

Payments for Ecosystem Services and their Institutional Dimensions

International Conference on Payments for Ecosystem Services

10-12 November 2011, Berlin, Germany

Payments for Environmental Services and Environmental and Territorial Governance: lessons from empirical studies¹

Bonnal P.², Maury C.³, Le Coq J.F.⁴, Méral P.⁵, Bonin M.⁶, Legrand T.⁷

Since the turn of the millennium, PES have become an increasingly used environmental policy instrument. Apart from some pilot experiments in the USA (Heal, 2000) and France (Perrot-Maitre, 2006), they were particularly developed in central America, notably Costa Rica, at the end of the 1990s, before being implemented worldwide in recent years (Africa, Latin America, Asia, Europe, etc.). Several institutional initiatives, such as the MA (Millennium Ecosystem Assessment), or the TEEB (The Economics of Ecosystems and Biodiversity), have facilitated the dissemination of this approach based on the services provided by ecosystems. Other networks involving scientists, conservation NGOs and multinational corporations are also involved in PES mainstreaming (Ecosystem Marketplace, Katoomba Group, etc.) and more generally in MBI mainstreaming (Market-Based Instruments) (Heal, 2000; Landell-Mills and Porras, 2002).

If PES expansion has taken place in high biodiversity countries, it is down to a context of deforestation control in countries with low development levels. They were designed to cope with the limitations of earlier policies and, in the process, to increase conservation funding (i.e. protected areas). More precisely, PES are the brainchild of conservation NGOs and certain funding agencies (World Bank, etc.) as an alternative to ICDPs (Integrated Conservation and Development Projects), judged not to provide enough incentive for rural households involved in deforestation (Pagiola and Platais, 2002; Ferraro and Kiss, 2002; Ferraro and Simpson, 2002; Pagiola et al., 2004). PES, which were rightly called "direct payments" at the outset, have been presented as novel tools capable of internalising positive external effects created by environmental service providers. Reference to the Coase theorem has thus formed the theoretical basis of PES. For instance, Pagiola et al., 2008 stated "*In effect, PES programs attempt to put into practice the Coase theorem, which stipulates that the problems of external effects can, under certain conditions, be overcome through private negotiation*

¹ This work is part of the Serena project: Environmental Services and use of rural areas, funded by the French Research National Agency (RNA) in the Systerra program.

² UMR ART-Dev-CIRAD. Agro-economist. CIRAD researcher. Philippe.bonnal@cirad.fr

³ UMR Metafort, Engref. Lecturer in Political Sciences. caroline.maury@engref.agroparistech.fr

⁴ UMR ART-Dev-CIRAD. Agro-economist. CIRAD researcher. jean-francois.le_coq@cirad.fr

⁵ UMR Gred- Economist. IRD researcher. philippe.meral@ird.fr

⁶ UMR Tetis – Geographer. CIRAD researcher. Muriel.bonin@cirad.fr

⁷ Versailles Saint Quentin en Yvelines University, Cemotev, economics doctoral student. Thomas.legrand@eurogroup.fr

between affected parties (Coase, 1960)⁸” (p.665). In order to explicitly define PES, and to render this theorem more operational, it is usual to refer to Wunder's five conditions⁹ (2005).

The scientific and institutional literature has adopted this normative definition of PES (see for instance Lipper, 2007; Katoomba Group, 2008). Whilst the interest shown in the theoretical model by different institutions can largely be explained by the will to develop MBIs, the reality is completely different. Although, in developing the theoretical model, Wunder, 2005 or even Engel et al., 2008, accepted that true PES are very rare or that PES should be understood as being "part of policy mix" (p.669), other authors have taken the criticism further.

Firstly, the difference between the model and reality raises the problem of the existence of the model and of the underlying scientific approach. For example, Sommerville et al. (2010) stated: *“There is a risk that the use of terms such as “PES with qualifications” or “PES-like” implicitly suggests that interventions not fulfilling all of the definition’s criteria are inferior.”* The same point is raised in Muradian et al. (2010, p.1203): *“However, as discussed below, most PES experiences do not comply strictly with these conditions. We think this is problematic, since a prescriptive definition of PES that excludes the bulk of PES cases can be deemed at least flawed. “Furthermore, dividing PES into ‘genuine’ (good) and PES-like (less good) may cause a mismatch between theory and practice, given that practitioners may often feel the frustration of not meeting theoretical expectations.”*

Thus, over and above criticism of the Coasian approach to PES, it is more generally the hypothetical-deductive approach of neoclassical economics that is targeted, particularly as, for some, that approach is not ideologically neutral; it stresses the commodification of ecosystems (Kosoy, Van Hecken and Bastiaensen, 2010) and a simplification of ecosystem functioning (Norgaard, 2010). Consequently, it seems necessary to prefer a more comprehensive and institutional approach to PES.

Secondly, following on from these initial debates, some place more emphasis on the content of an alternative approach for PES analysis. Muradian et al. (2010, *op.cit.*) propose considering the degree of commodification, the degree of directness of transfer and the extent of economic incentives. Other authors, such as Swallows et al. (2010) stress the typology of the players more, i.e. middlemen. Lastly, others highlight the historical dimension of setting in place PES, adopting the institutional path dependency approach (Cahen-Fourot, Meral, 2011). The idea is neatly summed up by Sommerville et al. (2010): *“We believe that “PES” is best seen as an **umbrella term** for a set of resource-management tools that are based on the philosophy of implementing conditional positive incentives in a wide variety of institutional contexts”*.

Today, these arguments lead authors to consider the governance challenges associated with implementing PES. When taken as a process of interconnection between regulatory modes, this concept raises questions relative to the transformation of political, economic and social regulation. In addition, following on from Boussaguet and Jacquot (2009), it is considered here that governance is a process marked by precise characteristics: (i) institutional complexity (there does not exist a sole seat of power and decision-making), (ii) an increasingly blurred public/private boundary, (iii) the procedural aspect of public action: forms and instruments sometimes take precedence over substance (Lascoumes and Le Galès, 2005), and (iv) a particular relationship with authority such as public policies (more horizontal, more flexible) and the development of less restrictive public action instruments.

However, both the approach and the way in which such governance is analysed remain to be constructed, notably regarding how PES/AEMs influence environmental and territorial governance.

⁸ Coase R.H. (1960). The problem of social cost. 3 J. Law & Econ. 1

⁹ A PES is: (i) a voluntary transaction where, (ii) a well-defined ES (or a land-use likely to secure that service), (iii) is being "bought" by an ES buyer (minimum one), (iv) from an ES provider (minimum one), (v) if and only if the ES provider secures ES provision (conditionality).

This paper sets out to help in that construction, by proposing a comparative analysis between different countries (France, Costa Rica and Madagascar). In the first section, we set out the theoretical and methodological framework, interconnecting the effects of public action instruments, namely PES/AEMs, with any changes in regulatory modes and, ultimately, in environmental and territorial governance. This enables us, in the second section, to propose a comparative analysis of PES design in these different countries. Lastly, in the third section, we propose an analysis of the types of governance induced by these new systems.

1. Methodological benchmarks of the analysis

PES/AEMs are considered here as instruments working for public action in the environmental (for PES) and agri-environmental (for AEM) fields, subject to territorial governance whose logic is based on the environmental effect being sought on a territorial or global level. This positioning brings into play three notions - public action and policies, public action instruments, and governance - which call here for an explanation.

Public environmental policies and actions are compromise policies between State sectors possessing different logics, between opposing rationalities (e.g. producing cheaper versus protecting the environment with costly measures) and between stakeholders (numerous and varied) holding different action logics (Lascoumes 1993, p.18). More than any others, these policies result from mutual adjustments between players, logics and rationalities (Lascoumes & Le Bourhis, 1997).

Procedures (and instruments) are not only geared towards solving problems; they first and foremost create concrete interaction frameworks for "constructing" issues and interpreting the actions undertaken (Lascoumes, 1993, p.104). In other words, the PES/AEM instruments considered in this paper participate in the regulations and governance of the system in which they are inserted, so it will be a matter of looking at the power relations induced by the instruments in question. These power relations are akin to the notion of public action instrument defined as being both a technical and social device that organizes specific social relations between public power and its recipients depending on the representations and meanings it bears (Lascoumes, Le Galès, 2005, p.13). So, public action instruments are not "neutral"; on the contrary they are purveyors of values fuelled by an interpretation of what is social, and precise conceptions of the envisaged regulatory mode (Lascoumes, Le Galès, 2005, *ibid*, p.18).

