy-makers while exchange between countries/regions on practical examples could be used to devise clear guidelines for implementation of successful mechanisms (SFC 2008).

- Constraints in the creation of markets are often related to high transaction costs (include the cost of identifying and selecting service providers, attracting potential demand/buyers, negotiating and developing contracts, training, monitoring, reporting and follow-up activities, etc.) and/or the legal and socio-economic framework, such as the open access to forests and everyman’s right. Also, people may not be aware of the real value of non-wood forest goods and services and expect to use them for free even when this is not legally the case. In this regard, the environmental and social benefits of forests could be characterised as undervalued. Some people, however, regard them as valuable but expect them to be paid from public budgets (SFC 2008).

- 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 (Viszlai et al. 2016). Changes in land management rules and regulations may also have a significant impact on ecosystem service delivery and the PES.

- Failure to monitor the effectiveness of the compensation schemes, including risks of not fulfilling the performance condition. Inappropriate or absent monitoring and evaluation of PWS is commonly referred to as a strong limitation to identifying both their direct and indirect impacts on both human (i.e. socio-economic) and environmental systems (Asbjornsen et al. 2015). Despite the increasing number of PWS experiences and the growing global attention by scientists, practitioners and policy makers, several studies reported the failure in documenting progress towards targeted hydrologic outcomes (e.g. Brouwer et al. 2011; Kroeger 2013; Reed et al. 2014) as well as in producing undesirable social, economic and environmental side-effects (e.g. Goldman-Benner et al. 2012).

- There is also the concern that tapping new income sources is particularly difficult for poor people, small land owners and developing countries (Landell-Mills and Porras 2002; Karsenty 2004; Bracer et al. 2007). A critical dimension of PES systems concerns their impact on the poor, because they may eventually lead to changes in property rights against the poor or against indigenous groups. Moreover, poor people lack the requisite skills, knowledge, contacts and resources to enter the emerging environmental markets and are therefore excluded from benefiting from such schemes (Landell-Mills and Porras 2002). Smallholders tend to be excluded due to high transaction costs, uncertainty of formal land titles and their limited impact on ecosystem services, which undermines a credible or substantial demonstration of additionality (Grieg-Gran et al. 2005; Engel et al. 2008; Pagiola et al. 2008; Wunder et al. 2008). This calls for special attention from governments, land owners and NGOs alike when attempting to apply MBI. (Comment by DE: This rather applies to a development discussion, which would make sense to discuss for European conditions, too, but our stakeholders might not like the word “poverty“ applied to them. There it might make sense to convert this to “rural area/smallholders”.)
It is also argued that PES may become counterproductive. Assume that the service was supplied as a matter of course and as a social obligation for free. When a system of payment is introduced to guarantee quantity and quality of service, the logic has changed. If the payments are now seen as insufficient, appeals to social obligation will be useless.

A number of successful examples for the application of PES mechanisms seem relevant, promising and feasible for the support of forest goods and services but their potentials are still not fully utilised and studied. Their real potentials and limitations can therefore not be assessed reliably. The lack of knowledge includes questions regarding the role of institutional actors in the development of MBI and in the support of innovation processes. It seems that improvements not so much depend on the development of new mechanisms but more on an increased use of knowledge and established mechanisms and their proper implementation (DG AGRI 2008).

Whilst the emphasis of PES has always been on improving the quality and permanence of environmental systems, it would be easy to label the contributions of companies as conscience money, paying for irreplaceable environmental damage. It is also sometimes argued that PES schemes can be unfair and can provide perverse incentives where payments go to those who have degraded or threaten to degrade their land, rather than those already sustainably managing it. It will be the job of any future PES scheme to address and allay such fears which will undoubtedly arise. Trading schemes will be particularly vulnerable to this criticism (UNECE/FAO 2014).

It could be seen that the environmental service paid in the PES scheme is not the most vulnerable, or most vital, service in the region, however it will benefit due to its fortunate proximity to an identifiable user. PES tends to favour environments involved with populated regions rather than, remote areas which may be under more environmental stress (UNECE/FAO 2014).

PES policies represent a growing trend in conservation policy. By altering private incentives to induce desired outcomes, PES schemes offer a direct, and possibly more equitable, method for achieving environmental outcomes than other approaches. However, the context in which a PES initiative is implemented matters greatly for effective policy design and the achievement of stated goals.

Whilst the foregoing has made the case for the usefulness and application of PES, it must be acknowledged that this approach does not exist in a vacuum and will need to ‘win the hearts and minds’ of the governments, private sector and the general public in the countries in which it is hoped it will be adopted (UNECE/FAO 2014). The importance of context in achieving policy goals emphasizes that no single policy is right for every scenario. Previous experience with incentive-based approaches suggests it is unlikely a PES approach will always be able to simultaneously improve livelihoods, increase ecosystem services, and reduce costs. Potential trade-offs among these goals can be assessed reasonably well by considering the correlation between characteristics of poor landholders and their land, characteristics of the costs and benefits of providing ecosystem services, and the political feasibility of various policy options (Kosoy et al., 2007). Special attention should be paid to securing tenure rights, because land-use is often the basis for schemes which normally compensate a restriction of land-use or finance specific management measures on a specific type of land (UNECE/FAO 2014).

