

# Policy instruments to preserve or restore woodlands and to improve the supply of forest goods and services

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***In this paper, the authors review the various tools to take into account the value of goods and services provided by forests. From regulatory «passive» instruments to «active» instruments allowing direct income to forest operators, advantages, disadvantages and implications of each are discussed, especially the payments for environmental services (PES).***

## **Introduction**

The economy of Mediterranean forestland is influenced by an increasing gap between financial and economic profitability in forest management, i.e. between the provision of market products and of public non-market services like carbon sequestration, biodiversity conservation, water quality enhancement and the promotion of forest tourism and recreation. In order to support the supply of public or common goods by the forestry sector a set of instruments have been developed (see Table 1). A broad distinction can be done between regulatory instruments (command and control or passive tools) not associated to any form of compensation for the forest owners/managers and active instruments that can create new sources of income for the sector operators (OECD, 2010). Traditionally Mediterranean decision makers have given priority to regulatory instruments: they are based on relatively low implementation costs and they can enhance the role of public institutions in law enforcement. These instruments however are associated with a top-down approach and they do not create any incentive to forest owners and managers to actively support the provision of non market services. Over-regulated forest resources can easily become non profitable; the final outcome is that they may be abandoned or mis-managed with negative effects (policy failures) associated to the spreading of forest fires and lack of regeneration.

## **Market based instruments**

To avoid the negative impacts of regulative instruments, active tools tend to be promoted. Among them the market-based instruments (MBI) aim to stimulate the consumer' and supplier' behaviours through the cre-

	Tools	Direct costs for the public sector	Transaction costs for the public sector	Approach	Participation by the privates	
Passive: Command and control	Thresholds, limitations, constraints	Relatively low	Relatively low	Top down	Compulsory	
Active: creation of new sources of income	Tax deductions, tax exemption	Relatively high			Voluntary or imposed by the State	
	Fixed compensation				Voluntary	
	Marked-based instruments	- PES schemes	Zero costs	Relatively high	Bottom up	Voluntary
		- PES-like schemes	Very low	Low	Mixed	Compulsory for some parties
		- PPP	Relatively high	Low	Top down	Voluntary
		- Land acquisition by public authorities or large companies (lease, concessions, ...)		Low		Normally voluntary
		- Tradable permits (cap & trade schemes)	Relatively low	Low	Mixed	Compulsory for some parties
		- Certification and labelling (premium price)	Zero costs	Zero costs	Bottom up	Voluntary
		- Sponsoring, donations (philanthropy)				
		- Information, provision of services, goods free of charge or a low prices	Relatively high	Low	Mixed	

**Table 1:** Policy tools to stimulate the provision of public goods

ation of financial motivations to properly manage forest resources. As in the case of regulative instruments, public authorities may have either a passive or active role to promote MBI, according to the type of service, its complexity and dimensional scale. Well defined services at a small scale are easier to achieve, while opposite situations may request a more active involvement of public authorities in order to reduce some constrains such as transaction costs for grouping the demand or supply, measurement protocols and general information access. In any case governments have a fundamental responsibility in order to set up and secure property rights (e.g. in the case of game, mushrooms, truffles, etc.). Relatively new in the south Mediterranean countries, MBI look promising approaches. Some authors (STAVINS, 2001; PANAYOTOU, 1994) suggest to subgroup MBI in further three different categories: 1) price-based, 2) quantity-based, that might be the evolution of a command and control instruments, and 3) market friction instruments.

1. Price-based instruments generally stimulate the provision of services mainly through grants, subsidies, soft-loans, concessions, auctions, etc.; they have a direct effect on service supply.

2. Quantity-based instruments limit the negative externalities by setting up a maximum production threshold on a given economic activity. Each economic agent may produce a certain quantity according to the purchased permits and in any case the total amount of permits is limited according a general agreement among the economic agents.

Among the most common quantity-based instruments cap-and-trade (i.e. where a maximum limit is calculated according a reference time), off-set (or no-net-impact) and mitigation banking have been implemented as economic tools for climate change mitigation (the first two) and wetland conservation (last one), in which a third party usually certify the compliance with a set of standards.

3. Finally, market friction instruments are tools to promote or even create a new service market. These tools vary from simple marketing strategies such as product differentiation and eco-labelling for less impacting products to more complex financial tools based on the environmental risk assessment of a given activity. Conservation insurance and leveraging eco-investments are two examples. Some of these tools are similar to the financial derivatives (i.e. Debt-for-conservation), where the reduction of natural resources in one area is compensated with the expected investment of another one. However, in the recent years, thanks to the demand analysis, more pressure has been put in contract-payment and service market creation based on schemes for the payments for environmental services (PES).

## Payments for environmental services

PES are defined as: 1) voluntary economic transaction based on a contract between at least two parties, 2) one supplier and 3) one buyer, that trade a 4) certain service and its provision is 5) ensured by the provider (WUNDER, 2005). While simple bilateral contract between private actors (see Figure 1) are rarely implemented, more frequent are PES developed by intermediaries due to the high number of payers and suppliers (see Figure 2).