The notion of governance, corresponding to the forms of coordination, guidance and management of sectors, groups and society beyond the conventional forms of government (Le Galès, 2010, p.299), is used here in a comprehensive manner. It is a matter of concretely identifying the adjustments operated in coordination modes between types of stakeholders (private, public, associative) for the management and adaptation of PES/AEMs at territorial level. In this way, we shall prefer a definition of governance that places emphasis on the hybridization processes between distinct action logics, namely the stabilized interconnection of different regulatory modes. The term "regulation" should be understood here in the sense of the new political economy, in that it refers to the process by which different activities and/or relations between players are coordinated, to the allocation of related resources, and to the structure and resolution of associated conflicts (Lange & Regini, 1989). P. Le Galès identified five ideal-typical forms in terms of regulation: constraint (State), competition (market), hierarchy (firm), solidarity (community), negotiation (employers' association) (Le Galès, *op. cit.* p.306). This acceptance of meaning follows on from work on regulatory modes in the social sciences and their hybridization, developed over two decades, notably by Streeck & Smitter (1985), Lange & Regini (*op.cit.*), Campbell et al. (1991), Le Galès (1998). The merits of this archetypical distinction lies in the emphasis placed on the coherence existing within worlds of meaning between specific regulatory, types of players, action contexts and rules, norms and specific routines. Hybridization arises from the linking of these different worlds of meaning via public policy instruments, in our case PES/AEMs.

It is in this sense that we propose to centre our analysis on the nature of PES/AEMs and of the associated territorial governance processes. To that end, we take into account the fact that while PES/AEMs produce aggregation or translation effects (to use the sociology terminology of M. Callon (Callon, 1984, p.183-184)) and federate heterogeneous players working in common and producing a specific representation of the PES/AEM stakes, this does not make them closed systems that are indissociable from modes of contextualized appropriation (Lascoumes, 2011, p. 20).

The methodological sequence adopted in this study comprises of three stages.

The first stage was to describe the instruments in each of the chosen action contexts: territorialized agri-environmental measures (TAEMs) in the Auvergne region (mainland France), TAEMs on the island of Guadeloupe (France, overseas department), the payment for environmental services programme (PESP) in the forest domain of Costa Rica, the Water, Biodiversity and Carbon PES in Madagascar. The second stage was to identify the nature of the regulations linked to instrument management, distinguishing between activities to promote the instrument, the origin and mechanisms of funding, the conditions of access or the recruitment of service producers, and monitoring activities. This stage led to the characterization of ways in which governance modes become hybridized and to the identification of some standard profiles. The last stage concerned changes induced by PES/AEMs in different local governance components, notably identifying any changes in the dominant regulatory modes.

In some national contexts (notably Madagascar), PES are still in the process of being adapted and set in place, so we currently lack the necessary hindsight for a full analysis of the effects of these instruments. Nonetheless, it is possible to focus on the players involved in these systems and the consequences of that implication in terms of regulations and governance, so a central place is assigned to stakeholders in the second part of the text.

2. Description of the case studies

The AEM system in Auvergne and Guadeloupe

Agri-environmental measures (AEM) were introduced as part of the steps accompanying the reform of the CAP (Common Agricultural Policy) in 1992, but aid to farmers designed to protect the environment had already been tested in France in the 1980s with the application of article 19 of European regulation 797/85 and Local Agri-Environmental Operations (LAEO). Their purpose was to encourage agricultural practices compatible with environmental protection, by providing financial compensation for the extra costs and foregone earnings incurred through the change in practices. They thus set out to *"encourage farmers to protect and enhance the environment on their farmland by paying them for the provision of environmental services"*¹⁰. Agri-environmental measures can be defined at national, regional or local level, and adapted to respond to farming systems and environmental conditions. They are mostly funded by the European Union, by way of the European Agricultural Fund for Rural Development (EAFRD), funded from the contributions made by member States to the Common Agricultural Policy (CAP), and to a lesser degree directly by the States. For the 2007-2013 programming period, 22% of the EAFRD budget is reserved for AEMs.

Some of these measures follow on by derivation from earlier instruments designed to induce changes in practices and create environmental amenities. This is notably the case of the Territorial Exploitation Contract (TEC) implemented under the Agricultural Orientation Law of 1999 acknowledging the multifunctional nature of agriculture. The TEC was applied to a "project territory" defined by local stakeholders and including economic, social and environmental components on which a territorial diagnosis was undertaken. On that basis, a diagnosis of the candidate farmer's

¹⁰ http://ec.europa.eu/agriculture/envir/measures/index_en.htm

farm to be included in the initiative was drafted, then extended by the establishment of an action plan for the approved farm, once the application file had been accepted by Departmental Agricultural Orientation Commission (DAOC) (see below), with the signing of a contract between the State and the farmer for a period of five years. The replacement of TECs by sustainable agriculture contracts (SAC) in 2003 led to an administrative simplification compared to TECs, and a refocusing on the environment. With the disappearance of SACs, in 2003, to the benefit of AEMs and TAEMs (T for territorialized), the territorial and multifunctional approach to agriculture is no longer centre stage. TAEMs are strictly refocused on the environmental dimension - the territory in which they apply must correspond to an area with particular environmental stakes identified in line with biodiversity preservation or water management objectives - and are defined in respect of European regulation under the Natura 2000 network and the Water Framework Directive (WFD). In TAEMs, measures for the territorialized system are theoretically defined for each territory by a local project initiator (Agri-Environmental Operator: AEO). A limited number of TAEMs is selected per territory to avoid "dispersal" and have a controlled territorial impact. Local consultation is favoured for defining measures, and regional agri-environmental commissions (RAEC) play an important role in this matter.

In addition to TAEMs, the system also involves 8 non-territorialized AEMs, such as the protection of endangered races or plant resources, conversion to organic agriculture, or changes in technical management and rotation systems - for which specifications are defined at national level. Despite the successive changes in AEM systems since 1985, the contractual formula of a 5-year duration has been constantly re-affirmed.

As AEM system management is largely devolved to a regional level, some specificities exist in the two regions chosen for our study, the Auvergne region and the island of Guadeloupe, the latter of which benefits from the double status of being a region and a department. We shall examine them in succession.

For the Auvergne region, the system covered here is limited to TAEMs, which are relative to areas at stake¹¹. At regional level, the State services (agriculture and environment) have thus drawn up a map of zones eligible for contractualization. Priority has been given to the zones of the Habitat Directives under the *Natura 2000* programme, given the obligation of European Union countries to have at least 50% of sites identified under contracts by 2012.

The planned architecture for this system adds new players to agri-environmental policies, "project initiators", AEOs, who are now veritable middlemen for all phases of the contractualization process between the State and farmers. This change is important, compared to the earlier systems, where the farmer was directly in contact with State services. In Auvergne, the existence of an operator belonging to the territory and that operator's involvement in initiating and running the TAEM projects has been decisive¹². The State issued competitive invitations to tender, ensuring that potential operators had to compete with each other. In many cases, at the Natura 2000 sites, the bodies in charge of drafting the objectives document and/or which coordinated the process were also candidates. This brought players into the system who are mostly from the world of the environment, associated most of the time with the State technical services (Adasea) for dialogue with the farmers and for carrying out farm analyses¹³.

¹¹ In practice, this means that farmers whose plots are located outside these zones cannot be included in the project.

¹² See Alice Noulain (2010), The system of agri-environmental territorialized in Auvergne, internship report under the direction of Armelle Caron and Philippe Jeanneau, Serena program.

¹³ It is possible to briefly sum up the system as follows: 1. Zoning of territories at stake at regional level, 2. Invitation to tender and choice of AEOs, 3. Drawing up of the site project for the AEO (in the case of Auvergne, very often in consultation with the farmers and the State technical services), 4. Presentation and selection of AEM projects by the RAECs (regional agri-environmental commission), 5. Coordination and

The RAEC (Regional Agri-Environmental Commission¹⁴) plays an important role; it is a body that already existed under earlier AEM territorialization systems (LAEOs). Although it is this body that decides on the allocation of the financial envelope available depending on the projects, and draws up orders of priority, it is important to highlight all the informal negotiating and consultation work undertaken upstream between the project initiators and the State services or Water agencies (in the case of TAEMs). There is also a great deal of negotiation and consultation between the TAEM project operator and the farmers regarding the technical procedures and remuneration involved in the TAEMs, and this preparatory phase seems to contribute to a higher rate of contractualization of measures when they have been discussed beforehand between farmers and operators. This phase is also important for mutual familiarization between somewhat agricultural players and players who are more providers of environmental logic. AEOs all highlight this rapprochement as a positive aspect of the TAEMs in Auvergne¹⁵.

In Guadeloupe, AEMs were introduced late as they were only applied very little before the Agricultural Orientation Law (AOL) of 1999 (only three contracts were signed between 1992 and 1999). The arrival of AEMs in Guadeloupe therefore primarily coincided with the introduction of TECs. The spirit of the instrument was considerably transformed with the switch from TECs to SACs then, especially, from SACs to AEMs. The refocusing on environmental aspects sidelined the challenge of redistributing agricultural support, which had been central to the TEC system, and which had fuelled debates and led to position taking and the commitment of the different agricultural players in Guadeloupe. With SACs, then TAEMs, the agri-environmental systems were gradually recentred on environmental challenges and partly lost their strategic interests for operators in the main agricultural supply chains. The banana sector, which was closely involved in the TEC debate has nonetheless remained the main beneficiary of AEMs, notably through a specific "*banana cover: bare fallow*" AEM, which has involved most of the application files accepted and the payments made.

The introduction of AEMs in Guadeloupe has two particularities: the limited commitment of socio-professional stakeholders on the one hand, and a lack of identification of territories at stake on the other hand.

