

How do environmental economic incentives perform in Catalonia? Analysis of the experiences from forestry

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1. INTRODUCTION

Mediterranean forests provide to society multiple goods and services, including many public goods and positive externalities (biodiversity protection, landscape generation, CO₂ sequestration, microclimate regulation, erosion prevention, etc.) that play a crucial role in society's welfare and in the economic development of rural areas (*Palahi et al, 2009*).

Most of these goods and services remain, however, outside the market system, which accentuates a divergence between the social value of forests and the income their owners receive from forest activities. All this in many cases leads to the abandonment of forests or to their mismanagement. This is very relevant in the region of Catalonia, where 60% of its area is covered by forest lands and the 80% of them are private-owned (*IFN3 2007*). The consequences of this abandonment are, i.a., the increase of big wildfires, vulnerability of forest to pests or storms impacts, such as the windstorms of 2009 or the snowstorms 2009 and 2010 (*Plana 2010, Diari Forestal 2010*). In parallel, forest areas fragmentation, simple species' composition, human disturbances or doubtful of food or water availability in critical seasons, i.a. are causing a decrease in forest biodiversity.

Despite the difficulties which suppose the internalisation of the externalities, in the last decade certain entrepreneurs, NGOs and public institutions in Catalonia, based on citizens' demands and signed international agreements, have launched new economic instruments in order to cover these citizen demands (*Caixa Catalunya 2009, CPF 2008, Mavsar et al. 2008, XCT 2001*). However, according to some claims the size of forest territory currently managed as well as the quality of its management have not reached the optimal, which would cover the needs of society (*WWF 2006, Plana 2010*).

There is a need for analysing the experiences that have reached a certain degree of consolidation and identify success factors and shortages in their implementation. Following the scheme of *Kelsey et al 2008*, environmental, socio-economic and political context interact with policy design and together determine policy outcomes. The results could serve to improve the institutional framework surrounding economic incentive instruments, their design characteristics, as well as to propose the creation of new ones.

With this work, we want to answer the question of: how well the current economic incentives (addressed to internalise the value of forest goods and services) work in the Catalan context?

As secondary research questions we aim to respond: Can we elucidate the factors influencing this implementation? And do forest-related discourses influence these instruments?

Given the transnationality of the problem, this research is included among the priorities of the Mediterranean Forest Research Agenda (*MFRA 2009*), in the area of *Policy, economic and institutional aspects for sustainable provision of forest goods and services*. This work is part of the FP7 project *NEWFOREX – New ways to value and market forest externalities*.

This paper is structured in four chapters. It starts with the general framework affecting forests in Catalonia, where context features and general policy objectives will be exposed. The second chapter analyses the process to design policy instruments. It is followed by a review of the existing instruments and by a chapter on evaluation of the instruments. We finalise with a discussion and conclusions on instrument design and evaluation.

2. METHODOLOGY

The theoretical approach of this research is the Grounded theory methodology, understood as methods of systematic and flexible guidelines for collecting and analyzing qualitative data to construct theories grounded in the data themselves (*Charmaz 2006*). Theory is derived from data acquired through field interviews, observations and documents, and these data are analysed systematically as soon as become available. Constant comparison among data obtained allows identification of incidents (individual units of text that seem interesting to the analyst) and inducing categories, which have meant our criteria and lead to the theory building.

In a first phase we carried out a bibliographic review in order to identify (1) the key regional context variables (relevant socio-economic indicators as well as legal and institutional characteristics), (2) the different discourses regarding forest management in the region and (3) the existing mechanisms, focusing on: subsidies, taxes, payments for environmental services and other PES-like schemes (*Wunder 2006*). From every mechanism we elaborated a factsheet, which was filled in with the information compiled from the bibliographic review and the interviews of the key stakeholders. Such factsheet included from historic references and evolution of the instrument, to background normative and implementation data. At this stage we produced a brainstorming on potentially critical factors for the implementation of the instruments.

In the second phase we interviewed the main stakeholders related to these instruments. We aimed at compiling information on instrument performance, e.g.: specific definition of the environmental service, baseline scenario and expected changes, programme goals, incentives, commitments, intermediaries, necessary administrative structures, actual costs and impacts achieved. We also requested their opinion about the factors identified above and invited them to suggest new factors. Face-to-face interviews were selected to gain the confidence of the interlocutor in order to get the most sincere answers. The content of the interviews was semi-structured, with a guide of questions common to every instrument and also including some adapted ones to the specific instrument particularities, and including both open-ended questions and *ranking* questions. In order to familiarise the interviewee with the objective of the interview, we sent them in advance a guide with the topics to be discussed.

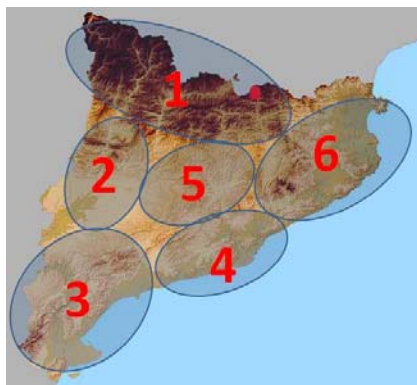
Finally, in the last phase we have analysed the results comparing the outcomes of the different instruments among each other, with the discourses found during the interviews, as well as contrasting them against evaluation criteria. Success and failure stories have been excelled through boxes, providing examples that support the statements of the theory built.