If one of these five parameters is not fulfil, PES may be call PES-like scheme (WUNDER, 2008). This is the case (quite frequent in the Mediterranean region) when the buyer and seller are public institutions or if there is no voluntariness and the scheme is compulsorily enforced on one of the two parties. However, the two pre-requisite of having a well-defined service and the additionality condition must be respected in both PES and PES-like schemes. PES may last for one of more years, or even forever; its length is strictly related to the service demand.

The financial mechanism of a PES scheme might be explained through a simple graph (see Figure 3). In the business as usual (BAU) scenario a forest owner gains a certain level of revenue selling wood, while other forest stakeholders do not receive any benefit; e.g. a coppice forest managed with short-rotation large clear cuts in a mountain area. The missed benefits for the society associated to this management type can be a social cost related to land protection against floods and soil erosion as well as general loss of recreational activity and non-wood forest product (NWFP) harvest. A change of forest management based on the implementation of legal constraints, such as the reduction of the area of clear-cut, may reduce the social costs (scenario "A"): the forest owner has to reduce his/her revenue on wood production, while all the other stakeholders enjoy the benefits related to increased forest externalities.

Policy makers may consider an option based on some constraint to the forest owner rights without any compensation (win-loose system) and a consistent amount of money to ensure law enforcement and to restore degraded land. These costs will be covered through the general fiscal system. An alternative to this policy is moving toward a PES scheme: providers and consumers trade their utility to have a certain level of good and services from forest management in exchange of a monetary transaction to cover the forest owner's opportunity cost. In the scenarios "B" and "C", both parties have positive net gain

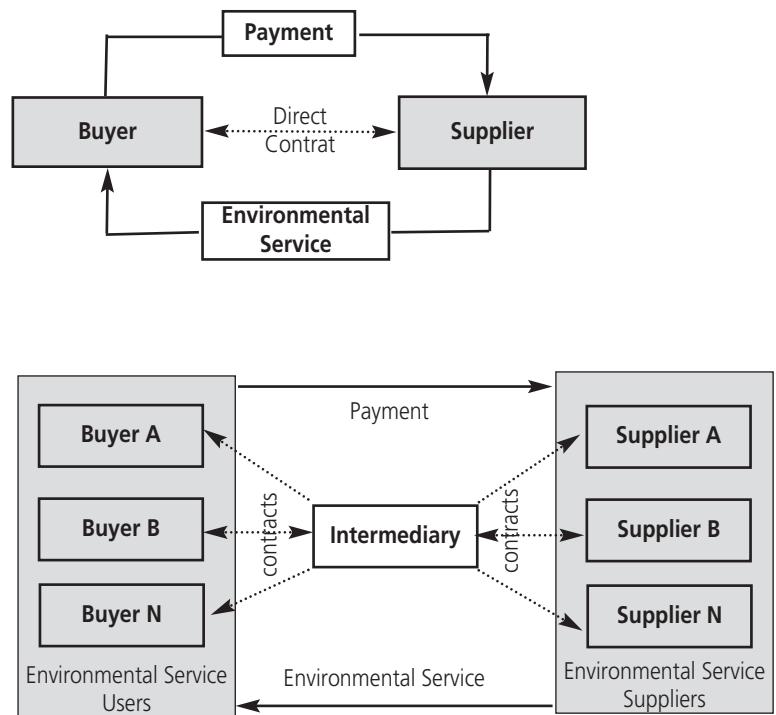


Figure 1: Direct PES

compared to the BAU scenario, both in terms of environmental service provision and equity between service beneficiaries and supplier. PES might be built for target externalities (scenario "B"), where the beneficiaries pay for a specific forest management that provides NWFP and recreation. In this case, NWFP collectors and recreational users will be the only beneficiaries. In fact the best theoretical scenario is "C", where all the externalities are compensated to the producer by a wider set of