Regarding this first point, it needs to be mentioned that the Agricultural Orientation Law of 1999 had introduced TECs in decentralized areas of debate concerning agricultural and rural development, by leaving it up to the Departmental Agricultural Orientation Commissions (DAOC) to discuss and select application files and by inviting members of the different organizations representing users of rural areas (consumers, nature protection or management agencies, craftsmen, food distribution, etc.) to sit on the DAOCs, along with some territorial authorities (Regional Council). In practice, in Guadeloupe, these new rural development stakeholders did not often attend DAOC meetings and they have been even less mobilized since the switch to AEMs.

On the second point, when the TECs were introduced, the Public Administration chose to draw up a single standard territorial contract applicable to the entire island, despite the mobilization of the institutional players (chamber of agriculture, agricultural academy, national park, etc.) which had already identified different project territories and carried out territorial diagnoses. When the TAEM was launched in 2008, a call issued for local project initiators to come forward went unheeded. Unlike the other regions of France, the TAEM system continues to be applied to the whole regional territory, with no application of the idea of targeting the system on a territory with particular environmental stakes.

contractualization phase, 6. Submission of application files to the State services by the farmers, 7. Payment of aid and checks by the ASP.

¹⁴ The CAER is composed of representatives of the State, public technical institutions, the business world, trade unions, agri-environmental operators and users of the environment.

¹⁵ Noulain, 2010, *op.cit.*

The Payment for Environmental Services Programme in Costa Rica

The Costa Rican Payment for Environmental Services Programme (PESP) was initiated by the 1996 Forest Law 7575. This programme followed on from the different incentive instruments introduced in the 1980s and 1990s, which were intended to support reforestation and promote sustainable forest management and forest conservation. The forest law acknowledges that forests provide 4 environmental services: (i) carbon sequestration and storage, (ii) water protection, (iii) biodiversity protection and (iv) scenic beauty. It has also defined a programme manager, the National Forestry Financing Fund (Fonafifo) and has earmarked a percentage of an existing tax on fossil fuels as a source of programme funding.

Since 1997, the PES programme has undergone several changes in its implementation. At the outset, the PESP was almost exclusively funded by the tax on fossil fuels, but today it is funded by multiple sources, such as loans (World Bank) and international donations (GEF), specific contracts with private companies (hydroelectricity production or tourism companies) sensitive to the conservation of forests and the ES they produce and, more recently, by a share of the water use levy and contributions to a national biodiversity fund. In addition, the PES mechanism has been fine-tuned and adjusted in order to more effectively take into account ES production. For instance, a system has been set in place to prioritize payments for forests of particular biodiversity protection interest, and for forests located in regions with a low development index. The PES mechanism has also been expanded by diversifying the ecosystems eligible for PES, notably since 2003 with the introduction of a PES for Agroforestry Systems (payment per tree planted). Lastly, differentiation in the level of payments was introduced within certain modalities in 2009 (protection, natural regeneration).

Today, the Costa Rican PES programme is a consolidated PES mechanism of national scope, efficiently and transparently managed by Fonafifo. With over 700,000 ha under PES contract (12% of the national territory), and an increase in forest cover since its creation, the PESP is considered a success story.

Costa Rican PESP governance is marked by the key role played by public regulation, combined with the delegation of certain functions to the private and associative/cooperative sectors. The participants in the programme are mostly (around 75% of the contracted areas) recruited by private forestry engineers who are responsible for drafting the application files, and notably a land management plan to be committed to. However, for the remaining 25% of areas, the technicians are taken on by associative or cooperative forestry organizations with a social mission and whose role is important in promoting the PESP. The State, in liaison with international donors, has also promoted the programme, at times, among specific target audiences, such as the Amerindian communities, with a view to improving its social impact.

In financial terms, the State ultimately guarantees the majority of the funding (88% of funds between 1997 and 2010) via the fossil fuel tax, the water levy and two loans taken out with the World Bank. Donations from international cooperation (KfW, GEF) amount to 10% of funding, whilst private stakeholders (contracts with companies, voluntary contributions, etc) only amount to 2%. This notably reflects the PESP's difficulty in gaining access to funds under the international carbon market. The PESP is therefore far from being a purely market mechanism under which the beneficiaries of services (demand) would directly pay forest owners (supply) for the provision of environmental services. In fact, it is primarily a public action programme whereby the State promotes the maintenance and development of the provision of certain services to the Costa Rican population.

Programme administration is ensured by Fonafifo, a trust fund having an instrumental legal personality, making it easier for it to manage financial and human resources and affording it greater independence, notably with regard to the monitoring procedures that conventional public organizations are subjected to. Following a decision by the Audit Office, Fonafifo became a public

entity in 2009, subject as such to a certain number of obligations, which led to a large increase in staff numbers.

The programme is monitored by private stakeholders, namely sworn forest regents (who are technicians). However, the mistrust of them on the part of the public institutions (Fonafifo, Sinac) leads the latter to make checks, as does the Council of Agronomists, an organization ensuring the representation and supervision of forestry technicians.

Lastly, the PESP, which was created by law, and the Fonafifo management committee where programme rules are drafted, are dominated by the 3 public sector representatives, although the National Forestry Office (NFO), which represents the forestry sector, has two other representatives. Definition of the rules is therefore marked by the predominance of public sector stakeholders, as is the negotiation between them and the representatives from the organized private sector.

PES in Madagascar

Implementation of PES in Madagascar is a recent event strongly initiated by international players outside a clearly defined national framework like the one in Costa Rica. Given its great biodiversity, Madagascar has been attracting international attention for many years (Kull, 1996; Andriamahefazafy and Méral, 2004; Corson, 2010, etc.). Whether it be multilateral donors (World Bank, UNEP, GEF, etc.), bilateral donors (USAID, French Cooperation, Swiss Intercooperation, GTZ, etc.) or international conservation NGOs (CI, WWF, WCS), the involvement of international stakeholders has been geared in two ways: support for an environmental policy at national level, and support for specific projects at more decentralized levels.

The Madagascan environmental policy, which was implemented as part of an Environmental Action Plan spanning almost 20 years (1990-2009), has placed greater emphasis on community management of resources, increasing population awareness of environmental challenges, the establishment of a network of protected areas, etc. Reference to payments for environmental services has always been limited and encompassed in a logic of the financial perpetuation of that environmental policy. Only the retrocession of half the admission fees to parks by the national manager (Madagascar National Park) to neighbouring populations can be seen as PES before their time. Since the middle of the 2000s, whilst the idea of targeted fiscality (notably reassignment of fuel taxes) was mooted for a time, it is particularly via the Biodiversity Foundation and (especially) through the post-Kyoto carbon agenda (as of January 2013), that the idea of directly funding conservation is now discernible (Méral et al., 2011).

It is therefore mostly through specific projects at local level that PES are being implemented. The PES initiated by these international stakeholders can thus be classed in three major groups.

The first group concerns Biodiversity PES experiences. Over and above the park admission fees paid by tourists, or even by touristic concessions, PES take on two distinct forms. On the one hand, conservation agreements, initiated by the CI NGO in the Centre-East, whose objective is to compensate the populations living alongside certain forests for strict rules governing the use of resources (Randrianarison, 2010; Karsenty, 2010). On the other hand, they take the form of participatory ecological monitoring, in the form of biodiversity competitions (Sommerville et al., 2010, 2011). These initiatives, launched by the Durel NGO in the West (2003) and Centre-East, are intended to remunerate local communities that preserve certain target species. Through Durel, which funds these communities, it is the Jersey Zoo that ensures payment. In both these cases, PES of limited size are involved, be it in terms of the size of the protected ecosystems or of the populations involved. They rely on the achievements of community management of natural resources practised since the mid-1990s, either within the legal framework (GELOSE law of 1996, GCF decree of 2001) or the group of stakeholders involved, the local grassroots communities (VOI in Malagasy).

The second group comprises Carbon PES, which have been developed on a large scale in forests of the East and run by CI and WCS. The marketing of carbon-credits on the *Voluntary Carbon Markets* is the main source of funding. Some multinational companies (Dell, Mitsubishi, Air France, etc.) compensate for their CO₂ emissions by funding the protection of Madagascan forests via these NGOs. As much as governance challenges are relatively local in the case of biodiversity PES, in the case of Carbon PES, they form part of the debates relative to additionality, conditionality, leakage effects, etc (Bidaud et al., 2011). At the present time, these PES are closely linked to the carbon agenda, notably for obtaining specific funds (such as those from the World Bank within the R-PP framework) or accreditation for international standards.

The third group involves attempts at Watershed PES. For the moment there are no contractualized PES in this field, but the most advanced projects are being jointly run by the WWF and the World Mountain People Association (WMPA) (Andriamahefazafy, 2011), along with a project included in a hydro-electric power station construction project (Toillier, 2011). The common point of most of these PES is to seek the involvement of the national water and electricity distribution company (JIRAMA). In some cases, it is the population that is considered as the service provider, whilst in others it is the manager of the protected forest area (upstream) who is the provider. Although these PES have yet to be perfected, their inception and the governance processes that are (will be) associated with them are worth our attention.