The original idea to enrich the study considering also other instruments and relevant experiences from other related sectors, like tourism or agriculture have not been implemented due to time constraints.

3. GENERAL FRAMEWORK OF FORESTS IN CATALONIA

3.1. ECONOMIC FRAMEWORK

Forestry has very small influence in the regional GDP: it constitutes the 1,3% of the agrarian and livestock sector. From the 42M€ that the forest sector mobilises annually, 40% corresponds to mushrooms and 30% to hunting and fishing activities (Vayreda 2004). Therefore, Non-Wood Forest Products (NWFP) represent the major component of the business. Forest owners, however, rarely live on the forest business. Those



who actively manage their lands, usually combine forest activities with another main activity such as agriculture. Due to the variety of climate, bedrocks and topography of the region, we can group forest owners in the following areas (figure 1). We identify: (1) the Pyrenean forests, mainly municipality-owned, with productive rates and no wildfire risk but with difficult accessibility; (2) the agrarian lands of Lleida, with no forests; (3) Tarragona, with the lowest productivity and no-timber species, very fractioned private ownership and very high wildfire risk; (4) the urban forests around the metropolitan area of Barcelona, which are small and private-owned; (5) the Central Catalonia, with medium productive forests, actively privately owned, medium-size parcels; and (6) Girona, with the highest and most diverse productivity rates and medium-high fire risk, with small-size holding belonging to private, active and organised owners. The validity of this partition is supported by the fact that most of the forest managers of the Government, as internal organisation, already work in these blocks. It's interesting to remark that this territorial division coincides with the recently approved *vegueries*, a historical, institutional level which will substitute the current provinces due to their better adjustment to management realities. This may lead in the future to more focused instruments.

3.2. LEGAL FRAMEWORK

The legal framework of Spain, reflected in the Forestry law (BOE, 2003 & 2006) and the Biodiversity law (BOE, 2007), is implemented through the Spanish Forestry Strategy (MIMAM, 1999) and the Spanish Forestry Plan (MIMAM, 2002) which is valid for the period 2002-2032. This frame acknowledges the benefits that society receives from forests and places the public authorities as stewards of their conservation, enhancement and rational use, whether they are private- or public-owned. It also gives landowners the right and duty of management of their holding, according to the specific regulations. Whereas the treatment of the providers' side of externalities is rather clear, the users' side is handled in a more blurry manner. While the Strategy puts more emphasis on the government role, stating that "the overall goal of government administration should be to maximise the social utility of the resource", the Forestry Plan encourages individual actions, promoting the "co-responsibility of society in the conservation and management of forests". These two approaches, treated as complementary, are contemplated in the

Forestry Law by endorsing the implementation of “*measures supporting Sustainable Forest Management (SFM), through subsidies (clearly Government-driven) and other incentives for the externalities (by both public and private initiative), as well as fiscal benefits to SFM sponsors and related non-profit associations*” (privately promoted). The incentives above referred are planned to compensate landowners for lost profit (“*lucrum cessans*”) and other restrictions imposed aiming at conserving nature. By declaring SFM as “*of public interest*” the Government justifies its intervention through subsidies, acting as representative of the citizens. The source of funding of such incentives is, however, only tackled in the Forestry Plan, which looks for ways “*affecting solidarily not only the beneficiaries of these externalities but also users or polluters of natural resources*”.

This constitutes the umbrella framework to work in, given that the autonomous community structure of Spain places the competences in nature conservation and forest management in the regional governments. Exploring the Catalan level, we find in the Catalan Forestry law (*DOGC 1988*) the creation of a Forestry Fund meant to private and public forest owners undertaking certain activities towards fire prevention and reforestation of burnt areas. Even if its functioning has been developed (*DOGC 1990*) and there is proposal of practical implementation (*Rojas 2001*), it has never been put into practice. Also political reasons explain the stop of the draft of the General Plan of Forests in Catalonia (in process during 2002-05) and the Catalan Biodiversity law (in process during 2009-10).

3.3. INSTITUTIONAL FRAMEWORK

The transfer of competences from the central government in Spain gives to the Autonomous Communities (Regions) the functions of: management of State forests, forests from the former Nature Conservation Agency (ICONA), Public Utility Forests (MUP) owned by municipalities and Consortium forests with private owners and municipalities. Therefore, the main decision-making unit for forest management is the Department of Environment and Housing of Catalonia (DMAH), hosting the Forest Service. Although main planning is done from Barcelona, there is a Territorial Service with technicians based in every county. Since 1999 there is a key actor: the Private Forest Ownership Center (CPF), a public agency of the DMAH in charge of supporting forest management in private lands along Catalonia. This type of independent agency constitutes a unique example in Spain. DMAH is responsible not only for forest management, but also for declaration of protected areas, biodiversity strategy and fire prevention activities. The competences in fire extinction, on the contrary, are under the Department of Interior. Lack of trans-sectoral policy planning and evaluation difficult the evaluation of efficiency of both bodies.