Current knowledge and experience also suggest other areas in which additional research is needed. Several PES projects that have been running in developing countries for some time are starting to offer provocative findings about the use of PES mechanisms (Rosa et al. 2013; Sanchez-Azofeifa et al. 2007). However, new projects will only be able to learn from the successes and failures of their predecessors if the manner in which outcomes relate to the environmental, socioeconomic, and political contexts of the policy are systematically documented and compared across a range of cases. With more long-run experience, rigorous program evaluation will provide additional understanding of the effectiveness of different policy designs over time (Ferraro and Pattanayak 2006), as well as information on how PES
schemes respond to exogenous shocks. Collaborations between ecologists and economists can better specify the production function for ecosystem services. Communication actions should not only be directed at ecosystem providers or buyers; they also should target decision-makers and the general public because political support is often needed, especially during the early phases of development. Pilot projects are often a good way to demonstrate the relevance of PES and show results (UNECE/FAO 2014). This information will improve the design of input proxies and reduce the uncertainty surrounding environmental effectiveness. More research is also needed on how incentive-based mechanisms can account for potential trade-offs and synergies in the production of multiple ecosystem services. Additional analysis of large-scale PES policies can help us to understand the broader effects on the economy from scaling-up PES schemes (Xu et al. 2005; Sullivan et al. 2004).
9 Expected outputs

This document will serve as a background for the discussion at the second meeting of the Expert Group on Forest Ecosystem Services to be held in November 2018 as well as for the development of the FOREST EUROPE Web Portal on Forest Ecosystem Services, which is in line with the FOREST EUROPE Work Programme 2016-2020. The portal on FES will serve as a platform for knowledge and information exchange on valuation methodologies of and payments for FES as well as sharing best practices in this field. The web portal is a tool that aggregates available and published information on valuation of and payments for FES in one place via simple browsing systems. It will enable to facilitate decision-making on FES and select appropriate method for their valuation as well as appropriate financing mechanism. Policy makers will also have the opportunity to explore existing valuation methods and payment schemes implemented in FOREST EUROPE signatory countries. The portal will comprise three modules: (i) Introduction to forest ecosystem services; (ii) Valuation of forest ecosystem services; and (iii) Payments for forest ecosystem services. First two modules have been developed since 2017. Based on the background document provided by the Expert Group on FES in 2017, interactive schemes were created and provide simple orientation within different valuation methods. Schemes relatively quickly and clearly determine which method should be used to value individual FES. It also allows to show simple references to the explanatory notes (description of the method, its benefits and limitations as well as practical example of its use) where, if necessary, the user will find detailed information. Working version of the portal is accessible for Expert Group members via FOREST EUROPE Communication Platform (https://foresteurope.org/forestforum/communication-platform/?wpforo=signin).

From the second half of 2018, it is planned to expand the portal by the third module on payments for forest ecosystem services. The module will comprise an interactive map of FOREST EUROPE signatory countries including case studies of existing financial mechanism implemented in individual countries. Case studies will be collected from the FOREST EUROPE focal points, Expert Group members, international organizations, project outcomes, study papers etc. Users of the portal will be able to select cases in the interactive map by using the following criteria: (i) country/region; (ii) financing mechanism; (ii) type of forest ecosystem service.

There is a wide range of mechanisms for financing of ecosystem services that are in use. Table below illustrate the most used financial mechanisms for each type of forest ecosystem service. For this purpose, classification according to TEEB (2010) was applied. The table will be used when creating the third module of the portal.

[Please feel free to fill in the table according to your knowledge and experience]

<table>
<thead>
<tr>
<th>Classification of ES</th>
<th>Suitable financing mechanisms</th>
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</thead>
<tbody>
<tr>
<td><strong>PROVISIONING SERVICES</strong></td>
<td></td>
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<tr>
<td>Raw materials</td>
<td>Certification</td>
</tr>
<tr>
<td>Food / Raw materials</td>
<td>Entry fees, hunting licences, mushroom picking licences</td>
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<tr>
<td>Water supply</td>
<td>Taxes, tax exemptions, earmarked taxes, user fees or charges, Land purchase</td>
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<tr>
<td>Genetic resources</td>
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<tr>
<td><strong>REGULATING SERVICES</strong></td>
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<tr>
<td>Biological control</td>
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<tr>
<td>Regulation of water flows</td>
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<tr>
<td>Disturbance prevention or moderation</td>
<td>subsidies</td>
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<tr>
<td>Waste treatment (water purification)</td>
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<tr>
<td>Air purification</td>
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<tr>
<td>Climate regulation (incl. C sequestration)</td>
<td>Emission trading schemes</td>
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<tr>
<td>Erosion prevention</td>
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<tr>
<td>Maintaining soil fertility</td>
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<td>Pollination</td>
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<tr>
<td><strong>HABITAT SERVICES</strong></td>
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<tr>
<td>Maintenance of genetic diversity (especially in gene pool protection)</td>
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<tr>
<td>Lifecycle maintenance</td>
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<tr>
<td><strong>CULTURAL &amp; AMENITY SERVICES</strong></td>
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<tr>
<td>Spiritual experience</td>
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<tr>
<td>Inspiration for culture, art and design</td>
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<tr>
<td>Recreation and tourism</td>
<td>Taxes, tax exemptions, earmarked taxes, user fees or charges, land lease</td>
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<tr>
<td>Aesthetic information</td>
<td></td>
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<tr>
<td>Information for cognitive development</td>
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References
[tbd]