One of the particularities of all these PES is that they form part of the continued intervention of these international players at the sites in question. Indeed, as is now acknowledged at international level, "PES systems are not created in an institutional vacuum" to quote Vatn (2010). They back up the conservation projects of the players already in place. If the governance of these PES is to be understood, it is necessary to take a look at the historical and institutional dimension specific to each case. In doing so, it can be seen that PES are distant from the theoretical model and display forms of hybridization that result from earlier practices and relationships (Andriamahefazafy et al., 2011).

3. Interconnection of regulatory modes

The PES/AEM governance systems (understood here as being the interconnection of regulatory modes¹⁶) presented earlier are diverse. Three distinct types of governance system can be distinguished.

The first system is relative to national or regional contractual arrangements run by the State in consultation with national and/or local corporative or professional organizations at the more or less affirmed behest of international or supranational organizations. The French case (Auvergne and Guadeloupe), along with the Costa Rican PESP, fit in with this logic. However, they differ through the degree of international or supranational inducement, which is very strong in the case of France and weak in the case of Costa Rica, but also through the processes of negotiation with the professional or union sectors.

In the French case, the position of the European Union exceeds simple supranational inducement, since the AEMs are part of the Common Agricultural Policy (CAP). Its implementation in national and regional areas derives from a logic of public service devolution. In this respect, the normative structure of the AEMs - defined under the Mainland Rural Development Programme (MRDP) in the case of mainland France and under the Regional Rural Development Programmes (RRDP) in the case of Guadeloupe - must tally with European directives and the Common Agricultural

¹⁶ Cf. supra page 3

Policy. The financial resources from the European Agricultural Fund for Rural Development (EAFRD) are only allotted if coherence with European regulations is proven. The governance structure consists of management structures devolved to national, regional, or even departmental level. It is mostly at regional level, in a joint committee - the RAEC (regional agri-environmental committee) that consultation takes place between representatives of the State, public technical institutions, the professional world, unions and users of the environment.

In the case of Costa Rica, international inducement is weak. Even though, initially, the prospect of international funding via the carbon markets was one of the facilitating factors, it is within public institutions that the system was created and developed (Le Coq et al, 2010) and it is once it had proved itself that the programme attracted international attention and benefited from funding through international organizations (World Bank, Global Environment Facility). Fonafifo is the devolved public body in charge of managing the system. Its Board of Directors, mainly comprising representatives from the different ministries involved (environment and agriculture) also has professional representatives equally divided between small-scale and large-scale timber producers. It is thus within Fonafifo that negotiations take place between the State and the professional world regarding PES specifications and the rules for recruiting producers taking part in the programme.

The second governance system is relative to contractual arrangements based on local projects in tune with global environmental challenges and run by international NGOs via a system of delegation to national NGOs and contractualization with local communities. In this configuration, the State only plays a secondary or even marginal role and its participation is segmented. In the examples studied, two initiatives can be attached to this way of logic, the Carbon PES and the Biodiversity PES, both located in Madagascar. In both cases, the norms governing user practices are defined by the international NGOs clearly positioned within the framework of international biodiversity or climate agreements. The territorial relay is ensured by national NGOs, funded by the international NGOs (or even directly by local branches of the international NGOs). Their role is primarily to ensure the interface with local communities. The relationship of these NGOs with the State is specific and fragmented and takes place via agencies in charge of public services, which themselves depend financially on international NGOs or more traditional donors. The financial and operational dependency of those agencies on external operators, which introduces a break in financial resource distribution processes and in hierarchical relations, may contribute to confusing relations within the public administration (cf. *infra*). This said, although the State does not run the governance system, it is not totally absent. Given the international framework of the general agreement for climate change, of which the Carbon PES are a part, it is the States who are the discussion partners.

In Madagascar, this system breaks down into two distinct modalities. In the case of the Carbon PES, a strong link is established with the major international corporations positioned on the carbon market, which ensure funding. The instruments set in place tally with international standards and are restrictive and limited. In the case of the Biodiversity PES, this link with the private sector is slacker.

The third governance system borrows aspects from the previous two as regards contractual arrangements based on local projects designed to solve local environmental issues, focusing on conflicts in the use of resources: water in this case. The structure of Water PES governance in Madagascar, which corresponds to this third system, takes place on three levels: on an international scale, one or more NGOs structure the system, fund the system, manage the interface between central government and local stakeholders, and ensure technical monitoring of the system. At watershed level, a nationally-oriented public water agency, and a consultation platform bringing together all the users and managers of the resource, define the rules of access to the resource and any changes in utilization practices. At local level, traditional communities take care of applying sanctions, bringing into play social and common law rules. This system of governance thus establishes an interplay between a public body, the water agency, which is independent in its choice

of norms and techniques, and users with divergent interests, all brought together in a consultation body. The international NGOs and their local branches act as conciliators and negotiators between stakeholders located at the different levels of governance. In this third case, the rhythm at which PES schemes are applied greatly depends on the inertia or dynamics of the players involved.

Types of hybridization

These governance systems rely on different configurations associating public, private and associative stakeholders, whose roles and functions are also redefined. The hybridization processes amount to a redistribution of functions and missions for each category of players, along with the way they operate on the one hand, and the mixture of regulatory modes brought into play on the other hand. Let us take a look at these two aspects in succession.

In the case studies, it is the State and the NGOs which play the main roles, whilst the private stakeholders, even though they sometimes act as middlemen (PESP in Costa Rica), play a role that is more discreet or even hidden, though without being negligible.

The State is an essential player in the different systems, but the ways in which it is involved are clearly specific to each system. For AEMs, it is the whole structure of State governance that is brought into play through its devolution and coordination mechanisms on the different scales of intervention, ranging from the European Union to the territory (with environmental stakes). Consequently, the State controls the production of norms in its entirety, and organizes the interface with socio-professional stakeholders and environmental stakeholders. The claims of service producers, farmers, foresters and water users are reinterpreted within joint management structures. Some of the grievances of the most powerful pressure groups are dealt with by differentiating the instruments (multiplication of standard measures) or by adapting the conditions of use. In Costa Rica, the State is also the main player in the system, but the governance structure is confined to the functions of defining norms and running the system. Beyond budgetary decisions, the functions of the State are primarily implemented within a single, joint structure over which it keeps control. Routine management is contracted out to the private sector. In Madagascar, State involvement is limited by a lack of resources and fragmented through the alliance set-up with international NGOs which impose their own body of standards and action strategies, thereby losing control over the coherence between what is national and what is local. This is combined with the major political instability in the country. Since 2009, the country has been run by an interim president not recognized by foreign governments and therefore not by donors. The role of the NGOs is therefore automatically increased, since they are the only players able to officially back the conservation policy.

NGOs are next in line in the running of PES/AEM systems, acting, like the State, in accordance with modalities specific to each national or even regional context. In the European context, their actions remain marginal when compared to those of the State and focus on lobbying and persuasion operations. Their action is important in negotiations to draw up specifications for the exploitation of areas with environmental stakes, such as the objectives document (Docob) defining the management rules for the Natura 2000 sites. However, in Madagascar, their role is essential, as they partially replace the State, notably in drawing up standards for using resources and for managing the systems, or even in relations with multilateral and bilateral donors. In some systems, NGOs even organize the governance of their system at local level, by encouraging the local village communities to sign up to the VOI (an arrangement created by the GELOSE law) and by setting up patrols with an associative status which take on considerable importance in the local system (under the control of the Durel NGO for example), and notably work with the devolved State authorities in charge of making sure that environmental regulations are respected.

In the systems analysed, the private sector stakeholders are strangely discreet¹⁷. In PES/AEM they are first represented by farmers and foresters who, at local level, produce ES and play an active role within the consultation bodies for the definition of standards. At the other end of the chain, private players are involved in funding the systems. These may be industrialists positioning themselves on the carbon market, or companies involved in tourism and leisure activities, or even patrons involved in the protection of biodiversity. In the Madagascan case, the patrons or large corporations funding carbon compensations always operate via the NGOs, which are therefore unavoidable for access to PES on Madagascan soil. While these private players are subject to the mediation of the NGOs, they nevertheless have an impact (even indirect) on the type of instruments set in place. For instance, in the case of the biodiversity competitions set in place by the Durel NGO, the work by Ch. Bakhache showed how keen the NGO is to comply with certain criteria of major importance to patrons (Bakhache, 2011, *ibid*).

A redefinition and redistribution of roles between players can be seen, along with substitution effects. It is these substitutions that illustrate the hybridizations observed in the types of regulation.

Hybridization firstly involves the introduction of elements of negotiation in the regulatory set-ups. It occurs to different degrees in each of the systems observed. However, it is in the case of AEMs in France and Guadeloupe that it is the most obvious. In the French case, negotiation takes place at different levels: between the member States of the European Union, within the State, between the different administrations and between the State and the professional and union organizations, or even the environmental NGOs. It also occurs in different domains: political, technical and economic. There is also negotiation in Costa Rica, within Fonafifo between the representatives of the State and of farmers, but it is limited by the representation rules that only grant a minority role to the latter. It also takes place in Madagascar, between the NGOs and/or the multilateral or bilateral donors with the private sector on the one hand, and with State services on the other hand, but it is of limited scope due to the asymmetries in play.