At the provincial level we find the figure of *Diputació*n, conceived as a supporting body devoted to municipalities. It usually has a division dealing with environmental issues that may get involved in forest issues affecting a municipal-owned forest related problem, as well as promoting certain economic activities in public forests. In a lower level we find the *Consell comarcal*, a county organisation, dealing with issues of closer, market-related municipalities. They may have some role in the organisation of the associations of forest defence. These last two organisational levels engage in forest related activities voluntarily, mainly driven by the affinity of the technician in charge.

3.4. GENERAL OBJECTIVES

General policy process identifies problems and redefines them as objectives of the policy tools. Based on the scheme proposed by *Kelsey et al. 2008*, the context in which policies are implemented together with policy design influence the outcomes of the instrument (*see figure 2*).

In the introduction we have identified the main problems related to Catalanian forests, namely:

risk of soil erosion, landscape degradation, loss of biodiversity, uncertainty about water reservoirs and lack of profitability of traditional products (cork and timber). Through the analysis of the legal framework, we found that these items are contemplated in policy planning tools. Official documents usually contain the general objectives, however they may be in a more explicit or implicit manner, either in their preamble or in the explanation of the different measures they include.

In this work, we have focused on the following objective areas dealing with forest products and services: traditional production, wildfires prevention, biodiversity conservation, recreation, CO₂ sink and water provision.

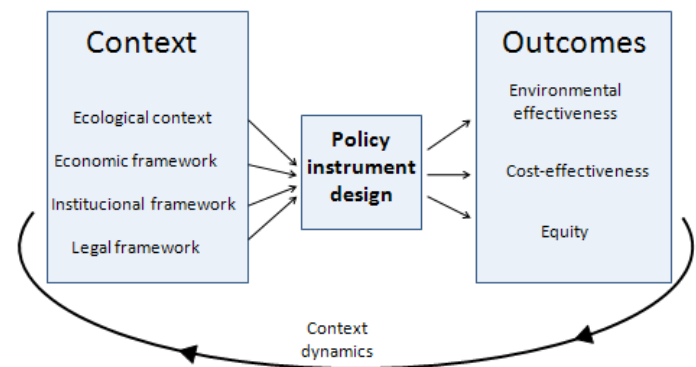


Figure 2 - Context interacts with instrument design to determine outcomes. Adapted from Kelsey et al. 2008

4. FROM POLICY OBJECTIVES TO POLICY INSTRUMENTS

Objectives develop into concrete targets

Once the objectives are established, they need to be translated into concrete targets for policy instruments. For the purpose of this paper we consider “targets” as measurable goals, impacts or outcomes expected from the instrument. Targets are defined by an indicator and a level to be reached. Instrument’s targets would be then expected to address the problems existing in an area.

In our work we found that these targets are rarely specified in the official policy documentation. This fact poses several problems, which we will explain below.

How to choose the instrument?

In order to reach the target, the decision maker should choose whether to emphasize the type of instrument chosen from the available policy toolbox and the final target, or instead excel the land uses presumed to address to such targets.

Perrels 2001 defines as the “*bottom-up approach*” the process by which the decision maker incentivizes a series of measures or activities. This means that policies are designed towards promoting those activities which are assumed to lead to the planned goals or targets. They may be good practices such as certain silvicultural treatments, or e.g. educational campaigns or placement of nest boxes (*see figure 3*).

On the contrary, in the “*top-down approach*” targets are stressed and therefore incentivised, leaving freedom to forest managers to decide on which actions to take in order to reach the desired targets. The

top-down approach would allow forest managers to reach the targets at the lowest cost. Therefore, this approach is oriented to ensure the cost-efficiency. The difference with the *bottom-up* approach is that the importance is given to how targets are attained, adequate in the cases in which the manner how to targets are reached matters. In this case, environmental effectiveness is in focus, while the costs of reaching the targets are not that relevant.

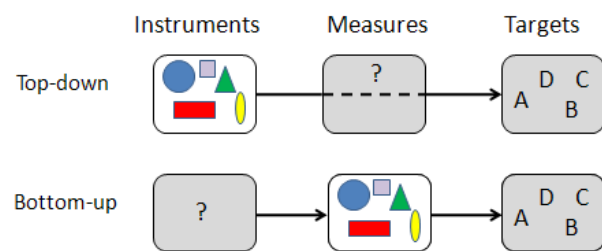


Figure 3 - Policy design approaches. Adapted from Perrels 2001.

Catalonia adopts the approach of “*bottom-up*”

The fact that measurable policy targets are missing effectively prevents the use of the *top-down* approach. As our research has shown, every studied instrument follows the “*bottom-up* approach”: the supporting documentation encourages certain actions in forests that from empirical knowledge are supposed to provide the desired impacts. This illustrates the traditional strong role of the institutions: individuals expect the Government to define how things should be done. This governmental paternalism also means that risks are mostly transferred from forest owners to the government partially implying that society will bear both benefits of the success and the costs of the failures. However, government is treated as an external entity and independent from the society, with a budget the origin of which is not questioned. This “public money” approach contrasts with the “tax-payers money” approach in some other countries, in which tax payers demand an efficient use of tax proceeds. Some authors attribute this approach to the civil law tradition in Catalonia, where government’s role as an intervention agent is generalised and well enrooted among the population. The opposite happens in common law countries, where individual initiatives are socially rewarded and continuous backing from public authorities is not needed. In this latter line would fit the land stewardship, conceived to arrive to those places where government cannot reach. In any case, even land stewardship entities in Catalonia need public money support to maintain their activities.