Figure 2: Mediate PES

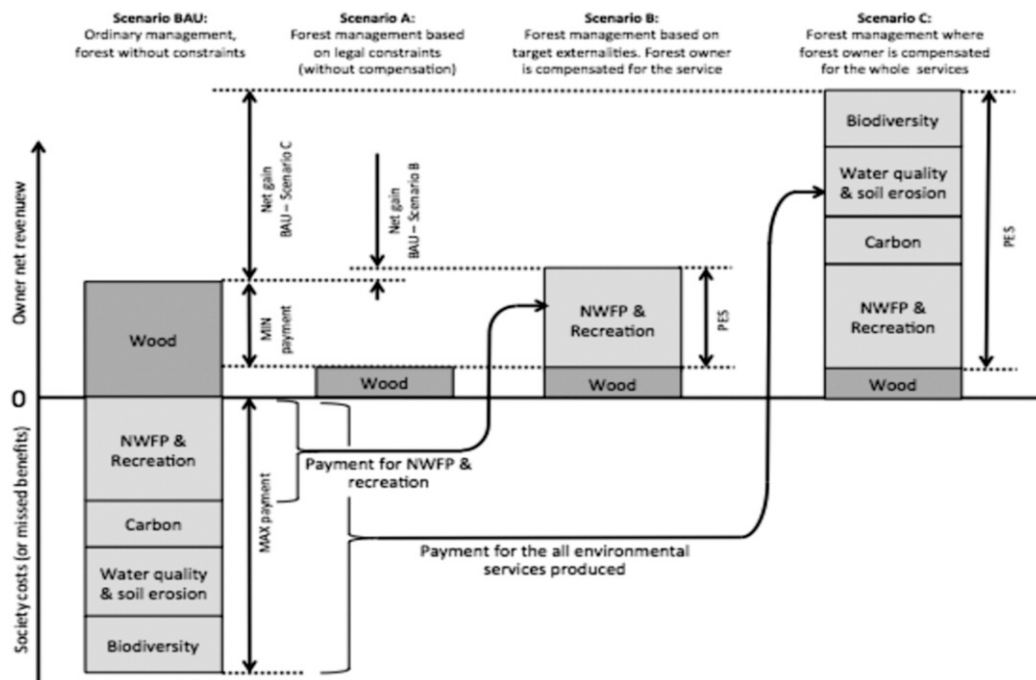
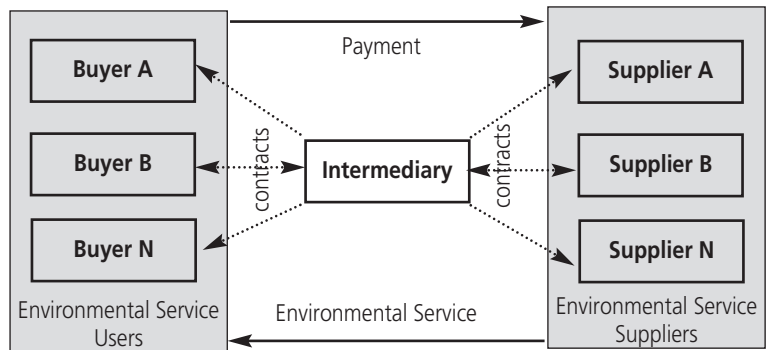


Figure 3: PES schemes for target and multi environmental service provision Source: Pagiola and Platais (2007) modified

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stakeholders; nevertheless PES schemes are commonly related to the scenario "B", where transaction costs are lower.

## Conclusion

Important factors influencing PES design and implementation are the service physical characteristics, the demand-supply relationship, the cultural context and institutional framework (e.g. property rights regulation). A huge constraint to any PES implementation is the buyers' or the suppliers' fragmentation; the high fragmented landownership and the absence of forest owner associations increase transaction costs. In such conditions, the role of national or local governments is fundamental (YANDLE, 1999; HILL, 1997).

In the Mediterranean region water PES are more frequent than other forest-based services, because it is relatively easier to define service buyers and suppliers in the catchment areas and link one another in relation to water quality or quantity issues. Positive examples are often reported on mono- or oligopsony markets typical of water-related services where the presence of one (e.g. a water authority) or few buyers reduces the negotiation costs and allows reaching the best agreement.

Cultural context is also important for the PES acceptability. People may accept the concept of service monetization but in other cases they might see PES as too strong limitations in their land use. The commercialization of access rights for recreational purposes is an example. In fact, small forest owners are generally not willing to sell part of their property rights, frightened by the fact the new users will damage their forest or create new privileges.

Property rights are of fundamental importance for PES design and clear excludability is a *condicio sine qua non* for PES scheme implementation (ENGEL *et al.*, 2008). However, policy makers in many cases are reluctant to legislate on high sensitive issues such as environment and water, where civil

society is frequently against any privatization process. Unlike a command and control approach, PES schemes usually increase the price to the service final users. Local users may associate at first glance a PES-like schemes to a form of environmental taxation.

Other aspects like efficiency, information symmetry, scalar invariance, ES provision monotonicity, and other elements related to the contract theory may play a relevant role in PES scheme design.

Probably in the future PES or PES-like schemes will substitute some of subsidy-based mechanisms in developing a more efficient and effective system of forest-related service provision. On the supply side landowners' associations may concretely support the development of PES through a decrease in the transaction costs, but in the future the most important role will be played by consumers' awareness and willingness to pay, *de facto* the real engine of the green economy.

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## Summary

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In the Mediterranean region, policy makers and forest managers are seeking for policy instruments to fill the gap between financial and economic profitability in forest management. This paper reviews these policy instruments focusing on the market-based instruments and specifically on payments for environmental service (PES). We focus on the implementation problems of PES schemes looking at barriers and opportunities offered to their development in the Mediterranean region.