Hybridization also involves the introduction of competition relationships. In Costa Rica, implementation of the PESP involves competition between foresters wishing to be incorporated into the PESP system, as demand for inclusion outstrips the limited funding available and the areas involved. Demand is currently regulated according to the date on which applications are received and on a fixed number of new hectares that can be contractualized for each of the modalities. This way of operating would seem to result in the most informed forest owners benefiting more from the system (Zbinden and Lee, 2005). Competition also exists in a totally different form in the case of TAEMs, but it does not involve farmers, but the organizations applying to become Agri-Environmental Operators, i.e. to assume the role of intermediation between farmers, service providers, and the State which is the beneficiary in the name of society.

The degree of hybridization is even greater in Madagascar. In addition to the previous regulatory modes, the involvement of local communities in PES management adds a new regulatory mode based on cooperation and reciprocity marked by the existence of specific rules in terms of obligations and sanctions, the most serious of which is exclusion from the group (albeit rarely seen). The inclusion of local communities in the PES management system also entails a hybridization of exchange methods, between trade-type exchanges - linked to the sale of environmental services – and non-trade-type exchanges – linked to how the participation of community members and the remuneration of services are managed, sometimes regulated by rules of reciprocity based on gift and counter-gift and on sanctions. In addition, the financial and political dependency of national NGOs

¹⁷ Of course, this is not always the case. In the field of private PES, the experience of Vittel in France, which contractualized farming methods with farmers located in a catchment area to ensure the quality of its water, is an emblematic case.

and public environmental institutions on outside operators (international institutions and NGOs) is not without inducing a certain dose of hierarchical regulation between national institutions in relation to international bodies.

Implementation of the instruments and their impacts

The question that needs to be examined in this final section is how the hybridization processes revealed in the previous section have encumbered, or not, the expected break away from the instruments previously used. Three aspects will be more particularly examined: How have PES altered the relations between stakeholders and incorporated ES producers into the decision-making processes regarding system management? How have PES brought about a change in stakeholders' perceptions of environmental challenges and more specifically of ES? Do the first impacts of the PES introduced on a territorial level meet with expectations? We shall examine these three points in succession.

Effects concerning interrelations between stakeholders and their participation in decision-making processes.

In France, it is generally seen that TAEMs have not led to any significant changes in terms of interrelations between players, because the TAEMs are a direct follow-on from the previous instruments focusing on the multifunctionality of farms. In the two regions studied, the succession of the systems did not prevent the relative continuity of the measures. The motivations for farmers to sign up to a contract with the State also remained quite similar: the search for higher income combined with a commitment to marginal change, or even maintenance of their technical practices. However, in the Auvergne region, the introduction of the Agri-Environmental Operator (AEO) had a beneficial effect as an intermediation structure. The introduction of this territorialized negotiation process has changed the nature of interrelations between players and widened the range of possible choices, which were previously limited to accepting, or not, the imposed specifications. From now on, farmers can make suggestions for drawing up measures specific to the zone they are involved in. On the other hand, in Guadeloupe, despite some major changes in principles and objectives from TECs to SACs then TAEMs, there has been great continuity in the measures and main beneficiaries. The measures evolve little¹⁸. The main beneficiaries in the programme remain banana growers who corner most of the available budget.

In Costa Rica, the PESP follows on from three instruments introduced in 1997, which preceded it: Reforestation-PES (*certificat abono forestal* - CAF and *certificado de abono forestal por adelantado* - CAFA), Management PES (*certificado de abono forestal para el manejo*) and Protection-PES (*certificado de protection de bosque*)¹⁹. It has to be said that the introduction of the PESP led to greater direct participation of private players in the programme's decision-making body, through their participation on the Fonafifo board of directors and the establishment of a consultative procedure with the professional organizations (NFO)²⁰. There would also seem to have been a change in profile of the beneficiaries, linked to Fonafifo's determination to improve the participation of smallholders and the Amerindian communities to the detriment of large-scale owners holding title deeds and social capital who were the target-category for the first PES (Miranda et al, 2003, Ortiz et

¹⁸ Apart from the replacement of AEMs in support of perennial high-altitude banana plantations by supporting fallow practices.

¹⁹ For a history of the different forestry laws and instruments (see Camacho et al., 2000; Segura et Moreno, 2002 ; Segura, 2003).

²⁰ The NFO was created by the same forestry law No. 7575 which laid the foundations of PESP governance, namely: recognition of the 4 ES produced by forests and forest plantations, designation of Fonafifo's role and of the funding mechanism via the fuel tax.

al, 2003 ; Zbinden and Lee, 2005). From then on, restrictions regarding the lack of land ownership were eased and a maximum area of 300 ha per dossier was decreed, measures which were completed by the introduction of a quota system to the benefit of smallholder forestry organizations.

In Madagascar, the situation is completely different as these are the first experiences of PES, which are rich in lessons. In order to understand these experiences, a distinction needs to be made between the national level where PES projects are decided and the local level where they are implemented. In the first case, the State, which is currently absent, is more of a follower due to the external nature of the ES/PES frames of reference in relation to the national area. However, within the State, several categories of players co-exist and a distinction needs to be made between the agencies (MNP, ONE) benefiting from foreign funding and which are consequently proactive, on the one hand, and the central administration on the other hand, which takes a dim view of funding from abroad passing directly to the local populations without its being involved. From an institutional viewpoint, PES development, and especially the Carbon PES via the REDD, therefore clearly reconfigures the alliances between national stakeholders. This is much less visible (for the moment) at local level, where complexity specific to the PES (measure, contractualization, monitoring, payment subject to conditions) is added to the complexity of Man - Nature relations in the rural environment arising from non-secured ownership rights, and to the vulnerability and dependence of the local populations on the ecosystems, etc. In this context, in order for PES to exist, they must be based on the previous initiatives (payments in kind, maintenance of local development logic, based on grassroots communities and on community management systems). The provision of aid subject to non-deforestation seems to be the only true innovation at local level. But this too is not without its problems, since the decentralized Water and Forests administration - the State guarantor of respect for the (hence of penalties linked to non-respect) does not take kindly to the conditions imposed by the NGOs for granting aid. The conflict of prerogatives already perceivable in the ICDPs is also likely to be very substantial with PES.

How stakeholder perceptions are influenced by PES

In Auvergne, the contractualization (or not) of farmers is linked to the technical implications of the TAEMs, and to the impact that their remuneration has on incomes. Quite often, the measures contractualized as a priority by farmers are those ensuring a good level of remuneration with the maintenance of existing practices. Contractualization therefore depends on the characteristics of the production system on the farm and its location in the area at stake. This finding by the bodies running the system therefore somewhat denotes a follow-on from the previous systems, but the introduction of TAEMs in the Natura 2000 priority conservation zones has changed farmers' perceptions regarding the role of their activities in environmental conservation, notably through their relations with players who have come more from the environment world and who ensure territorialized conception and management, site by site. **In Guadeloupe**, the situation is quite different. In the particular case of a supply chain (banana) weakened by the environmental crisis caused by an aggressive crop management system, we cannot see any massive adhesion to the changes in practices induced by the AEMs in the early days. When TECs arrived in Guadeloupe, at the beginning of 2000, the environment was not a priority concern of the banana supply chain. With the "chlordecone crisis"²¹ of the 2000s, agricultural stakeholders in Guadeloupe changed their views of the environment issue, having previously been somewhat unreceptive to it. Consequently, the banana supply chain in Guadeloupe has become truly converted to the environmental cause, seeking to restore the image of the sector and take part in defending its economic interests. "Sustainable banana" is used both to distinguish the products on the increasingly competitive European market and to continue benefiting from the public aid granted by the supply chain (Cathelin, 2010). In this

²¹ Linked to the discovery of water, soil and plant pollution by a very persistent molecule, applied up to 1993 to control the banana weevil.

context, AEMs appear to be the appropriate instrument for defending an agricultural production sector by increasing its green credentials.

The merits of economic greening seen in Guadeloupe exceed the production supply chain in **Costa Rica**, becoming a national strategy. Implementation of the PESP is accompanied by a wider orientation of the Costa Rican State towards a service economy (De Camino et al., 2000; Le Coq et al., 2010), reckoning on a well-trained population but also on a strong environmental image. As early as the 1970s, the State had developed a conservation policy by establishing numerous national parks (Steinberg, 2001). As of 1990, it signed up to the major international climate change and biodiversity agreements. Conceived in the wake of Rio-92, the emergence of PES in 1996 proved to be an adequate means of projecting the country's green image, justified by numerous scientific articles and by international donors (World Bank). Whilst the lack of additionality of the PESP has sometimes been highlighted (Wunder et al., 2008), local stakeholders point out that it has contributed to a change in how economic players see the forest and to environmental education, and it has helped to change the mentality of the population or even of certain forestry stakeholders, who now value the standing forest as an ecosystem and not just as a supplier of timber. The forest has gradually become part of the Costa Rican identity and its stake in the tourism field has been taken seriously by the successive governments since the programme was launched.