Targets are not specified: how to identify them?

For the purpose of evaluating instrument’s performance one needs to know the targets planned when the instrument was designed. It is also important to define the measures/activities and to compare them with different alternatives. In our work, we derive targets from social expectations and personal convictions of forest managers (chapter 3). These expectations and convictions have been drawn from preparatory policy documents and discourses in which they are reflected. The evaluation of policy instruments follows in the chapter 4.

5. EXISTING MECHANISMS

5.1. REVIEW OF CURRENT MECHANISMS

We have identified various economic instruments applied nowadays by means of the bibliographic overview. The list of these instruments is presented in Table 1. We understand as “*economic instruments*” those tools modifying costs either for producers or consumers. The underlying rationale is that humans react to price incentives.

Due to the variety of these instruments, we have grouped them in “umbrella” blocks of what we called “mechanisms” according to their similarities. We have preliminary classified them according to their voluntary character, source of funding and agents involved: intermediary and final executor of activities. For the purpose of this paper we have focused in the ones in bold, given their relevance in Catalonia.

Table 1 - Existing mechanisms in Catalonia. Source: own elaboration.

Name mechanism	Name instrument	Voluntary participation character	Funding source	Intermediary	Final executor of activities
Subsidies	Subsidies to municipalities for Sustainable Forest management (SFM)	voluntary	Government	DMAH-FM Service	Municipalities
	Subsidies to private owners for SFM	voluntary	80% Government 20 % owners	DMAH-CPF	Landowners
	Subsidies to private owners for Private Forest Reserves	voluntary	Government	Dip. Girona	Landowners
	Damage compensations	Voluntary for affected	Government	DMAH-CPF DMAH-FM Service	Landowners or Municipalities
	Subsidies for contracting insurances	Voluntary	Government	DMAH-CPF	Landowners
Voluntary initiatives (<i>bottom-up</i>)	Subsidies to forest defence groups (ADFs)	voluntary	95% Government 5% individuals	ADF / Federation of ADFs	Landowners and volunteers
	Land stewardship	Voluntary for both parts	15% Government 10% individuals 75% companies	NGO or foundation	Volunteers (civil society)
	Eco-sponsoring	Voluntary	Big enterprises	NGO or foundation	Volunteers or company staff
Market development	Access fee	Mandatory	visitors	Government body	Landowner
	Access fee + guidance service	Voluntary / Mandatory for visitors	visitors	Travel agency	Landowner and/or travel agency
Taxes	Felling taxes	mandatory	Government	DMAH-FM Service	Landowner
Eco-labelling	Forest certification	voluntary	Landowner	DMAH-CPF	Landowner
Contract public-private	Global exploitation contract (agriculture)	voluntary	Regional government	Dept. Agriculture	Landowner

Subsidies to silvicultural activities started in the 80s, both addressed **to municipalities and to private forest owners**. With the development of the concept of **Sustainable Forest management (SFM)** they have been actualised and reformulated to fit the international standards of SFM. They cover from thinning,

scrubs clearing, pruning and more lately also biomass production or plantations for truffles. They also include the CAP measures for fire prevention through water point construction and roads conditioning, and also afforestation in agricultural lands or reforestation in burnt areas. It is managed by the Forest service directly for the municipal forests and through the agency CPF for the private ones.

The concept of **Forest Reserves** emerges with the development of SFM standards, which indicate that some percentage of the holding should be left untouched for biodiversity conservation and research purposes. It was known in Catalonia that some owners already applied this in some parts of their holdings, what meant that some patches of old forests exist and were to be discovered. The *Diputació of Girona* found relevant to conserve these scarce forest types by demonstrating to its owner that society values them. Therefore they launched in 2008 a line of subsidies for municipalities and privates, in which applicants commit themselves not to cut these forests during the next 25 years and receive a lump sum.

During the 90s some civil groups initiated a network of private conservation areas, called **land stewardship**. It aimed to be an alternative to legally imposed protected areas. In the same line that the Forest Reserves, they aim to recognise the work of the forest owner. They either purchase directly the land or make a management agreement with the owner. The entities count with very limited resources, therefore their main man-force comes from volunteers; in fact one of their objectives is implying society actively in conservation.

Finally, the **Forest defence groups (ADFs)** were born during the 80s through the spontaneous organisation of private forest owners when a fire happened. Being the most interested in effective fire suppression and the experts on the local reality, the Government bet on these organisations as complementary to the firemen work but imposed that they should work jointly with the municipalities. By subsidising the personal equipment of volunteers, their training, the necessary machinery and its maintenance, Government recognises their work and improves the first attack to fires.

5.2. TARGETS EMERGE FROM DISCOURSES AND INSTRUMENT EXPECTATIONS

No targets specified, but agents evaluate performance.