Recent work undertaken in **Madagascar** (as in France) clearly reflects an absence of knowledge about the ES concept and more generally about the idea that ecosystems provide services, and about the PES and REDD mechanisms. It is only gradually that representations have evolved. Apart, no doubt, from the water tower effect of forests in watersheds and the benefits derived from tourism in protected areas, few stakeholders had conceptualized this Ecosystem-Service for Mankind relation. Moreover, the idea that one can pay players in the name of those services was, up until recently, an innovation... but an innovation from abroad. In addition, unlike other environmental policy instruments, such as fiscality and community management, PES are based on respecting the terms of contracts. When they have an international dimension, foreign financiers seek all possible guarantees to ensure the additionality and effectiveness of the contract. Under these conditions, the NGOs initiating these PES have little inclination to leave it to others to fulfil that guarantee. Consequently, PES are, by principle, technical mechanisms that do not need a period of appropriation by a whole series of middlemen, but simply a period of contractualization. For the Madagascan players, PES remain systems outside their field of application. This said, once they are set in place, everyone sees the need for those player to adhere. As these PES are implemented in a hybrid manner, the involvement of the mayor, of the devolved water and forestry services, of traditional chiefs, of the grassroots community, etc. is compulsory. For example, our work shows that transaction costs (ex-ante evaluation) when PES are introduced are mostly devoted to communication. In terms of governance, this hybridization meets two requirements: the control of the system by the organization ensuring intermediation between the payers (beneficiaries of ES), and the payees (ES providers - usually the conservation NGO), control from which PES derive their credibility, hence their effectiveness, and concrete implementation of the system, which calls for the involvement of local players. It is this compromise between these two requirements that prefigures stakeholders' perceptions and the resulting types of regulation. In addition, the hybrid forms of PES currently being implemented in Madagascar suggest, for these local players, that this is purely and simply a new way of putting into effect the actions of these conservation NGOs or donors. Apart from the rhetoric of ES, which sometimes seems to be totally foreign to their way of thinking (the idea that one can pay to keep carbon in the ground, for example!), the populations involved consider PES as a new way of funding community management, as in the absence of any national legislative framework devoted to PES, such payments rely on the law of community management (GELOSE Law of 1996 and its 2001 forest decree).

Effect of spatial structuring between protected and non-protected zones

Depending on the sites and the nature of the instruments, the introduction of PES may or may not induce environmental discontinuity phenomena.

In **mainland France**, substantial segregation can be seen between protected areas and exploited areas. In the case of TAEMs, such segregation is down to two factors. The first is the distinction made between zones eligible for the TAEM system due to an environmental stake, and those that are not. The second factor comes from the distinction within eligible zones between those that are eligible for reasons of biodiversity stakes and those that are eligible for reasons of water stakes. At the present time there do not exist any systems combining biodiversity and water stakes at national level. However, at regional level, it is the Regional Agri-Environmental Commission (RAEC) that assumes that role. It is this body, which comprises representatives from the Ministry of Agriculture and the Environment, the Water Agency, representatives from the agricultural professions and environmental protection associations and agri-environmental operators that assumes the coordination and prioritization of measures. In areas not eligible for the TAEM system, it can be seen that intensive practices of natural resource use have been maintained or increased (soil and water), as is the Limagne cereal growing area, for example.

On farms, a lack of correspondence between the boundary of the agricultural production unit and the eligible areas may also induce segregation between protected plots and more intensively exploited plots. The emergence of opportunistic creep on the part of farmers, motivated by the search for higher incomes, consisting in increasing human pressure in farm plots not subject to regulation, in order to compensate for the application of conservative measures in the regulated plots, cannot be ruled out.

In addition, within the territory at stake, environmental segmentation is increased due to the voluntary nature of the commitments, which can lead to splinter development within the eligible areas depending on the degree of resource conservation. This just goes to show how important the work of the agri-environmental operators is, and notably their territorialized management of the measures in order to avoid such perverse effects.

In the case of **Guadeloupe**, the entire territory of the island is eligible and the system is managed by the agricultural administration as the overseas departments are not yet involved in implementing Natura 2000²² or in applying the WFD. Nevertheless, the introduction of these processes is likely to reduce AEM possibilities to certain territories. Despite the potential perverse phenomena induced by zoning, the case of Guadeloupe also shows (on the reverse side of the coin) that zoning makes it possible to find project initiators (outside the agricultural world) which had been lacking in the case of the island²³.

In **Costa Rica**, long-standing segregation exists between "protected" territories and productive areas since the introduction of protected areas in the 1970s (natural parks, biological reserves, wildlife refuges, etc). At the moment, approximately 25% of the national territory is subject to regulated use, marked by the banning of farming or mining activities. In most cases, these land areas have been acquired by the State, but the private enclaves, where agricultural use is authorized, are also integrated into the PES attribution priorities, and that has been the case since the system was introduced. Ecological corridors were created more recently in order to complete the conservation system and facilitate the connectivity between its different components. The declared objective of the operator of the system is to expand the environmental protection zones by seeking

²² The feasibility studies were launched in 2010.

²³ The territorial coordinators for the 2011 AEMs are all organizations with links to agriculture, with two notable exceptions: the *Parc National de Guadeloupe* and the *Communauté de Communes Nord Grande Terre*, but these two bodies only provide information and do not compile the dossiers.

to combine economic and social development with environmental protection. Consequently, PES generally play a role in strengthening the segregation of areas at national territory level.

In addition, the introduction in 2003 of a PES modality for planting trees in agroforestry systems was an attempt to break away from the traditional antagonism between conservation and production. However those dynamics have not been strengthened since, despite numerous initiatives in recent years on the part of the agricultural sector to benefit from the PESP²⁴.

The segregation between forest areas under PES-protection and little-regulated cultivated areas is also discernible on farms. For instance, it is not rare to find farms combining intensive pineapple or banana cultivation and a forest area benefiting from a conservation PES. The insertion of environmental conservation measures in cultivated areas mainly arises from green certification (Rain Forest Alliance, organic agriculture) or social certification (Fair Trade).

In **Madagascar**, the emergence and development of PES is greatly linked to a political will to step up the protected areas. It is a matter of either funding existing areas²⁵ or creating new protected areas and thereby achieve the norm of 10% of protected territory proposed by the IUCN and accepted by former President Ravalomanana, at the Vth World Parks Congress held in Durban in 2003. Consequently, PES help to maintain a form of segregation between protected and non-protected territories, a policy that had been abandoned in the 1990s to the benefit of more integrated approaches (community management, sustainable management of resources by local populations, etc.).

However, in practice at local level, the ability to maintain this separation between protected areas and non-protected areas induced by PES is greatly restricted by two elements. Firstly, it involves limiting forest conversion to agricultural areas made temporarily more fertile by slash and burn practices. Failing organic applications (fertilizers), the lands on which the local population is invited to maintain these activities (under the PES) cannot provide the same income as in deforested areas. It therefore appears essential for PES to cover opportunity costs, foregone earnings. Secondly, but following on from the previous point, the degree to which the devolved State services ensure that rules are respected is essential (hence the importance of self control in community management, or the patrols mentioned by Durel and CI in their conservation contracts). These two criteria mean that, in many cases, segregation is not as real as one might like it to be at local level. Only highly supervised, local and long-term PES can really help to turn the claims made at local level into reality in the field. Lastly, it should be noted that the spatial distribution of protected areas and exploited areas is generally determined by conservation biologists, through their familiarity with ecological inventories and now long-standing knowledge of the habitats of certain endemic species. It is thus that some NGOs, like Durel, have set in place conservation contracts in the habitat zones of the NGO's target species. Although a type of segregation is found, namely areas at stake depending on the habitats of species to be protected (e.g. Auvergne), those zones are usually defined by the NGO according to its own target species. Apart from these very local biodiversity PES, the conservation stakes are also linked to all the forests in the East, which form a very long corridor from North to South. When faced with such areas, given the associated international stakes, Carbon PES offer adequate cover.

²⁴ Thought is currently being given to defining some new modalities within the PESP concerning existing or innovative agroforestry and agro-sylvo-pastoral systems, along with organic agriculture, or even farm management methods.

²⁵ Today, the Hydro-Biodiversity PES are run by the national protected areas manager – *Madagascar National Parks*.

4. Conclusion

After placing these French, Costa Rican and Madagascan cases of PES/AEM in their comparative contexts, we now need to return to two essential points. These are the regulatory modes and their hybridization on the one hand, and governance of the systems on the other hand.

On the first point, it should be noted first of all that in none of the cases studied were the PES limited to a specific and unique regulatory mode, of a market type, which would bring face to face two groups of players whose interests in relation to environmental services would appear to be both complementary and convergent, according to ES producer – beneficiary logic. On the contrary, the systems observed all arise from a complex process whereby the intervention instruments (PES) are contextualized, bringing into play a set of stakeholders, themselves located on different scales of governance and operating the different types of regulations mentioned earlier (negotiation, constraint, competition, hierarchy, solidarity). This process of adaptation is linked to the more or less long history of PES/AEM establishment and notably the different phases of adaptation in relation to the specific political/institutional contexts of the country in which each system is implemented. For example, there can be no doubt that farmer corporatism in France was consulted when the practical modalities for implementing AEMs were defined. Likewise, in Madagascar, the weakening of the State following the political crisis is not alien to the hegemony of the conservation NGOs and the multiplication of types of PES and specifications.