It has been found that there are very blurry references to the final goals in the published documentation: while there is a mention to some general objectives in the preambles, neither target indicators nor levels are specified. For example the aid for SFM bases its action in the direct and indirect benefits to society and in minimising the risk of wildfires. In the case of the land stewardship, where private entities have acquired the felling rights of certain areas, they justify their action as no disturbance helps to preserve endangered species like the cappercaillie. Nevertheless in none of the cases neither indicators nor the roadmap are established.

This situation complicates the task of evaluating the degree of achievement of instrument goals. However, the different agents are able to make some kind of evaluation. In official published documentation, the different organisations usually measure their effectiveness as the size of the area where the measures of the instrument have been implemented. In contrast, in the interviews all the stakeholders, however, accept that this is an incomplete proxy, although it is the best available at the moment. In the case of

subsidies for SFM, technicians keep track of the subsidised actions: they have data in hectares for the silvicultural measures, but in many cases several activities take place in the same area, so the exact figures on the surface being managed in the desired manner are easily double counted. Fire prevention activities of roads conditioning are counted in lineal kilometres and water points in units; meanwhile there is no mention to the extent of the area covered through this network. In Catalonia, then, formal evaluation is based on the extent achieved by the measures instead the outcomes produced by them.

From the responses in the interviews, we explain this goal indefiniton by the mix of: (1) a lack of available information on the level of social needs regarding forests; (2) lack of monitoring systems providing the results; (3) lack of the clear, generalised link activity-consequences for the different areas in Catalonia, or (4) unwillingness to publish the targets in order to avoid future criticisms about the commitments.

Even if targets are not specified, we found through the interviews that every person has its own expectations on the targets set for the instrument. Agents evaluate the results contrasting them against these expectations. It supposes a qualitative analysis of non-written targets. In the interviews, expectations resulted easier to articulate than the instrument goals. This may be explained because expectations come from personal convictions on the vision on forests, while targets emerge from discussed and agreed levels shared with other instrument agents. This is even more important in those voluntary instruments, where one engages based on own convictions. Are these targets shared across all the Catalan society? The only common pattern found has been the statement that the desired target is always *“as much as possible and at least the same level or better than the past year”* with the only limit of funding. We have captured major expressions and statements emerged during the conversations, grouped the similar ones and linked them to the criteria the person uses to evaluate the instrument. Activities are planned and implemented according to these expectations; and given that generally there is a simple monitoring, results become perceptions of these criteria. We have structured this process in figure 4.

Figure 4 - From the discourse to instrument outcomes



Discourses on forest management in Catalonia

Previous works concerning active private forest owners' motivations (Domínguez 2008) and social perceptions of rural development and forests (Plana et al 2004) in Catalonia have served as basis for defining a preliminary scheme of the discourses influencing forest decisions in the region. We found complementary the typologies contemplated in Elans et al 2000, as they may fit not only for the society at large but also for those absent forest owners and managers of public forests. Our proposed scheme, then, compiles the main driving lines of both forest externality providers (managers) and demand (societal groups). We do not consider these discourses as closed, rigid behavioural bases, but instead as major

explicative factors of the positions of agents for claiming, supporting and personally engaging in certain actions in forests. As Domínguez mentions in her work, decisions generate from the unique combination of these variables valid for every individual. These discourses are compiled in Table 2 with a brief explanation of their vision and type of value. The responses of the interviews have proved the validity of our scheme. According to it some of the forest owners' motivations are also shared by other agents in the society and vice versa: conservationist approaches are also found in some forest owners, contrary to traditional topics.

The stakeholders' explanations on how and why instruments born have allowed us to relate them to the discourse from which they have emerged. These correspondences are shown in Table 2.

Table 2 - Forest-related discourses in Catalonia and their relation with the mechanisms studied in this paper. Sources: Domínguez 2008, Elans 2000 and own elaboration.

Author	Discourse	Vision of forests in Catalonia	mechanisms	instruments
Domínguez (2008)	Having an archetype to fit	Standing trees – commercial species - Timber and other NWFP market (<i>use value</i>)	Subsidies to SFM - fire prevention - catastrophes	Aid for SFM to private Forest Owners
Domínguez (2008) Elans (2000)	Fitting one's economy Utilitarian	A mixed amount of forests products and services, optimum for the society -market - competitiveness (<i>use value</i>)		Aid for SFM to municipalities
Domínguez (2008)	Reducing risk of forest fire through management	Forest's structure without shrubs, with infrastructure of roads and water points (<i>use value</i>)		Aid for catastrophes to private forest owners subsidies to municipalities fire prevention
	Fulfilling a moral norm	Forest resources with similar characteristics maintained along the time (<i>non-use value</i>)	Forest Defence Groups (ADFs)	subsidies to ADFs for investments subsidies to ADFs for equipment maintenance ADFs' membership fees
Elans (2000)	Hedonic	Landscape for locals and mass tourism (<i>use and non-use value</i>)	Land stewardship	Private entities of land stewardship
	Nature conservation	landscape and biodiversity for (specialised) eco-tourism (<i>use & non-use value</i>)		Private Forest Reserves Municipality Forest Reserves
	Agri-ruralist	New social contract farmers society, sustainability and quality (<i>use & non-use value</i>)		subsidies to private entities of land stewardship

Defining the targets

In our work we focused on the impact of economic instruments in objective areas, as presented above. (1) traditional forest production; (2) wildfires suppression; (3) biodiversity conservation; (4) recreation; (5) CO₂ sink; and (6) water provision.

The analysis of the different instrument documentation evidenced that the objectives from (1) to (4) were considered, while no action explicitly addresses the objectives (5) and (6). This is justified by the lack of consistent scientific findings explaining forest action with water, and some studies in Mediterranean

forests showed even negative correlations water-trees. As for CO₂ is not considered in the Catalan framework plan for climate change mitigation, based on the Carbon sequestered by these types of forests does not account for Kyoto protocol purposes.

We found that desired indicators and levels are different for every interviewee, but possible to group according to the discourses abovementioned. The table 3 compiles some of these identified targets.

Table 3 - Examples of targets related to one or more discourses

Discourse	mechanisms	instruments				Targets	
						indicator	level
Having an archetype to fit	Subsidies to SFM - fire prevention - catastrophes	Aid for SFM to private forest Owners		Aid for SFM to municipalities		Wildfires	0 Big Fires/year
Fitting one's economy						Area with certain forest structure	60% area/year
Utilitarian						Area with management planning actions effectively undertaken	65% forest area
Reducing risk of forest fire through management	Forest Defence Groups (ADFs)	Aid for catastrophes to private forest owners	ADFs' membership fees	Subsid. municip. p. fire	subsidies to ADFs for investments	Conflicts with recreationists	70 % of actions from those planned
Fulfilling a moral norm						Quality products (wood, cork)	0
Hedonic						Area burnt	Increase from previous years
Nature conservation	Land stewardship	Private donations to private entities of land stewardship	subsidies to private entities of land stewardship	Municipality Forest Reserves	Private Forest Reserves	Abundance of hunting species	0 ha/year
Agri-ruralist						Abundance of pests	Viable populations
						Below the harmful threshold	
						Big wildfires	0 Big Fires/year
						Area with low fuel "clean" equipment	1/5 forest area/year
						Equipment and infrastructures infrastructure	Restock of damaged stuffs
						Rapidity in first fire attack	Used for expected activities
						Small & medium fires	Maintain and increase
						Big wildfires	Less than 15 min
						Volunteer time (h/days)	Less than previous years
						Nr visitors	0 Big Fires/year
						Information produced (leaflets, web, etc)	Same or more than previous year
						Abundance of endangered species	Same or more than previous years
						Nr visitors	Enough to reach objective population
						Final cuttings	Maintenance or increase
						Traditional activities: silvicultural treatments	Limited access not to disturb nature cancelled
						Pastures, aromatic plants gathering, others	Maintenance
							Maintenance

6. HOW TO EVALUATE INSTRUMENT PERFORMANCE

6.1. CRITERIA

We started our work planning to evaluate the instruments against a set of criteria, as recommended in the literature (*Engel 2002, Mavsar et al 2009, Sommerville 2009, Wunder 2006 and Wunder 2007*): economic efficiency, effectiveness, equity, acceptability, conditionality and flexibility. They are defined as follows:

Effectiveness refers to the success of a financing instrument in achieving certain predefined targets.

Economic efficiency is the degree the instrument is designed to be able to achieve the optimal allocation of resources, which in practice often means the ability to achieve a chosen target at the lowest cost. We should count both the direct costs imposed by the instrument and the indirect cost in terms of opportunities forgone.

Flexibility refers to the easiness to adapt the instrument to external changes in markets, technology, knowledge, and social, political and environmental conditions.

Conditionality refers to the degree the economic reward effectively arrives to the provider of the desired good or service only after s/he demonstrates their provision.

Acceptability is the degree of agreement of target groups to the instrument imposed onto them; it is important not to danger the whole functionality of the instrument. The following elements are here included: (1) **Adequate information** of target groups about any aspect of the new instrument they might be interested in; it is also often referred as **transparency**. (2) **Consultation** with target groups which should be involved as far as possible in the execution of the instrument. (3) **Progressive implementation** of new instruments preceded by an appropriate anticipation period and a timely announcement.

Equity deals with the different distributive consequences of the economic instrument for different interest groups, both within and across generation.

6.2. REDEFINING EVALUATION CRITERIA

These preliminary criteria have been challenged by respondents. Given that we have not yet reached the phase with enough information to undertake a rigorous scientific evaluation, we do not present the evaluation of these criteria. Opinions on the performance of the instruments that have been compiled during the interviews still need to be contrasted. Moreover, the lack of a consistent link between actions and outcomes as well as missing monitoring of outcomes complicates an in depth evaluation. Rather than considering costs and technical impacts achieved, respondents referred to other criteria, which we explain below:

Rural development, understood as jobs in rural areas, is the common feature along the activities supported by all instruments' documentation. In Catalonia, government is expected to protect traditional activities, even when it supposes a loss of competitiveness of the rural areas. The economic claims to leave forest areas to the market logic are contested by the constitutional duty of the state to ensure nature and safety. The debate arises with the degree of government interventionism. Interviewees have pointed the risk of establishment of dependence paths, which in a critical time, as we are facing nowadays with cuts in environmental budget, the system may prove not to be sustainable in time. Therefore rural areas become disadvantaged. In the case of SFM subsidies, there is an estimation of the taxes proceeding from all the companies executing the silvicultural treatments and all the indirect economic impact in rural areas may sum up the amount of the subvention budget; but there are no real figures to support this claim. In any case, subventions are accepted as a tool of territorial balance, through the direct transfer of funds from urban to rural areas. Rural development is then linked to geographical equity.