But, over and above the particularities of national contexts, the diversity of instruments, territories and audiences involved also seems to be partly explained by discriminatory factors of a general scope.

This is primarily the case for the nature of ES which ultimately determines the population that will be involved, either in producing those ES or in benefiting from them. In France, agri-environmental measures only have a sense in relation to territories with particular environmental stakes concerning specific plant or animal species. In Costa Rica, priority has been given to forests with particular biodiversity stakes, associated with socio-economic considerations. In Madagascar, it is actually the nature of ES (biodiversity, carbon, water), well ahead of socio-economic aspects, that determines population access to PES. This does not mean that the nature of PES is unchangeable, as can be seen, for example, in Costa Rica where major efforts have been made to overcome the exclusive reference to forests and to incorporate agroforestry and agro-sylvo-pastoral systems in the PESP.

This is also the case with the origin of the system and its external or internal nature in relation to the national territory, which notably influences the link between preservation, production on globalized markets (carbon), and the economic and social development of ES producers and the areas involved. In Madagascar, where the incentives come from outside the national territory, and are only slightly weighted by the State and local stakeholders, this link seems slack, or even nonexistent. Carbon or Biodiversity PES largely have single objectives. In Costa Rica, where the origin is internal, this link is more important, great emphasis is placed on the impact of PES for the well-being of the populations on the one hand and for the regional economy, or even national economy (tourism) on the other. Mainland France comes somewhere in between, since the public authorities are greatly involved in the AEMs arising from the European supranational zone at national and regional level, as they afford great importance to defending the income of the farmers involved in this system.

Lastly, this is the case of practices whereby the audiences involved are chosen by normative provisions. It is mostly in Costa Rica that the practice of targeting audiences to be included in the system is clearest. However, it also evolves, as shown by the recent intention to open up the system more to smallholders and to the Amerindian communities. In mainland France, this State "targeting" practice is barely seen given that the TAEMs are open to any farmer whose plots are located in the

territory at stake. However, it is obvious in Guadeloupe, where AEM negotiations are quite largely governed by players organized in production supply chains (banana, sugarcane, etc.) In Madagascar, this practice does not exist due to the weakness of the State.

Generally speaking, PES are introduced by way of pre-existing relations, be it between agricultural organizations and the State (France, Costa Rica) or relations between the State and the NGOs (Madagascar), which have largely contributed to formatting the national or even territorial specificities of the systems. It would seem that some of the adaptation processes highlighted earlier operate within the room for manoeuvre available within these stable relations. It is in this light that should be seen the use of local communities in Madagascar to exert control over producers as a substitute for State services, but also the gradual opening up of the PESP in Costa Rica to smallholders and to the Amerindian communities, or even the inclusion in AEMs of farming systems (creole gardens) not included in the production supply chains of Guadeloupe, or lastly, the possibility offered in Auvergne to identify measures on a territorial level that are adapted to the environmental challenges, but also to farmers' interests. And it is primarily the intermediate institutions that make use of this room for manoeuvre and make adaptations to the systems. Be it the RAEC, in France, Fonafifo in Costa Rica, or the territorial NGOs, the intermediate players implement PES models imagined by the other stakeholders, sometimes located on other scales, by seeking solutions to practical, but also strategic problems, and by taking into account changes in how stakeholders perceive and represent environmental services.

As regards the second point, i.e. system governance, let us first of all emphasize how important the negotiation and control of the process is when drawing up PES/AEMs in the different national contexts. In this perspective, the analysis of State/NGO²⁶ interfaces is particularly interesting for deciphering these systems.

In the case of Costa Rica and France, negotiation is closely supervised by the State, on several levels. For France, it is control via the regulatory and legislative pathway (at European and national level) ensuring the production of standards and the institutionalization of instruments, but also organization of the interface with socio-professional players and the NGOs around the PES/AEMs (negotiation, consultation around the CAP, association in the work connected with the *Grenelle de l'Environnement*²⁷, for example). In Costa Rica, it is by creating a structure dedicated to the PESP (Fonafifo) that the State ensures how the system is controlled, how its operation is organized and how the stakeholders - such as NGOs and socio-professional stakeholders - are associated in the governance of the system. In these two national contexts, the autonomy of the NGOs has thus been limited by the role assumed by the State player, right from the outset of the systems. Their involvement in the systems has been conditioned by their ability to penetrate them. For the French case, the NGOs have thus multiplied their actions while adapting them to the levels of intervention. At European level, most of them have developed lobbying activities, while at national level, many of them managed to become involved in consultation initiatives, notably the *Grenelle de l'Environnement*, from which certain resolutions have led to regulatory measures. At territorial level, some NGOs applied to become the agri-environmental operator under regional agri-environmental committees (RAECs) for TAEM²⁸ implementation. Thus, it is by being indirectly involved in attempting to take part in shaping the framework of the AEM system (at European and national level), but also in a territorialized manner in the implementation of the system, that the NGOs participate in that

²⁶ Which we have shown throughout the text to be two decisive stakeholders in the systems.

²⁷ The *Grenelle de l'environnement* is the process launched by the French State in 2007 whereby civil society is consulted on ecology and on sustainable development and land management matters.

²⁸ Some NGOs are found at all the levels mentioned. Such is the case for the LPO (Bird Protection League).

system. In Costa Rica, the presence of international NGOs remains very limited²⁹ in the system, whilst the national NGOs are increasingly involved, as are the forestry cooperatives. By being present within the NFO, these national and/or local organizations are associated in the strategic choices and governance of the PESP. In addition, as in the French case, they play an important role at territorial level as middlemen for programme implementation (information, compilation of dossiers, facilitation, etc.). However, over and above these installation strategies on the part of the NGOs, case studies tend to show that PES/AEMs remain largely controlled by the State in France and in Costa Rica.

The Madagascan case exhibits a completely different State/NGO interface. The negotiation and definition of standards and instruments are thus mainly undertaken by the international NGOs present on Madagascan territory and the State has to "fight" to remain in the game and take part in defining a system which partly escapes its hold. The political crisis in which the Madagascan State finds itself further strengthens the position of the NGOs and certain Madagascan agencies thus manage to benefit from foreign funding directly without passing through the State. This therefore means that the State has to make a considerable effort to continue to exist (notably through its devolved bodies) between outside financiers (relayed via the NGOs) and the population. In Madagascar, the State is therefore present in a PES system that it does not run.

We feel that the comparative approach proposed here helps to provide a clearer understanding of the processes associated with PES/AEMs. Even though the empirical elements clearly illustrate the existence of irreducible specificities specific to the national political and institutional contexts, the comparison of the processes whereby instruments are elaborated, and their effects on the territorialized governance of agri-environmental policies, provides a wealth of lessons.

The first lesson, in all cases - never mind whether the PES are of internal or external origin - is that there exists a process of system adaptation, "translation" that is greatly determined by interactions and interdependencies that pre-existed the elaboration of the instrument.

Nevertheless - and this is further food for thought - the introduction of PES affects the environmental and territorial governance stakes, which it tends to transform. Among those transformations, the comparative work we have undertaken reveals changes in stakeholder perceptions and the appearance of middlemen who "create a link" between players with sometimes diverging interests, but also segregation effects induced by PES. Indeed, the nature of ecosystem services or agri-environmental measures, bearing in mind the territorial characteristics on which they are to be applied and the architecture of the systems set in place, lead to the inclusion/exclusion of territories and players. In terms of governance, these significant incidences are all challenges that the stakeholders involved will have to know how to negotiate and manage.

5. Bibliography

Andriamahefazafy, F. (2011). Expériences des projets-pilotes WWF en paiement pour services environnementaux hydrologiques à Madagascar. Programme Serena, Document de travail n°2011-05.

Andriamahefazafy, F. and P. Méral (2004). "La mise en oeuvre des plans nationaux d'action environnementale : un renouveau des pratiques des bailleurs de fonds ?" Mondes en Développement **32**(127): 27-42.

²⁹ cf. the text by Marie Hrabanski in connection with this conference.

Andriamahefazafy, F., Bidaud, C., Cahen-Fourot, L., Méral, P., Serpantié, G. et A. Toillier. (2011). Analyse historique des PSE à Madagascar : entre continuité et rupture. Programme Serena, Document de travail n°2011-04 24 p.

Bagnasco, A. and C. Trigilia (1993). La construction sociale du marché. Paris, ENS Cachan.

Bakhache, C. (2011). *La mise en concours de suivis écologiques participatifs : gouvernance et conservation par la production de savoirs*. Paris, Université Pierre et Marie Curie - Sciences Po. **Master Sciences et Politiques de l'Environnement: 35.**

Bidaud, C., P. Méral, et al. (2011). Scientific knowledge mobilization in carbon and water PSE projects in Madagascar. . XIII Annual Bioecon Conference. Geneva.