The **social process of learning** how to deal with the environmental problematic is the signal repeated across the interviewees when referring to effectiveness (*see box 1*). Changing behaviours related to convictions is felt as a harsh task, even more if it requires an active approach. Instruments born from the proactive civil society are positive but should be channelled by the general strategy. Implementers are generally convinced that current imperfect instrument implementation is always better than doing nothing and supposes one step further to a more effective and efficient system; but it requires a buffer timing to adapt and to learn how it should be applied.

Box 1. The risk of lacking targets

The subsidies for SFM fund silvicultural treatments, such as: scrubs clearings, thinning, pruning, i.a. The former approach to the assignation of subsidies was to subsidies every applicant proportionally calculating the amount according to the available budget. In this way, the government agency encouraged a high rate of applications and everyone requested the maximum possible amount. However, due to budget constraints the government agency could only subsidise part of the costs. Sometimes, the activities that this money could cover were so few, and the parcels were so distant and small that the granted landowner finally did not undertake the subsidised treatments. At the end, some budget was left unused, and that was negatively considered for next year's consignment of funds. The areas effectively treated are usually big forest holdings from wealthy landowners. **Has the action been effective?** It does not seem having reached those agents with higher opportunity costs: those small and active *borderline* owners whose better alternative is abandonment. The current financial cut due to the economic crisis has raised the question about effectiveness. Government has launched the 2010 call with a competitive ranking through which less applications will be selected but completely focused on the objectives and will have 100% of costs covered. This has been the lesson learnt.

7. DISCUSSION and CONCLUSIONS

Defining the discourses and their links to the instruments' objectives has already given some light about factors generating, launching and maintaining the economic incentives in the region. The interviews, however, also stood out other key design features, that we will discuss next.

Unclear link actions-targets and Monitoring

When determining the activities which will ensure the desired goals, we find a large uncertainty in the scientific bases of the arguments used. In contrast with other sectors where impacts are visible in e.g. a year, forests have the handicap that the results show up in the medium- and long-term. Lack of information difficulties not only the definition of activities, but also the decision-making during the implementation (*see box 2*).

Promoters are aware of this point and since some time ago are developing programmes with the regional forest research institutions, in order to determine the closets input-output links. Despite the pilot studies started near a decade ago, the methodology is only nowadays being extended to the rest of the territory. At this stage, then, it is still difficult to generalise scientific statements. Cost of maintenance of this network of monitoring parcels all around Catalonia becomes the main

Box 3. Proved: Appropriate preventive forestry measures reduced wildfire impact

The coordination between forest-specialised firemen body (GRAF) and the private forest owners center (CPF) has enlightened the usefulness of an adequate forest structure. There are some 2009's reports stating that the fire effectively stopped in the same holding where started because it reached a low fuel area. Similar studies should be conducted to prove the efficiency of the alternatives.

challenge. As stated by the agents with low financial capacity, they focus their resources in undertaking activities rather than spending them in monitoring the outcomes of these activities. Therefore, this network, mainly managed from the public agency CPF, is expected to provide results valid to other areas (*box 3*).

Participants' engagement and administrative complexity

It largely depends on the dissemination of the call, the easiness of the application, the supporting service of intermediaries, and

the familiarity from own experience of previous years or references provided by neighbours. The huge bunch of documentation requested by the SFM subsidies contrast with the few documents requested for the Forest reserves subsidies (*see box 4*). Land stewardship initiatives are much easier given that they are direct, private contracts. The point of officially requesting certain documentation allows evaluators at the office have a more exact picture of the individual landowner case; otherwise they should be visiting field more intensively. In the public administration there is, however, a problem of a geographical database compiling this information, what means that following year applicants would have to submit again similar papers and technicians

Box 2. Information and trade-offs: A private foundation facing paragliders

A private foundations engaged in land stewardship purchased in the late nineties private estates in highly valuable natural sites. In the particular case of Mont-rebei, they devoted a canyon to biodiversity enhancement and tourism. The cliffs host impressive scenery and a relevant community of birds of prey. Actions towards promoting the area and improving the access have effectively increased the number of visitors. The foundation holds the philosophy of "social properties" and of avoiding prohibitions, fences and entrance fees. Also they only have funds for one person staff in the welcome hut during certain hours in the weekends. However, last year has seen a significant increase in frequency of paragliders who precisely look for the experience of flying along the canyon. The threat is that they disturb the vultures and challenge their nesting. The foundation faces nowadays a trade-off between both uses: biodiversity and tourism. The lack of previous information on the consequences of paragliding as well as lack of nest monitoring complicates the decision-making.

Box 4. The trade-off between beneficiary application and bureaucracy

Forest owners complain about the amount of useless documentation they are requested to present for both application and justification phases of the subsidies to SFM. The call requests, i.a. statements on the use of Catalan language in the signs or a certification about the lack of women discrimination. These requirements come from trans-sectoral policies; however such information is relevant neither for the technicians nor for the owners. Another case is the overlapping and unclear denominations: the aids to fire prevention give priority to the areas classified by some fire planning as of high risk. However one may find up to four, not connected fire plans affecting the same forest holding.

would have to check them again. The proactive behaviour of a third agent with the SFM helps, being it an entrusted professional task (*see box 5*) or an economic convenience. This last happens with the SFM applications, generally prepared by a consultant who will earn a commission only if later the application is selected. In the case of ADFs, landowners are not familiarised with this terminology and bureaucracy; therefore many applications are commended to the municipality personnel; when this administrative personnel is not enough engaged, it often happens that not enough attention is put to duly meet the requirements. This supposes an extra effort to evaluator staff: which trying to avoid the missed chance for the applicants, end up going after the applicants to collect the missing information. Another issue are *free-riders*, who do not actively take part but benefit from the impacts of neighbours' behaviour. This is the case of a passive landowner whose roads are maintained by volunteers, given that they also affect access to other holdings, or whose forests become pruned or thinned because the neighbour looks for a fuel reduced surrounding area. We found then that simplification, training to landowners (for an increased independency), grouping landowners' applications and a modernisation of donors' IT could improve the system efficiency. Normative should consider actions in non-active forest holdings "*for public interest*" when appropriate.

Intended and unintended impacts

When designing an instrument, attention should be paid to the incentives they give. Agents' drivers of behaviour and sensitive issues are key factors to identify them. Old forests' instruments are an example of both positive and negative reactions (*see Box 6*). We have received personal communications of the use of equipments acquired through subventions differently to the purpose they were devoted to. A more defined policy or further control should be taken, considering the different realities. Measures against the negative impacts should be taken in advance: dealing with credible information, preliminary economic commitments or coordination of agents, as shown in the examples.

Coordination and strategy

Some of the initiatives have emerged from individuals or isolated associations. For an improved effectiveness, entities are recommended to work together and with other related institutions. Both ADFs and firemen were reluctant to work together; the time has shown

Box 5. The key role of technicians closer to landowners

When explaining geographical engagement of landowners in the instrument, it was repeatedly mentioned the role of the technician located in the Territorial Services (depending on the Catalan government but based in the counties). In the case of subsidies to municipalities, there is a positive correlation between proactive technicians and applications. In the case of aids to private owners, there is an educative, helpful complicity between forest owner and the CPF technician. The opposite occurs in other areas, where there has been a restrictive police during the past 30 years: landowners don't trust any longer in forest officials. Therefore for some conservation activities the same government has requested the action of NGOs which have built trust through incentive-based instruments.

Box 6. Side effects: Perverse incentives

Institutions offering money for old forests incentive owners to preserve them and increase rotation age; in this way they may be eligible at some point. This is the case of the subsidies to create Forest Reserves. However, the action of the Government of developing an Atlas of Old Forests of Catalonia without specifying the later use of these data has provoked the opposite reaction: forest owners are afraid that this is a new strategy to impose further restrictions on them; and so they cut them. Another case was the "conservationist speculation" induced by the lack of coordination among agents with similar objectives: a small NGO was about to close a land purchase deal when a bigger foundation offered the double amount of money to the owner. The result was that finally neither of them purchased it, but it was sold to the ski resort nearby to extend its infrastructure. The result was not only the decrease in biodiversity protection but also a conflict among conservationist agents.

them that the establishment of a action strategy is very useful to avoid accidents in fire extinctions and double works. Diputació de Girona foresees its resource limitations in the maintenance of the Private Forest Reserves; therefore it has committed to maintain those directly fitting under its competences, the municipal ones, and it's already under conversations with the network of land stewardship to establish a system of sponsorship. These actions improve the sustainability of the impacts. Example of failure in coordination is shown in *box 7*.

Flexibility- key in the learning process

The fact that all the society is learning on how to act in front of environmental questions, assumes that in the beginning all launched instruments are imperfect; some degree of flexibility is necessary to adapt them to the new information and realities. All the interviewees punctuated flexibility of current instruments with the higher rank. Once the call has been published, very little place for manoeuvre does exist. But eligibility criteria are timely reviewed (every year or two at maximum). These modifications are induced due to the adaptation to new normative, but also serve to actualise prices, percentages of cost coverage, activities promoted or the method of justification, i.a. changes are progressively implemented, what allows their explanation to managers and avoids misunderstandings.

Finally we want to mention that more research is needed to explore the other instruments mentioned as well as those ones in forestry-related sectors. Also further data collection is needed based on emerged concepts.

Box 7. The risk of lacking coordination with the owner or manager

An NGO explained their experience organising reforestations in degraded riverbanks. The activity was funded and addressed to their sponsor company, which also organised a voluntary outing day to their staff in order to take part in the plantation. They explained that the action will serve as a fauna corridor and also improve water conditions. The organisers had requested an authorisation to the river management agency. Nevertheless, two years later the agency authorised building works which destroyed the reforestation. The donor company complained for the wasted money. This has lead to need of coordination with the agency. **Has the action been effective?** We could say that neither for the NGO nor for the company, but yes as a social learning process.

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