Boussaguet L. et Jacquot S. (2009) « Les nouveaux modes de gouvernance » in Dehousse R. (dir), *Politiques européennes*, Paris, Presses de Science Po, p. 409-428.

Cahen-Fourot L. and P. Méral. (2011). Gouvernance des Paiements pour Services Environnementaux (PSE) à Madagascar : l'apport de l'analyse institutionnaliste. Projet ANR Serena : document de travail, n°2011-01.38p.

Callon M., (1984), « Eléments pour une sociologie de la traduction », *L'Année sociologique*, 11, 1984, p.183-184

Camacho M.A, O. Segura, V. Reyes, A. Aguilar. (2000). *Pago por Servicio Ambientales en Costa Rica*. preparatory report of the Prisma-Ford Fundation proyect "pago por Servicios ambientales en Latin America", San Jose, 65 p.

Campbell, J., R. Hollingsworth, et al., Eds. (1991). Governance of the american economy. Cambridge, Cambridge University Press.

Corson, C. (2008). Mapping the development machine: the U.S. Agency for International Development's biodiversity conservation agenda in Madagascar. Environmental Science, Policy and Management. Berkeley, University of California.

De Camino R., O. Segura O, L.G. Arias, I. Perez. (2000). *Costa Rica: Forest Strategy and the Evolution of Land Use*, Washington, The World Bank, 151 p.

Engel, S., S. Pagiola, et al. (2008). "Designing payments for environmental services in theory and practice: An overview of the issues." Ecological Economics 65(4): 663-674.

Ferraro, P. J. and A. Kiss (2002). "ECOLOGY: Direct Payments to Conserve Biodiversity." Science 298(5599): 1718-1719.

Ferraro, P. J. and R. D. Simpson (2002). "The Cost-Effectiveness of Conservation Payments." Land Economics 78(3): 339-353.

Heal, G. (2000). "Valuing ecosystem services." Ecosystems 3(1): 24-30

Karsenty, A. and e. al. (2010). "Paiements pour services environnementaux et biodiversité dans les pays du sud " Revue Tiers Monde 2(202): 57-74.

Katoomba, G., T. Forest, et al. (2008). "Payments for ecosystem services getting started: a primer."

Kosoy, N. and E. Corbera (2010). "Payments for ecosystem services as commodity fetishism." Ecological Economics 69(6): 1228-1236.

Kull, C. A. (1996). "The Evolution of Conservation Efforts in Madagascar." International Environmental Affairs, 8(1): 50-86.

Landell-Mills, N., I. T. Porras, et al. (2002). Silver bullet or fools' gold: developing markets for forest environmental services and the poor. Stevenage, Hertfordshire, International Institute for Environment and Development.

Lange, E. and M. Regini, Eds. (1989). *State, market and social regulation*. Cambridge, Cambridge University Press.

Lascoumes P. (1993), *L'Eco-pouvoir. Environnement et politiques*, Paris, La Découverte

Lascoumes P. Simard L. (2011), « L'action publique au prisme de ses instruments », *Revue Française de Science Politique*, Vol 61, N°1, p.5-22

Lascoumes P., et P. Le Galès (2004), « L'action publique saisie par ses instruments » in P. Lascoumes et P. LE Galès (dir), *Gouverner par les instruments*, Paris, Presses de Sciences Po, p.11-44

Lascoumes P., J.P. Le Bourhis. (1997), *L'environnement ou l'administration des possibles. La création des DIREN*, Paris, L'Harmattan.

Lascoumes P., L. Simard (2011), « L'action publique au prisme de ses instruments, introduction », *Revue Française de Science Politique*, vol 61, N°1, p.5-22

Le Coq J.F., G. Froger, T. Legrand, D. Pesche, F. Saenz (2010). Payment for environmental services program in Costa Rica: a policy process analysis perspective. Paper presented at the 19th Annual Meeting of the Southwestern Social Science Association, Houston, 31 March-3 April, 33 p.

Le Coq J.F., PSEche D., Legrand T. Saenz F. (2010) Changement climatique et innovation dans les instruments de politiques publiques : le cas du programme de paiement pour services environnementaux au Costa Rica. Paper presented at the ISDA conference from 28 to 30 June 2010, Montpellier.

Le Galès, P. (1998). Régulation, Gouvernance et Territoire. *Les métamorphoses de la régulation politique*. J. Commaille and B. Jobert. Paris, LGDJ: pp. 203-240.

Le Galès, P. (2010). Gouvernance. Dictionnaire des politiques publiques. L. Boussaguet, S. Jacquot and P. Ravinet. Paris, Les Presses de Sciences Po: pp. 299-307.

Lipper, L., T. L. Raney, et al. (2007). The state of food and agriculture, 2007: paying farmers for environmental services. Rome, Food & Agricultural Org.

Méral, P., G. Froger, et al. (2011). Financing protected areas in Madagascar: new methods. Protected areas, sustainable land ? C. Aubertin and E. Rodary. Farnham, Ashgate;IRD: 87-101.

Miranda M, Porras I, Moreno L. (2003). The social impacts of payments for environmental services in Costa Rica: a quantitative field survey and analysis of the Virilla watershed. *Markets for Environmental Services Paper No.1*. IIED, London.

Muradian, R., E. Corbera, et al. (2010). "Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services." Ecological Economics **69**(6): 1202-1208.

Norgaard, R. B. (2010). "Ecosystem services: From eye-opening metaphor to complexity blinder." Ecological Economics **69**(6): 1219-1227.

Noulin, A. (2010), *Le dispositif des mesures agro-environnementales territorialisées en Auvergne*, rapport de stage sous la direction d'Armelle Caron et de Philippe Jeanneaux, programme Serena.

Ortiz E, Borge C, Sage L. 2003. Impacto del programa de pago de servicios ambientales en Costa Rica como medio de reducción de la pobreza en medios rurales. San José, CR, Unidad Regional de Asistencia Técnica (RUTA). 62 p. (Serie de Publicaciones RUTA. Documento de Trabajo, no. 8).

Pagiola, S. and G. Platais (2002). "Payments for Environmental Services." Environment Strategy Notes World Bank(3): 1-4.

Perrot-Maître, D. (2006). The Vittel payments for ecosystem services: a "perfect" PSE case? International Institute for Environment and Development, London, UK.

Randrianarison, M. (2010). Les paiements pour services environnementaux pour la protection de la biodiversité. Agroparistech et Université d'Antananarivo: 468.

Segura O, M.L. Moreno. (2002). Innovación económica y política forestal en Costa Rica. Segura O., Moreno M. L. (eds), *Políticas Económicas para el comercio y el ambiente*. San Jose, Centro Internacional de Política Económica para el Desarrollo Sostenible (CINPE). Universidad Nacional, pp. 189-218.

Segura O. (2003). Competitiveness, systems of innovation and the learning economy: the forest sector in Costa Rica, *Forest Policy and Economics*, 5, pp. 373-384.

Sommerville, M. M., E. J. Milner-Gulland, et al. (in press) "The challenge of monitoring biodiversity in payment for environmental service interventions." Biological Conservation(0).

Sommerville, M., J. P. G. Jones, et al. (2010). "The role of fairness and benefit distribution in community-based Payment for Environmental Services interventions: A case study from Menabe, Madagascar." Ecological Economics 69(6): 1262-1271.

Steinberg P.F. (2001). Environmental Leadership in Developing Countries. Transnational Relations and Biodiversity Policy in Costa Rica and Bolivia, Londres, Massachusetts Institute of Technology, 208 p.

Streck, W. and P. Schmitter, Eds. (1985). Private interests government. Beverly Hills, SAGE.

Swallow, B. M., M. F. Kallesoe, U. A. Iftikhar, M. van Noordwijk, C. Bracer, S. J. Scherr, K. V. Raju, S. V. Poats, A. Kumar Duraiappah, B. O. Ochieng, H. Mallee, and R. Rumley (2009). Compensation and rewards for environmental services in the developing world: framing pan-tropical analysis and comparison. Ecology and Society 14(2): 26.

Toillier, A. (2011). Quel schéma de gouvernance pour un mécanisme de Paiement pour services hydrologiques ? Le cas de la microcentrale de Tolongoina, Madagascar. Programme Serena, Document de travail n°2011-02: 20 p.

Van Hecken, G. and J. Bastiaensen (2010). "Payments for ecosystem services: justified or not? A political view." Environmental Science & Policy 13(8): 785-792.

Vatn, A. (2010). "An institutional analysis of payments for environmental services." Ecological Economics 69(6): 1245-1252.

Wunder, S. (2005). Payments for environmental services: some nuts and bolts / Sven Wunder. Bogor, Indonesia: CIFOR.

Wunder, S., Engel, S., Pagiola, S. (2008). Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries. *Ecological Economics* 65, 834-852.

Zbinden S, D.R. Lee (2005). Paying for Environmental Services: An Analysis of Participation in Costa Rica's PSA Program. *World Development*, 33, pp. 255-272